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The next meeting of the American Institute of Mining Engineers, which is to be held in Baltimore early in February, promises to be as successful as the memorable meeting at Glen Summit, Penn., last October. The subject of phosphates and their commercial preparation and utilization will undoubtedly lead to a very interesting and valuable discussion.

"The Silver Question" is the title of an able and valuable paper read before a club in Colorado by Mr. Louis R. Ehrich, of Colorado Springs, Coló. Every one at all interested in the subject, and particularly every

one who wishes to promote the interests of the silver mining districts should read this paper, which has been published in a small pamphlet and no doubt can be procured on application to Mr. Ehrich.

The stocks of copper on hand at the close of the year were reported by us at 76,000,000 pounds, or 33,929 gross tons. Several of the producers have doubted the accuracy of these figures, believing they overstated the stock. We have, however, reason to believe that they are somewhat under the true figure, and moreover that they are as low as it is safe they should ever be, or as they probably ever will be in future.

It should be considered that about a two months' output is necessarily on hand "in transit" as it were, and after deducting this and a few important stocks the balance is very small indeed when divided among some 50 producers.

Two slight compositors' errors were made in our tables which call for correction. The Buffalo mine in Arizona is credited with the output of the United Verde mines in 1887, 1888 and 1889—the figures having been placed on the wrong line. The Cliff mine, Lake Superior, is similarly credited with the output of the Wolverine in 1891. These errors do not affect the totals, but are noted as important to the mines themselves.

THE OSAGE MINE DISASTER.

On the 8th inst. an explosion occurred in shaft No. 11 of the Osage Coal Mining Company near McAllister, Indian Territory, wrecking the mine, killing fifty-eight miners and injuring fifty-four, seventeen of whom the physicians say will not recover. There were between 400 and 500 men in the mine at the time, nearly half of whom escaped by climbing the air shaft. The report says: "The force of the explosion was terrific. It closed up the galleries, tore down the barricades, which kept the air from circulating freely through the unused portion of the mine, thus cutting off all air from the galleries in use. T. Fleming, a mining expert, and for eight years superintendent of the mine, was interviewed in regard to the explosion. He said that the whole blame should be placed upon the shot firers, who fired the blast too soon. A window shot caused the catastrophe. The blast was overcharged. It should have been fired at 5:30 o'clock, after the miners had left the mine, in which case the explosion would have occurred, but only five or six men would have been killed. As it was, the shot was fired at 5:07 o'clock, before the men had ascended."

The information thus far received does not indicate clearly the cause or responsibility for this accident, but it is very evident that defective ventilation in this as in most other cases is responsible for the serious character of the explosion.

While science has not yet provided a means of rendering explosions in mines producing large quantities of firedamp absolutely impossible, yet the vast improvements in ventilating machinery and in the working of mines have made it possible to restrict the areal and intensity of explosions so that it may almost invariably be said that a serious explosion is a proof of bad management. At least two shafts, large and well made air ways and abundant ventilating power in fans or other approved mechanical appliances are the first conditions of safety, while the adoption and strict enforcement of good rules for the government of the workmen are elements of safety scarcely secondary to these.

PROFESSIONAL ETHICS AND THE ACCEPTANCE OF COMMISSIONS.

The standard of ethics in the engineering profession is far above what it was some years ago, thanks largely to the influence of the engineering societies and engineering periodicals, and many things which were formerly tolerated would now be ruled out as unprofessional or even dishonest. There still remain, however, some old abuses which are somewhat largely practiced, though rigidly discouraged by the better members of the profession.

The most widely extended abuse to-day is unquestionably the practice of mining engineers, superintendents, purchasing agents and other employes accepting commissions on goods purchased or on work done for their employers. So general is this custom that manufacturers called upon to bid on machinery or supplies, and sometimes contractors who are tendering on work to be done, include in their estimates a certain commission they expect to pay to some one through whom the order comes, or by whom it is controlled, and if they are unwilling to pay this commission they probably will not get the order or the work.

No one questions the right of an engineer to act openly as the agent for a manufacturer and to receive his remuneration in a commission on the goods sold, but this is a very different case from that of the employe of a company accepting a commission. Every salaried employe, whatever his position, whether president, engineer, superintendent, purchasing agent or any other position in which he has undertaken to give his services, owes to the employer his very best service, and if in making purchases he can secure a reduction in cost, that is a part of the service for which he is paid. If then he accepts a commission and applies it to his own use, i. e., does not turn it over, he is defrauding his employes

just as much as if he gave to another a portion of the time for which he is paid, or as if he took so much of his employer's money out of the till and appropriated it to his own use.

There can be no doubt but that the acceptance of such a bribe or commission by an employé from any one is a breach of trust and a fraud upon his employer.

We are quite aware of the argument that the manufacturer would not allow the purchaser (employer) this commission direct, and that consequently the accepting of it by the employé works no injury to the employer, but this is mere sophistry, for if an employé can obtain it he owes it to his employer whether the latter could get it himself or not.

The fact that the acceptance of a commission by an employé is always a secret transaction carefully concealed, shows that its recipient and its giver are both well aware that it is a dishonorable transaction and one that they would not willingly have made public. If there be any ground on which it can be defended openly we shall be pleased to hear of it and make it public, but in our opinion it is one of the most demoralizing practices in business, for between defrauding an employer of the services for which he has paid and stealing his money there is but a very short step—morally they are the same crime.

In engineering work in this country, and it is even worse in Europe, and in the management of mines all over the world, this practice of taking commissions is very general. Yet if our engineering societies and honorable men everywhere would denounce it and use their best efforts to put a stop to it, we would not long have the humiliation of admitting its prevalence. Engineers are certainly among the most honorable of men, and with them this appeal should find a prompt and willing response.

Stamp out this degrading, dishonest practice, and let all the societies place upon record their emphatic disapproval of it.

THE SALT LAKE "TRIBUNE" AND THE FREE COINAGE QUESTION.

Our usually courteous contemporary, the Salt Lake *Tribune*, appears to forget itself somewhat in referring to our comments on President Harrison's views of free coinage, and charges "dishonesty" to the ENGINEERING AND MINING JOURNAL for saying, "There are, no doubt, many sincere and honest advocates of free coinage of silver, and, strange to say, many of these are to be found in the class of wage earners which free coinage would certainly greatly injure. The men who have skillfully disseminated and encouraged the free coinage craze are, however, the producers of silver and the employers of labor, who can purchase silver at its market value in gold and pay it out to their wage earners at \$1.29 per ounce, making a profit of 30 per cent. or more on the transaction. It is always, as President Harrison says, the laborer who cannot protect himself; the capitalist, the employer or money lender can do so, but the wage earner must accept his earnings in depreciated coin, if that can be forced on him by making it legal tender. It is a marvel that wage earners everywhere do not recognize this patent fact, and at once stamp out this free coinage scheme so skillfully devised for paying 74 cents' worth of silver for their \$1 worth of labor." The *Tribune* replies as follows:

"It is safe to say that not one man in a thousand of those who have encouraged the free coinage of silver is a producer of silver, and when this journal says that any one, whether he be a producer or not, can purchase silver at its market value in gold, and pay it out to his wage-earners at \$1.29 per ounce, making a profit of 30% or more on the transaction, it publishes a direct, palpable and transparent falsehood—a falsehood which there is no excuse for, but which is so manifest that it is evident the editor of the paper intended it only to work upon the prejudices of the ignorant people who do not know the real truth. Will he explain by what means any one can buy silver at the market price, that is as a commodity, and pay any kind of debts with it at the coin rate? He knows it is impossible. Further, he is aware that if silver were to be remonetized, following a natural law it would be worth the same as gold the next day. He knows, too, that as the purchasing value of silver does not change, the prices of commodities would be advanced in the same ratio that silver is advanced—that is, inflation would be taken from gold and business would come back to its natural level."

The question is extremely simple. Free coinage does not advance the market price of silver for every one knows that India, the largest consumer of silver, Mexico, a large producer, and many other countries now possess free coinage and the price is declining. The adoption of free coinage here, stopping, as it would, the heavy purchases of silver by our Government, could have no other result than to depreciate the market price of the metal. When one can no longer get a dollar in gold for, say, an ounce of silver, the price of the white metal will decline, and under free coinage the only large purchaser who pays gold or its equivalent will have stopped buying.

What we have said and the Salt Lake *Tribune* criticises is absolutely true. Those who have been most active in skillfully disseminating the free coinage craze are certain producers of silver or their agents, and it is, we believe, also true that if we had free coinage here our employers of labor would do exactly as the employers of labor do in free coinage India for example; that is, pay for labor in legal tender silver which they can buy in the markets of the world at the current price of bullion.

Why has the market price of silver not risen to the coinage rate in Mexico or India, and why are wages there lower, and not higher, than in our gold basis country? The rate of wages depends on the supply of and demand for labor, and our silver producers will not advance wages

one cent because they can make 30 or 35 per cent. by getting the seignorage on silver.

Will the *Tribune* explain why silver should go to \$1.29 an ounce under free coinage here, while it is worth say 94 cents an ounce under free coinage in Mexico and India?

Do the employers of labor in Utah advance wages in proportion to the profits they are making or only when the supply of labor is so short that they cannot secure men at the old rate?

Why should the prices of commodities (imported commodities, let us say) advance in this country if the market value of silver actually advanced to \$1.29 an ounce under free coinage? Our critic in assuming that commodities and wages will advance simply admits that silver will not come to a parity with gold at the present coming ratio.

So far as we can see there is no reason to suppose that silver would advance, but on the contrary it would depreciate under free coinage, and the cost of commodities produced by labor paid in silver would not greatly increase in value as measured by silver and would in many cases be lessened in gold value, which in fact has long been the complaint our silver men have made against Indian wheat sold cheap in London at its gold value, the wages of labor producing it having been paid in legal-tender depreciated silver.

The Latin Union gave up free coinage because the quantity of silver coinage as compared with gold had reached the limit where it could be exchanged for gold; had it increased much more it would not have remained at par. When we had but few greenbacks they could be exchanged at their face value for gold, but as we increased the volume of paper currency it depreciated in value until it took 2½ dollars to command a dollar in gold. Had the printing of greenbacks gone on indefinitely they might ultimately have reached their intrinsic value as paper "stock," and have been sold by the pound.

Without international agreement on a value ratio between gold and silver, at which the chief commercial nations will accept either metal as offered, it will be impossible to bring the price of silver up permanently to our coining ratio, and should any international ratio be agreed upon it will probably be nearer the present production ratio of, say, 25 to 1 than to our coining ratio of 16 to 1.

As the wage earners are most interested in maintaining the value of the coin in which they are paid, they above all others should oppose a project that must inevitably lessen the intrinsic value (as measured by gold which alone is current all the world over) of that coin. The capitalist, and the employer in most cases, can take care of themselves; they will then be able to buy silver at its bullion value, and, having it coined free, pay it out to the wage earners at 30 or 35 per cent. above what it cost them. Let wage earners everywhere consider this, and weigh and measure the question and there will be no free coinage advocates among them.

We would commend to our esteemed cotemporary the careful perusal of Andrew Carnegie's admirable article "The A. B. C. of Money" published in the ENGINEERING AND MINING JOURNAL July 11, 1891.

NEW PUBLICATIONS.

SYSTEMATIC MINERALOGY, BASED ON A NATURAL CLASSIFICATION, with a General Introduction. By THOMAS STERRY HUNT, M. A., LL. D., Author of "Chemical and Geological Essays," "Mineral Physiology and Physiography," "A New Basis for Chemistry," etc. New York: THE SCIENTIFIC PUBLISHING COMPANY, 27 Park Place, New York, 1891. Octavo, 391 pp., with general index, and index of mineral names.

Nearly half a century ago the author of this book began that career of scientific investigation which has won for him in so many departments of chemistry, geology and metallurgy a fame well-earned by his contributions to the progress of each of those sciences, both in theory and in application. The roll of illustrious Americans contains few names comparable with that of Sterry Hunt for breadth, versatility and thoroughness of learning, combined with industry and skill as an original investigator, insight and logic as a reasoner, fecundity and lucidity as an author. Certainly I can recall no man who has written so voluminously, and is at the same time so familiar with the works of others; who has spent so much of his life in the laboratory, and is, nevertheless, equally at home in the library. In the art of exposition, whether by tongue or pen, he stands easily first among our original scientific thinkers, and is not surpassed by any, even of those whose profession it is simply to teach and explain without originating anything. The sincerity and the truthfulness of this recognition of his eminence involve no necessity of agreeing with all his views, even in those branches which he has made peculiarly his own. Much of his work (though not, in my judgment, his best work) has been controversial; and it has happened more than once to me, as to others who admired him, that we could not adopt the contention for which he argued. Nevertheless, I think the experience of all of us will confirm the statement that it is not safe for the student of any subject upon which Sterry Hunt has expressed a deliberate judgment, to omit the careful consideration of that judgment.

Although his scientific activity began long ago, he was then so young that he might still now look forward to many fruitful years of labor. But the bodily weakness of the last few years (keeping him for long periods a helpless patient, and, at the best, confining him to his chamber) has probably ended the prospect of new and arduous investigations; and Dr. Hunt has wisely devoted his impaired strength to the work of gathering together in connected form and framing in comprehensive treatises the scattered utterances which embody the results of his great experience

and study. The perseverance, fortitude and mental vigor with which this task has been executed partake of the marvelous and heroic. Remembering the disabilities under which the distinguished author has labored in the preparation of this, his latest volume, one would scarcely wish to criticise it at all. But the book itself bears no evidence of infirmity and makes no claim for lenient judgment. It is as clear, vigorous and masterly as anything that Sterry Hunt has written. Higher praise could scarcely be accorded to it.

Moreover, it must be confessed, nothing could contribute more effectively to the permanent fame of the author than the series of volumes, of which this is one, in which his views are consolidated in systematic form. It is builders of systems who survive philosophic and scientific literature. Mere suggestions of new truth, however brilliant and useful, are but contributions of material out of which systems may be constructed; and the name placed upon the completed edifice is that of the architect, not that of him who furnished this or that part of the material.

This "Systematic Mineralogy" is on the whole, the crowning work of the series, and of the career of the author; for it brings to a focus all his knowledge for the illumination of a great theme. It is true that an additional volume is promised—a descriptive mineralogy—which the students of this will earnestly hope the author may be able to complete. No doubt it will greatly enhance the usefulness and the influence of the generalization here presented. A descriptive mineralogy is constantly consulted; and the one which will inevitably be most widely used is the one which proves in practice to give the largest and most trustworthy information, most clearly stated and most conveniently arranged. But once preferred on these grounds, it will incidentally perpetuate the reign of the classification upon which it happens to be based—just as a good dictionary, universally consulted, enforces its own rules of orthography. It may be important, therefore, as an aid to the general acceptance of Dr. Hunt's systematic mineralogy that it should be embodied in a first-rate book of reference. Nevertheless, the higher work of creating the system itself has been done in this treatise. The other may be required as *finis*; but it is of this that we must say *coronat opus*.

It would be impossible to discuss, in this general notice, the merits of Dr. Hunt's new system. I shall be satisfied (and not a little surprised) if I succeed in conveying, by a brief statement, a reasonably just notion of its nature and its relation to mineralogy.

As all mineralogists are aware, the battle between the physical and the chemical schools of classifications is an old one. But there was a difficulty older than the conflict; the underlying cause, indeed, of the conflict. The mineral world presents species, so-called, not inter-related like biological species, not similarly definable, and not capable of a precisely analogous classification. Nobody would dream, for instance, of putting two minerals in the same order or genus, because one had "descended" from the other by oxidation or reduction. On the other hand, the mineral species are singularly constant in their physical characters, such as gravity, hardness, color, luster, crystalline form, cleavage and fracture; and these characters present incomparably the best means of ready identification, so that systems based upon them have been the best working systems. Yet such classifications cannot easily be brought into harmony with those based on chemical similarities. Repeated attempts to effect such a harmony practically resulted in compromises at the cost of both principles. The pressure of practical convenience was too great to be resisted, so long as the less convenient scheme could not be conclusively shown to be self-consistent and truly scientific. This is what was done for the natural system in botany; yet how long the mechanical Linnæan catalogues lingered, and how handy it was to count pistils and stamens, and thus find in the artificial list the place of an unfamiliar plant! Nothing can be more unscientific than the arrangement of words in a dictionary, according to the letter with which each, in its current form, happens to begin. Yet nobody would use any other kind of dictionary.

Breithaupt, one of the champions of a combined physical and chemical classification, was my instructor in mineralogy at Freiberg, more than 30 years ago. He had a Latin binomial nomenclature. His classes, if I remember correctly, were differentiated mainly on chemical grounds; his orders, on physical; his genera, on chemical; and his species, on both. Of course we listened to his sonorous Latin names with the reverence due to his age and fame; but in the laboratory we used Naumann's *Mineralogie*, and were trained to recognize minerals by their physical characters alone, and to be a little ashamed of ourselves if in ordinary cases we had recourse even to the blowpipe or to a drop of acid. Such practice will always be wholesome, and there is no danger that any more truly natural classification will lead to its abandonment. But the point I make is, that while the attempted natural classifications were so imperfect, as well as inconvenient, there was really no good reason for adopting them. They did not arrange in such a way the mass of facts to be known, that they could be better remembered or better understood.

In a word, neither the system of Mohs nor that of Breithaupt was thoroughly logical. Breithaupt in particular had a mania for the multiplication both of genera and of species. He overrated the significance, in this respect, of minute variations in crystalline angles; and there is a rumor (how well founded I cannot say) that, after his death, innumerable observations to which he had attached importance were found to be vitiated by defects in his trusted goniometer. However that may be, the tendency of his method was to complicate rather than simplify the subject of study.

Our first authority, Dana, also proposed in 1837 a Latin nomenclature upon a system simpler than Breithaupt's; but this was abandoned, and in later editions of Dana's great work the chemical classification of Rammeisberg is substantially followed. On the other hand, the scheme of Mohs (which was natural-historical and not chemical) adopted in this country by Shepard, is now practically obsolete. By virtue of the surpassing excellence of Dana's work in other respects, American mineralogists are nominally employing (and in practice, I think, to a considerable degree ignoring) the moderate compromise he has set forth in a chemical classification not very scientific, yet not too cumbersome.

Is anything better now practicable? Is there any reason for believing that more favorable conditions now exist for the renewal of the endeavor which has hitherto proved unsuccessful? This question is answered by the discoveries of modern chemistry, which have put the facts of that science in a new light, revealing new laws among them, and

establishing relations not previously recognized between chemical and physical characters. It is by the application of these new principles that Dr. Hunt now undertakes the problem of a truly natural classification of minerals.

If such a classification is to include, after the analogy of biological systems, classes, orders, genera and species, then there must be three principles of distinction—one (and this the most general and profound) which determines classes; another, less deep, which defines orders; a third of subordinate degree, limiting genera. -Minor distinctions may then be left to characterize species, sub-species and varieties.

Applying this test to the new system, we find that it contains four classes, distinguished on chemical grounds, viz.:

I. The non-oxidized metalline minerals, embracing metals, their alloys, and all their compounds with sulphur, selenium, tellurium, phosphorus, arsenic, antimony and bismuth (167 species).

II. The haloid minerals (fluorides, chlorides, bromides and iodides; 21 species).

III. The oxidized minerals (oxides, silicates, carbonates, aluminates, phosphates, etc.; 404 species).

IV. The carbonaceous combustibles (carbon, diamond, coal, petroleum, etc.; number of species not stated).

This division is simple and satisfactory. It bears a direct relation to the one profoundest distinction of all among the materials of the earth's crust—the distinction between fuel and ashes; between the substances not yet oxidized and capable of oxidation, and those which have undergone this process or its dynamic equivalent. It is thus founded on the principle which prescribes the cycle of inorganic change, and may well be selected as fundamental.

The further subdivisions of the system are both chemical and physical, but characteristically chemicophysical. That is to say, new light is thrown upon the relations between chemical and physical characters, so that certain of the latter are shown to depend upon certain of the former, and thus to present natural distinctions founded jointly in both. The principal of these adjuncts invoked by Dr. Hunt are the periodic law of Mendeljeff (and other investigators); and the law of polymerism or intrinsic condensation. By an ingenious method, Dr. Hunt obtains from the specific gravity of a mineral species and its assumed chemical equivalent weight, as calculated from the results of analysis, a figure representing what he calls the reciprocal of the co-efficient of condensation. This figure furnishes a means of classification with which hardness and other physical characters coincide to a remarkable degree. It is not practicable to give here the proof of this connection. Nor can I follow further the subdivisions of Dr. Hunt's system. In its main groups it does not greatly transform the arrangement to which we are accustomed in practice. Such minerals as the zeolites or the sparry carbonates are bound to go together under almost any system; and the same is approximately true of the pyritic sulphides or the blends. Nevertheless, a perusal of the remarks of Dr. Hunt upon each genus in his scheme reveals many subtle and interesting analogies hitherto neglected, and not infrequently the place assigned to a given species serves as a record and a reminder of such relations. This is at once a high function of any system and an excellent test of its truly natural character.

Dr. Hunt repeats with hearty praise the propositions laid down by Dr. Persifor Frazer, many years ago, that every true mineral is a definite chemical compound, with a formula of its own, and a molecular unit; and that mineral species are generally polymers of a high order. This principle is amply illustrated in organic chemistry, and has won recognition of late in mineralogical chemistry. One of the good results is the harmonization of the fundamental conceptions of these branches of a science which must be one, though it has been made to appear two.

Among the suggestive and useful observations of Dr. Hunt which constitute no small part of the merit of this book (quite aside, indeed, from the value of his system) we may refer the reader to his brief but singularly clear summaries concerning petroleum and saline springs. With regard to the origin of petroleum, after stating the leading hypotheses, Dr. Hunt says of the question whether the origin be animal or vegetable:

"To one familiar with the facts of modern chemistry this question, often raised and still discussed by certain geologists, appears but an idle one. When it is considered that the albuminoids of plants and animals are the same, and the fatty bodies for the most part identical; that the glycogen, so abundant in the liver and other tissues of the higher animals, is isomeric with starch, and that tunicin, which is found in the mantle of Ascidians, is similar in composition with cellulose, and, like it and glycogen, is converted into glucose by hydrolysis, the question loses its significance. To the chemist there is, in the last analysis, no difference between the composition of oats or maize and the body of an animal daily fed and nourished thereby."

I had marked other passages for quotation and comment—a few, even, for partial dissent. But lack of space forbids the further prolongation of this notice. I can only hope that I have at least succeeded in making plain my own opinion of the extraordinary scope and value of this book, which seems to me at once profound and brilliant. It will not prove easy reading to the average mineralogist, even though he be also a chemist. But what he will get from it by careful study will be worth all the pains it may cost. There is nothing in it of which he can afford to remain ignorant, if he aspires to that broader view of his special science by which its relations to universal nature are revealed.

R. W. R.

Japanese Coal.—At a recent meeting of the Society of Arts, in London, Mr. Watson Smith, lecturer on technical chemistry at University College, read a paper on the coal deposits of the southwest of Japan. This deposit has been known for four centuries, but in 1873 it was acquired by the Japanese government and worked by convict labor, under the supervision of an English engineer. Up to 1885 the daily output was not more than 300 tons, but now 1,200 tons daily are to be got out, while the estimate for this year's total output is 600,000 tons. The coal is richly bituminous, yielding 9.5% of bitumen, as compared with 6% in Scotch boghead cannel and 1.06% in American cannel. It is pronounced by English engineers to be a good steam coal, and it may be added that it is much used by British steamers calling in Japan. An experimental trial of the coal as a gas producer resulted in a very favorable verdict, and the coke obtained was in every way as good as Durham coke. Mr. Watson Smith said he was of opinion that it would, in fact, replace the latter, which was used in Japan for metallurgical purposes, especially in the smelting of iron, and that that country could now depend solely upon herself.

THE UNDERGROUND FIRE AT THE LAKE SUPERIOR MINE, ISHPEMING, MICH.

Written for the Engineering and Mining Journal, by J. Parke Channing, E. M.

During the last eight years I have witnessed in the Lake Superior region nine mine fires of more or less magnitude. Five of these I have had the opportunity of closely investigating. The list includes two at the Calumet & Hecla and one each at the Germania, Norrie, Aurora, Pabst, Palms, Republic and Lake Superior mines. Several more fires have occurred to my knowledge, but at such times and places that I did not see them.

The last of these fires occurred at the Hematite mine of the Lake Superior Iron Company, in Ishpeming, Mich., and is very interesting from the skill used in combating it. This mine is working on a body of soft hematite ore that is 75 ft. wide and 75 ft. high, lying in a trough of diorite and capped with mixed ore and jasper. The ore body pitches to the east and has two footwalls, one dipping to the north and the other to the south. The figures given, 75 ft., will not indicate the shape of the body, which is like a "V." From a little east of the Cage shaft the ore body is under Lake Angeline, but is heavily capped. The Old shaft, to the west, is in the ore body, and it has settled down from its original level on account of the proximity to the workings. The Cage and the Lake shafts are both vertical in the rock and the ore is reached by cross-cuts.

The method of working the mine is to drive the drifts in the ore and every 18 ft. lay out a chamber to run north and south. These chambers are timbered with square sets and are 18 ft. wide outside of the lagging and leave between each chamber an 18-ft. pillar. The pumping is done with a compound condensing duplex Knowles outside-packed plunger pump that is erected in a chamber about 50 ft. east of the Cage shaft and on the 513-ft., or bottom level. The steam for this pump is generated at a boiler house near the shaft and the column and steam pipe are carried through the Cage shaft. The hoisting is done from this shaft with a cage that is balanced by a cast iron counterweight. A distinct rope runs from the top of the cage to the dummy and the dummy travels in a wooden box. The shaft is made with two compartments, in one of which the cage runs and in the other are the dummy box, the pipes and the ladder road. These two compartments are divided and cased apart.

On Saturday morning, November 28th, 1891, about 2:10, the cage tender at the 444-ft. level of the Cage shaft discovered that there was fire in the shaft above the 400-ft. level and at the same time the landers discovered smoke coming from the collar of the shaft. The cage tender started through the mine and notified the shift bosses, who immediately began to get the men out of the mine up the ladder roads in the Old and the Lake shafts. The landers turned in an alarm from the nearest box, and at 2:15 the first hose cart arrived at the shaft and got two streams on the shafthouse, which in an incredibly short time was a mass of fire and smoke. The mine was in charge of Mr. W. H. Johnston, the superintendent—Mr. C. H. Hall, the agent, being in the East at the time. Mr. Johnston immediately got all the mine teams at work drawing sand, manure and plank to the Old and the Lake shafts. The department streams were turned on the shafthouse and occasionally down the mouth of the shaft that was belching up smoke and flames, due to the draught of a 400-ft. chimney. After a few minutes playing down the shaft a tendency for the draught to change and go down would be noticed, when the stream would be put on the shafthouse again till the fire from the shaft became too strong to stand.

At 2:40 A. M. the mining captain reported everybody out of the mine and the sealing of the two extreme shafts was proceeded with. In doing this work two sets from the collar of the shaft a double thickness of 2-in. plank was put across so as to fit tightly around the skip stringers and the ladders. Upon this plank was placed a layer of refuse straw and manure and the final covering was 18 in. of moist sand. These shafts were covered by 4 A. M. Once during the progress of the work the streams were turned down the burning shaft too long and a reversal of the draught took place, driving the men from the shafts. Cessation of the water remedied this in a few minutes.

When the Old and the Lake shafts were covered an attempt was made to cover the burning shaft, but as soon as the streams were taken out from it the flames came up and drove the men away. The streams were turned down the shaft again and finally the nozzles were allowed to hang in the shaft a few feet, and in such direction that two streams from inch pipes impinged on the sides of the shaft, and thus the water sprayed its way down through the fire. This kept the top of the shaft clear, and at 4:30 A. M. the covering was over. Notches were let in the boards to accommodate the hose and the streams still played down the shaft. It took till 7 A. M. to finish covering the shaft completely, as small openings around the base of the shafthouse allowed smoke to creep out. The two streams of water played down the shaft till 2 P. M., while preparations were made to force in steam instead of water.

It should here be remarked that soon after the fire was under headway the steam pipe supplying the pump at the 513-ft. level broke and the steam was turned off at the boilers.

Saturday forenoon was occupied in lowering down through the shaft a 2-in. wrought iron pipe. Holes were bored in the board covering and the space between the hoies cut out with a chisel sufficiently large to allow the pipe and its flanges to pass down. The main 4-in. steam pipe at the collar of the shaft was cut and connected with the 2-in. pipe by a reducer and a set of flanges. At 2 P. M. the water was turned off and the steam turned on, delivering all that a 60 in. x 18 in. return tubular boiler could discharge through the pipe. Pressure at the beginning was maintained at 40 lbs., but this was afterward allowed to go down so as to diminish the amount of heat as much as possible.

Matters were now in a state of quietness, watchmen being stationed at all of the shafts day and night. Monday morning the steam was turned off for awhile and the water put on while the steam pipe was lengthened by the addition of 160 ft., making it 350 ft. in all. This was done as it was known that at this point the ground around the shaft was paint rock and it was feared that if the timbers burnt out the shaft might cave. Steam was allowed to play down the shaft for a period of 60 hours or till Tuesday morning, when it was turned off and means of testing the gases in shaft prepared by fixing a screw cap on the end of the broken 4-in. steam pipe. All evidence seems to show that by this time the fire was out, yet, in view of the rather disastrous results that had occurred at other mines

by opening up too soon, Mr. Johnston concluded to wait till a full week had elapsed before making any attempt to enter the mine.

On Dec. 4 the temperature of the burned shaft was tested with a thermometer at various depths and it was found normal. On the morning of the 5th, the covering at the Lake shaft was removed, and to the skip was attached a lighted candle and a lantern, which were lowered to the 444-ft. level and came to the surface again without being extinguished. This seemed to indicate that no gas was present, and a party of men went to this level by the ladder road, the skip following them down to be at hand in case of the discovery of any gas. None was encountered, however, nor in fact was there any found in the mine. The Cage shaft was soon reached and it was found that the damage was confined to this shaft exclusively, not even the timbers in the cross-cuts being damaged.

In the shaft itself the steam and compressed air pipes were broken the dividings, casings, ladders, cage guides and counterweight box were entirely destroyed, and between the 340-ft. and the 444-ft. levels, and below the latter, the lath behind the sets were so burned that they had to be replaced. The wall plates and the end pieces were more or less charred, but not any of them so badly damaged that they had to be replaced. The cage was at the bottom of the shaft when the fire broke out and about 550 ft. of the 1½-in. rope was ruined. Eighteen feet of water had accumulated above the 513-ft. level and the large pump was drowned in consequence.

Work was immediately begun on the Cage shaft repairing the damaged timber from the surface down. At the 444-ft. level a winze runs down at the 37th chamber to the 513-ft. level, and through this winze the water was pumped to the 444-ft. level and from there to surface through the Lake shaft. In this work steam pipes were temporarily run down the Lake shaft and the water handled by one No. 7, two No. 9, and one No. 10 Knowles pumps of the ordinary type. At the time of writing the water is all out and the large pump is found to be uninjured.

The above is a statement of the facts and from it one can draw his conclusions as to the efficacy of the means employed to put out the fire with a minimum of damage. During the fire it was suggested by some of the fire department, which is a volunteer one and many of them miners, that they would be willing to take streams down the Lake and the Old shafts and, after allowing the fire full play up the Cage shaft, work at it from the various levels and extinguish it. I have no doubt that this might have been done, as I saw almost the same plan pursued at the Aurora fire some two years ago, but I doubt if the fire could be extinguished with as little damage.

At the Aurora the fire gained such headway at No. 4 shaft that it was impossible to control it, there being no hydrants or steamer convenient. It was impossible to cut off the draught toward the base of the fire, as west of No. 3 shaft was an open pit in full communication with the levels. As a result of this the fire from the shaft got out past the narrow shaft pillar and set fire to a large room of dry square sets between No. 4 and No. 3 shafts. The next day a stream was carried down No. 5 shaft to the level where the fire began at No. 4 and water thrown on the burning timber in the room. A little while after a second stream was carried down No. 3, and these two finally put the fire out, but not before the entire shaft timber and the top work was completely consumed. If this means had been tried at the Lake Superior mine I am confident there would not have been a stick of timber left in the shaft, the paint rock would have caved and the shaft house, which is now available with a small amount of repairs, would have been utterly ruined.

From my experience the best way to extinguish a mine fire is to cut off the supply of oxygen as quickly as possible and be very careful not to open up too soon after the fire is supposed to be out. Steam, if it can be applied in the immediate vicinity of the combustion, is excellent. Artificial carbonic gas I have not much faith in. While it is supposed to be heavier than air and settle down to the bottom of the mine, it is, as it leaves the tanks where it is produced, very hot from the heat engendered by the reactions producing it, and hangs around the collar of the shaft. A fierce fire will soon use up all the oxygen in a sealed mine and then carbonic acid will be present in far larger quantities than can be generated by chemicals on the surface. The plan pursued by Mr. Johnston is certainly very creditable to him.

Practical Projection and Construction of Maps.—Mr. Jacques W. Redway presented an elaborate paper upon "The Practical Projection and Construction of Maps," before the Engineers' Club of Philadelphia on the 19th inst., and gave a brief oral description of its salient features. He described briefly the orthographic, stereographic and equidistant projections of the hemisphere, expressing his personal preference for the stereographic. For the projection of small areas the development of the sphere on a cone was the most practicable and feasible way of constructing a map. The development of Bonne's and Flamsteed's projections from the simple cone, and the more complex polyconic projection employed in the United States and British Coast Surveys, were considered. The author emphasized the importance, in depicting the details of maps, of giving to the map such character that the physical geography of the area could be read from its lines.

Antimony Pentasulphide.—According to Th. Wilm (*Zeitschrift für Analytische Chemie*, Vol. XXX., part 4), the compound met with in commerce as "golden sulphuret" is not always an antimony pentasulphide (Sb_2S_5), but a mixture of antimony tersulphide with free sulphur, or of the penta and tersulphides with sulphur. He shows that the determination of the sulphur capable of extraction by means of carbon disulphide does not lead to satisfactory results. For the determination of total sulphur he recommends oxidation with fuming nitric acid in a sealed tube. A determination in an Erlenmeyer flask did not give constant results. He heats for 2-3 hours not above 130°, when no explosion takes place. On opening the tube a little water is added, when the contents turn green or bluish-green, and a quantity of gas escapes. When this reaction is over, the glass is nearly filled with concentrated hydrochloric acid, and heated in the water bath until the white powder is completely dissolved. The whole is then rinsed into a porcelain capsule, evaporated down as far as practicable on the water bath, covers the moist residue with a little concentrated hydrochloric acid, applies heat and adds a solution of tartaric acid. The boiling solution is precipitated with barium chloride, and the barium sulphate filtered off after standing for 10-12 hours.

THE LATE F. W. BARNES.

F. W. Barnes, one of the best known mechanical and metallurgical engineers of Europe, and a valued friend of the *ENGINEERING AND MINING JOURNAL*, died suddenly on the 27th of June last. He was the engineer of M. Chaudoir's copper, brass and zinc works at Simmering, Vienna, Austria, an engineer of the mines and smelting works of the *Betriebs-Unternehmung der Majdanpeker Domänen* of Majdanpek, Servia; he also took a leading part in M. Chaudoir's iron works at Petten, Austria, and in fact was the principal man in all the undertakings in which M. Chaudoir was interested. After attending to his duties at Simmering on June 26th he left in the evening for his home in his usual good health and good spirits; about 11 p. m. he experienced a stroke of apoplexy and died the next morning.

Mr. Barnes was born in London, England, in 1851. His father was engaged in extensive business in London. At the age of seven Mr. F. W. Barnes was sent to a school at Bedford with which an engineering shop was connected. He took great interest in working in this shop, and when he left school at the age of fourteen he had acquired a good knowledge of mechanics, machinery, etc. He was then apprenticed at the Crewe Engine Works where he went through a regular system of mechanical engineering in all its branches. During his apprenticeship he displayed marked ability, and when his term had terminated he was immediately appointed assistant traffic superintendent at Crewe, a position which he ably filled for some time.

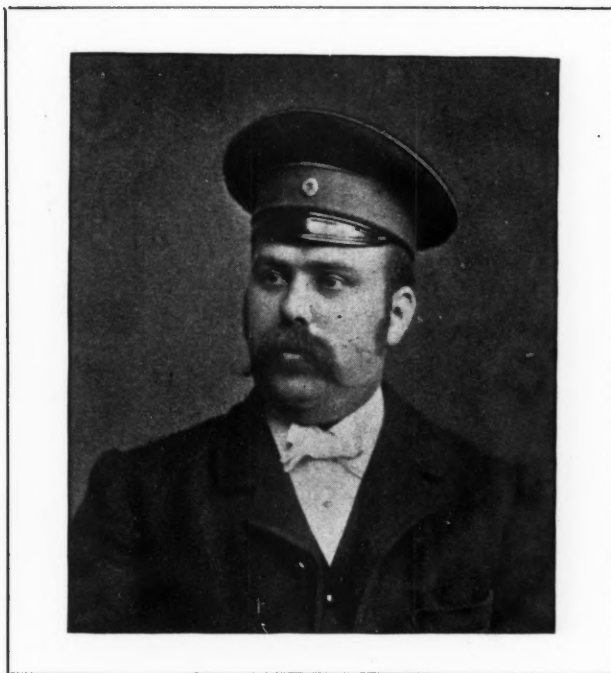
In consequence of the death of his father, Mr. Barnes resigned his position at Crewe and went to London, where he carried on with his brother his father's business, but, finding that it was uncongenial to him, he abandoned it and again engaged in engineering work. In 1881 he went to Majdanpek, Servia, and erected a Bessemer plant and other furnaces

CORDWOOD IN THE MATTING BLAST-FURNACE.*

By Herbert Lang, M. E.

Cordwood, sawn in blocks of a foot in length, is a regular constituent of our fuel charge at Mineral, Idaho, our work being the matting of silver ores by fusion in a blast-furnace. The furnace is a round water jacket furnace, of 36 in. diameter at the tuyères, and the charge of smelting mixture weighs 950 lbs., requiring 110 lbs. of Connellsville coke to drive it. I replace half this coke with 135 lbs. of firwood, cut from dead and apparently perfectly dry trees. This mixture produces as high a smelting temperature as all coke, whence I infer that the smelting effect of a given weight of wood is to that of the same weight of coke as 11 to 27, or 1 to 2½. A cord of wood sawed ready for use weighs 2,340 lbs., costs \$5, and is equivalent to 866 lbs. of Connellsville coke, which, at \$25 per ton, costs \$10.92, or rather more than twice as much as wood per unit of smelting power. The saving by the use of wood plus coke, over coke alone, is therefore 75 cents per ton of ore. The principal advantage, however, is not in the saving of cost, but in the fact that a great deal of sulphur is burned off by the wood, thus allowing the use of a greater proportion of sulphide ores in the charge, which is a point of great moment, as such ores predominate here, and we are as yet unprovided with roasting apparatus. To offset these advantages, the wood produces a great deal more flue dust—twice as much, I should think—and reduces the smelting capacity about one-third. With the fuel mixture described, I can carry only six ounces of blast; but the furnace keeps in good condition above and below, the tuyères remain unaffected, the slag is hot and reasonably free from valuable metals, and the conditions of successful smelting are met in all respects, except as to the serious reduction of tonnage.

Mr. Dwight, in his comments upon Mr. Neill's paper on "The Use of



THE LATE F. W. BARNES.

for Hollway Brothers' sulphide process. He also built a railway and two narrow gauge locomotives for transporting wood, which were the first locomotives built in Servia and are still doing excellent duty.

In 1884 Mr. Barnes left Majdanpek and went to Simmering as engineer for M. Chaudoir, but in 1885 the Majdanpek mines and smelting works being transferred by the Hollway Brothers to M. Chaudoir, Mr. Barnes again became connected with them.

In 1886 he went to America and inspected several mines and smelting works and on his return constructed two water jacket furnaces which have proved a thorough success; in fact the company is now smelting ores containing about 2% of copper only and paying expenses. In 1888 Mr. Barnes again went to America to study diamond drills and percussive rock drills and to purchase a plant of the same. This installation proved very successful in the Servian mines and both the diamond drills and rock drills are being used there with excellent results.

An intimate friend of Mr. Barnes and a director of the *Betriebs-Unternehmung*, of Majdanpek, Servia, writes us: "I was personally acquainted with Mr. Barnes for over ten years and always found him a true friend. He was a man much respected and his death has caused general regret, not only among his friends but everywhere he was known. He was not only a first-class engineer, but was also well up in the smelting of copper and iron ores, and was a good chemist." Mr. Barnes had made many friends in America who have been greatly pained to learn of his untimely death.

The Salt Industry of England.—There has been a very fair trade done in this industry during the past year, says the Middlesbrough correspondent of *Industries*, the production for 1891 being estimated at 260,000 tons, as compared with 235,671 tons during 1890. An encouraging feature is the opening of a trade with India, and four very large shipments have already taken place to that country.

Stone Coal in Lead Smelting" (see *ENGINEERING AND MINING JOURNAL*, August 8th, 1891), appears to infer that the coal has to be converted into coke inside the furnace before it can perform useful work. I presume he would also infer that wood has to become charcoal before it can do its smelting work, but that such an inference is erroneous appears from the fact that our fir-wood produces but about 20% of charcoal, and that of a very poor, fragile sort. Accordingly, 135 lbs. of wood would produce only 27 lbs. of charcoal, a quantity clearly insufficient to replace 55 lbs. of coke. I therefore believe that the volatile constituents of the wood do a considerable amount of useful work in the smelting before escaping from the furnace. The smoke, which is very thick and abundant, has a peculiar nauseating odor, giving no evidence of free sulphurous acid—a circumstance which leads me to believe that the sulphur so largely burned off forms a volatile compound with the organic matters sublimed from the wood, the reaction perhaps furnishing a considerable amount of heat. I presume that the use of denser kinds of wood, such as mountain mahogany, oak, hickory, ash, etc., would give still better results.

A Green Solid Chromium Sesquisulphate.—A. Recoura has found (*Comptes Rendus*, CXIII., 24, December 14th) that either on producing chromium sulphate in presence of a very small quantity of water, or by partially dehydrating by heat the crystalline violet sulphate, we obtain a new variety of chromium sulphate which is green, solid and crystalline. It possesses properties quite distinct from those of the violet sulphate. M. Etard has also shown that if the solid violet sulphate is placed in contact with dehydrating liquids such as SO_4H_2 or NO_2H , it becomes green. But this is only a transient modification, for when the green sulphate thus obtained is freed from the dehydrating liquid it quickly returns to the violet condition.

* From a paper read at the Glen Summit meeting of the American Institute of Mining Engineers.

ESTIMATE OF MATERIAL AND LABOR ON LARGE REVERBERATORY FURNACES FOR COPPER SMELTING.*

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

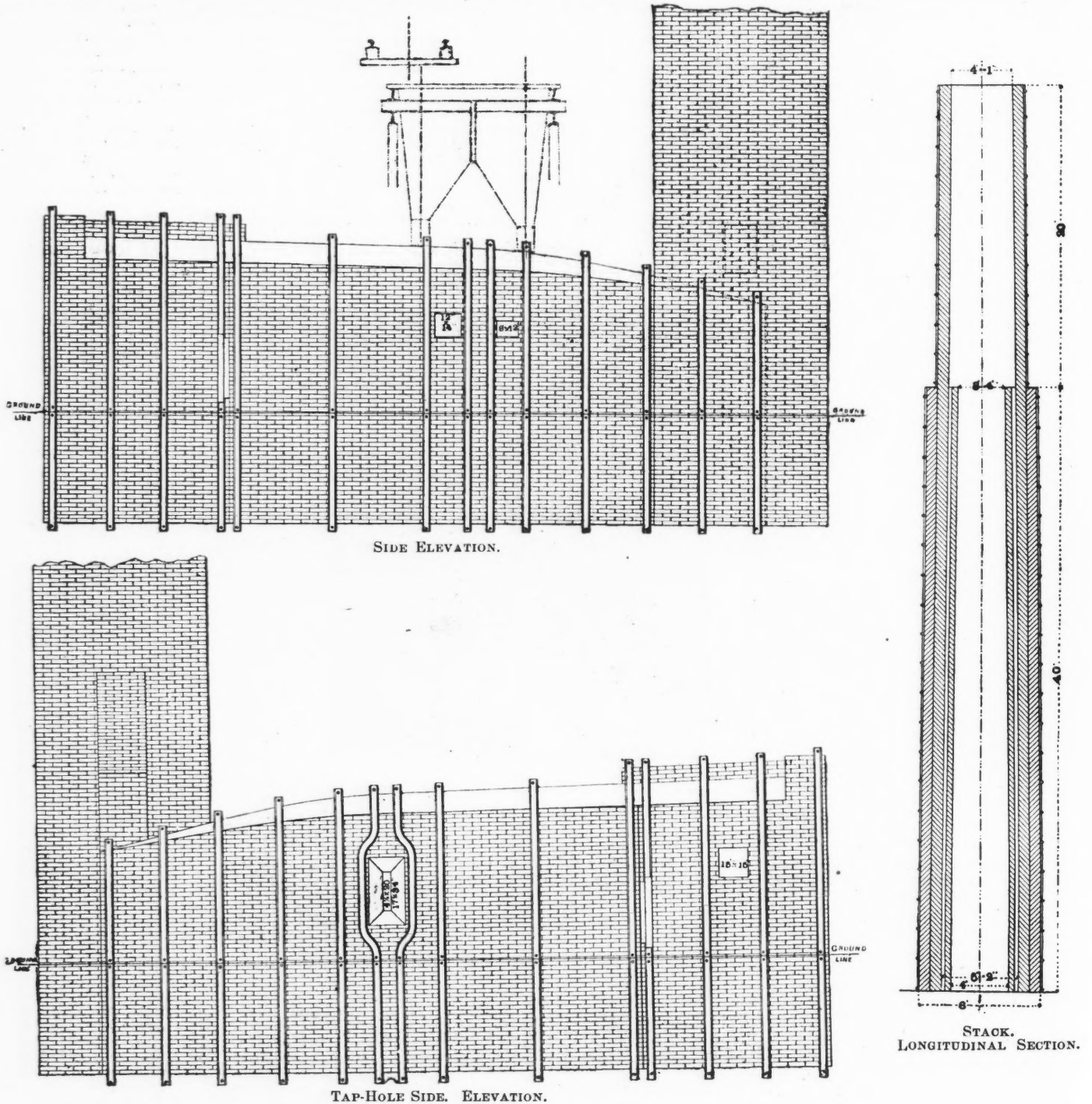
Although the latest type of reverberatory furnace does not differ from the old pattern, except in size, yet it may be useful to have at hand detailed estimates of the former, as well as full drawings, which accompany these estimates, and which may be relied upon as working drawings that may be used directly in construction.†

It will of course always be borne in mind that different ores and different varieties of coal require differently proportioned furnaces; but under ordinary conditions, and with a fair quality of bituminous or lignite coal, the measurements here given will be found satisfactory.

The amount that may be smelted in one of these large furnaces de-

MATERIAL USED IN CONSTRUCTION OF REVERBERATORY.

Brick-Work.		Cubic feet.
<i>Firebrick.</i>		
One 4½-in. foundation arch.....	22 ft. × 7 ft. × 4½ in.	58
One 9-in. foundation arch, inverted.....	20 ft. × 15 ft. × 9 in.	225
One 4½-in. flat hearth bottom.....	20 ft. × 16 ft. × 4½ in.	120
One 9-in. lining, both sides hearth.....	46 ft. × 3½ ft. × 9 in.	121
One front wall.....	10 ft. × 6 ft. × 9 in.	45
Two skewback walls of hearth.....	46 ft. × 5 ft. × 9 in.	173
One bridge-wall.....	6 ft. × 6 ft. × 2½ in.	90
One rear wall, opposite skim door.....	8 ft. × 7 ft. × 13½ in.	63
Two side walls of fire-box.....	14 ft. × 9 ft. × 13½ in.	123
Flue, doors, clamps, etc.....		123
Lining of stack (see plan of stack).....		1,040
Total.....		2,200
2,200 cubic feet of firebrick, at 18 brick per cubic foot, make, allowing for breakage and waste, 40,000 brick, at \$40 per thousand.....		\$1600.00



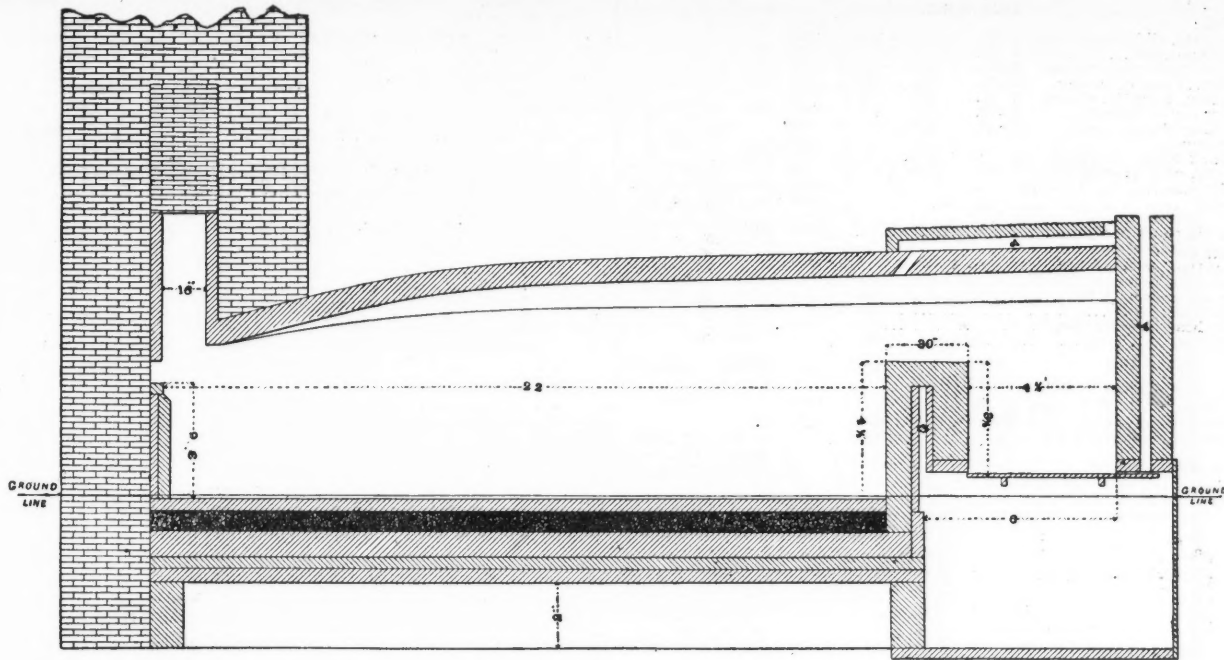
pendents entirely upon the particular conditions of each case. With favorable sulphide ores, calcined so that not too much of the iron is changed into a sesquioxide, and so that it may be charged redhot direct into the furnace, and with the charging and skimming arrangements made practically automatic, as shown in the accompanying drawings, it is quite possible to smelt from 30 to 36 tons per 24 hours in this furnace.

In a furnace of about the same size at the Argo Works, Mr. Pearce informed me that he had on an average put through 29½ tons of ore per 24 hours for an entire month.

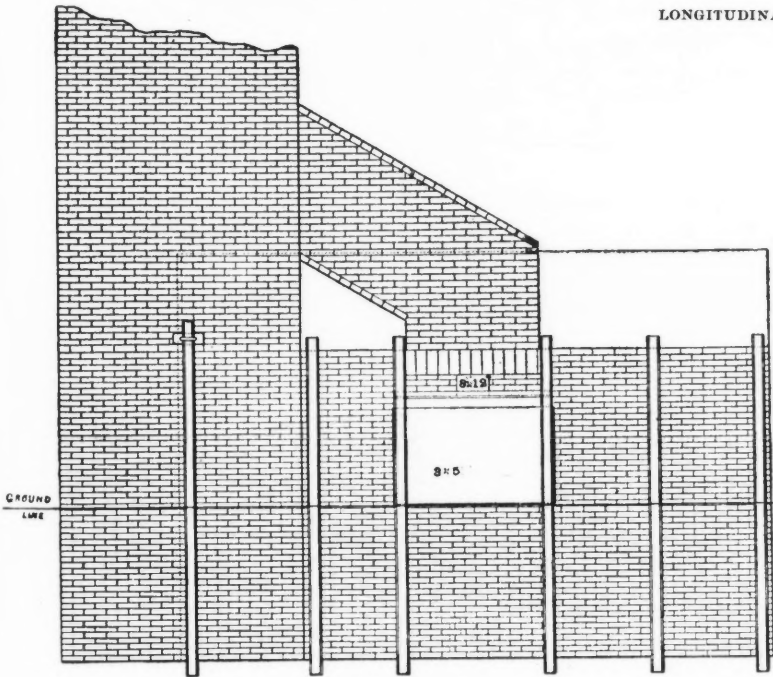
* Taken from "Modern American Methods of Copper Smelting," by permission of the Scientific Publishing Company.

† The drawings of the large reverberatory furnace that accompany this estimate were just completed for the Eastern Development Company, Limited, of Boston, and Cape Breton, N. S. And I am indebted to this company for the privileges of using them in this connection.—E. D. P., Jr.

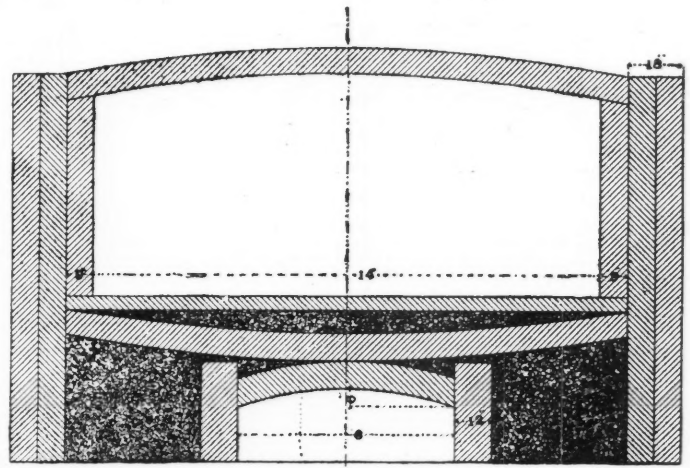
<i>Shaped Firebrick.</i>		No.	
Bullheads.....		250	
Side-skewbacks.....		250	
End-skewbacks.....		50	
Jamb-brick.....		60	
Wedge-brick.....		50	
Soaps.....		50	
Splits.....		100	
Total.....		810	
Dinas brick for arch, 10,000 (used also in lining, etc.) at \$60.....			\$600.00
Red brick for furnace and stack, 60,000, at \$8.....			480.00
Fire clay, raw and ground, 8 tons, at \$8.....			64.00
Lime, 80 barrels, at \$1.....			80.00
Cement, 80 barrels, at \$1.50.....			120.00
Sand, 30 loads, \$1.50.....			45.00
Total masons' materials.....			\$3,085.00



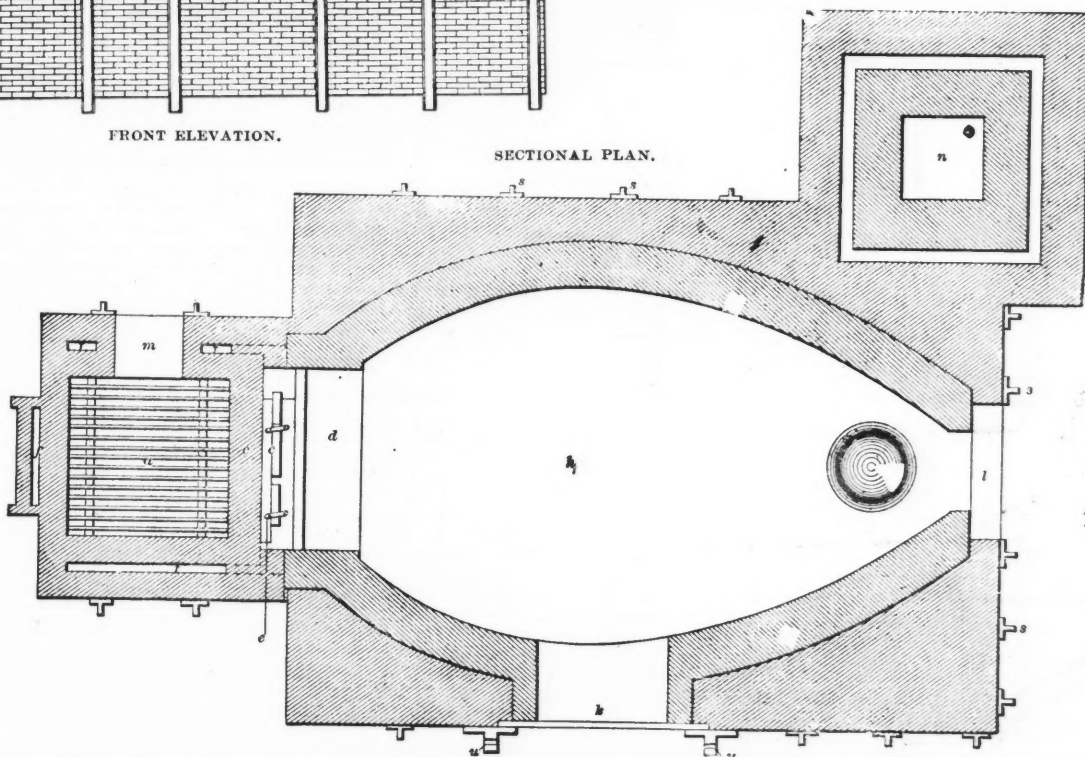
LONGITUDINAL SECTION.



FRONT ELEVATION.



CROSS SECTION.

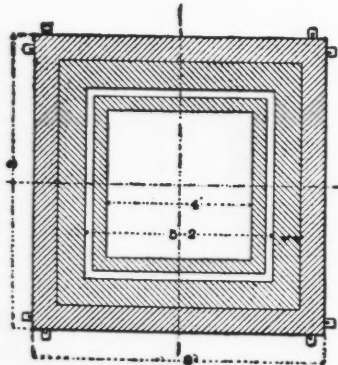


SECTIONAL PLAN.

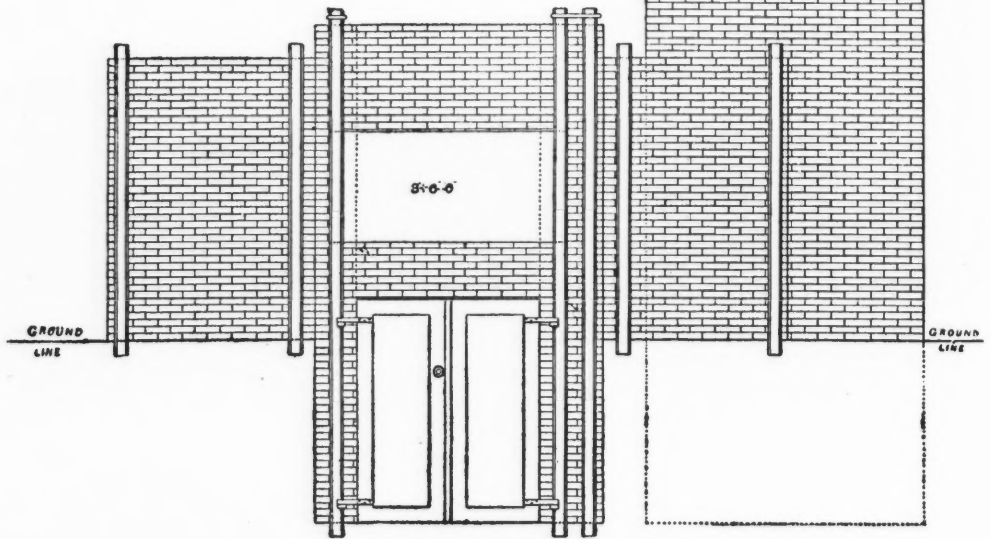
LARGE REVERBERATORY FURNACE, COXHEATH COPPER MINES, CAPE BRETON

IRON WORK.			
		Pounds.	
Cast Iron:			
One bridge-plate, ribbed and holed	6 ft. x 3 ft. x 3 1/4 in.	2,500	
One rear bridge-plate	6 ft. x 26 in. x 2 in.	1,000	
Split plate for rear wall, ribbed	6 1/4 ft. x 9 in. x 1 1/4 in.	600	
Plate to support rear of bridge	6 1/4 ft. x 9 in. x 1 1/4 in.	600	
One front-plate, strongly ribbed	6 ft. x 2 ft. x 1 1/4 in.	1,100	
One plate for end of firebox	6 1/4 ft. x 3 ft. x 1 in.	950	
Two skimming-blocks, each	26 ft. x 6 in. x 4 in.	620	
Two door frames		300	
Two skewback strips, in lengths	22 in. x 4 in. x 1 in.	2,200	
Three bearing, and grating-bars	6 ft. x 2 in. x 3 in.	452	
Gutters and pots		2,856	
Miscellaneous		1,200	
Total at 2 1/4 cents per pound		14,352	\$358.80
Wrought Iron:			
Tie-rods of 1 1/4 in. round-iron		Ft.	Pounds.
20 main furnace side-rods at 18 1/2 ft.		370	
8 cross firebox rods at 8 ft.		64	
2 longest rods at 31 1/2 ft.		63	
4 long main-hearth rods at 23 1/2 ft.		94	
Hooks, loops, etc.		232	
Total		823	3,410 \$358.80 \$3,085.0
Iron for Stack.			
8 uprights, 1/4 in. x 1 in., 60 ft. high, at 2 1/2 lbs. per ft.		1,200	
100 cross straps, 2 in. x 1/4 in. x 8 ft. long, at 13 1/4 lbs. each		1,350	
Extra clamps for outside of stack		1,200	
Total at 2 cents per lb.			7,160 \$143.20
<i>Buckstaves, old rails, say at 70 lbs. per yard:</i>			
[These need only reach just below bottom of firebrick hearth, though shown deeper in drawing.]			

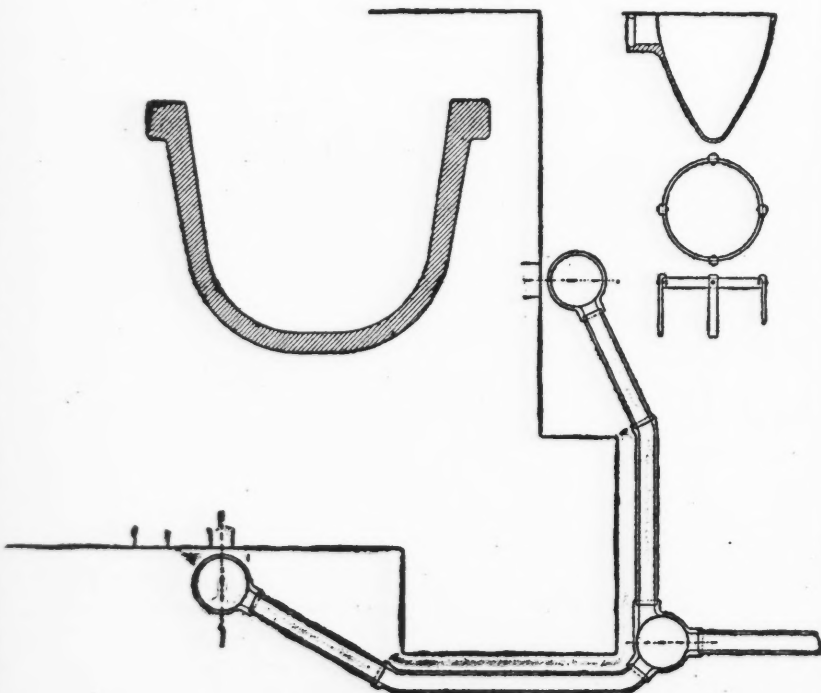
Old Rails.		
Price, \$25 per ton:	Ft.	Pounds.
20 for main part of furnace... 6 1/4 ft. high,	130	
4 for sides of firebox..... 8 ft.	32	
2 for end of firebox..... 12 ft.	24	
4 for upper shoulder..... 8 ft.	32	
6 for front end..... 5 ft.	30	
Bearing-bars, etc.....	50	
Total	298	7,000 \$87.50
Total of ironwork \$589.50		
<i>Miscellaneous.</i>		
Lumber for patterns of arches, etc., 3,000 ft., at \$18.....		\$54.00
Hoppers, complete.....		140.00
Excavation and stone work.....		300.00
Grading and clearing up.....		70.00
Total		\$564.00
<i>Labor.</i>		
200 days masons' labor, at \$4.....		\$800.00
220 " helpers' " at \$2.....		440.00
10 " carpenters' labor, at \$3.....		30.00
10 " smith and helper, at \$5.....		50.00
Total		1,320.00
Incidentals and superintendence.....		220.00
RESUME OF TOTALS.		
Masons' materials.....		\$3,085.00
Ironwork.....		589.50
Miscellaneous.....		564.00
Labor.....		1,320.00
Incidentals and superintendence.....		220.00
Grand total		\$5,778.50



STACK CROSS SECTION.



REAR ELEVATION.



SKIMMING POTS AND SLAG-GUTTERS.

LARGE REVERBERATORY FURNACE DESIGNED FOR COXHEATH MINES, NOVA SCOTIA

The Indian Government is taking steps to introduce the basic process of making steel into India, and Mr. M. Wright, of Parkgate, England says the *Engineer*, is about to proceed to that country to erect Siemens' furnaces at Cessipore. India has long been known to contain valuable supplies of iron ore, though two companies formed to work the deposits in 1874 have failed. One of the difficulties to be faced is the bad quality of Indian coal, which is said to contain but 45% to 65% of carbon.

Assumption of Risk by Miner.—A person who was employed in a mine as "trammer," was directed, and made no objection, to help the miners fix the roof of a "stope," take down some ground, and was injured by loose rocks or ore falling from a place in the roof that had been tested in his presence and appeared to necessitate blasting. He had been tramping for four months from a stope in which there were frequent blastings, and knew that loose rock often fell from the roof and sides thereof. He assumed all the risk of the new duties, and could not recover for injuries sustained.—*Paule v. Florence Min. Co., Supreme Court of Wisconsin, 50 N. W. Rep., 189.*

Explosions From Coal Dust in Mines.—The first report of the Royal Commission on Explosions from Coal Dust in Mines has just been issued as blue book. The commissioners state, says the *Iron and Coal Trades Review*, that, as the enquiry is not yet completed, they refrain at this stage from offering any opinion or recommendation based upon the information thus far received. Twenty-three witnesses have been examined, amongst whom is Sir Frederick Abel, who expresses the opinion that coal dust alone may have the power of causing catastrophes, but when mixed with even a very small quantity of firedamp it becomes excessively dangerous. One witness recommends as a prevention that the workings should be regularly sprinkled with water, while others pin their faith most closely on improved methods of blasting the coal. All the evidence given thus far tends to show that there is no doubt among mining experts that coal dust has been a powerful factor in many of the great mining disasters in the northern and other coalfields. They all agree in thinking that it helps to promote explosions and that it certainly extends and aggravates them. All these matters, and particularly the evidence with regard to sprinkling the workings with water regularly, and improved methods of blasting the coal, will no doubt receive due attention in the commissioners' final report.

ORE SAMPLING AT EL PASO, TEX.

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

The art of ore sampling as generally practiced in Europe is behind that of the United States. There whole shipments of copper bearing pyrites and phosphates, of more than 1,000 tons, are frequently sampled by a foreman selecting, according to his judgment, a few pieces from every 20 or 30 tons of the load, or by taking out a few shovelful here and there. This method is not accurate, and admits of "doctoring" the samples, sometimes in favor of the buyer and sometimes of the seller. In order to take accurate samples it is necessary to proceed in a systematic way, generally practiced, taking from 3% to 20% in weight of the whole load, depending on the nature and value of the ore, in quantities of from 20 lbs. to 100 lbs. each time, at equal intervals throughout the unloading of the cargo, and breaking the first gross sample into finer pieces, mixing it thoroughly and then quartering down, grinding the sample finer until it is reduced to a convenient bulk for assay or analysis. I have many times verified the accuracy of the sample taking in this way of cargoes of copper bearing iron pyrites, containing from 3% to 5% of copper and from 43% to 46% sulphur, by taking duplicate samples of the whole cargo and quartering these down as separate samples, and though the material was not very uniform, I have come, with the copper, as near as from 0.1% to 0.2%, and with the sulphur from 0.5% to 0.75%.

I once had the task of sampling a whole mine of copper bearing iron pyrites in Norway, with streaks of pretty rich ore through the mass. I took two sets of samples throughout the whole mine in order to see how the results would agree. I divided the mine into 18 different sections and took a separate sample from each section by chipping off with a chisel and hammer pieces of ore of about the same size every 9 in. across the ore bearing parts of the lode in rows 9 in. apart, at the same time measuring the width of the ore bearing parts. Thus I was able to determine the average width of ore of each section, which multiplied by its length gave the ore bearing surface from which the sample was taken. The different samples were crushed and quartered down systematically in the common way. This having been done I took new samples from each section of the mine, this time clipping them every 6 in. and in rows 6 in. apart. The samples were broken up and quartered down as before. The 18 duplicate samples agreed very closely as to copper and sulphur contents. In determining the average copper and sulphur contents of the mine I multiplied the ore bearing surface of each section by its percentage of copper and sulphur; then I summed up all the square areas of the different sections and all the products of the different section areas with their respective contents of copper and sulphur and divided the latter figure by the former, when I got out the general copper and sulphur average of the mine. Though the samples from different sections of the mine varied from 2% to 6% in copper, which shows that the material was not very uniform, the duplicate samples from each section, as before mentioned, agreed very well, and at the calculation of the general average 3.50% was obtained in one case and 3.55% in the other. The general average of sulphur was found in one case to be 44.25% and in the other 44.75%. The copper was determined electrolytically, and this determination on an ore of said percentage, when made with care ought not to differ by duplicate analyses more than 0.02%. One cannot come so near in the determination of the sulphur, which accounts for greater difference in these results, which is also due in part to the higher percentage. I have mentioned this case of the sample taking of a whole mine, because I consider it a more severe test for the accuracy of the method than the sample taking of a cargo of similar ore, to show that the systematic method of Cornish sampling, with its gradual comminution and quartering of the ore, gives very satisfactory results.

I read, some time ago, in the *Transactions of American Institute of Mining Engineers*, a plain and practical description of the Cornish method of sampling, presented at the Cleveland meeting, June, 1891, by Mr. W. Glenn, of Baltimore, Md. Dr. Raymond in a discussion of this paper gave a brief description of the sampling of silver ores as practiced in the United States. This has led me to give a more detailed description of this important part of the metallurgical business often rather neglected in Europe, as practiced at El Paso, Tex., and as the ENGINEERING AND MINING JOURNAL has a large circulation in Europe, this may be of interest there, where the Cornish system, as described by Mr. Glenn, is more generally known and used.

The El Paso Smelting Works, which are a branch establishment of the Consolidated Kansas City Smelting and Refining Company Works, are situated about three miles northwest of El Paso, Tex., on the Mexican frontier, lying between and close to both the Atchison, Topeka & Santa Fé and the Southern Pacific railroad lines. There is a station on the former line called Towne, after the founder of the works, and the trains on the other line stop at the "Smelter." Switches from both lines lead into the works, while the Rio Grande River runs close by and furnishes the necessary water. The works receive ores principally from Mexico, New Mexico, Arizona and Texas.

The loaded cars contain from 15 to 20 tons of ore each, and as they can be weighed with an exactness of 65 lbs. to 75 lbs. each, this gives a limit of error of about 0.2% in the determination of the weight of the ore lots. Small lots of high grade ore are generally weighed on movable Fairbanks scales in the sampling-house. When the lot is low grade, containing below 100 oz. to the ton, one-tenth of the whole lot is taken for sample; when high grade, at least one-fifth part is taken, and sometimes more, if the lot is not large. The metallurgist of the works, knowing the character of the ore, decides in which mix bin it is to be unloaded: the car is brought above this bin, a room is cleaned at the middle side of the car floor, opposite the discharging door, by shoveling away the ore from this spot, and the sample is taken during the unloading by putting aside every tenth or fifth shovel into a heap in this place. If the car contains 20 tons of ore and every tenth shovel is taken, two tons of ore are thus obtained for the first gross sample. Four Mexican laborers unload and sample a car in two and a half hours. The high grade ore often comes in sacks and in small lots. If the lot contains five to seven tons, for instance, the car is brought outside the sampling-house, the lot is weighed on the Fairbanks scale, and the contents of the sacks are poured into a heap, every third shovelful being put into a wheelbarrow for the gross sample, while

the rest is thrown into barrows and wheeled to the receiving bin, where the lot is stored till the purchase is consummated. In taking the sample it is aimed to get the first gross sample about two tons, though the lot may be less than ten tons, as the saving in labor in cutting down a smaller sample is more than compensated by the greater accuracy in cutting down a larger part of it. If the lot contains only two tons the whole is cut down.

While the gross sample is being taken, the foreman selects, according to his judgment, pieces and handfuls of ore here and there in the lot, for the moisture sample and sends this immediately to the assayer, with a ticket giving the number of the lot and the car and stating the time when the sample was taken; the quantity taken for the moisture determination is always above 1 kg., as this is the quantity the assayer weighs out for the determination of the moisture in the lot. If the sample, after drying, weighs, for instance, 0.975 kg., then 3 1/2% of the load is water and 96.5% of the weight is taken in order to get the dry weight of the lot, the assays being always made on dried samples.

The sampling house is 45 ft. wide by 125 ft. long. It is equipped with a Blake crusher on a stage or platform 3 ft. above the floor of the sampling house, and two pairs of Cornish rollers for the subsequent comminution of the crushed stuff.

At the east end of the building are four rows of receiving bins for storing small lots of ore or preserving the gross sample, if this is required by the seller, until its value is ascertained. There is one double row of bins in the middle with a slanting boardway leading over the middle bins and then over the side bins, allowing the wheeling of the stuff to the tops of the different bins; these boxes are 32 in number, the side bins being calculated to hold a car-load, or about 20 tons each, and the middle bins from 1/2 of a ton up to 10 tons. East of the building are two rows of receiving bins, 30 in all, capable of holding from 15 to 20 tons of material; as these are exposed to the winds and rain small lots of ore in lumps and not of a dusty character are put here, preferably. Between the crusher stage and the receiving bins is the sampling floor with spacious room for 3 to 5 gangs of men to work at the same time. The mill also has a bucking room where the final sample is reduced and a "watching" room, separated from the bucking room by windows, where the representative of the seller may observe the operation. West of the building are one Gates crusher and one large Blake crusher, for crushing iron ore and lots coming in large pieces and large quantities.

A tenth part of a carload of ore (about 20 tons) having been taken for the sample, if there are lumps of above 1/2 in. in size, it has first to be run through the crusher to reduce the largest pieces to this size. The car with the sample is therefore brought to the east end of the sampling house and the floor of the railroad car being level with the jaws of the crusher, the material is brought in wheelbarrows convenient to the latter. Before beginning the crushing all necessary parts are well cleaned to remove all dust from the last crushing. The crushed sample drops into a wheelbarrow and is wheeled to a clean place on the floor to be systematically cut down, the barrows being dumped so that their contents form a ring.

In the special case under consideration 25 wheelbarrows of crushed material were obtained and the work was divided between 4 workmen in such a way that one wheeled material from the railroad car to the crusher, one attended to the crushing and two wheeled the crushed material into the ring on the floor, the time required for this operation being from one-half to three quarters of an hour, according to the hardness of the stuff. If the lot is a large one, say three carloads, of uniform character and not high grade, the three cars with their samples are brought to the crusher, and all is run through, letting it drop on the floor and taking off every third shovel to the ring for the sample, while the other two are thrown into barrows and wheeled to the "mix bin" containing the shipped lot.

For every lot of ore shipped to the works, the sampling foreman receives from the office a triple ticket, with information for the sampling foreman, the bucking master and the assayer, giving number of the lot, name of the shipper, numbers and marks of the cars, description of the ore and orders as to what mix bin it is to be put, with blanks for filling in time and date of weighing and sampling, etc. The foreman has besides to keep in the sampling office a special book with information concerning every lot received, giving the number, name of shipper, numbers of the railroad cars with their initial marks, weight of the lot and its percentage of moisture, number of receiving bin for the rejected part of the gross sample, number of the mix bin and of the mix to which the lot has gone, destination, number and marks of the ore sacks—if the ore was shipped thus—date of their return, and the gross tare and net weight of the lot.

The different lots coming to the works are distributed in the mix bins according to their chemical and metallurgical character; thus those of "neutral" character are put into one "mix," those of basic into another, those of silicious into a third, etc; when the lot has been unloaded from the car into the bin, it is spread evenly to insure good mixing. These mix bins contain from 80 to 120 tons of ore and upward and are somewhat above 50 in number, so that the works are able to keep stored about 5,000 tons of ore. The sample foreman has also to keep a so-called "mix" book, with the number of each "mix," the number of the bin containing this mix, the different weights and numbers of the lots making up each mix and date when it is closed up.

(To be continued.)

Asbestos Porcelain.—F. Garros (*Comptes Rendus*, CXIII., 24, December 14th, 1891) describes a novel porcelain which he has obtained by grinding asbestos to an impalpable powder, removing iron, etc., if necessary, by treatment with hydrochloric acid, making the powder into a paste with water, and baking it in a porcelain furnace for 18 hours at 1200°. The porcelain thus produced may be used for the filtration and sterilization of liquids. The experiments of Drs. Durand-Fardel and Bordas have proved that water containing 1,200 colonies of microbes per c. c. are absolutely sterile after filtration through asbestos porcelain. At the same time it filters more rapidly than ordinary porcelain. Other comparative experiments made with the co-operation of MM. Cousin and Méran on the filtration of wines, vinegars and acids show that the porcelain may serve equally for the filtration and sterilization of wines, vinegars, etc., and for the filtration of acids.

THE DISCOVERER OF THE COMSTOCK LODE.*

Written for the Engineering and Mining Journal by Dan De Quille.

When Judge James Walsh and others who led the rush from Grass Valley and Nevada City over the Sierras to Washoe arrived at the Ophir mine, they found Comstock and partners still engaged in working their ore for gold alone. However, the secret of the peculiar black mineral being a rich ore of silver very soon leaked out, yet Judge Walsh succeeded in buying Comstock's interest (one-sixth) in the 1,400 ft. comprising the Ophir claim for \$11,000, paying only \$10 down. The promised sum of \$11,000 in one "pile" seemed to Comstock an immense amount of money. He knew nothing about silver mines and not much about gold-bearing quartz at that time, and, fearing that the rich spot was merely a "bunch" that would soon be dug out, he thought it best to make sure of a sum that seemed to him a great fortune.

For the \$11,000 Comstock conveyed to Judge Walsh one-sixth of the Ophir mine, all his right to the waters from the Caldwell spring, some placer ground in Six-mile Cañon, and all the ground on which Virginia City now stands, claiming to have located and recorded it as a ranch. No record of such ranch location was ever found. Several leaves were torn out of the book of the Recorder of Mines at Gold Hill, and on one of these (torn out in different places in the book to suit the purposes of various parties) may have been the ranch location which Comstock always claimed to have made. The book of records was kept behind a bar in a saloon at Gold Hill, and the "honest miners" of the time were in the habit of coming in, taking the records down from the shelf, where they were within easy reach, and altering them to suit themselves. They thought it right for them, as old settlers, to occasionally regulate their locations, in order that they might reach any developments of importance that were made by newcomers. Thus were sown the seeds of an immense crop of profitable mining suits.

When Comstock received his \$11,000—which was after much delay—he concluded to branch out as a "merchant prince." He opened a store at Carson City that was fairly well stocked with such goods and supplies as the trade of the country demanded, with a branch store and a small stock of cheap stuff at Silver City, a town founded on Gold Cañon in the fall of 1859. Comstock trusted all who asked credit—made two-dollar presents to all ladies who bought one dollar's worth of goods—and posed as the popular store-keeper of the place. Having no education, no experience in business, and being unable to keep or even read his books of accounts, he very soon failed. Clerks, outsiders, and all who wanted goods, or anything else, helped themselves. It was the best fellow who could pack away the most stuff. Toward the end, seeing how all must terminate, Comstock gave the people of Carson and Silver City a benefit. Disgusted with the business of playing merchant, he flung out bolts of calico, miners' shirts, overalls, blankets, "dog-leg" tobacco, picks, shovels, "grub," and Yankee notions to Indians and all others who would pack them away, and then struck out for the new mining fields of Idaho and Montana, expecting there to find as good a mine as he had sold. Luck, however, had deserted him. He discovered neither quartz veins nor placer diggings of value. Finally, when en route to the Big Horn Mountains with a party of prospectors, he blew out his brains in a corral in a fit of despondency. Thus tragically he ended his career on the night of the 27th of September, 1870, after nearly ten years of failure in Montana and Idaho—failure made unbearable by the success of others on all sides.

Comstock was a singular being—a strange compound of greed and generosity. All his thoughts were of mines and getting gold, yet as soon as he had money he was ready to give it to the first person that asked for it. He would pay any price asked for a thing that caught his fancy, but perhaps in a day or two would tire of his purchase and give it to any one who appeared to admire it. Yet he would dispute to the bitter end the possession of a little path of placer ground or an insignificant spur of quartz, if he had ever done any work near the spot.

When he had found a claim that would pay, Comstock always so managed that others should do all the hard work. If he could not get white men to do his digging he would press Piute Indians into his service. He could not settle down to steady work, as he always had the idea that there was somewhere near and about to be discovered a bigger thing than any that had yet been found, therefore he was always on the watch—always scouting about the hills. By the early Johnstown miners he was called "Old Pancake," for the reason that he never had time to make loaf bread, but always made and fed upon slap-jacks.

Many of Comstock's peculiarities doubtless had their origin in his early irregular, half-Indian mode of life. The account he gave of himself was that he was born in Canada and bound by his father to the North American Fur Company. He said his earliest recollections were of packing traps; that he trapped all through Canada, Michigan, Wisconsin and other western regions; thence he went to the Rocky Mountains, where he was for many years a trapper and a guide. Also he claimed to have been in the Mexican war. He finally settled down in Santa Fé, N. M. From Santa Fé he went to California when gold was discovered, and in 1853 went over the mountain from Placerville to the new diggings on Gold Cañon; thence went back to Santa Fé and returned to Gold Cañon in 1855.

Comstock took a wife while acting as superintendent of the Ophir—the wife of a Mormon emigrant who camped near the mine. He first ran away with her and then bought her, paying a horse, a six-shooter and \$60 in coin, and taking a bill of sale for her. She subsequently left Comstock and ran away with another man.

Although Henry T. P. Comstock was not one of the discoverers of the great lode, he may be said to have officiated at the discovery, and so identified himself with the vein as to fasten upon it his name.

Peter O'Reiley was an uneducated, simple-minded, honest fellow. He was a natural-born spiritualist, and a believer in all manner of signs and omens. He heard voices in the earth, in the rocks and amid the silence of the mountains. He was undoubtedly perfectly sincere in what he told of the utterances of the voices. Though he located them in various places, all were really in his brain. Frequently he spoke to me of what the voices had been chiming into his ears, and was as sure he heard certain

things as though they had been told him by "Old Virginia" or any other miner of his acquaintance. Men called him a spiritualist, but he knew next to nothing about the doctrines of the modern spiritualists; his spirits were all born in his brain, which was unsound, though he was a large, powerful and apparently healthy man.

O'Reiley held on to his interest in the Ophir longer than any other original locator, and obtained for it, counting dividends, about \$50,000. He expended a considerable part of this in building in Virginia City a stone hotel called the Virginia House, and lost the remainder in stock speculations.

When O'Reiley met with losses and was overtaken by misfortune the voices became very active. When his money was gone and he had again shouldered pick and shovel the spirit voices reminded him of a spot he had once seen in the foothills of the Sierras, near the town of Genoa. There in a hill of decomposed granite the voices told him lay hidden more gold and silver than was in the whole Comstock lode.

Poor Pete set to work in the hill and toiled away alone under all manner of discouragements and in danger of losing his life from frequent caves, the ground being very wet and treacherous. Often caves obliged him to change the course of his tunnel, but the voices cheered him on with prattle of great crevices filled with pure silver and caverns lined with gold. Owing to the fact of his being one of the discoverers of the Comstock lode there were those who had sufficient faith in his luck to supply him with provisions and all else he required in his work.

O'Reiley spent about three years in his tunnel, the voices constantly encouraging him—speaking to him like old friends from the chinks of the rocks. He was so near the golden chambers that the spirit voices were quite hilarious. Never before had they so laughed, sung and kicked up their invisible heels. In the midst of the hilarity a cave occurred and the exulting miner was very badly hurt. When a physician came to dress his wounds he at once pronounced O'Reiley insane and said it was all wrong to permit such a man to work in a place so very dangerous. So the unfortunate discoverer of silver was sent to a private asylum for the insane at Woodbridge, California, where in a year or two he died. To the last the voices were calling to him to return to the golden caverns his tunnel had almost reached.

Patrick McLaughlin, partner of O'Reiley in the discovery of the silver ore, sold his interest in the mine in September, 1859, for \$3,500. This sum he soon lost in stock speculations. He then tried his luck at prospecting for gold on the California side of the Sierras. All went wrong with him, and he turned cook, and while thus working from place to place death overtook him.

"Old Virginia" (James Fennimore) may be said to have discovered the Comstock lode in January, 1859, at the point where it crosses the head of Gold Cañon, at the town of Gold Hill. Also, he is entitled to credit for having located a quartz claim in Virginia City, just west of the Ophir, a year before the discovery of silver. The croppings on which he located have since been known as the Virginia ledge. They are undoubtedly a portion of the great Comstock deposit.

James Fennimore or Finney, as he was sometimes called, was a native of the State of Virginia. He came to the Gold Cañon diggings from the Kern River country, California. He was very fond of hunting and when there was no water in the cañons for washing gold, was always out after deer, antelope and mountain sheep. It was while hunting that he found "pay dirt" at Gold Hill and made his location on the Virginia ledge.

"Old Virginia" was a favorite with the "boys." He had occasional sprees when he was full of music. Comstock had named the camp about the Ophir mine Silver City, but it happened that one night when "Old Virginia" was out with some of the boys he fell over a pile of rocks and broke a bottle of whiskey he was carrying. He at once cried out: "There, I baptize this place Virginia City!" The boys shouted: "Good! So it shall be. Hurrah for Virginia City!"

And thenceforth Virginia City it was. Comstock tried to continue the name of Silver City, but the "boys" would not have it.

Although not a locator in the Ophir mine, "Old Virginia" had valuable claims on the Comstock lode at Gold Hill, a mile south of where the silver ore was first brought to light. The jolly old man was thrown from a bucking mustang in the town of Dayton in 1861, suffering injuries which proved fatal in a few hours. He still had about \$3,000 in gold coin at the time of his death and was contemplating a trip to his native State. He was the most genial man of the old timers prominently connected with the discovery of the Comstock.

By the subtraction of common air to a pressure of 1,125 lbs. to the square inch, or 75 atmospheres, says the *Engineer*, with a condenser kept at -130° C., air has been reduced to liquid form, and the liquid when allowed to evaporate, produces, it is said, a temperature of -200° C. This is within 73° of absolute zero, which is -273° C.

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:

TUESDAY, JAN. 12, 1892.

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| 466,770. | Steam and Hot Water Boiler. | Alfred Catchpole, Geneva, N. Y. |
| 466,780. | Steam Boiler. | John Gangee, London, England. |
| 466,825. | Method of Electric Welding. | Peter Gendron, Toledo, Ohio, Assignor to the Gendron Iron Wheel Company, same place. |
| 466,850. | Metallic Standing Seam Roofing. | John B. Goodwin, Pittsburg, Pa. |
| 466,864. | Pulverizing Mill. | Emery I. Nichols, San Francisco, Cal. |
| 466,881. | Ore Feeder. | John R. Russell, San Francisco, Cal., Assignor of one-half to Fred. C. Keller, same place. |
| 466,882. | Rotary Ore Roaster. | Julius E. Shettle, Salt Lake City, Utah. |
| 466,916. | Drilling Machine. | William F. Barnes, Rockford, Ill., Assignor to the W. F. & John Barnes Company, same place. |
| 466,927. | Process of Manufacturing Steel. | Henry C. S. Dyer, Westhope, Assignor to W. G. Armstrong, Mitchell & Co., Limited, Newcastle, England. |
| 467,041. | Method of and Apparatus for the Manufacture of Lead Fiber. | Norman K. Morris, Denver, Colo. |
| 467,042. | Method of and Apparatus for Producing Lead Carbonate. | Norman K. Morris and John W. Bailey, Denver, Colo. |
| 467,069. | Air Ship. | James C. Walker, Waco, Texas. |
| 467,140. | Alloy. | Edward C. Miller, East Orange, N. J. |

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PERSONALS.

Mr. James P. Witherow, the well known engineer, of Newcastle, Pa., is lying critically ill at Pittsburg, Pa.

Hon. Peter White, of Marquette, has accepted the position of Commissioner to the World's Fair from Michigan, vice Mr. J. B. Cooper, resigned.

President McLeod and the present board of directors of the Philadelphia & Reading Railroad and Coal and Iron Companies have been re-elected.

Mr. D. M. McFadden has been reappointed superintendent of the Custer mine of the Harney Peak Tin Mining, Milling and Manufacturing Company.

Hon. Edward Hall, member of the New York State Assembly from Clinton County, has resigned his position as chief engineer of Chateaugay Ore and Iron Company.

Mr. S. W. McMunn, late of Coolbaugh, McMunn & Pomeroy, will hereafter represent Carnegie, Phipps & Co., Limited, as special railroad agent. Mr. McMunn's headquarters will be in Pittsburg.

Mr. George F. Kunz, the well known gem expert of New York City, has been elected an honorary member of the Societe Ouralienne d'Amateurs des Sciences Naturelles à Ekatherinebourg, Russie.

Mr. A. Raht, formerly general manager of the United Smelting and Refining Company's works at Helena, Mont., has left Helena for Pueblo, Colo., where he will assume the duties of his new position immediately.

Frank M. Kelly, formerly coal sales agent for the Philadelphia & Reading Coal and Iron Company, has been appointed special agent to inspect the line and terminals of the New York & New England Railroad Company.

Mr. Andrew Carnegie has added \$100,000 to his gift for the establishment of the Carnegie Library in Pittsburg, bringing up his total gifts for this purpose to \$2,100,000. There will be five branch libraries in connection with the principal library, the latter to cost \$850,000, while the branches will cost \$250,000.

Sir William Thomson, D. C. L., president of the Royal Society and Professor of Natural Philosophy at Glasgow, Scotland, who is universally regarded as the first physicist, and one of the profoundest mathematicians, most suggestive thinkers, and most original inventors of the age, has been created a peer of the United Kingdom. Honors have been showered upon him by almost every learned society in Europe in connection with his researches in light, heat, electricity and magnetism, and of recent years his investigations into the constitution of matter. He was knighted in 1866 in connection with the laying of the Atlantic cable.

The present number of the Proceedings of the Engineers' Club of Philadelphia, October, 1891, is devoted largely to a discussion of the problem of rapid transit, a question which is just now agitating the public mind in Philadelphia. Papers upon this subject are presented by Professor H. W. Spangler, and Messrs. G. Herbert Condict and T. Carpenter Smith, with discussion by several of the members. An iron sewer templet is described by Mr. H. B. Hirsh, and a portable photometer, for measuring street lights and illumination in general, by Mr. Carl Hering. Mr. Chas. H. Haupt contributes an account of a photographic survey, and Mr. Thos. G. Janvier a paper on roads.

OBITUARY.

Joseph T. Gilpin, general superintendent of the mills of the Ansonia, (Conn.) Brass and Copper Company, died last week, aged 55 years.

J. W. Clark, ex-president of the Boston & Montana and Tamarack, Osceola and Kearsarge mining companies, died on the 5th inst., at Boston, Mass., after a long illness.

Sihias Iturbide, nephew of the late Emperor Iturbide, died in the City of Mexico, on the 9th inst., of general debility. He was one of the best known civil engineers in Mexico.

John Gleason, paymaster of the Cleveland Iron Cliffs Mining Company, was murdered while at work in the company's office at Ishpeming, Mich., on the 5th inst. Robbery is said to have been the incentive.

Albert Tower, whose funeral took place on the 9th inst., in Poughkeepsie, N. Y., was born in Paris, Oneida County, in 1817. He was the owner of several furnaces and iron mines in different sections of the country.

George Walker, for 70 years a surveyor and civil engineer in northern Pennsylvania, Prothonotary of Susquehanna County in 1836, and for half a century manager of the Drinker estate of 10,000 acres in Susquehanna, Wayne, and Bradford counties, Pennsylvania, died last week at South Montrose, aged 93 years.

INDUSTRIAL NOTES.

The foundrymen of Hamilton, Ont., have reduced wages 10%.

The nail manufacturers of Canada have formed a pool, the effect of which will, it is said, be to increase the price slightly.

David Carlin, W. A. Kerr and other Pittsburg parties have applied for a charter for the Carlin Manufacturing Company, which is to make a specialty of iron and steel castings.

The largest nickel and steel ingot ever cast in the country is said to have been made recently at the Homestead works. It weighs a little over 50 tons and was made from two heats.

The Brooks Iron Company's No. 2 anthracite blast furnace at Birdshoro, Pa., resumed operations on the 5th inst., after a year's idleness. It is one of the largest furnaces in the Schuylkill Valley.

On the 7th inst., six boilers in two batteries at the Braddock Wire Works, Rankin Station, Pa., exploded, killing the engineer and injuring a number of others. The cause of the explosion is unknown.

The two great charcoal iron furnaces at Grand Rivers, Ky., were started on the 12th inst. The plant is of the most modern construction, with a capacity of 150 to 200 tons per day, and has cost about a million dollars. The plant is owned principally by Aratus Blood, the Manchester locomotive builder and prominent Boston capitalist.

In the United States Circuit Court at Trenton, N. J., on the 7th inst., the case of the Brush Electric Company vs. Accumulator Company came before Judge Green on an application for a preliminary injunction to restrain the defendants from infringing on the patents of the complainants on storage batteries. An adjournment was taken to the 19th inst.

James P. Witherow, of Pittsburg, Pa., manufacturer of furnace and rolling mill equipments, made an assignment on the 6th inst. to Alexander Thomas, of Pittsburg. The works are in New Castle, Pa., and have employed about 300 men. Several days ago they were shut down, and on the 5th inst. 239 mechanics' liens were filed by the workmen. The plant has been in charge of A. R. Thompson, as receiver, for several months. A month ago the seventy creditors decided to grant an extension of four years. At that time Mr. Witherow submitted a detailed statement of the condition of his affairs, which showed his liabilities to be \$273,225.63 and his assets \$569,774.55, consisting of open accounts, contracts on hand and the value of the plant. His total investment at New Castle amounts to \$380,000, and with the machinery, raw material, and work in process of construction is considered safely worth \$325,000. He is said to have a great deal of money tied up in the South.

A meeting of the representatives of the various Scotch oil companies was held in Glasgow, Scotland, on the 13th inst., for the purpose of discussing the report of a deputation which was recently appointed to confer with the Standard Oil Company in America. The report was to the effect that the Standard Oil Company desired to increase its exports by 10,000 tons in order to meet the increased exports from Russia, and it also wished the Scotch manufacturers to make a reduction of 10% in their output, and to reduce the price scale 1/4d. per pound. The meeting adjourned without any decision as to the action to be taken by the Scotch manufacturers being arrived at.

The comparative tests of armor plates partially carried out at the Indian Head naval ordnance proving ground in October and November, were concluded on the 13th inst. by the trial of two plates made by Carnegie, Phipps & Co. of Pittsburg. One of them was a low carbon all-steel plate and the other was high carbon nickel steel, both treated by the Harvey process of surface carbonization. The plates corresponded in their chemical composition with two plates from the Bethlehem Iron Works tested in the former trials. Their value for comparative purposes was somewhat lessened by the fact that neither was up to the proper dimensions. They should each have been 10 1/2 in. thick, with a superficial area of 8 ft. x 6 ft. The all-steel plate was warped in tempering, and in order to get a flat surface for securing it to the backing it was planed down so that its thickness at the sides was reduced about an inch. The reduction at the points of impact was not so great. The nickel-steel plate was cracked at one end, and about 20 in. were cut off, reducing it almost to a square. Owing to this reduced area, but four shots were fired at it instead of five, as at the other plates. Three 6-in. shots were fired so as to form an isosceles triangle with its apex 2 ft. below the center of the upper edge of the plate, and the base angles 2 ft. from the bottom and 2 ft. from the right and left hand sides respectively. The fourth shot was from the 8-in. gun at the center of the triangle. The points of impact on the all steel plate were the same as in the six plates previously tried—a 6-in. shot at each corner and an 8-in. shot at the center. All the conditions of the trial were as before. For the 6-in. shots a 40-caliber gun was used. The Holtzer projectiles were weighted to 100 lbs. each. The powder charge was 42.4 lbs., giving a striking velocity of 2,075 ft., and a striking energy of 2,989 foot-tons. The 8-in. projectiles were made by Carpenter, and weighed 250 lbs. each. They were fired from a 35-caliber gun with a charge of 72 1/2 lbs. of powder. The striking velocity was 1,700 ft. per second, and the striking energy 5,008 foot-tons. The 6-in. projectiles were fired first. The first shot was at the upper right hand corner of the all-steel plate, which was completely perforated, with a total penetration of 39 1/2 in. The plate was not cracked. The next shot was at the

apex of the triangle in the nickel-steel plate. The projectile penetrated 11 1/2 in. and rebounded slightly broken, leaving an irregular hole from which chips of metal flew over the bombproof and far out into the Potomac River. No cracks were visible. Shot No. 3 was at the upper right hand corner of the all-steel plate. It penetrated 30 in. in the plate and backing, and cracked a triangular piece off the upper right hand corner of the plate with a crack connecting this fracture with the shothole. Shot No. 4 was fired at the lower right hand angle of the triangle on the nickel-steel plate. It penetrated 13 in., leaving another ragged hole from which there was another shower of chips. There was still no crack in this plate. The fifth shot struck the lower left hand corner of the all-steel plate, and penetrated 35 in. in the plate and backing. The previous cracks were widened, and a new crack developed between the two upper shotholes. Shot No. 6 was at the lower left hand angle of the triangle on the all-steel plate. It penetrated 11 in. and remained intact in the shothole. A slight crack extended to the side of the plate. The seventh shot was at the lower right hand corner of the all-steel plate. It penetrated the plate and backing 43 in., and a new crack was opened up from the upper left hand hole to the left edge. This was the last shot with the 6-in. gun, which was then dismantled and replaced by the 8-in. weapon. The first shot from this gun was at the center of the all-steel plate. It went clear through the plate and backing, struck the sandbank behind them and glanced over. It was picked up uninjured. The last shot was at the center of the nickel steel plate, which had been so weakened by the three shots already grouped so close together that it was wrecked. The projectile encountered so little resistance that it went on into the sand mound. Cracks from 2 in. to 3 in. extended from the center through each shothole to the edges. This test again demonstrated the advantages of nickel-steel, treated by the Harvey process. The nickel plate, owing to its small size and the close grouping of the shots, was subjected to a very severe strain, yet until it had been weakened by three shots it kept all the projectiles out. The all-steel plate let every projectile through. Owing to the defects in these plates they cannot be accurately classed with the others tried. The all steel was the poorest of the eight fired at in the series of tests, while the nickel-steel, had it been full size, would probably have ranked about third or possibly second.

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, "is" "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one 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 the services. We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning 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.

All these services are rendered gratuitously in the interest of our 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
- 2,510. A 100-h. p. second-hand engine of high grade. Georgia.
 - 2,511. A quantity of 1 1/4-in. pipe and 1 1/4-in. hose. Florida.
 - 2,512. Latest improved pebble phosphate machinery. Georgia.
 - 2,513. A steel storage tank or standpipe, for a water works system; dimensions, 20 ft. inside diameter by 40 ft. in height; tank to be set on iron supports 30 ft. high. Maryland.
 - 2,514. Estimates on an overshot water-wheel to be built of iron and steel, to be 50 ft. in diameter and to generate 35 to 50 h. p. Pennsylvania.
 - 2,515. Three 70-saw gin stands, condensers, feeders, belting, shafting, pulleys, cotton elevators, press, etc. Texas.
 - 2,516. A well pump. Virginia.
 - 2,519. Engine, boiler and steam pump. Florida.
 - 2,520. A second-hand portable engine to run an Ingersoll drill. Connecticut.
 - 2,521. Machinery for a hroom factory. Texas.
 - 2,522. Engines, cars and 40-lb. rails for nine miles of standard gauge railway. Georgia.
 - 2,523. Hoisting engines, saw mills, screens, washers, etc., for mining phosphate. Georgia.
 - 2,524. Galvanized iron, sheet steel and hot-air furnaces. West Virginia.
 - 2,525. A complete outfit of machinery for plow factory, including boiler, engine, drill presses, power hammers, punches, shears, pulleys, shafting, emery wheel, grindstones and blowers. Texas.

- 2,526. Twelve hundred tons new steel rails, fastenings and rolling stock. Virginia.
 - 2,527. Firebrick, tile, etc., for the construction of 100 standard beehive coke ovens (12 ft. in diameter) in block. Also coal washing machinery including elevators, shafting, belting, engines and boilers; capacity 350 tons per day of 10 hours. Kentucky.
 - 2,531. Sash machinery. South Carolina.
 - 2,532. A hydraulic pump, hydraulic shape press, set of shapers 3x12 box screw, kettle, capacity about 20 gallons, mill to make smoking tobacco, and four knives. North Carolina.
 - 2,533. Engine and boiler, complete smelter, and possibly concentrating works and cars for transporting ores, etc. Texas.
 - 2,534. Full equipment for a factory for the manufacture of mechanical rubber goods, including calanders, grinders, washers, belt pressers, vulcanizers, rolls, etc. Tennessee.
 - 2,35. A 30-H. P. engine, a 45-H. P. boiler, three 70-saw or four 60 saw gin stands, suction elevators, steam press, and corrugated iron house Texas.
 - 2,536. A machine to crush hard stone from 16 to 160 mesh fine. It must be crushed, not pulverized, so as not to impair its cutting edges. The stone in the scale of hardness is about 8". Pennsylvania.
 - 2,537. Ten tons of 70 lb. rails, second hand. West Virginia.
 - 2,538. A good pug brick machine, capacity 10,000 to 12,000 per day, to be drawn by two horses or mules. North Carolina.
- AMERICAN GOODS WANTED ABROAD.
- 2,509. Catalogues, prices, and discounts of all kinds of machinery, and especially of technical novelties and oil vapor lights. Germany.
 - 2,517. Fancy brass work ornaments for brass bedsteads. Mexico.
 - 2,518. A machine for bending 1/2-in., 3/4-in. and 1-in gas piping. Mexico.
 - 2,528. Sea Island cotton gins and presses. India.
 - 2,529. Linseed, castor, ground wet crushing, and other oil making machines. India.
 - 2,530. Machines for pressing or forming oil cake. India.

GENERAL MINING NEWS.

UNION PACIFIC COAL COMPANY.—On the 7th inst. articles of incorporation of the Union Pacific Coal Company, of Cheyenne, Wyo., were filed at Butte, Mont. The purposes of the company are to carry on the business of prospecting and locating coal and stone mines, and to deal in real estate. The capital stock of the company is said to be \$20,000,000, divided into 200,000 shares of \$100 each. Along with the copy of the articles of incorporation is an annual statement signed by Sidney Dillon, the present president of the coal company. The statement says that none of the capital stock has ever actually been paid in money, but that \$5,000,000 has been paid in coal land and other property. The assets are \$10,213,975.73, and the actual cash value not less than \$10,000,000. The assets consist of material on hand, accounts and bills receivable, coal lands, mines and other property, situated in Montana, Wyoming, Colorado and Utah. The liabilities are equal to the assets, and secured by certificates of capital stock for \$5,000,000; first mortgage bonds for \$5,000,000, and the balance by cash and cash assets on hand. The statement is signed by the following trustees: Sidney Dillon, Jay Gould, Fred L. Ames and F. Gordon Dexter.

ARIZONA.

The following statements of financial condition on the 31st ult. of Arizona mines listed on the San Francisco Stock Exchange were filed on the 4th inst.: Cash—Silver King, \$1,101.56; Peer, 405.93; Peerless, \$6,177.75; Weldon, \$339.

CALIFORNIA.

The San Francisco *Bulletin* says: The receipts of quicksilver at San Francisco from California mines in December and for the year compare as follows:

	For December.	Jan. 1 to Dec. 31.
1891, flasks.....	1,386	16,264
1890.....	1,182	12,947
1891.....	1,287	14,982

The exports from San Francisco by sea last month were 138 flasks, of which 110 flasks went to Mexico. The exports in the same way for the year 1891 were as follows:

	Flasks.	Value.
Japan.....	80	\$3,753
Australia.....	10	410
New Zealand.....	250	10,349
Central America.....	210	8,736
Mexico.....	3,491	152,234
British Columbia.....	5	248
Total.....	4,046	\$175,730
In 1890.....	3,426	173,660

There has not been a flask sent hence to China in three years. Four years ago China took 3,758 flasks from us. In the year 1891 a considerable quantity was imported from China for account of Mexico, and reshipped from San Francisco.

Representative Geary has introduced several important bills at the present session of Congress. One is on the subject of mining, and provides that the President shall appoint three engineers, who will comprise the Mining Commission of Califor-

nia, and all persons intending to mine by the hydraulic process shall apply to the Commission for a license, giving a description of the land, the mode of mining and the appliances to be used. If the Commission is satisfied that the mine can be operated without material damage to the rivers a license will be issued, but if the Commissioners should find that damages would result unless dams or other works were built, it will be their duty to see that these works are properly constructed, and then they will be empowered to issue a license. Mr. Geary sets up a definition for "material damage," which the Commission will be compelled to interpret closely. It is this: "When the amount of debris accumulated in the river is no greater than the amount of alluvial or other deposits caused by ordinary farming, then there is no material damage, but when the debris of hydraulic mining is greater than the amount deposited by farming, damage is being done, and the license shall not issue. The bill also appropriates \$250,000 to be spent under the provisions of what is known as the Biggs bill for the construction of two dams, one at Bullard's bar in Sierra County and the second on the north part of Feather River, at some point to be designated by the Commission, the work to be done under the eye of the Secretary of War. The bill as originally drafted provided that the Commission should ascertain the extent of mineral land tributary to these two dams and that such land should be assessed an amount sufficient to pay for the dam, but that section was omitted.

SAN FRANCISCO, Jan. 7.

(From our Special Correspondent.)

Preparations are being made for the Miners' State convention which will meet in this city on the 20th inst. Every county in the State will send 30 delegates, with the exception of San Francisco, which will be entitled to 60. The delegates have been elected by local conventions of mining men, and where this course has not been followed the supervisors of the various counties have made the necessary appointments. The local committee has selected all the prominent men in the industry as city delegates. The objects sought to be attained by the convention are to urge Congress to make an appropriation for the construction of dams for the impounding of mining debris and to secure appropriations for the thorough dredging of the Sacramento, San Joaquin and Feather rivers.

As might be expected the Anti-Debris Association does not intend that any agitation in favor of the resumption of hydraulic mining shall pass without protest. Nevertheless the resolutions adopted on the 28th of November by the Executive Committee of the Placer County Miners Association, and which are certain to be confirmed by the convention held in this city during the current month, are along the line suggested by the report of the board of government engineers, a brief summary of which will be found in the review of the mining industry of California in 1891 in our last statistical number.

Since Governor Markham in his inaugural address boldly sided with the miners, as against the farmers, a very healthy sentiment seems to have developed in the counties concerned, and it is reasonably certain that in the near future the iniquitously selfish policy that has been followed hitherto to the detriment of the entire State will be altogether reversed.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—The secretary of this company has issued the following financial statement to December 1st: Surplus January 1, 1891, \$22,258.93; miscellaneous receipts, \$2,350.16; gold bullion produced April, \$5,812.68; gold bullion produced May, \$3,011.96; gold bullion produced June, \$4,305.01; gold bullion produced October, \$3,554.11; gold bullion produced November, \$3,060.14; total \$44,353.89. January expenses, \$2,313.68; February expenses, \$2,406.39; March expense, \$2,605.76; April expenses, \$3,049.84; May expenses, \$3,016.22; June expenses, \$3,463.50; July expenses, \$3,263.20; August expenses, \$2,828.26; September expenses, \$3,298.07; October expenses, \$4,253.15; November expenses and taxes, \$7,290.29; total \$37,908.36; surplus \$6,445.53. "Advices from Plymouth of the 12th of December inform us that the tunnel is now in 500 ft. With present rate of progress the lode line should be reached about February 1st. We may have to run some distance before striking ore."

MONO COUNTY.

The following statements of financial condition of the 31st ult. were filed on the San Francisco Stock Exchange on the 4th inst.: Cash—Bodie, \$16,985.48; Bulwer Consolidated, \$11,066.26; Mono, \$7,664.95; Syndicate, \$2,307.86.

BULWER CONSOLIDATED MINING COMPANY.—The last official letter from this mine says: "The extraction of ore from the mine and shipment of the same to the mill has been steadily carried on, and the mill has run steadily since starting up. The north stope from east crosscut from flat upraise continues to yield a fine quality of ore. Stopes 1 and 2 from the south drift from the same crosscut from the flat upraise are yielding good milling ore. We crushed the past week about 130 tons of ore. The average battery assay and tailings sample for five days were as follows.

Battery gold, \$36.20; silver, \$3.76; total, \$39.95 per ton. Tailings gold \$9.08, and silver \$3.04 per ton. Total, \$12.12 per ton."

COLORADO.

Following is given the schedule showing the reduction of freights on the Colorado Central line of the Union Pacific, so far as it relates to coal and ores:

COAL.

From Louisville, Lafayette and other northern points to Black Hawk—Old rate, \$2 per ton; new rate, \$1.50; reduction, 25%.

From same points to Central City—Old rate, \$2.25 per ton; new rate, \$1.75 per ton; reduction, 22%.

From same points to Idaho Springs—Old rate, \$2 per ton; new rate, \$1.50 per ton; reduction, 25%.

From same points to Georgetown—Old rate, \$2.20 per ton; new rate, \$2 per ton; reduction, 9%.

From same points to Silver Plume—Old rate, \$2.40 per ton; new rate, \$2.25 per ton; reduction, 6 2/3%.

ORE.

From Black Hawk to Argo or Denver—Old rate on ore valued at \$100 per ton and under, \$2 per ton, no reduction; but on ores of a valuation of \$30 per ton and under, new rate, \$1.50 per ton.

From Central City to same points—Old rate stands.

From Idaho Springs to same points—Old rate on ore valued at \$100 and under, \$2.25 per ton; new rate on same classification, \$2 per ton; valuation, 11%; new rate on ore valued at \$30 per ton and under, \$1.50 per ton.

From Georgetown to same points—Old rate, one classification on ore valued at \$100 per ton and under, \$3.25 per ton; new rate, \$3 per ton; reduction, 8%. New rate on ore valued at \$30 per ton and under, \$2 per ton.

From Silver Plume to same points—Old rate, one classification on ore valued at \$100 per ton and under, \$3.50 per ton; new rate on same classification, \$3.25 per ton; reduction, 7%. New rate on ore valued at \$30 per ton and under, \$2.25 per ton.

All ore to be billed at the highest rate and correct rate to be ascertained by agents at destination from smelter returns.

Gilpin County gets a reduction of 50 cents a ton on tailings, which is to that section a most important item.

CLEAR CREEK COUNTY.

SEVEN-THIRTY.—This mine at Silver Plume continues its rich and regular shipments of ore, and gives employment to 100 men. The main shaft, situated near the center of the property in Brown gulch, is down 800 ft. Work has been commenced on another lift of 100 ft. The shaft is 14 x 16 ft., and follows the dip of the vein, which is nearly vertical. The upper workings of the mine, says the Silver Plume *Standard*, which include some five miles of drifts, shafts and winzes, have been producing continually ore for the past 20 years, and have yielded more in the past year than in any previous. It is the intention of the owner of the property, Mr. H. M. Griffin, to continue sinking the main shaft and follow the ore bodies down to the level of the Buileigh tunnel, 500 ft. deeper, to connect the tunnel with the shaft, and hereafter to work the mine entirely through the tunnel which opens on the railroad within the limits of Silver Plume. This will greatly cheapen and facilitate the work. The main shaft, after passing for some distance through unproductive ground, has entered an ore body at the depth of 750 ft., which appears to be of great extent and value. It has been cut in the upper workings and appears to extend downward to the lowest depths reached by the shaft. The 575-ft. and 675-ft. and 775-ft. levels are now being driven into it with every indication of large returns, and 21 drifts or headings are being driven at the present time. The Seven-Thirty group embraces 60 patented claims, and is one of the most extensive individual holdings in the State. The claims cover the main vein for over one mile in length and other veins for 15 miles.

DOLORES COUNTY.

Mr. W. C. Brace, of the Rico Ore Market, is overhauling the Grand View smelter, with a view to resmelting the slag dump. There is estimated to be about 10,000 tons in the dump; a profit of 50 or 75 cents per ton will yield a handsome revenue to the management. The furnace to be operated is the one formerly used by the Grand View Smelting Company, no new machinery of any consequence being required to start up the plant. C. V. Green, formerly of the Pueblo Smelting and Refining Company, arrived in Rico last week to take charge of the metallurgical department.

LA PLATA MINES, LIMITED.—The 275 ft. cross-cut in the White Cloud mine has reached the vein and discovered ore.

GILPIN COUNTY.

The Gilpin Tramway Company for the year 1891 transported to the stamp mills in Black Hawk quite a larger amount of stamp mill and smelting ore than in any previous year since the establishing of that line of traffic, says the *Register-Call*. The following tabularized statement is furnished by Mr. Robert A. Campbell, president of the company, for publication, it giving the number of

cords, which includes the shipment monthly of both classes of ore:

1891.	Cords.	1891.	Cords.
January.....	5,345'00	August.....	5,977'50
February.....	4,500'00	September.....	5,450'00
March.....	4,735'00	October.....	5,252'50
April.....	4,807'50	November.....	4,200'00
May.....	4,477'50	December.....	4,140'00
June.....	4,430'00		
July.....	5,747'50	Total.....	59,752'00

The cords of ore, at a ratio of ten tons to the cord, gives the amount of ore handled by the company as 597,525 tons. The company has extended switchbacks to the following named mines: Calhoun, East Leavenworth and Topeka in Russell, from the San Juan mine on Quartz Hill, also from the main track on Gunnell Hill to the James Henry and St. Louis-Gunnell properties. It now has in contemplation a switchback from the Topeka to the Air Line, Denhigh and Springdale mines in the westerly portion of Russell district. There are now over eleven miles of rail laid outside the switchbacks laid the past year. The company has three locomotives and a hundred cars that can be made available as the traffic over the road demands.

BALLARAT-SMUGGLER MINING COMPANY.—The annual meeting of the stockholders of this company was held at Denver on the 4th inst. The following officers were elected: W. E. Haxtun, president; W. R. Crowell, vice-president; J. M. Houghton, secretary and treasurer. These, with N. R. Twitchell and A. W. Kellogg, were elected directors. The reports presented showed the property in very prosperous condition. It is expected that the new 20-stamp mill at the mine will be started within the next 60 days. A toll road from the mine to the Burlington road at Lyons is nearly completed. At the present time all ore has had to be hauled by a hard road to Boulder, a distance of 19 miles. By the new road it is only eight or nine miles, all down grade. This has made handling the product so expensive that ore running under \$100 a ton has been stacked up in piles all about the mine. During the past few months the capacity of the works has been doubled. The process for handling telluride ore is found to work perfectly, and with the new stamp mill the vast stopes can be speedily concentrated. Over 100,000 tons of ore are awaiting treatment. The mines have been worked for 15 years and on account of the expense in hauling an immense amount of valuable mineral has been put on the dump. As soon as the mill is completed the mine will start up with a greatly increased force. During the past year much has been done to improve the property.

NEW CALIFORNIA, LIMITED.—The following review of operations at this company's mine in Central City in 1891 is from the *Register-Call*: The California mine has been worked continuously throughout the year 1891, affording regular employment to a large number of men. The manager, Mr. Alfred Rickard, has devoted much of his attention to the development of the property and succeeded in sinking the main shaft to the depth of 2,200 ft. In doing so he was rewarded by opening up continuous and profitable bodies of ore, which, treated under stamps, yielded an average of 10 oz. gold per cord. It is reported that the ore in this portion of the mine will yield not less than \$700 per fathom of ore stoped out or drifted upon. The results of this sinking is of vast importance, as it proves in a practical manner that the veins are true fissures and are productive at great depths. Development of the deeper workings has been greatly impeded since May, through an increased amount of water flowing into the mine. It is thought that the increase is owing to infiltration from the Kansas mine, which, having been idle for some length of time partially filled with water during the wet season, which proved unusually severe and prolonged the past year. It is thought that an amalgamation of the California with the Kansas group will eventually be consummated. The production the past year was as follows:

	Cords.	Ozs. Gold.	Value.
Milling ore.....	847'50	2,100'15	\$33,602'40
Concentrates.....	696		5,914'20
Smelting ore.....	90'700		7,984'05

Making a total from 6,870 tons of ore..... \$47,500'65

The company's mill (the Hidden Treasure, 75 stamps capacity) has been well patronized by the miners of the county, the custom ore milled being 2,513-73 cords, which, added to the company's ore, gives a total of 336½ cords milled in 1891. The latest reports from the mine are to the effect that the 2,000-ft. levels are opening out good paying ore.

LAKE COUNTY.

(From our Special Correspondent.)

GREY EAGLE MINING COMPANY.—The pump station at the 450 ft. level of the Penrose has been completed, the 1,000-gallon pump placed in position with a 10-in. water column attached, and sinking has been resumed. They have only about 60 ft. of further sinking to put them into the ore body, though the intention is to cut another station when that point is reached and place another powerful pumping plant there. There are now four No. 9 B. Cameron sinkers hanging in the shaft below this station, and these ought to hold

the water down until the big pump is in. It is stated by the management that the Grey Eagle shaft, in which the diamond drill demonstrated the existence of a good body of ore, will be sunk as soon as the contact is reached in the Penrose, though no attempt to sink the Valentine Shaft, on East Third street will be made until next summer.

LEO.—It is more than probable that a strike of some importance has just occurred in the Leo Consolidation, through so little development has ensued that it is difficult to state definitely how important it may be. Fighting against a number of disadvantageous circumstances the shaft on the Leo has been fully unwatered, together with all of the workings from it, and the drift at the 530-ft. level has been run out to the northeast. Here, cutting up through pyritiferous porphyry, a streak of extremely high grade sulphide ore has been met with. This, however, can hardly be a portion of the Moyer ore chute, as the Leo workings are too far to the southeast, but is evidently a chute of ore whose existence has been hitherto unsuspected.

MAHALA.—The great ore body in this mine, says the *Leadville Herald-Democrat*, continues to open up well. Shipments of good ore are being made continually. It is reported that many improvements at this mine are contemplated.

MAID OF ERIN SILVER MINES, LIMITED.—The new dryer has been finished and is in operation, handling with ease about 100 tons of ore a day. The shipments have been resumed, and about 200 tons, including lead carbonate, are daily mined and shipped. The dryer, of course, contributes largely to the successful working of the sulphide bodies, as prior to its erection the moisture in the fine ore caused a corresponding loss, both at the smelter and in the hauling. So perfectly does this work that barely 1% of water is now found in the ore upon arrival at the smelter. From the Adams Discovery shaft the level has been carried out, in ore, to a point to the south of the Standard shaft of the Wolfetone, while the 700-ft. level from the Maid of Erin has made connection with the main working shaft of the Wolfetone, which shaft has been sunk to a depth of 660 ft. from the surface, and after cutting through about 50 ft. of an intrusive sheet of gray porphyry, has got into the so-called second contact upon which the Mahala people are working, and from a basin at that point are shipping so much good ore. The Standard shaft on the Wolfetone is soon to be sunk.

THESPIAN.—The most important transaction of the past week has been the sale of ex-Senator Tabor's interest in the Thespian to some Chicago parties. These, in conjunction with Captain George Jenks, intend effecting an immediate resumption of the work of development there, and the initial effort will be made in the continuance of a winze, which has already attained a depth of 70 ft., sunk at the end of the northwest drift from the 523-ft. level. This drift is out about 700 ft. from the shaft, and is going down in a synclinal basin in which some fine argentiferous iron ore has already been found. The developments here will be anxiously watched, as the mine is located about 2,000 ft. south of the Wolfetone and Maid of Erin territory, where no bodies of ore have as yet been discovered.

EL PASO COUNTY.

The snow now lies very heavy on the ground at Cripple Creek and but little prospecting can be done, but, nevertheless, new finds are reported every day, extending for miles in all directions. Some very experienced miners have visited the camp and reported favorably upon it. Mr. Newberry, manager of the famous Mollie Gibson and Aspen Contact mines at Aspen, made a report upon the Buena Vista lode at the time the option was taken that was flattering in the extreme.

OURAY COUNTY.

AMERICAN BELLE MINES, LIMITED.—A fire took place at the shaft-house of the National Belle mine on the afternoon of the 27th ult., by which the shaft, hoisting frame, some machinery and tools were destroyed. The engine-house, with winding engine, was saved. The shaft-house and contents are insured, but the accident will cause some delay in mining operations at this point.

PITKIN COUNTY.

The *Rocky Mountain Sun* reports the mineral production of Aspen for the past seven years as follows:

Year.	Tons.	Value.
1884.....	10,000	\$1,420,000
1885.....	12,500	1,625,900
1886.....	13,000	1,530,000
1887*—wagon shipment.....	12,500	2,353,000
1887—railroad shipment.....	14,300	
1888.....	30,170	5,299,860
1889.....	127,750	7,259,000
1890.....	117,580	7,098,249
1891.....	143,763	9,299,300

* Prior to 1887 all shipments were made by wagon; in that year the Colorado Midland and Denver & Rio Grande railways were built to the camp.

RIO GRANDE COUNTY.

The most peculiar thing about the Creede boom, says a Western exchange, is the remarkably low prices prevailing. The best hotel in Creede charges 50 cents a meal and the same for a bed, and there are a number of places where meals are furnished for 25 cents. Work seems to be plenty and wages fairly good for those who are prepared to handle

the axe, saw or hammer, but there is no use of mine buyers or prospectors going in until the snow disappears in the spring. Business of every kind is fully represented.

SUMMIT COUNTY.

(From our Special Correspondent.)

ROBINSON CONSOLIDATED MINING COMPANY.—The outlook for this property is extremely favorable, as the incline from the East shaft caught the No. 2 chute at the 16th level, and has followed it down to the 19th—50 ft. intervening between each level. The incline is now showing ore in the breast. They are shipping on an average about 25 tons of high grade lead sulphide a day, with a steadily increasing output. In the main tunnel a persistent effort is being made to carry it into the Giant ore chute, the tunnel having advanced about 2,300 ft.

IDAHO.

BOISE COUNTY.

The *Idaho Statesman* says: The Elmira mill at Banner is making a splendid record this year, the yield being from 4,000 to 4,500 oz. silver bullion per week. Beaver district, sometimes known as El Dorado, will be the district to start a boom for this county when spring opens. Silver ore was first found there in 1889, by A. W. Dunn, who recorded five claims on July 5th. He commenced work on them, and during the fall sent a few tons of ore to Banner that milled nearly 400 oz. of silver per ton. A good many locations were made in 1889 and 1890, on 30 of which representation work has been done. The owners of the principal mines in the district are A. W. Dunn, M. H. Kempner, Vivian Thorne, Dr. Southworth, D. W. Brown, Charles Curtis and John Henry. They have done a large amount of work on their claims and developed many wonderful silver mines, as well as several mines on the gold belt, half a mile south of the silver veins. These mines are 10 miles southwest of Banner, and in the right direction to be on the same belt. They are on a direct line between the Banner and Summit Flat mines. All of the gulches of the district carry large streams of water the year round, and the finest timber for lumber and mining purposes is abundant; in fact, the mines are surrounded by a dense forest of pine and fir.

OWYHEE COUNTY.

DE LAMAR MINING COMPANY, LIMITED.—The following is the latest advice from this company's mine: We have struck a seam of shipping ore against the hanging wall of the 77-ft. vein in the Wahl tunnel, 7 in. wide, assaying \$500 per ton. I think it is the same which we found on the No. 7 level 100 ft. above.

ILLINOIS.

MERCER COUNTY.

COAL VALLEY MINING COMPANY.—Two hundred coal miners employed in the mines of this company, at Cable, are on strike. They struck because of wage troubles and dismissals.

KENTUCKY.

COAL.

HECLA COAL MINING COMPANY.—This company is now making shipments of its coal to Chicago and Milwaukee. It has added a new haulage plant, with electric power, as well as a complete mining machine plant, with one motor car and seven electric mining machines to its equipment.

MICHIGAN.

COPPER.

ATLANTIC MINING COMPANY.—This company has announced a reduction in wages of 7% it be the second of a similar percentage since September 1st, 1891.

ARNOLD MINING COMPANY.—One thousand shares of the company's stock on which there was a delinquent assessment of 25 cents, were sold on the 11th inst., in Boston, Mass., for the amount of the assessment.

CALUMET & HECLA MINING COMPANY.—Superintendent John Duncan is quoted by the *Calumet Conglomerate* as having said that for years there was never so much water in the company's mine at this time of the year as now. All the pumps in No. 5 Calumet shaft are working to keep it down. Heretofore this has been necessary only in the Spring. The smelting works at South Lake Linden have been closed for an indefinite period. For the past week the company's daily shipment of mineral from the stamp mill to the Black Rock (Buffalo) smelter has been somewhere between 75,000 lbs. and 100,000 lbs. From this it may be deduced that it is the policy of the company to run the eastern smelters and use the Lake Linden plant as an auxiliary. Notices forbidding admission to any of the company's engine-rooms and shops are up all over the mine. No one but employes is allowed in except on passes. These strictures are drawn closer every year. There is some especially good ground at No. 6 shaft, South Hecla. It is down between the 31st and 32d levels.

FRANKLIN MINING COMPANY.—This company has declared a dividend of \$2 per share, payable January 25th, to stock of record July 11th. This is the first dividend since July 11th, 1891. The *Boston Herald* says that the company still has assets of \$12 per share in cash, copper and supplies. The report that it has loaned money to other companies is denied.

A recent issue of the *Michigan Copper Journal* contains the following: One more shaft at the mine has closed down, and 25 men are out of employment. The company had operated to the line of its property, and, consequently, could not go further until the deal now in hand is closed. It is possible the matter will be arranged before spring, when the mine will again be operated to its fullest capacity.

ISLE ROYAL MINING COMPANY.—Under the 30-year clause of limitation in the State laws relative to corporations, the charter of this company expired on the 19th ult. Under a reorganization which has been effected the capital stock is \$500,000, divided into 20,000 shares. The offices of the company are located in this city.

OSCEOLA CONSOLIDATED MINING COMPANY.—The *Portage Lake Mining Gazette* publishes the following relative to this company's mine: The Opechee shaft is down to the 21st level and drifting at that point is under way. The equipments at both the mine and mill have been placed on a footing commensurate with the needs of a large producer, and during the present year we expect to see copper laid down as cheaply, if not cheaper than ever before.

IRON—GOGEBIC RANGE.

NORRIE.—Every few months the management of this mine, says the *Ironwood News Record*, knocks out the props of some of the upper levels and let down the surface. A year ago there were but two "drops"—the one extending from No. 4 to 7 shaft, and the other between No. 8 Norrie and No. 2 East Norrie. But during the past year the pillars have been "robbed" and the legs blown out to such an extent that the surface has fallen in for almost the entire length of the workings from No. 2 to No. 8 shaft. The latest piece of ground to succumb was that between Nos. 6, 7 and 8 shafts, this was let down about a week ago, the pillars of the first, second and third levels being "robbed" to an extent considered safe and practicable, and then fifty or sixty enormous charges of giant powder exploding simultaneously, did the rest.

NORTH PABST IRON MINING COMPANY.—A boiler explosion occurred at the North Pabst mine, at Ironwood Mich., on the 12th inst., which shook the entire eastern part of the city. The hoisting plant, engine house and mine office were wrecked. John Hughes, a drum man, was blown 50 feet, death being instantaneous. John Carney, a pump man, was being lowered into the shaft when the explosion occurred. The shock broke the cable, Carney falling to the bottom of the shaft into several feet of water. He sustained severe injuries about the head and was unconscious when brought up. Superintendent Buddle was buried in the ruins, and dangerously hurt, his escape from death being miraculous.

IRON—MARQUETTE RANGE.

LAKE SUPERIOR IRON COMPANY.—During the past season this company completed a new shaft to the section 16 deposit and one at the east end of the Hematite workings for the purpose of reaching ore extending beneath Lake Angeline. It has two more in course of sinking at section 21, a short distance south of Ishpeming. It is also straightening No. 6 shaft so that a cage can be used therein. A large steam shovel has been added to the mine's equipment. The cage shaft of the Hematite mine was rendered temporarily idle by reason of fire which occurred November 28th. In four weeks repairs had been completed and the cage placed in operation. The big pump on the 513-ft. level has been started. On section 21 the first shaft has reached a depth of 80 ft., and hoisting has been commenced at the second. At this point the Winthrop Iron Company has developed a large body of ore on the property of the Lake Superior, and it is for this, and its extensions, that the latter company is sinking.

VOLUNTEER.—Shaft "C" is soon to be the main outlet for the ore of this mine. It is now done 220 ft., and will be ready for use in two months. In the bottom openings a marked improvement over previous showings is made in the condition of the ore—it giving 63% metallic iron. Exploration work at the extreme east end of the mine has proved the presence of a large and what promises to be a profitable ore deposit. The *Iron Ore* says that at all points the mine looks well, and is in shape to produce more hard ore next season than any other mine in the district.

IRON—MENOMINEE RANGE.

The last issue of the *Norway Current* states that the water continues to rise in the Ludington and Hamilton shafts. On the 7th inst., it had reached a point 40 ft. above the 9th level in shaft "A" at the Ludington, and was rising at the rate of about one foot an hour over the plunger pump which was throwing about 500 gallons per minute. Preparations were being made at that time to use the skips in "A" as bailers and to put two bailers into shaft "B." When this had been done it was thought that the water could be lowered or at least held down until other pumps could be placed. It was also the intention of the management to put in pumps at the 8th level which would throw water to the big plunger pump to fully supply it, the conditions at present being that there is a 14-in. lift under an

18-in. one and the 18in. is not being supplied to its full capacity. The water is going down in No. 2 shaft at the Hamilton very slowly, and had fallen on the 7th inst. altogether, 134 ft. The amount of water in No. 1 of the Hamilton cannot be told, as no one can get down to ascertain without some risk, but it is probable that it is fully as high as in the Ludington.

MINNESOTA.

There is in practical operation in this State a law relative to the leasing of State mineral lands, of which there are many acres on the Vermillion and Mesabi ranges. By its terms any one can secure for a year, in consideration of \$25, a permit from the State to explore and prospect on any 40-acre tract of its land. At the end of the year for \$100 the right can be extended for another year. At the end of either the first or second year, the person who has been exploring can secure, as against all other persons, a lease of the property for 50 years. The terms of the lease are that \$100 a year royalty must be paid until a railroad comes within two or three miles of the property, and after that a royalty of 30 cents per ton per year on at least 5,000 tons of ore. Any person can take any number of forties. The new law has already resulted in an enormous amount of prospecting and the discovery of several fine mines, some of which will pay annually large sums to the State. The Chandler, which occupies only two forties, has paid as high as \$90,000 royalty in a year.

IRON—MESABA RANGE.

OHIO MINING COMPANY.—This company has recently filed articles of incorporation. Its capital stock is \$1,000,000. Its incorporators are: James E. Campbell, E. D. Sawyer, W. J. Hilands, of Cleveland, O.; C. F. Nester, of West Virginia; S. R. Ainslie, general manager of the Wisconsin Central road; R. S. Munger, Dr. Fred Barrett, M. R. Baldwin, T. H. Pressnell, and J. K. Persons, of Duluth. Its officers are: Governor James E. Campbell, president; M. R. Baldwin, vice-president; Dr. Fred Barrett, Tower, secretary and treasurer.

For the past three weeks explorations have been carried on in section 11, 58-17, under the superintendence of E. W. Mee. At a depth of 13 ft. ore was struck in the first pit. Another pit was next sunk farther south, and is also bottomed and is still working in good ore. Fifteen additional men were sent into the camp Monday, and developments will be carried on most energetically. Land in sections 9 and 16 is also controlled by the company.

MESABA LAND AND EXPLORATION COMPANY.—Alfred Merritt, Roswell H. Palmer and John Helmer have applied for a charter under the above caption. The capital stock is to be fixed at \$100,000 in 10,000 shares. Exploration will soon be commenced on the property.

GREAT NORTHERN MINING COMPANY.—This company has been incorporated with a capital stock of \$2,000,000 by the following: L. Robbins, T. Merritt, John T. Culhertson, Napoleon Merritt, R. Brace, A. Merritt, W. Allnuth, W. Merritt and H. A. Wing, all of Duluth.

MONTANA.

ANACONDA MINING COMPANY.—This company now employs 3,200 men. During December it is said to have produced 10,000,000 lbs. of fine copper. The company is doubling the capacity of its electrolytic plant.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—This company advertises that sealed proposals will be received until noon of Monday, January 25th, 1892, for the sale of 7% first mortgage bonds, due January 1st, 1898, at not above 110 and accrued interest sufficient to absorb the sum of \$50,361.83 or any sum thereof, in accordance with the mortgages dated August 23rd, 1887. Proposals will be opened and successful bids declared January 25th, 1892, and interest on accepted bonds will cease January 28th, 1892.

DEER LODGE COUNTY.

HOPE MINING COMPANY.—At the regular meeting of the stockholders, held at St. Louis, Mo., on the 11th inst., the following directors were elected: G. A. W. Augst, James O. Broadhead, Wilbur F. Boyle, G. W. Chadbourn, Luther H. Conn, Chas. A. Cuno, Louis Duestro, H. B. Louderman, Edgar Miller, H. F. Niedringhaus, John C. Porter, Augustus F. Shapleigh and John F. Shepley. A telegram was also received from the superintendent, which stated that the rock crusher had been repaired and the mill started on the 10th. The mine is reported as looking well.

GALLATIN COUNTY.

All the machinery boats belonging to the company that worked in the vicinity of Three Forks with a dredge last summer have been attached at the instance of a Colorado Bank for the sum of \$13,000.

JEFFERSON COUNTY.

ELKHORN MINING COMPANY, LIMITED.—The manager's report for November shows that the mill was closed down for three days at the beginning of the month in order to put in two new sections in the roasting furnace, and to rebuild the arch. At the same time a new pan was set up to replace an old one which had given out. The general grade of the ore milled was above that of the previous month. For the time run the crush-

ing per stamp was about the same. The machinery all worked satisfactorily. Following is the mill work for November, 1891: Dry tons panned, 980-36 tons; average assay value, 42.60 ozs.; average per cent. salt used, 14; average value of tailings, 3.3 ozs.; average per cent. saved, 93.4; No. of Doré bars produced, 39 bars; No. of ounces fine silver produced, 39,682.11 ozs.; No. of ounces fine gold produced, 46,204 ozs.; batteries in service, 26½ days; pans in service, 27 days 12 hours; estimated value of hullion shipped, \$36,950; actual returns from ore shipped, \$32,251.66; total, \$69,201.66; current expenses, including salaries, labor, supplies, etc., \$23,894.05; profit for November, 1891, \$45,307.61.

MOUNTAIN KEY.—Judge Armitage and associates, of Helena, Mont., have purchased this claim located on the left-hand fork of Indian Creek above St. Louis.

PRINCE.—E. F. Nave, of Radersburg, recently sold this mine to W. B. Stockton for \$5,000.

LEWIS AND CLARK COUNTY.

ORO CACHE GOLD MINING COMPANY.—An important strike is reported to have been made in this company's mine at Summit, in a tunnel which cut the lead at a depth of 400 ft. It consists of 2 ft. of high grade gold ore, carrying from 6% to 8% of pyrites, which runs from \$500 to \$800 per ton.

MEAGHER COUNTY.

ATLANTIC MINING AND MILLING COMPANY.—Articles of incorporation of this company were recently filed at Helena, Mont. Business is to be done in the Barker district. The capital stock is \$1,000,000, and the incorporators are Mathias Galitzek, Henry Vorhen, Charles Willing, Peter Jones and Harry C. Shipkey.

CUMBERLAND MINING AND SMELTING COMPANY.—The vein of the Cumberland has now been prospecting to a depth of 600 ft. From the surface to the lowest development; the lead possesses a uniform dip of 52° E, while its course is north and south. The regularity of the dip of this vein in a lime formation arrests the attention and amazes every expert miner who has had the occasion to examine it, says the *Helena Journal*.

MOULTON MINING COMPANY.—The new hoisting engine of the Moulton mine at Neihart is in operation. The main building is 160 ft. long. It contains the two boilers, which are each 6 ft. in diameter. The engines are two, of about 80 H. P. each. The machinery, engines, reels, etc., resting on one foundation, weigh about 26,000 lbs. The reels use a flat wire rope. The shaft house is 65 ft. high, supplied with an exceedingly strong galloways frame. The shaft is now completed 290 ft. down, and at 300 ft. the intention is to cross-cut to the vein, which is expected to be reached 105 ft. from the shaft. The building and machinery for this mine have cost \$30,000. The lower stopes in the old shaft have been opened and some ore has been taken out.

YELLOWSTONE MINING & SMELTING COMPANY.—The working shaft has attained a depth of 415 ft. A station will be cut, after which the work of cross cutting on the vein will be commenced. While sinking the last 15 ft. the ground became very soft. In it rich bunches of gray carbonates were found. This discovery was quite unexpected, as the shaft is sunk to the north of the vein. The ore encountered in the lowest workings, like that in other mines of Castle, is richer than that found near the surface.

NEVADA.

The following statements of financial condition on the 31st ult. were filed with the San Francisco Stock Exchange on the 4th inst. Comstock mines: Indebtedness—Belcher, \$10,418.23; Challenge, \$3,719.93; Confidence, \$5,208.21; Crown Point, \$28,376.14; Chollar, \$29,412.24; Hale & Norcross, \$40,419.19, with \$45,914.50 uncollected on the pending assessment; Occidental Consolidated, \$6,893.61; Potosi, \$41,716.42; Savage, \$17,677.67. Cash—Alpha, \$19,793.31; Alta, \$9,507.45; Andes, \$7,669.62; Bullion, \$6,430.68; Best & Belcher, \$15,652.60; Consolidated California & Virginia, \$41,168.09, with hullion on hand valued at \$63,062.43, and further shipments to arrive; Consolidated Imperial, \$6,726.64; Caledonia, \$11,061.53; Consolidated New York, \$9,811.76; East Sierra Nevada, \$949.70; Exchequer, \$5,361.82; Gould & Curry, \$6,505.46; Julia, \$9,092.95; Kentuck Consolidated, \$8,902.12; Lady Washington, \$8,756.86; Mexican, \$4,125.76; Ophir, \$6,946.78; Overman, \$11,706.23; Silver Hill, \$7,087.35; Segregated Belcher, \$5,525.39; Scorpion, \$511.19; Sierra Nevada, \$13,517.88; Utah, \$4,351.34. Tuscarora mines: Indebtedness.—Belle Isle, \$9,838.17; Del Monte, \$13,560.49; Navajo, \$21,618.78, with \$12,800 due on pumping account. Nevada Queen, \$20,472; North Belle Isle, \$25,005.69; North Commonwealth, \$8,261.16; Casa.—Indebtedness, \$390.68; Coptis, \$16,528.96; Candelaria mines: Indebtedness.—Holmes, \$36,960. Cash.—Mount Diablo, \$8,990.61.

ELKO COUNTY.

The following are the latest letters from the superintendents of Tuscarora mines:

BELLE ISLE MINING COMPANY.—Southwest drift from the Williams cross-cut extended 16 ft.; have started an intermediate drift north from the winze below the 300-ft. level. No. 2 vein, and the face is showing very fine ore. Stopes on Nos. 2 and 3 veins are producing as usual.

DEL MONTE MINING COMPANY.—The joint drift

on second level has been advanced to 10 ft., exposing ore along the line 45 ft.; have started to open stopes on this ore; North drift from No. 3 raise third level, advanced 15 ft., encountering bunches of good ore. West drift from same point has been extended 11 ft. without material change.

NAVAJO MINING COMPANY.—North intermediate drift below 350 ft. level extended 4 ft., yielding some good ore; No. 2 winze below 350-ft. level sunk 4 ft. on a small vein of very rich ore. The stopes are yielding as usual, but we have been unable to ship any ore, owing to continuous snow storms.

NORTH BELLE ISLE MINING COMPANY.—No. 3 drift, 400-ft. level, extended 5 ft.; No. 3 north drift, 500-ft. level, extended 13 ft., again cutting the vein; crosscut from No. 2 raise, north end, extended 7 ft., passing through several stringers of good ore. Winze below intermediate crosscut sunk 7 ft., exposing a strong vein with very rich ore. There is no doubt but that this vein is the No. 1 vein of the Belle Isle that has yielded so largely in the past. The stopes are yielding as usual and employing about ten men.

NORTH COMMONWEALTH MINING COMPANY.—The stopes north on the second level from the winze do not look so well as last reported; on the south and east of winze still showing very high grade ore, have started winze from west drift to follow the ore down.

LANDER COUNTY.

PITTSBURG CONSOLIDATED GOLD MINES, LIMITED.—The second ordinary general meeting of this company was held in London on the 30th ult. The chairman stated that since the reconstruction of the company (February 14th, 1890) the sum of £13,023 had been realized from the sale of bullion. Captain Secombe, superintendent of the mines, reported that latterly the ore had been becoming poorer and water scarcer, and the clouds seem to be lowering over us. A great portion of the ore reserves has been now used up. There is still a considerable quantity there, but on the development of the mine and on the supply of water everything really depends. Recently the outlook has become somewhat better, however. At present the operating expenses at the mines are exceeding the bullion yield about £50 to £200 per month.

STOREY COUNTY—COMSTOCK LODGE.

Following is an official statement of sums disbursed to employés of Comstock mining companies for services during the month of December, according to the Virginia City *Chronicle*: Confidence, \$1,178; Challenge, \$1,654.50; Imperial, \$1,336; Yellow Jacket, \$1,218; Hale & Norcross, \$6,450; Savage, \$3,508; Ophir, \$2,486.88; Mexican, \$2,791.37; Consolidated California & Virginia, \$34,389; Chollar, \$10,434; Potosi, \$3,435; Silver Hill, \$1,804; Consolidated New York, \$1,685; Alpha, \$1,170; Exchequer, \$1,170; Ward Combination Shaft, \$3,120; Bullion, \$2,924; Sierra Nevada, \$3,890; Union Shaft, \$2,744; Occidental, \$3,000; Quartz Mills, \$20,000; Pumping Association, \$4,000; Water Company, \$6,000; Electric Light Company, \$2,500; Utah, \$2,848.50; Best & Belcher, \$2,666; Gould & Curry, \$2,492; G. & C. and B. Shaft, \$248; Andes, \$2,500; Belcher, \$6,107; Seg. Belcher, \$795; Crown Point, \$4,319.25; Justice, \$2,085.75; Kentuck, \$994; Belcher Shaft, \$124; Oest Mine, \$3,420; total, \$171,775.25. Estimating the Alta at the preceding month's figures brings the total up to \$173,475.25.

CONSOLIDATED NEW YORK MINING COMPANY.—According to the Virginia City *Enterprise*, a strike of rich ore is reported in this company's mine on the 600-ft. level. It has been tapped by four crosscuts, and the last of these has developed richer ore than its predecessors. The ore in the last crosscut is said to go \$500 or \$800 per ton.

CROWN POINT INCLINE.—Following is the official report of the pumping operations in the Crown Point incline for the week ending January 2d, 1892: The pumps have been working up to their full capacity during the week. The pressure of the water is being reduced rapidly, and in a few days we expect to be able to bore another hole through the bulkhead. The surface of the water in the Belcher incline is now 125 ft. below the floor of the 1,600-ft. station. At the Overman mine the surface of the water in the vertical shaft is 45 ft. below the 1,400-ft. station.

(From our Special Correspondent.)

Included in the relocation of the Comstock mining claims, filed January 1st, 1892, is that of the Cole tunnel, the title to which has hitherto been vested in the Virginia & Gold Hill Water Company, and prior to the construction of that company's flume from Marlette Lake it was the sole water supply for Virginia City. W. S. Hobart and the late John Skae were the original locators of the Cole tunnel water right. The relocators claim that the ground is unpatented, and, the water company having failed to perform its tunnel work, the relocation is valid. The tunnel property was recently leased, but the lessee was refused admittance by the relocators. Superintendent Overton, of the water company, has promised to put the lessee in possession, but has failed to do so far. W. H. Jackson and John B.anner, veteran miners, are the relocators, and have fortified themselves in the tunnel, which they are holding with their Winchester. The ground included in the tunnel location is west of the main Comstock lode.

The following is the weekly statement of ore ex-

tracted from Comstock mines, shipped to the mills, and the average assay values:

Mine.	Tons extracted.	Tons milled.	Assay Value. Jan. 2.	Dec. 26.
Con. Cal. & Va.	1,025	980	\$22.36	\$24.55
Chollar.....	368	368	18.91	18.10
Overman.....	.....	.....	.....	.....
Savage.....	686	530	20.00	21.00

***Cars.**

ALTA SILVER MINING COMPANY.—The southeast drift, 1,350-ft. level, has been advanced 11 ft. in quartz showing bunches of fair ore, but too low to save. The mill was started up last week and is working well. The north drift 1,350 level has been advanced 20 ft., the face being in ore of fair milling grade.

BELCHER MINING COMPANY.—The raise from the north lateral draft, 500-ft. level, is up 95 ft.; the top is in old ground with quartz in place on the west side of it containing spots of pay. Are opening out to the north from the 1,300-ft. level south raise on the fourth, fifth and sixth floors. The pay streak varies from one to two feet wide and is of fair grade.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—The bullion report for the month of December was as follows: Worked at the Morgan mill, 3,520 tons ore. Bullion produced: Gold, \$30,825.58; silver, \$28,015.22; total, \$58,840.80. Yield in bullion per ton: Gold, \$8.75; silver, \$7.95; total, \$16.71. Assay value of the ore per ton per battery samples, \$23.95.

Worked at the Eureka mill, 1,811 tons of ore. Bullion produced: Gold, \$16,070.95; silver, \$20,639.54; total, \$36,710.49. Yield in bullion per ton: Gold, \$8.87; silver, \$11.39; total, \$20.26. Assay value of the ore per ton per battery sample, \$29.25. The total amount of ore worked was 5,331 tons; total amount of bullion produced: Gold, \$46,896.53; silver, \$48,654.76; total, \$95,551.29. Average yield in bullion per ton: Gold, \$8.79; silver, \$9.12; total, \$17.92. Average assay value of the ore per ton, \$25.75. For the year 1891, from scraps in the assay office: Gold, \$613.86; silver, \$821.01; total, \$1,434.87. Granulations: Gold, \$246.63; silver, \$278.57; total, \$525.20. Total seraps and granulations, \$1,960.01. The loss during the month has amounted to about \$25,000, and consequently the reserve in the company's treasury has been drawn upon to this extent.

GOULD & CURRY MINING COMPANY.—All work in the upper levels is about to cease, and attention will be directed to exploring operations on the 1,600-ft. level where a large block of ground remains intact.

HALE & NORCROSS MINING COMPANY.—The case of M. W. Fox vs. the directors of this company came up before Judge Hebbard on Monday last. Counsel representing Alvinza Hayward and W. S. Hobart, two of the new defendants, asked for a continuance, on the ground that the defendants had not had sufficient time to digest the testimony already taken and that they also wished to take numerous depositions in Virginia City. The application was opposed by plaintiff, but the court thought the request reasonable and gave the defendants until the 25th inst. to examine the testimony and take depositions.

WHITE PINE COUNTY.

OSCEOLA GRAVEL MINING COMPANY.—A nugget was picked up at the bed rock of the Osceola gravel mine on November 29th which weighed 145.75 ounces, its value being about \$2,200. It contained about 125 ounces of gold, the balance being quartz. A characteristic of the Osceola nuggets is the presence of quartz imitating the proximity to the original source of the gold. The cubic contents of this large nugget recently found were about 41 inches.

NEW MEXICO.

SANTA FE COUNTY.

The Cerillos Coal Railroad Company, with a capital stock of \$2,500,000, has filed a charter with the Secretary of State. The incorporators are A. G. Taylor of Chicago, R. C. Kerens, Charles H. Smith, P. M. Hoeffle, F. W. Risque and F. W. Schuarte of St. Louis, and R. J. Palen of Santa Fé. The charter calls for the building of 76 miles of railway lines in this County, starting at Cerillos, on the line of the Santa Fé, and radiating south and west through the coal and mineral fields to San Pedro. Construction work will begin within two weeks. This road will open the richest coal and mining regions in the State. The Cerillos Coal and Iron Company and the Atchison, Topeka & Santa Fe Railway Company are working in harmony on the new project.

GRANT COUNTY.

W. H. Newcomb, of Silver City, has contracted for the delivery of 124,000 lbs. of iron ore to the smelters at El Paso, Socorro and Pueblo during the next year, and shipments have already been commenced from Legal Tender Hill. Iron shipments from Silver City have never before exceeded 6,000,000 lbs. per month, but the average for the next year will probably be more than double this amount.

SUNSET MINING COMPANY.—This company has been organized in New Orleans and has purchased the Ann Arbor mine at Mogollon, Silver Creek. The purchase price was \$20,000 cash and a large stock consideration. The deal was promoted and effected through the efforts of Judge Ed. Nester, of Silver Creek. Two veins within the company's

grounds are considered very promising. Development work will be started about January 15.

CONTENTION.—Mr. James Martin, the lessee of this mine, the property of Judge Ball and others, has rescued it from comparative failure, says the *Southwest Sentinel*, and by competent mining judgment, and push made it a fair producer, and placed it on a paying basis. The mine is in limestone, and is situated on a low lying foothill abutting on the plains. The ore consists of galena and lead carbonate, and by rough sorting runs 45% lead and from \$13 to \$18 per ton in silver. The last four carloads of ore were consigned to the Pueblo Sampling Works, sold in the open market, and being a desirable product for the smelters, realized its full value, and the returns were satisfactory. Three teams are constantly employed hauling ore to the railroad depot of Deming, 22 miles distant, the freight being \$4 per ton. Mr. Martin, with a small force of miners, has chiefly done preparatory work, but has managed to ship a carload per week. Judging from the new ore chambers that have been recently opened up, and the quantity of ore exposed, the mine promises to be a big producer for some time to come.

PENNSYLVANIA.

COAL.

In the celebrated Lazarus will case the State Supreme Court has decided that a lease of "all the coal" under a lessor's land, whether perpetual or for a term of years, is a sale of said coal, or as much thereof as is taken out during a stated time, and that the consideration is not rent, but purchase money.

The West Lehigh mine fire at Ashland is still raging furiously, and appears to be of enormous proportions. The burning vein is almost 70 ft. thick. The outlook is very discouraging, the supply of water being insufficient.

DELAWARE, LACKAWANNA & WESTERN.—Orders have been issued from headquarters that the three greatest collieries of this company in the Plymouth region shall be shut down for three days in each week until further notice. The collieries are the Avondale, Woodward and Pittibone.

HARTFORD.—A fire is raging in the old workings of this colliery at Ashley. It is in the lower lift, where two years ago 28 men were shut in and killed by a cave-in. It was discovered by a miner dipping his hands into a stream of water flowing from the mine and finding it quite hot. It will take at least a month to quench the flames and render the mine safe.

PHILADELPHIA AND READING COAL AND IRON COMPANY.—The fire which broke out in the Otto Colliery, operated by this company at Branchville, Pa., several days ago, has now been almost extinguished. The principal gangways have been boarded up and the fire is being slowly smothered. Owing to the recent rains that portion of the colliery known as "The Nest" is flooded and water is gaining rapidly on the pumps. This part of the colliery has suspended, throwing 250 men and boys out of employment.

OIL.

The production of the McDonald oil field declined on the 11th inst. to 23,600 barrels. For some weeks past the output has been declining at the rate of 1,000 to 2,000 barrels a day. There are still a dozen or more wells around McDonald that are wonderful producers. While the Mathews well of Guffey, Jennings & Co. is the banner well in the field, so far as aggregate production, to the Morrey well of Greenlee & Forrest must be given the credit of the highest production for any given 24 hours, having done 14,000 barrels; the entire output of the well being estimated at something more than 400,000 barrels. It stands at the head of the list as being the greatest of any ever discovered in this country, but owing to its close proximity to others has declined rapidly. The Mathews well has done over 525,000 barrels in six months, and placed to its owners' credit over \$315,000. On September 1st the daily production of the field was 13,000 barrels. On October 1st it had advanced to 40,000 barrels, and on November 1st had increased to 77,000 barrels. Five days later, on November 5th, the production had reached 84,300 barrels. The following day it declined to 83,000, and since then has advanced and receded at times to the present mark. The production of the entire field for the last three months has been nearly 5,000,000 barrels, to which should be added that previously produced, and it will be seen that the entire output up to date must be about 6,000,000 barrels.

STONE.

PENNSYLVANIA GRANITE COMPANY.—Officers of this company state that there is no truth in the statement that the sheriff has seized the quarries and personal property of the company at St. Peter's.

WEST VIRGINIA.

According to statistics gathered by the mine inspectors the coal production of West Virginia during the year ending June 30th, 1891, was 7,281,430 tons. The coke production in the same time was 1,238,418 tons. These figures show an increase over the preceding year of 2,555,394 tons of coal and 572,225 tons of coke, the coke product having more than doubled in a single year. The mines in operation during 1890-91 numbered 179, employing 14,178 men. At the close of the year there were 4,117 completed coke ovens and 777 under construction.

(From our Special Correspondent.)

KENOVA COAL COMPANY.—This company has been incorporated by W. W. Coe, of Roanoke; W. C. Bullett, J. S. Miller, and others, for the purpose of developing coal mines, erecting coke ovens, etc., at Kenova. The capital stock is \$10,000, with the privilege of increasing to \$100,000.

MARION COUNTY.

(From our Special Correspondent.)

VIRGINIA AND PITTSBURG COAL AND COKE COMPANY.—This company has been organized at Fairmont, with a capital stock of \$200,000, for the purpose of developing a tract of land, recently purchased, comprising 1,000 acres, situated near Fairmont. P. Y. Hite is president of the company.

PUTNAM COUNTY.

The Queen City coal works, several miles above Winfield, operated a number of years ago by a Cincinnati company, have been leased by the Brown Brothers, of Pittsburg, Pa., and put into operation.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF NOVA SCOTIA.

Following is given data relative to the coal production of Nova Scotia in 1890 and 1891:

CAPE BRETON COUNTY.			
Colliery:	1890.	1891.	
Sydney-Louisburg.....	139,777	154,656	I. 14,000
Goarrie	124,611	152,150	I. 27,500
Caledonia.....	145,000	145,000	
Mining Association.....	160,500	144,000	D. 16,000
International.....	133,000	130,000	D. 3,000
Little Glace Bay.....	108,500	115,000	I. 7,500
Victoria.....	77,367	94,000	I. 17,000
Bridgeport.....	28,700	30,000	I. 2,000
Gardener.....	.....	22,000	I. 22,000
CUMBERLAND COUNTY.			
Springhill Mines.....	377,572	405,698	I. 28,126
Joggins	53,400	60,700	I. 7,000
PICTOU COUNTY.			
Drummond.....	151,556	136,396	D. 18,160
Acadia, Albion, Vale.....	242,637	237,605	D. 5,035
Black Diamond.....	32,000	32,000	est.
Muir's Mine.....	1,000	3,000	I. 2,000
SALES BY COUNTIES.			
Cape Breton.....	1890	917,000	
.....	1891	982,000	
Increase.....	.....	65,000	
Cumberland.....	1890	438,500	
.....	1891	465,693	
Increase.....	1891	27,694	
Pictou.....	1890	430,500	
.....	1891	409,000	
Decrease.....	1891	21,500	
Grand total.....	1890	1,786,000	
Grand total.....	1891	1,856,692	
Total increase.....	.....	70,582	

The shipments of coke in 1891 exceeded 20,000 tons—from the Albion. A small quantity was also made and sold by the Intercolonial Company.

MEXICO.

HIDALGO.

Great activity is reported in the Real del Monte mining district. The owners of the San José de los Doradores mine in that district have been engaged for some time past in draining the old workings, and they have completed their work. A valuable mining concession has just been granted the Real del Monte & Pachuea Mining Company through its director, José de Landero y Cos, by the Government for the development and working of the following properties: El Capulin, Escandon, Redencion, Camelia, Quintanilla, Mora, San Nicauro, El Tulipan, Santa Rita, La Entrometida, La Llave, Santa Gertrudis, Milanese, Santo Tomas, Dolores, La Luz, San Miguel, La Constancia, El Rosario, Xumuloo, San Antonio, El Puerco (a) Xacal, El Balcon, San Cristobal, Lerdo de Tejada, El Muerto, Redentor del Mundo, San Argeorio, San Pedro, El Condado, El Perro, San Anselmo, Valenciana, La Gloria, Mier, San Antonio, El Porvenir, El Cuizi, Martinez de la Torre, San Francisco, La Fortuna, Providencia, San Clemente, San José de Garcia, Azurmendi, Cortez, Nueva, Albion, Bartolomé de Medina, El Guero, Beis Tegui, Del Rio Iturbe, Barrow, Jauja and Velazquez de Leon. The concession also embraces valuable water rights. The company is obliged to expend not less than \$1,000,000 within the next five years in working its mines, and must employ not less than 300 miners, independent of all other employés and laborers.

DURANGO.

PITTSBURG AND MEXICAN TIN MINING COMPANY.—What is said to be the first car load of pigtin ever produced on the North American Continent arrived in Pittsburg, Pa., on the 15th ult. It came from Durango, Mex., and is the property of this company. There are altogether 20 tons of metal, which is now on exhibition at the company's office. The ore of the company at its mines is said to be yielding 14%, which is remarkable, as the average at the mines in Wales is but about 2½%. The mines of the company have been opened since August, 1890, and are in a tract of land comprising 224 square miles granted to the company by the Mexican government. The vein is 125 miles from Durango and 150 miles from any railroad, but one is being built that will run within 60 miles of the mines. At present the product is transported from the furnaces to the railroad in wagons, and to do that the company was compelled to cut a road 25 miles long over a mountain. It is ex-

pected that the Durango mines in the coming year will produce 500 tons of tin. Although 20 mines have been opened up only four are in a condition to work at present. Ultimately 10 tons of metallic tin per day will be produced.

UNITED KINGDOM.

ENGLAND.

The industrial capabilities of Warwickshire as a coal-producing county appear to be rapidly progressing. The Warwickshire coal field is about 16 miles in length, and it varies in breadth from 1 to 4 miles. The annual output of Warwickshire now exceeds that of Cumberland, which has hitherto been first. The figures for 1890 show a total production for Warwickshire of 1,744,000 tons, as compared with 1,730,000 for Cumberland. Yet in 1871 Cumberland raised 1,424,000 and Warwickshire only 724,000 tons. In the decade preceding 1890 the production of Warwickshire increased from 1,101,000 to 1,744,000 tons, and the number of people employed rose from 4,193 to 5,572. The average of coal raised per man has increased from 179 tons in 1873 to 313 tons last year.

WALES.

Some time since mine owners in South Wales announced to their men they had decided to do away with the scale system and after January 1st hire men individually. The men understood this to mean there would be a material reduction in wages and much dissatisfaction was caused thereby. On the 1st inst., 85,000 miners in South Wales were idle. After a lengthy conference, however, the matter was settled satisfactorily and work will be resumed soon.

VENEZUELA.

QUEBRADA RAILWAY, LAND AND COPPER COMPANY, LIMITED.—The board of directors has sent to the shareholders an interim report on the company's business for 1891, so far as it has gone. The all-round improvement which the board was able to announce in the last annual report has been well maintained, with every prospect of continued expansion of the company's business. The mines have been opened up on a scale which has yielded a considerable increase of copper during the current year, estimated at 35% over 1890, but the board has reason to look for a still further addition to the production of copper in the near future, for dealing with which adequate machinery is being prepared. The smelting works are giving good results. The railway traffic, other than mineral, is very encouraging and has been much consolidated by the opening of the Barquisimeto Railway, the working of which, as anticipated, has resulted favorably to this company. The health of the employés at the mine has again become good. In deciding, as the board has done, to declare an interim dividend for the half year on the ordinary shares, the board is limited by the company's articles of association to a rate of five per cent. per annum.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Jan. 15, 1892.

Heavy Chemicals.—During the week under review the market for heavy chemicals has remained quiet and without features of interest. A fair business has been transacted for future delivery, but sales on the spot have been the exception rather than the rule.

Caustic Soda.—Some activity has been manifested in this article, which remains practically unchanged, at last week's prices: 60% 3-10@3-15c.; 70-74%, 2-85@2-90c.; 76%, 3-15@3-20c.; 77%, 3c.

Carbonated Soda Ash.—The demand for carbonated ash has eased off, and only a few unimportant sales are reported. We quote B. M. & Co., 48%, 1-57½@1-62½c.; 58%, 1-55@1-60c.

Alkali.—There is nothing of interest to report of this market; the demand is light. Prices are about as follows: B. M. & Co., 48%, 1-55@1-60c.; 58%, 1-45@1-50c.

Beaching Powder.—A good many contracts for delivery over this year have been made. Actual sales thus far have been very large, and there are no stocks here worthy of mention. Quotations remain at 2-10@2-15c.

Sal Soda.—There is no English sal soda here, and quotations, 1-12½@1-15c. must be regarded as nominal. Domestic brands may be had at 90@95c.

Acids.—The acid market to-day is in marked contrast to last year's at the same time. The unfavorable circumstances which tended to produce demoralization in 1890 and 1891 are absent, and acid manufacturers just now are at peace with themselves and the rest of the world. The present consumption is greater and the production not so heavy as during the corresponding period in 1891, the latter circumstance being due to the fact that those acid makers who were forced into the substitution of pyrites for brimstone on account of the high price of the Sicilian article, are not producing as much. Altogether, the outlook for the acid men is cheerful. The market is healthy, and a fair amount of business is doing. Prices, according to manufacturers, are not what they should be; but this has been the tenor of their complaints for many a year, and it must not be taken too seriously by the buyer. We quote for 100 lbs. in New York in lots of 50 carboys or more: Acetic, \$1.60@\$.2, according to quality; alum, lump, \$1.50@\$.175; muriatic, 18°, \$1.20, \$1.12½; 22°, \$1.25; nitric, 40°, \$4; 42°, \$4.50@\$.475;

sulphuric, 90c.@\$.12½; oxalic, \$.725@\$.775. Blue vitriol is quoted all the way from \$3.50 to \$4.25.

Brimstone.—The market for Sicilian brimstone is quiet. Prices, owing to advices from the other side announcing a downward tendency, show a decline over last week's. Quotations for spot are \$31 for best unmixed seconds, and \$29.50 for best unmixed thirds. Futures are held at \$29.50 for seconds and \$28.25 for thirds. The stock here is about 3,000 tons, all of which is sold. During the month of December there were shipped from Sicily to ports in the United States 13,400 tons of brimstone.

Fertilizers.—Just now the usual midwinter dullness reigns in the market for fertilizing chemicals, but it will not be very long before active operations are resumed. The demand from the South has been very light thus far, and from present indications it appears highly probable that it will not be very heavy during the present year. The condition of the farmers in those Southern States which consume the most fertilizers is far from good. Cotton, due to the exceedingly heavy crop, is very cheap, and the farmer in the States where the ground is "lean," has made but little, if any, money. The persistence with which the average cotton farmer will continue to grow cotton at a small profit, and even at a loss, is worthy of a better cause. The outcome of his misdirected activity is that money is scarce in the South, and he will lack the wherewithal to purchase fertilizers. In the North, however, the situation is quite the opposite, and, taking it all in all, the general fertilizer market will probably be normally active in 1892.

Sulphate of ammonia has advanced abroad and it shows a corresponding upward tendency here. Prices already have undergone a slight rise, 3.07½@3.10c. being quoted. Dried blood is \$1.95@\$.2.00 per unit, with moderate stocks on hand. Acidulated fish scrap is slightly higher at \$13.50 f. o. b. factory; dried scrap is \$23.50@\$.24.00. Other ammoniates are as follows: Azotine, \$2.05; tankage, \$19@\$.21; bone meal, \$22@\$.23.

In double manure salts the prices fixed by the syndicate rule. Some fair contracts are being made on that basis.

Kainit.—The busy season, so far as this chemical is concerned, is past, the manufacturers having supplied their wants for the present. Quotations can be had only from jobbers and are fixed altogether by circumstances. Futures are quoted at \$8.75@\$.9.50, according to quantity, time of delivery, etc.

Muriate of Potash.—During the week there arrived 350 tons, making total arrivals at all ports thus far this month of more than 2,000 tons. Most of this amount is, of course, on last year's contracts, although some new sales have been made in a jobbing way. A portion of this year's consumption has been contracted for already. The syndicate fixed the following prices to obtain until January 7th: To New York and Boston, \$1.78½; to Philadelphia and Baltimore, \$1.81; to Southern ports, \$1.83½. Hereafter the following quotations will rule for 100 lbs., basis 80%: To New York and Boston, \$1.81½; to Philadelphia and Baltimore, \$1.84; to Southern ports, \$1.86½.

Phosphates.—This market, in sympathy with the South, continues weak and dull. A drop of 50c. in the price of Carolina phosphate has been experienced, quotations now being \$5 and \$6 vessel, for wet and dried respectively. Dr. Francis Wyatt's article on phosphates, which appeared in the Annual Statistical Number of the ENGINEERING AND MINING JOURNAL, has attracted great attention in the trade and to every person interested in the production and consumption of phosphates in this country we would recommend a careful perusal of it.

We are indebted to Mr. Paul C. Trenholm for the following statement of the shipments of phosphate rock from Charleston, S. C., for the month of December:

	1889.		1890.		1891.	
	Crude.	Ground.	Crude.	Ground.	Crude.	Ground.
Domes-						
tic.....	15,328	.....	16,025	.....	18,157	.....
Foreign	700	.....	.....	.....	103	25
Total.....	16,028	.....	16,025	.....	18,260	25

* Shipments via S. C. R. R. are for November only; December could not be obtained.

Nitrate of Soda.—This market is somewhat weaker this week. For nitrate on the spot \$2.07½ is quoted, for a carload lot, although \$2.05 would be accepted for a large order. Futures are \$1.85 @\$.1.90, according to shipment. Goods on the way are held at \$2@2.05.

NOTES OF THE WEEK.

The Grasselli Chemical Company is building new acid works at Chicago, Ill., which will be in operation within six months.

Liverpool. Jan. 6.

(Special Correspondence of J. P. Brunner & Co.) Since the turn of the new year a fair inquiry is reported for most lines of heavy chemicals.

Soda ash is wanted and prices are well maintained, the minimum quotations being as follows: Caustic ash, 48%, £5 6s. 3d. per ton; 57 and 58%, £6 7s. 6d. per ton; carbonated ash, 48%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d., all net cash. For prime brands special prices have to be paid.

Soda crystals receive a fair amount of attention and are held for £3 12s. 6d. @ £3 15s. per ton, less 5%.

Caustic soda is the slackest article on the list, but values are nominally unchanged as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. 0d. per ton, 76%, £12 10s. and upward per ton, net cash. For parcels under 10 tons. 5s per ton extra is charged. For contracts over 1892. home consumers are offered concessions on spot quotations, and also guaranteed against decline in price, but similar privileges are denied export buyers on this side. The result of this policy is that export buyers will only operate from hand to mouth, as any change in the position is likely to be a downward one.

Bleaching powder is scarce for prompt delivery, at £7 15s. @ £8 per ton per hundred packages, net cash.

Chlorate of potash is meeting with a good inquiry and steady at 5½d. per lb., less 5%, while a number of orders at a shade under this figure have been refused.

Bicarbonate of soda is selling at £6 15s. @ £7 per ton, less 2½% per one cwt. kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia has advanced to £10 12s. 6d. per ton for 24% and £10 17s. 6d. @ £11 for 25%, in double bags, less 2½% f. o. b. here. Sellers are inclined to hold aloof, anticipating a further rise, while "bears" show an anxiety to cover their short sales. This article is in a much better position than for some time past, and it would seem as if the "bears" had lost control of the market for the present.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Birmingham, Ala., Pittsburg, St. Louis, London, and Paris, see pages 124 and 126.]

NEW YORK, Friday Evening, Jan. 15.

A review of the mining market for the week just past involves a wearisome repetition of uninteresting facts. It is the old chronicle of dullness and inactivity of a mistrustful, non-investing public, of apathy among the brokers, and of a microscopically small volume of business. Such a market prompts one to think of the "days that are no more," the days when mining speculation was a favorite pastime with the frisky lambs. *Fuit Ilium!* The reminiscentially inclined are commencing already to talk of the mining market of other years as we talk of the dead, with awed voices and eulogistic phrases. But, after all, it may be premature to write the epitaph of the New York Mining market. It is not dead yet; it is merely in a state of lethargy from which it will be aroused some day. At least, so the majority of the brokers say, just now some satisfaction is experienced in the thought that the market could not be very much worse. The year has opened inauspiciously, but if success in the actual work of mining has anything to do with the mining stock market, the close of 1892 probably will see a better state of affairs.

The Comstocks are rather weaker. Assessments have begun to rain down. Thus within a fortnight there have been assessments of Mexican, 25c.; Occidental, 25c.; Gould & Curry, 30c.; Union, 25c.; Alta, 50c., not including other assessments levied in December. Such a course cannot fail to be reflected in the behavior of these stocks.

During the week there were sales of 1,000 shares of Alta at 65c. @ 75c., and 300 shares of Mexican at \$1.70 @ \$1.85. There was a solitary sale of 100 shares of Barcelona at 6c. Best & Belcher was neglected at \$2 25 @ 2.40; Potosi opened at \$1.40 and closed at \$1.90, with total sales of 350 shares. Segregated Belcher shows a transaction of 200 shares at 70c. Union Consolidated was stationary at \$1.50 and in little request at that price. Of Utah 1,000 shares are reported to have been sold at 45 @ 50c.

Consolidated California & Virginia advanced from \$3.85 to \$4.10; 300 shares of this stock changed hands during the week. Transactions in Crown Point amount to only 200 shares at \$1.35 @ \$1.65. Of Gould & Curry 350 shares changed hands at \$1.15 @ \$1.65. Ophir was dealt in to the extent of 500 shares at \$2.85 @ \$2.95. Savage shows sales of 200 shares at \$1.40 @ \$1.60. An equal number of shares of Sierra Nevada were sold at \$1.50 @ \$1.75. There was a sale of 100 shares of Yellow Jacket at \$1.25.

Of the Tuscaroras there was a sale of 100 shares of Navajo at 2c. Interesting news concerning various Tuscarora mines will be found in our mining news columns.

Among California stocks we note a sale of 100 shares of Belmont at 68c. Brunswick was stationary at 8c. Of Bulwer 400 shares changed hands at 45c.

Only a few of the Colorado stocks were dealt in. Leadville Consolidated continues the prime favorite of the Exchange and this week disposed of 9,700 shares at 20 @ 21c. There were 700 shares sold of Little Chief at 27 @ 28c., and 900 shares of Adams at \$1.65.

Alice returns to the Exchange this week with sales of 1,000 shares at \$1.40 @ \$1.45, which is lower than it has been for a long time.

Among the Utah stocks there were sales of 200 shares of Horn Silver at \$3.85 @ \$3.95, and 25 shares of Ontario at \$45. There were sales of 400 shares of Stormont at 3c.

There was a sale of 65 shares of Deadwood Terra

at \$2.10, and another of 50 shares of Homestake at \$12. No other Black Hill stocks were dealt in.

Of Phoenix of Arizona 300 shares changed hands at 41c. The annual meeting of the Silver King Mining Company was held in San Francisco on the 12th inst. A telegram received to-day announces the re-election of the old board of trustees, with the exception of Mr. H. H. Noble. Mr. T. B. Pheby was elected president.

Shoshone was again dealt in, and the official lists of the Consolidated Stock and Petroleum Exchange reports the sale of 800 shares at 2c. Who the extravagant investor is could not be ascertained.

There was a sale this week of 100 shares of San Sebastian at 8c. No significance is attached to this transaction.

Correction.—The proprietor of the Highland mill in the Black Hills, S. Dak., indignantly and emphatically denies that there is the least foundation for the rumor to which one of our reviewers referred in the ENGINEERING AND MINING JOURNAL, January 2d, page 72, where it was intimated that the Highland Mill gets ore from the Homestake Mine and makes no return of the bullion.

The ENGINEERING AND MINING JOURNAL has many times referred to the Haggin management, best known here by the great Ontario and Homestake mines, as being one which for honorable treatment of the stockholders is an example for imitation, and it would indeed surprise us were an exception to this rule to be found in the Black Hills mines.

Our reviewer was undoubtedly misled by the ill-natured remarks that are common in every camp concerning the phenomenally successful miner or business man, and on the very highest authority we are able to correct the quasi indorsement which our reviewer accorded the rumor by giving it publicity in these pages. The Highland mill, we are officially informed, works ores from the Highland mine only, and none from the Homestake or any other mine. The Highland Company is a California corporation, all the stock is held by one man, and there is therefore no obligation to publish returns of production, which, however, we are told, can be obtained at any time from the express company's shipments. We are further informed that the Highland ore is not so rich as Homestake, and that the reason the stock of this company has not been put upon the market is that the enterprise, until recently, was too small and unimportant. This information should fully answer all mere "uncomplimentary" rumors.

Denver.

Prices and sales for the week ending January 9th, 1892:

Company.	Open- ing.	H.	L.	Clos- ing.	Sales.
Mines.					
Alleghany	07			20a	
Amity	02¾	*03¼	02¾	02¾	10,600
Bangkok-C-B	05	*07½	05	06	28,100
Bates-Hunter	70a			21	
Brownlow	05	*07	06½	06	12,700
Calliope				13	
Claudia J.	05	*05¼	04¾	04¾	37,000
Cash					
Clay County	100			102	
Edmons	149	149	45½	149	18,000
Gettysburg	30a			27	
Gold Rock	59	64	62	60	500
Leavenworth	05			05	
Little Rule				90	
Lexington	*37	*37	134½	*38½	1,200
May-Mazepa	125a			75	
Matchless	290			290	
Oro	75			100	
Pay Rock	01¼			01¼	
Puzzler	02¾			02	
Paul Gold	15a	13	13	10	100
Reed National				50	
Rialto	115a	110	110	115a	100
Running Lode	31	32	30	31	700
Whale	05	06	05	05¼	700
Bal. Smuggler	15			23a	
Sutton	*15¼			116	
Prospects.					
Argonaut				20a	
Big Indian				10a	
Big Six				05½	
Century	10			12	
Diamond B.	03¾	04	03¾	03¾	20,200
Nat. G. & Oil Co.	*10	*10	09	09	17,300
Golden Treasure	*19	*70	*70	60	500
Ironclad	13	*18	14	16¼	7,400
John Jay	¾	02	01	01¼	3,300
Justice	22	*25	21¼	20½	16,900
Morning Gift	46a				
Park Consolidated				05	
Potosi	01¼	01½	01½	01¼	600
Total					175,900

* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30.
a Asked.

Boston.

Jan 14.

From our Special Correspondent.

There is but little change to note in copper stocks this week. The market has been rather inclined to weakness in some spots, while in others there is a little tendency to higher prices. There is but little speculative activity, the dealings being largely in the dividend paying mines, which are bought for investment. Calumet & Hecla sold at \$260. Tamarack is steady at \$160, a few shares selling up to \$162.

Osceola seems to be in good demand at about \$30. The opinion in copper circles is that the company will be able to pay \$3 in dividends this year with copper at 11c.

Franklin is strong at \$16. The \$2 dividend re-

cently declared has imparted strength to the stock, especially as the company has still on hand a good reserved fund for future use.

Centennial has recovered some of its recent decline and has sold up to \$10¼, a gain of \$2¼ over last week's lowest price. There is some dissatisfaction expressed at the way the mine has been developed, and this may account for the decline of last week. Kearsage is quiet but steady at \$12½. Atlantic sold at \$12, same as last week.

Boston & Montana sold at \$40 in the early dealings, and Butte & Boston at \$17. Both stocks were heavy to-day, the former selling down to \$38½ and the latter to \$16. There is more disposition to sell these stocks than we have noted recently. National sold at \$1¼; Ridge at 50c.; Al. louez at \$1¼ @ \$1½. There have been rumors that the Allouez management was about to suspend operations, the report is denied, but it is stated that if copper continues at its present price, it is only a question of time when the mine will be closed. Arnold sold at 65c. and Santa Fe at 27½c., both in a small way.

3 P. M.—The market has been very weak since the noon hour, especially in Boston & Montana which, under pressure to sell stock declined to \$37½. Osceola sympathized and declined to \$28, and Centennial dropped the fraction to \$10. The balance of the list was unchanged.

St. Louis.

Jan. 13.

(From our Special Correspondent.)

While prices are better on the whole this week than last, several stocks which a week ago were going up have fallen off in value. Business was generally fair and well distributed, several properties being dealt in which have been quiet for some time. Yuma experienced a strong advance and from an opening of 15c. is now quoted at 17½c. During the week it sold as high as 23¼c., while on Saturday 25c. was bid with no takers. Sales amounted to 100 shares at 15c., 200 shares at 17½ @ 18½c., 300 shares at 21¼ @ 23¼c. Since Saturday the stock has been weak, falling steadily.

Little Albert has been rather active, and held its own closing at the opening figure, 5½c. The facts that the debt against the property has been paid off and that work has been resumed at the mine, have had a good effect in steadying the market. The stock was quoted at 6c. and 5c. during the week, but most of the sales effected were at 5½c. Sales aggregated 1,600 shares.

Elizabeth was in better favor, and on a good demand went up several points. Opening at 71¼c., it sold down to 70c. on 700 shares; later, 73¼ @ 75c. was given for 400 shares. On Saturday 100 shares brought 75c. On Monday it was again lower, 73¼c. being the best offered; 200 shares were sold. To-day 75c. is the closing bid.

Central Silver went up 4c. this week, opening at 11c. and closing at 15c. The stock was very active throughout the week, sales aggregating 4,200 shares at 11½ @ 16½c. the latter price being reached on Monday.

American & Nettie, while fairly active during the week is now bid at \$1, 12½c. below the opening figure and 20c. below the highest quotation. Sales amounted to 300 shares at \$1.20. The market seems to lack strength.

Granite Mountain has improved slightly, and now is quoted at \$15.75. Only one sale of 20 shares at \$16 was made. The lowest quotation was \$15. The stock is now held firmly at \$16.

Silver Age is dull, only one sale of 500 shares at 5 @ 4¼c. having been made. The stock is weak, probably owing to the announcement of the directors that every stockholder must, within 10 days, pay his share of the debt of \$30,425 still outstanding in order to retain his holding. This is the amount unprovided for in taking up the \$50,000 mortgage.

A boom was attempted in Mickey Breen, but while it closes slightly higher than the 2c. opening it has not had the confidence of the brokers and closes weak at 4c. Sales were 3,000 shares at 5 @ 5½c. the lowest bid was 3c.

One thousand shares of Mountain Key were sold at 1½c. There is no strength in the stock, which closes at 1c.

Adams steadily improved and from an opening bid of \$1.40, closed at \$1.60, with sales of 100 shares at \$1.80.

San Francisco.

Jan. 8.

(From our Special Correspondent.)

So far the New Year has not brought any relief from the heaviness that has marked the mining stock market during the past few weeks. Prices have generally tended downward, and from present indications it looks as if the depression that existed during the opening month of last year was about to be repeated.

Trading has, however, been fairly active in the Pacific Board, the amount of shares that changed hands to-day amounting to over 10,000. A little flurry in Belcher, which suddenly rose this morning to \$2, made the Comstocks active for a time. This advance is attributed to the striking of a small bunch of ore in an east crosscut on the 1,300-ft. level, but as the general election will shortly take place this fact probably had something to do with the stimulation. For the same reason it is quite likely that other stocks will also advance within the next few weeks.

The North End stocks have been notably weak. Consolidated California & Virginia opened to-day at \$4 and afterward fell to \$3.60. Mexican sold

for \$1.60; Ophir, \$2.65; Sierra Nevada, \$1.55, and Union, \$1.30.

The middle group of Comstocks have been in a condition similar to the North Enders. Best & Belcher has gone begging at \$2.10; Chollar, at 90c., has been in fair demand; Hale & Norcross at 85c.; Gould & Curry at 95c.; Potosi at \$1.15, and Savage at \$1.30 have sold heavy, with very slight fluctuations.

What little activity has existed has been among the south end Comstocks and Gold Hill stocks, led by Belcher. This stock opened at \$1.55 and gradually developed strength until it sold at \$2.20. Toward the close of the session it declined to \$1.90. Of the others, Crown Point sold for \$1.20; Justice, 25c.; Confidence, \$2.65; Overman, \$1; Segregated, Belcher, 55c. and Yellow Jacket, \$1.

The good showing being made in the Bulwer mine is causing more than the ordinary amount of trading in the Bodie stocks. Bodie Consolidated has shown no advance, having sold steady at 60c. Bulwer, however, has been in active demand today at 75c.; Mono selling for 55c.

In the other miscellaneous stocks merely nominal sales have been made during the week.

MEETINGS.

Belmont Iron Company, at the office of Theodor Rand, 17 S. Third street, Philadelphia, Pa. February 8th, at 11 A. M.

Brewer Mining Company, at the office of the company, No. 29 Broadway, New York City, January 21st, at 12 o'clock noon.

Buffalo Chemical Works, at the office of the company, No. 55 Fulton street, New York City, January 25th, at 1 P. M.

Cambria Iron Company, at the office of the company, No. 218 S. Fourth street, Philadelphia, Pa., January 19th, at 4 P. M.

Carhon Iron Company, at the office of the company, Mills Building, No. 25 Broad street, New York City, January 21st, at 11 A. M.

Edison General Electric Company, at the office of the company, Edison Building, Broad street, New York City, February 10th, at 3 P. M.

Federal Valley Coal Company, at the office of the company, No. 7 Wall street, New York City, January 29th, at 12 o'clock noon.

Globe Iron Company, at the office of the company in Jackson, O., January 30th, at 12 o'clock noon.

Golden Treasure Mining Company, at the office of the company, room 23, Bank Block, Denver, Colo., January 20th, at 2 P. M.

Hecla Powder Company, at the office of the company, in New York City, January 20th, at 10 A. M.

Mansfield Coal and Coke Company, at the office of the company, No. 1042 Penn avenue, Pittsburg, Pa., February 9th, at 2 P. M.

Maryland Coal Company, at the office of the company, No. 35 Broadway, New York City, February 2d, at 11 A. M.

Navassa Phosphate Company, at the office of the company, rooms 103 and 105, No. 115 Broadway, New York City, January 27th, at 2 P. M.

Philadelphia & Boston Petroleum Company, at the office of J. Willis Martin, No. 709 Walnut street, Philadelphia, Pa., January 19th, at 5 P. M.

Vermont Marble Company, at the office of the company, No. 2 Wall street, New York City, January 28th, at 11 A. M.

Wide West Mining Company, at the office of the company, No. 56 Broadway, New York City, February 9th, at 3 P. M.

DIVIDENDS.

Deadwood-Terrá Mining Company, dividend No. 37, of five cents per share, \$10,000, payable January 20th at the office of Messrs. Lounsbury & Co., 15 Broad street, New York City. Transfer books close January 15th and reopen January 21st.

Franklin Mining Company, dividend No. 25, of \$2 per share, \$80,000, payable January 25th, at the office of the company in Boston, Mass. Transfer books close January 18th, and reopen January 26th.

Standard Consolidated Mining Company, dividend No. 77, of ten cents per share, \$10,000, payable January 26th at the office of the company in San Francisco, Cal. Transfer books close January 16th and reopen January 27th.

PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales
Jan. 9.	63 3/4	63 3/4	63	63 3/4	56,000
11	63 3/4	63 3/4	63 3/4	63 3/4	32,000
12	63 3/4	64 1/4	63 3/4	64 1/4	50,000
13	63 3/4	63 3/4	63	63	15,000
14	62 3/4	63 3/4	6 3/4	63 3/4	15,000
15	62 3/4	63	62 3/4	63	10,000
Total sales in barrels					178,000

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Jan. 9.	63	63	62 3/4	62 3/4	15,000
11	63	63	63	63	10,000
12	62	62 3/4	62	62 3/4	31,000
13	63	63	62 3/4	62 3/4	15,000
14	62 3/4	62 3/4	62	62	10,000
15	62 3/4	62 3/4	62	62	10,000
Total sales in barrels					81,000

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'ng't in office.	Day of sale.	Amt. per share.
Alliance, Utah.....	16	Nov. 16	Jan. 9	Feb. 2	.10
Bevan, Utah.....	4	Dec. 9	Jan. 16	Feb. 4	.20
Butte Queen, Cal.	1	Nov. 27	Jan. 5	Jan. 25	.02
Cons. St. Gothard G. Cal.....	4	Dec. 29	Feb. 6	Feb. 23	.05
Crocker, Ariz.....	11	Dec. 15	Jan. 19	Feb. 11	.10
Crown Point, Nev..	56	Dec. 2	Jan. 6	Jan. 27	.50
Gen. Merritt, S. Dak	4	Jan. 2	Feb. 8	Feb. 23	.00 3/4
Goodyear, Mont....	1	Jan. 2	Feb. 4	Feb. 23	.01
Grass Valley Queen Gold, Cal.....	1	Dec. 8	Jan. 14	Jan. 30	.10
Hale & Norcross, Nev.....	100	Dec. 31	Jan. 26	Feb. 18	.50
Justice, Nev.....	49	Dec. 23	Jan. 28	Feb. 17	.25
Morgan, Cal.....	15	Nov. 20	Dec. 28	Jan. 20	.10
Potosi, Nev.....	37	Dec. 10	Jan. 13	Feb. 4	.50
San Jose, Nev.....	20	Nov. 16	Jan. 2	Feb. 10	.04
Scorpion, Nev.....	3	Dec. 15	Jan. 22	Feb. 15	.05
Siskiyou Consol. Quicksilver, Cal..	2	Dec. 22	Jan. 28	Feb. 19	.02
Teresa, Mex.....	6	Dec. 1	Jan. 4	Jan. 22	.10
Umpire S. & S. Ore.	4	Dec. 16	Jan. 25	Feb. 15	.01 3/4
U. S. Grant, S. D....	4	Dec. 23	Jan. 30	Feb. 15	.00 3/4
Vulcan, S. Dak.....	3	Oct. 19	Dec. 18	Feb. 8	.003

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 15. PRODUCTION OF BITUMINOUS COAL for week ending January 9th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891. Year.
	Week.	Year.	
Phila. & Erie R. R.....	1,265	1,621	4,292
Cumberland, Md.....	76,831	89,672	106,376
Barclay, Pa.....	5,267	6,461	5,167
Broad Top, Pa.....	10,127	12,861	12,273
Clearfield, Pa.....	68,499	90,238	158,072
Allegheny, Pa.....	22,791	27,349	38,205
Beach Creek, Pa.....	46,241	49,731	90,772
Pocahontas Flat Top.....	46,062	53,839	54,618
Kanawha, W. Va.....	52,349	60,061	85,473
Total.....	329,432	389,833	550,248

WESTERN SHIPMENTS.

	1892.		1891. Year.
	Week.	Year.	
Pittsburg, Pa.....	28,275	33,546	48,117
Westmoreland, Pa.....	26,912	31,128	59,263
Monongahela, Pa.....	6,851	8,864	16,364
Total.....	62,038	73,538	123,744
Grand total.....	391,470	463,371	673,992

PRODUCTION OF COKE on line of Pennsylvania R. R. for the year ending January 9th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 107,140 tons; year, 138,564 tons; corresponding date in 1891, 134,137 tons.

Anthracite.

The sales agents' adjourned meeting, which was to have been held on the 14th inst., was adjourned to the 19th inst., at the request of President McLeod, of the Philadelphia & Reading, and Mr. Sayre, sales agent of the Lehigh Valley. In the annual report of the Philadelphia & Reading, given in this column, there will be found the first official utterance of that company to the effect that it expects to have its percentage increased for the current year. From this it is fair to suppose that the request for a readjustment will soon be made, and the belief prevails that the issue will be forced at this next meeting of the sales agents by the representatives who desire to know how Cox Bros. & Co.'s tonnage is being counted. The matter can only reach a final settlement by action of the presidents of the companies, before whom it will eventually go, presumably with some sort of a recommendation from the sales agents.

The demand is only nominal, and of a hand-to-mouth character. The dealer is suspicious of the future and will continue so until the allotment issue reaches a definite and satisfactory settlement. Prices are exceedingly low, and the little business offering is being eagerly sought by the companies and independent operators alike.

There have been no official figures showing shipments issued in two weeks; therefore it is impossible to say to what extent the policy of restriction rules. It is fair to give the statistician the benefit of the doubt, and repeat the report that this delay has been occasioned by efforts to make complete and correct returns for the year just closed, and not for the purpose of allowing to remain problematical the disposition of the 90,000 tons or thereabouts of Cox Bros. & Co.'s coal shipped weekly. A canvass of the company's representatives elicited the fact that restriction is being pretty generally and honestly followed.

The case of John C. Haddock vs. Delaware, Lackawanna & Western Railroad Company before the Interstate Commerce Commission came up on the 12th inst. before Mr. John Hillary, Commissioner, in Mr. Simon Sterne's office in the Delmonico Building, in this city. Mr. Geo. Vaillant, second vice-president of the New York, Lake Erie & Western Railroad Company, was recalled, and the plaintiff undertook to prove by him that shares of stock of the Hillside Coal and Iron Company were owned by the Erie Railroad. Mr. McDonough, secretary of the Hillside Coal and Iron Company, was called for the same purpose, but under the advice of counsel these witnesses declined to testify. Mr. Jas. E. Childs, general manager of the New York, Ontario & Western

Railroad Company, was also recalled, and the plaintiff undertook to prove by him that the contracts made by Dickson & Eddy for the purchase of coal from operators on the line of the New York, Ontario & Western were made at the instigation and for the benefit of that railroad company; that Dickson & Eddy, as agents for this railroad company, were simply the coal department of that road, hearing the same relation to it as the Hillside Coal and Iron Company is said to hear to the Erie, or the Mining Department to the Delaware, Lackawanna & Western Railroad Company.

Under advice of counsel the witnesses declined to answer many of the questions designed to prove the allegation. However, the relation which the Hillside Coal and Iron Company sustained to the Erie, and Dickson & Eddy to the New York, Ontario & Western Railroad Company was dwelt upon by the testimony of Mr. Clarence D. Simpson. He testified that some two or three years ago one of his companies had a transportation contract with the New York, Ontario & Western Railroad Company on a basis of 40% of the tide-water prices, and that it shipped the coal under that contract for about three months. At the expiration of this time it was suggested that it would be better, in order to prevent competition among operators on the line of this road, that the coal originating thereon should be bought by Dickson & Eddy at 60% of the tidewater price less five cents per ton for shipping expenses.

He also testified that the payments under this purchase contract to Dickson & Eddy were guaranteed by the New York, Ontario & Western Railroad Company. The figures which were given showing the result of operating under the contact contracts with the New York, Ontario & Western Railroad Company proved that the operators who made such a disposition of their product had an advantage in the net price obtained at the breaker with the Hillside Coal and Iron Company and the of some 30 cents a ton, even as against shippers in the Wyoming Valley, over the Lehigh Valley Railroad Company, and the Lehigh Valley, it is well known, carries coal to Buffalo at \$2 per ton. The alleged discrimination on the Delaware, Lackawanna & Western against Mr. Haddock, taking these prices as a basis for western shipment, amounted to quite 50 cents a ton. There will probably be another hearing next week or the week following.

ANNUAL REPORT OF THE PHILADELPHIA & READING COAL AND IRON COMPANY.

The following is that portion of President McLeod's report to the stockholders for the year ending November 30th, 1891, which relates to the Philadelphia & Reading Coal and Iron Company:

In the last annual report, attention was called to the failure of the company for many years past to make adequate provisions in the development of the mines, in rolling equipment and terminal facilities, to enable it to retain the place in the coal trade which it ought to command. While there has been a considerable increase of the tonnage, the revenue from the anthracite coal traffic has not yet reached the proportions to which the company is fairly entitled, and the concessions made by your board toward the preservation of harmonious relations with other companies and the maintenance of fair and reasonable prices for the product of the mines, continue to be out of proportion to the capacity of the collieries, the amount of capital invested in both productive and undeveloped coal lands, and the facilities possessed for the distribution of coal in the markets, as compared with those of the other coal carrying roads. Your board has never questioned the policy of making due concessions to competitors, who with yourselves are engaged in producing a commodity far in excess of the demand of the markets, but the proportion of the business allotted to this company in years past, when its financial straits and lack of facilities did not permit it to mine and distribute its fair proportion of the increase of tonnage, must not be taken as the measure of the business to which it is entitled in the conditions which now prevail since its reorganization and rehabilitations. It is to be expected, therefore, that, out of the regard that is due to the great interests involved, and a proper consideration of the importance of the subject to the general public, as well as from a just recognition of the equitable right of this company to a larger share of the traffic, your board will be able to secure for your company what its investments entitle it to, without the sacrifice of revenue or the disturbance of existing harmonious relations.

The experiences of the past year have emphasized the necessity for other means than those hitherto employed in the distribution of anthracite coal in New York harbor and its tributary tidewater points. The early completion of the new line to Port Reading on the Arthur Kill will remove the limitations upon the growth and extension of this traffic in that quarter, from which the business has suffered in the past. The work is progressing rapidly and will be ready early in the year for operations long in advance of the season when the heaviest traffic is to be expected.

During the year a new company has been organized, under the name of the Tamaqua, Hazleton & Northern Railroad Company, for the purpose of building a line from the Catawissa branch to the vicinity of Hazleton, connecting with the Delaware, Susquehanna & Schuylkill Railroad, with

which traffic arrangements have been entered into by which we are guaranteed a minimum of 1,000,000 tons of anthracite coal. The new line has been completed and is now in operation.

Connections have also been made with the Mount Carmel & Natalie Railroad, near Mount Carmel on the Mahanoy and Shamokin branch. This new line has been constructed by the proprietors of a large undeveloped coal estate, and, under an exclusive contract with your company, will deliver an additional anthracite tonnage to your lines of from 300,000 to 400,000 tons annually. At Buffalo a storage and transfer plant of large capacity has been established during the year for shipments of coal to all points West by rail, while wharf and dock facilities have also been secured for shipments by the great lakes during the season of open navigation to such distributing points as Chicago, Milwaukee and Duluth and others of less importance, where the necessary docks and storage room have been provided. The storage and transfer plant at Buffalo is worthy of special notice. It is novel in design and of durable material, being composed entirely of iron; it can be maintained and operated with the greatest economy and has a storage capacity of about 300,000 tons; as a transfer plant, which is a necessity for transferring coal from gondola to box cars, its capacity is practically unlimited, and it enables the company to avail of the surplus of empty westbound cars, which in most seasons of the year accumulates at Buffalo.

The following exhibits the results of the operations of the Coal and Iron Company for the year:

The total receipts amounted to.....\$21,311,734.50
The expenses.....20,829,068.82

Surplus from operations.....\$482,665.82

After charging all payments for the year to operating expenses, the deficit is reduced to \$332,860.68, against a deficit for 1890 of \$1,420,869.33.

A large part of this saving is due to the reduced cost of mining coal, resulting from the expenditures recently made for the introduction of new and improved methods and machinery, and has been effected notwithstanding an increased cost of supplies. Arrangements have been consummated for the extension of the divisional mortgage bonds maturing during the current year on satisfactory terms.

It may be of interest to those who are not familiar with previous reports to add that the immense estates of the company aggregate upward of 194,000 acres, which may be classified as follows:

Coal lands, owned (acres).....95,144
Coal lands, leased from others (acres).....7,429

Timber lands, owned (acres).....102,573
Iron ore lands (acres).....21,000

Total area (acres).....194,062

The collieries in operation are located:

On lands owned.....36
On lands owned by controlling companies.....4
On lands leased.....11
Temporarily abandoned.....10

61

In addition to these, and excluding smaller operations, there are 13 collieries which are operated by tenants. All of the company's collieries either have been or are being modernized and supplied with improved machinery for handling and preparing the coal for market.

The coal lands comprise in extent about 33% of the entire anthracite coal fields of the State, and taking into account the aggregate thickness of the veins on the company's lands, and the greater proportionate depletion of the estates in the other regions which has been going on for many years, it must be conceded that it has at least 50% of the entire deposit remaining unmined.

The company owns 2,764 dwelling houses, built upon its lands, which are mainly occupied by miners and others employed at the various works.

There are employed in and about the mines 24,754 men and boys, of whom 9,709 are foreign born. The records show in respect of their parentage that 4,719 are American; 2,088 English; 6,887 Irish; 3,709 German; 4,287 Polish; 1,466 Hungarian; 1,282 Welsh; 210 Scotch; 86 Italian; 20 French.

The operations of the mines are confined to an area of less than one-third of the company's coal estates; the remaining two-thirds—66,000 acres—will admit of an unlimited increase for an indefinite period. New collieries to be opened on new sites will, on account of new methods and devices, produce a given tonnage with much greater economy than was possible in the past. In earlier mining but 25% of the contents of the veins was marketable, while the marketable product is now advanced to upward of 45%. For supplying fresh water to the collieries, there have been provided ample reservoir capacity and 66 miles of pipe lines, ranging from 3 to 12 in. in diameter, through which upward of 5,000,000 gallons flow daily.

The steam power required to operate the machinery employed in raising the coal and water from the mines is generated by over 1,000 boilers; the drainage of the mines involves the pumping of about 57,000,000 gallons of water per day an average height of nearly 600 ft.; 2,600 horses and mules are used in hauling the coal from the chambers to the breakers, aided by 18 locomotive engines; 7,275 mine cars are in service. There are 568 miles of railroad, including turnouts, etc., used at the

mines in handling this traffic. Two thousand tons of blasting powder and 140 tons of dynamite are annually consumed, and for feed 250,000 bushels of grain and 7,200 tons of hay. In the maintenance of buildings and new structures 18,000,000 ft. of lumber are used, for mine props 14,000,000 lin. ft. of timber, and for sheathing and lagging 552,337 lin. ft.

Bituminous.

Trade is very dull and consists almost entirely of deliveries upon old contracts. The ensuing two months will be the closing ones in the bituminous coal year, and business, as on similar occasions in the past, will be of a piecemeal order. It is rather early to speculate upon the probable continuance of the Seaboard Steam Coal Association, owing to the fact that the subject is not yet being considered by the trade. A number of prominent operators approached this week, expressed the belief that the organization would be continued another year.

Owing to prevalent stormy and foggy weather there has been but light ocean shipments. Rates to Boston from lower ports rule nominally at 90c. @ \$1.00.

NOTES OF THE WEEK.

The annual meeting of the directors of the Huntington & Broad Mountain Railroad and Coal Company was held in Philadelphia this week. President Janney occupied the chair. A dividend of 3 1/2% on the preferred stock, making 7% for the year, and of 2% on the common stock, making 4% for the year, were declared. The preferred stock is entitled to 7%, and after that amount is paid the surplus earnings are to be divided among the holders of the common stock.

Boston.

Jan. 14.

(From our Special Correspondent.)

The anthracite coal market continues to be very quiet. No one seems to be willing to purchase at any price and consequently the market is merely nominal. Stove is easy at \$4, and both egg and chestnut can be had for \$3.75. Free broken is offered on this market for \$3.50. Lykens Valley coal is the only variety on the market that holds its own. Full circular prices are realized for this.

Bituminous coal, like anthracite, is very dull. There is practically no business doing here outside of filling contract orders. As they are getting over the difficulties of getting coal at Newport News and Baltimore, coal for contract purposes is more easily obtainable. Coal on the cars here is lower, and \$3.80 per ton is the best price at present. The general dullness in coal has affected freights seriously. With the exception of Baltimore freights, we note a decline all along the line. We quote: From New York to Boston, 60@65c.; from Baltimore to Boston, 90@95c.; from Philadelphia to Portland, 90c.@\$1; to Providence, —@75c.; from Baltimore to Boston, \$1; Newport News to Boston, 90@95c.; Sound points, 85c.

The retail trade has been better so far this month than it was last. Not from any advantageous change in temperature, however, but owing to the depletion of consumers' stocks. With the improved trade and had roads for carting owing to a recent snowfall, the average retail dealer finds all his teams fully occupied with work. Prices are fairly firm. We quote retail prices in this market: Free burning stove, \$5.50; nut, \$5.50; egg, \$5.25; furnace, \$5.25; Franklin, \$7; Lehigh furnace, \$5.50; Lehigh egg, \$6; Cumberland at wharf, \$3.75; screenings, \$2.

The receipts of coal at this port for the week ending January 9th were 22,447 tons of anthracite and 9,630 tons of bituminous, against 36,371 tons of anthracite and 10,265 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 34,526 tons of anthracite and 10,987 tons of bituminous, against 41,896 tons of anthracite and 11,315 tons of bituminous for the same time last year.

THE BOSTON COAL MARKET IN 1891.

The year 1891 was a fairly good one in the general coal trade of Boston. Dealers, both wholesale and retail, sold fully as much coal, if not more, than in previous years, and prices in most cases were fairly satisfactory. The financial standing of the companies is fully as good now as it was at the close of 1890. But one failure took place in this vicinity during the year, and that was an unimportant one.

The circular prices on anthracite coal made by the agents were most of the time totally ignored. Anthracite was plentiful throughout the year. From April 1st to June 1st circular prices of coal were steady and unchanged, although they were considerably above actual prices here. When the agents advanced prices in June, 10c. or 15c., the move failed completely as far as this market was concerned, as the advance realized was gradual and normal. From June to October the market kept improving until the agents' price of stove was fixed at its highest point during the year, \$4.40. Even then when the market was firmest and the demand good, stove coal could be obtained for \$4.10. After October the weather was very unfavorable for any trade, and buying was very limited. Circular prices were shaded about 40 cents all around.

The bituminous market in 1891 presented some rather novel and interesting features. The placing of contracts on standard grades in March and April was very successful, most of them having been placed at \$2.40@ \$2.50 f. o. b. The amount of

the better grades contracted for was probably less from the railroads this year than last, owing to their desire to get the lowest possible rates. A number of roads that last year paid \$2.25 and \$2.30 per ton for standard qualities, were unwilling in 1891 to pay any more and as a consequence bought a grade that cost them but \$2.15 and \$2.20 f. o. b.

The mills used probably more soft coal than heretofore, notwithstanding the fact that this and last winter have been mild and have not necessitated the use of much coal for heating purposes. The increase was mainly in the extra coal used by mills in this State and New Hampshire that usually use water power.

One of the most important features to note in the Boston bituminous coal market of 1891 is the great increase in all-rail shipments. Railroad companies have shown a determination to get more business than in the past, and, as a result, secured valuable and large Fitchburg, Lowell, and Lawrence contracts which until this year have been controlled by ocean shippers. The all-rail shipments, which three years ago were quite insignificant and amounted to but 150,000 or 175,000 tons, amounted to 350,000 or 400,000 tons in 1891, and we should judge by the policy laid down by the railroads that this amount would be increased materially in the next few years.

An unusual feature of the bituminous trade was the extremely low freight rates of last spring and summer and the advantage taken of the fact by the trade in stocking up to its utmost capacity. It made business active at that time, but since October 1st buying has fallen far below the average. Freights have stiffened, however, and soft coal has become scarce, while stocks now are getting low.

New England gas companies fared well with respect to rates. Coal for west of the Cape shipment was secured for \$4 on cars here and east of the Cape \$3, f. o. h. plus freight. The gas companies learned a lesson in 1890 which they profited by in 1891. In the fall of the former year they delayed purchases, and when they wanted coal it was not to be obtained in anything like sufficient quantities, and very high prices were paid. In 1891 the gas companies, not to again get caught napping, bought their supplies in the spring and summer.

The same troubles experienced with car rates in past years were encountered in 1891. When New England railroads running north from Boston have any extra freight to carry they are short of cars, and coal dealers and consumers away from the seaboard have to suffer. At the close of the year the price on cars here was \$3.85 strong; while a year ago it was \$4.25.

The retail dealers kept their prices on a fair basis during 1891. Heavy stocks were carried by them in the spring and summer when freights were low, but subsequently they have purchased sparingly. A noteworthy fact is that the price of coal was kept steady without the aid or dictation of any coal exchange, as the latter has not been an incorporate body since the spring. Dealers say they do just as well without an exchange.

The total receipts of coal on this market during 1891 were 2,039,443 tons of anthracite and 1,070,688 tons of bituminous, against \$1,740,574 tons of anthracite and 1,072,037 tons of bituminous in 1890.

Buffalo.

Jan. 14.

(From our Special Correspondent.)

The various statistics of the mineral products of the United States published in the January 2d number of the ENGINEERING AND MINING JOURNAL have been accorded, by the unanimous opinion of all parties in Buffalo by whom the compilation has been seen the greatest praise for its methods, work and results, accompanied with hearty good wishes for the future prosperity of the JOURNAL. This expression must be gratifying to all connected with the publication.

The cold and stormy weather has helped the small dealers. Out of town orders from near-by points have come in quite liberally for both bituminous and anthracite, and for the former a fair trade was done by filling the requirements of manufacturers.

Prices are unchanged, with a tendency to shade quotations for some varieties of bituminous. Stocks are ample.

The only items worth noting are that the Buffalo Coal Exchange is alive and strong, with its old officers re-elected for the current year, Mr. Thomas Hodgson being the president; Messrs. James Ash and Adam Schell, vice-presidents; Mr. C. M. Underhill, treasurer; Mr. C. D. B. Stowitz, secretary and executive chairman, and Messrs. J. J. McWilliams, T. Guilford Smith, Joseph H. Horton, John S. Bartlett, Henry Zipp, Jos. C. Batchelor, M. E. Robinson, James Hanrahan, H. E. Smith and John H. Ball, trustees.

Among the candidates for trustees of the Merchants' Exchange this year were Messrs. Horace A. Noble, Thomas Loomis, Millard S. Burns, T. Guilford Smith and John J. McWilliams. The fortunate men were Messrs. Millard S. Burns and John J. McWilliams.

Among the subjects to be presented at the next annual meeting of the National Board of Trade to be held in Washington, D. C., January 27th, and following days, and which are of interest to the coal trade, is the improvement of the great lakes, the Mississippi River and the enlargement of the Erie Canal, and its maintenance by the general Government.

Chicago. Jan. 13.
(From our Special Correspondent.)
The quietness so observable during the opening week of the new year has been little changed in the past week; conditions remain practically the same. Large amounts of anthracite coal are still on track at Chicago and surrounding junction points within a radius of fifty miles. Many of the railroads are becoming impatient for their cars and are demanding that shippers shall move their coal. Trade is only fair and buyers will only take coal at liberal concession from circular prices. Enough orders are now being received to release a number of cars, and we hear of cars being unloaded into rail yards which will still further relieve the car situation.

The severe weather has resulted in waking up country dealers, and orders from them have been more frequent and urgent, but the tonnage is light and partakes of the hand to mouth character which prevailed earlier in the winter.

City retailers' stocks are only replenished as needed from time to time. Any radical improvement is now entirely out of the question for this season, and trade will be spasmodic and entirely governed by weather conditions. All-rail coal is no firmer at \$4.80 and dock coal weak at \$4.90. The action of the companies in throwing such quantities of coal on the Western market meets with severe condemnation from the larger shippers.

The market here is pretty well glutted with soft coal of all grades, the only exception being Indiana block, which is restricted on account of many of the mines working short-handed. Shippers have no difficulty in marketing all coming forward at \$2.50@2.60 on track Chicago. Another reason for the restricted shipments from those mines at Brazil is the large supplies here of eastern and other good steam coal. There is a good demand for soft coal, but prices remain weak.

Foundry coke is in good demand. In Connells-ville there has been some delay in receipts on account of the snow storm, and orders have not been filled as promptly as could be desired. Other brands are in good supply and consumers are taking coke more freely each week.

Circular prices are unchanged at the following rates: Lehigh lump, \$6.25; large egg, \$5; small egg, range and chestnut, \$5. Retail prices per ton are: Large egg, \$5.75; small egg, range and chestnut, \$5.75.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$2.00 @ \$2.15; Brazil block, \$2.50.

Pittsburg. Jan. 14.
The market is firm and steady. The local demand shows a material increase. There has been no Ohio River shipments since our last report. The river at this writing is in good boating water, and unless the weather turns cold barges will be sent out during the next 48 hours. The situation in the Monongahela pools is as follows: 1st pool three mines in operation, 350 men at work, 1,125,000 bushels of coal loaded; 2d pool, eight mines in operation, 500,000 bushels of coal loaded; 3d pool, six mines in operation, employing 1,200 men, 900,000 bushels of coal loaded; 4th pool, fourteen mines in operation, employing 2,000 men; the coal mined is forwarded to Pittsburg as fast as mined. In the harbor there are 1,250,000 bushels ready to leave as soon as circumstances will permit. Prices in the latter market continued very low on account of the mild weather and a large stock on hand.

Coke.—The outlook in the coke region shows a decided improvement, so far as relates to business, but no improvement in values. The increase in shipments was 620 cars. There is now 13,900 ovens in blast and many others making ready to start up. All but about 18% of the ovens in the region are thus in blast. The live ovens were run a fraction over five days.

The H. C. Frick Coke Company ran 14 of its plants six days and 10 five days. The McClure Coke Company ran five days. The distribution of the shipments was as follows: West of Pittsburg, 3,980 cars; east of Pittsburg, 1,280; to Pittsburg, 1,690. Prices show no change, being the same as those established on the first of January, 1891.

METAL MARKET.

NEW YORK, Friday Evening, Jan. 15.
Prices of Silver Per Ounce Troy.

Jan.	Sterling Exch'g.	London Pence.	N. Y. Cts.	Jan.	Sterling Exch'g.	London Pence.	N. Y. Cts.
5	4.84 1/4	43	93 1/4	13	4.84 1/4	42 3/4	92 1/2
11	4.84 1/4	43	93 1/4	14	4.84 1/4	42 3/4	92 1/2
12	4.84 1/4	42 3/4	92 3/4	14	4.84 1/4	42 3/4	93

Prices declined owing to speculative liquidation with great pressure to sell. London market sympathized, and not until an Indian demand set in did there seem to be any check to the weak condition of silver. About 400,000 ozs. are engaged for shipment to Europe to-morrow, and as the government has nearly obtained its quota considerable quantities of silver will continue to be

thrown upon the London market during the coming two weeks.

SAN FRANCISCO, January 15th. (By telegraph).—Opening prices to day are slightly lower, as follows: Best & Belcher, \$2.05; Bodie, 60c.; Belle Isle, 30c.; Bulwer, 45c.; Chollar, 95c.; Consolidated California and Virginia, \$3.70; Eureka Consolidated, \$1.90; Gould & Curry, \$1.05; Hale & Norcross, 90c.; Mexican, \$1.55; Mono, 75c.; Navajo, 10c.; Ophir, \$2.65; Savage, \$1.30; Sierra Nevada, \$1.60; Union Consolidated, \$1.35; Yellow Jacket, \$1.05.

The United States assay office at New York reports the total receipts of silver for the week to be 41,000 oz.

Silver Bullion Certificates.

	Price.		Sales.
	H.	L.	
Jan. 9.....	94 1/4	93 3/4	55,000
Jan. 11.....	.....	.....	.....
Jan. 12.....	93	92 3/4	95,000
Jan. 13.....	92 3/4	92 1/2	110,000
Jan. 14.....	93 3/4	92 3/4	172,000
Jan. 15.....	93 1/4	93 1/2	8,000

Total sales..... 440,000

Government Silver Purchases.

WASHINGTON, D.C., January 15th (By Telegraph).—The Treasury Department purchased to-day 262,000 ounces silver at prices ranging from '9345 to '935 per oz. fine.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Trade dollars.....	74	75
Mexican dollars.....	73	75
Peruvian soles and Chilean pesos.....	70	72
English silver.....	4.75	4.85
Five francs.....	4.84	4.89
Victoria sovereigns.....	3.81	3.88
Twenty francs.....	4.74	4.76
Spanish doubloons.....	15.55	15.70
Spanish 25 pesetas.....	4.78	4.83
Mexican doubloons.....	15.50	15.70
Mexican 20 pesos.....	19.50	19.60
Ten guilders.....	3.96	4.00
Fine silver bars.....	93 3/4	94

Copper.—Since our last report the Calumet & Hecla Company has entered the market and made sales for January and February delivery at 11c., and this has put a damper on the market, and the firmer feeling has given way to a certain dullness, as consumers are now amply provided for, at least for the present, and are awaiting further developments. From all we hear consumption is very good just now, and this is also proved by the very high prices now ruling for casting copper, which is readily salable at 10 1/2c. and 10 3/4c. Of Arizona pig copper almost nothing at all is offered, or else rather above the market price. The producers in Montana are equally reluctant to meet the present level, and the Anaconda especially has not come on the market at all, yet, with any copper. From all appearances the lower prices now established are greatly stimulating consumption.

The English market, which has been very firm, leading the advance, has, on the advice that the Calumet & Hecla Company is selling here at 11c., been rather depressed, the more so as American copper was offered more freely in the European markets. In consequence, G. M. B.'s, which we left last week at £46 5s. for cash, have declined to £45 7s. 6d. cash and £46, three months. For manufactured copper. We quote: English tough, £48@£48 1/2; best selected, £50 5s.@£50 10s.; strong sheets, £59 15s.@£60; India sheets, £55 10s.@£56; yellow metal sheets, 5 1/2d. The consumptive demand is reported from Europe as being rather brisk and most consumers badly stocked.

The exports of copper from the port of New York since January 1st were as follows:

To Bordeaux—Copper.....	Lbs.	80,030	\$8,000
S. S. Chartant Lafitte... 279 pigs	Copper.....	Lbs.	.....
To Havre—Copper.....	Lbs.	399	.....
S. S. Colonia..... 400 casks	.....	575,000	\$73,250
..... 545 pigs	.....	189,095	19,500
..... 270 casks	.....	15,594	7,228
S. S. La Normandie... 119 casks	.....	75,269	9,650
To Liverpool—Copper Matte.....	Lbs.	.....	.....
S. S. Chaucer..... 1,712 pigs	.....	200,500	\$14,000
..... 3,996 bags	.....	401,000	28,000
..... 2,005 bags	.....	240,600	15,900
..... 1,720 bags	.....	200,000	15,000
..... 2,450 bags	.....	240,600	15,900
..... 4,315 bags	.....	463,231	30,000
The Queen..... 2,091 bags	.....	209,100	14,000
To Liverpool—Copper.....	Lbs.	.....	.....
S. S. Chaucer..... 799 pigs	.....	224,782	\$22,000
..... Nevada..... 360 pigs	.....	98,139	12,000
To Antwerp—Copper.....	Lbs.	.....	.....
S. S. Waesland..... 268 pigs	.....	73,825	\$7,500
..... 18 casks	.....	22,500	2,350
To Rotterdam—Copper.....	Lbs.	.....	.....
S. S. Oobdam..... 20 bbls.	.....	25,000	\$2,750
..... 280 pigs	.....	89,752	9,300
..... 468 bars	.....	160,652	17,000
..... 18 casks	.....	22,500	2,500
To Spaardam—Copper.....	Lbs.	.....	.....
To Bremen—Copper.....	Lbs.	.....	.....
S. S. Fms..... 157 pigs	.....	44,916	\$5,000
To Fiume—Copper.....	Lbs.	.....	.....
S. S. Bolivia..... 72 bbls.	.....	90,000	\$10,000

Tin.—This has not shown any life, and is quiet but steady, at \$19.75@19.85. Neither the stocks nor the quantities afford to this country are excessive, but not much interest is shown by buyers. The London market also has been rather dull

and is slightly lower than last week, the closing quotations being £90 for spot and £90 5s. for futures.

Lead.—After quotations had been firmly kept up during December at 4 1/2c. large quantities of lead have now been thrown on the market by Western smelters, who have not been selling hitherto, and the market quickly declined from 4 1/2c. to 4.10c., and this in spite of the fact that in Idaho serious strikes have broken out, which will curtail production there very much indeed, if not stop it altogether. At the lower prices there is decidedly much more tendency to purchase and consumers are quite ready to cover their wants for several months ahead.

The foreign market has been weak and prices in London declined to £11 2s. 6d. for Spanish and to £11 5s. for English.

Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: "The market has been very dull during the past week, and, while there is little or no pressure to sell, there is not much demand. Sales will not amount to over 200 tons at 4c., which is asked at the close.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: "Lead weak and lower. Unfavorable seaboard advices have caused our market to decline to 3'95c., at which price last sales were reported."

Spelter.—This metal continues irregular with a slightly better demand, and we have to quote \$4.65@4.75 New York.

Antimony has gone off somewhat, and the decline has brought out quite a fair demand; Cookson's on the spot being scarce; the price is held at about 15 1/4c., L X 15c., and Hallett's 12@12 1/4c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 15.

Persistent diligence and careful observation alike fail to detect any change in the general condition of the iron market. Trade is reported to be very dull, and in this market, at least, no new business of any importance is being done in any quarter. Not a single "significant fact" can be brought to light, for even the prevailing dullness may be attributed to the present season of the year when consumers are busy with their books or are engaged in forming plans for the conduct of their business during 1892. It is evident, however, that buyers do not believe in the possibility of an early rise in the price of iron. Producers all declare that they do not see how prices can go much lower; perhaps the consumer does; at any rate, he is leaving the future to take care of itself. What little trading there is of the hand-to-mouth nature, which has characterized this market for more than six months past.

American Pig Iron.—There is no scarcity of iron in this market just now. It is rather the liberal buyer which is the scarce article, but dealers are looking forward to a resumption of activity after the stocks which consumers bought in December shall have been exhausted. Southern irons are not pressing on the market, with the exception of the product of one company which is offering iron at a reduction of 25 cents per ton. Quotations are as follows: Northern, No. 1 X, \$17@18; No. 2 X, \$16@16.50; Southern, No. 1 X, \$16.50@17.50; No. 2 X, \$15.50@16.50.

Spiegeleisen and Ferro-Manganese.—There is nothing of interest to report of this market. We hear of no sales and of but little demand from any source. Quotations are nominally as follows: 20% spiegeleisen, \$26.50@27; 80% ferro-manganese, \$62@62.50.

Steel Rails.—We hear of little new business in this market, no sales of any moment having occurred during the week. Quite recently, however, the Lackawanna Company sold a lot of about 20,000 tons of steel rails to the New York Central. A good many inquiries have been received by Eastern mills, but they are rather as to time, option, etc., than for prices. The price for standard sections remains \$30 f. o. b. mills and \$30.70 tidewater. The opinion that these prices are firm and unchangeable now seems established among consumers, but the long-looked-for rush of the railroad companies to purchase rails has not materialized.

Rail Fastenings.—There is nothing doing in this market. Occasionally, when a small lot of rails is sold the order for the necessary fastenings is thrown into the market and there is momentary excitement among the dealers, which soon subsides and leaves this market in its old condition of dullness. We quote: Fish and angle plates, 1'75@1'80c.; spikes, 2'10@2'15c.; bolts and square nuts, 2'70@2'80c.; hexagonal nuts, 2'80@2'85c.

Merchant Steel.—Trade is improving somewhat in this market, and the outlook is promising. Our quotations are as follows: R. Musket's special, 48c.; English tool, 15c. net; American tool steel, 7@8c.; special grades, 13@18c.; crucible machinery steel, 4'75c.; crucible spring, 3'75c.; open hearth machinery, 2'25c.; open hearth spring, 2'50c.; tire steel, 2'25c.; toe calks, 2'25@2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

Tubes and Pipe.—The market is rather quiet, with a fair amount of business being done. At

this season of the year the volume of business never is very great. We quote discounts as follows: Butt, black, 57%; butt, galvanized, 47%; lap, black, 67%; lap, galvanized, 55%; boiler tubes, under 3 in. and over 6 in., 55%; 3 in. to 6 in., 60%.

Structural Material.—This may be called the bright spot in the iron market. Manufacturers report an active trade in structural iron, and above all, they are unanimous in the statement that 1892 promises to be very prosperous. The usual complaint about low prices is heard, but, all in all, the outlook is very promising indeed. Prices are as follows: Universal plates, \$2.10; bridge plates, \$2.10; tees, \$2.60.

Old Rails.—There is absolutely nothing doing in old material of any kind. Quotations for tees are, nominally, \$20@21.

Chicago. Jan. 13.
(From our Special Correspondence.)

There is a distinct improvement in the demand for crude iron, and on certain brands there is a firmer feeling and disinclination to accept contracts covering long deliveries. The general feeling among the officials of the large iron and steel interests in Chicago is one of entire confidence in the future, with the prospects brightening each week. Consumption of pig iron is steadily increasing in the West, and the expansion promises to enlarge greatly. Finished iron is in moderate demand, but inquiry is of such a character that greater activity is expected before the month closes. Structural material for bridges, viaducts, girders, etc., is in good inquiry, and the outlook in this line is particularly encouraging. Plates continue dull, heavy sheets in better demand, and merchant steels fairly active. There is a better inquiry for old material and values are stiffening.

Pig Iron.—The market has been active during the past week and a good deal of buying at prevailing low prices. Many negotiations will result in the placement of a much larger tonnage during present week. This activity is undoubtedly the result of the growing belief that the lowest prices of the season have been reached and an upward movement is not far distant. The local furnaces have made probably the lowest prices on standard grades, and one company, at least, declines to accept additional orders at the extreme low prices which have ruled on one or two grades. The furnaces are rapidly filling their order books and will soon decline to compete for further business except at better figures. It seems to be beyond a doubt that higher prices for iron ore will prevail, and cost of pig iron after June must of necessity be increased. Quite a good deal of business is being consummated on private terms. Orders for Ohio coke iron have been refused at prices current a month ago. Lake charcoal is in better demand, and only a few furnaces are shading \$17. Usual quotations now are \$17.25@17.50. Black band softeners are in fair request.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$17@17.50; Lake Superior coke, No. 1, \$15.50@16.00; No. 2, \$15@15.50; No. 3, \$14@14.50; Lake Superior Bessemer, \$17; Lake Superior Scotch, \$17@17.50; American Scotch, \$17.75@18.25; Southern coke, Foundry No. 1, \$15.50; No. 2, \$15; No. 3, \$14.50; Southern coke, soft, No. 1, \$15.50; No. 2, \$14.50; Ohio silveries, No. 1, \$18; No. 2, \$17; Ohio strong softeners, No. 1, \$18; No. 2, \$17; Tennessee charcoal, No. 1, \$18; No. 2, \$17.50; Southern standard car wheel, \$20@21.

Structural Iron and Steel.—There is rather more than the ordinary amount of inquiry for the time of the year. Material for bridge and general railroad work of that nature being quite a feature. Several prominent firms have cancelled prices given on work on account of advancing tendency of crude material. Quotations for car lots f. o. b. Chicago are as follows: Angles, \$2.15@2.25; tees, \$2.40@2.50; universal plates, \$2.15@2.25; sheared plates, \$2.20@2.30; beams and channels, \$3.20.

Plates.—Business from warehouse is fairly active, but mostly of a routine character. Mill orders are scarce, but stocks in dealers' hands are such as to stand heavy calls. Prices are more or less weak and on tubes great irregularity exists. Steel sheets, 10 to 14, \$2.40@2.50; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$3@3.25; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.25; boiler rivets, \$4.25; boiler tubes, 2 1/4 in. and smaller, 55%; 7 in. and upward, 65%.

Merchant Steel.—Demand from the implement trade and manufacturing consumers of merchant steel continues large, and specifications placed on account of contracts indicate that they will use largely in excess of maximum quantities bought. Tool steel is steadily gaining in demand. We quote \$6.75@7 and upward; tire steel, \$2.30@2.50; toe calk, \$2.50@2.65; Bessemer machinery, \$2.10@2.20; Bessemer hars, \$1.90@2; open hearth machinery, \$2.00@2.75; open hearth carriage spring, \$2.50@2.75; crucible spring, \$3.75@4.

Steel Rails.—Demand for standard weight heavy sections continues good. The outlook, based upon the extensions already being pushed in the West, Southwest and Northwest, is such, that large orders will be entered throughout the year. Price is steady at \$31 Chicago. Other track sup-

plies are in good demand. Regular quotations are: 180@185c, for steel and the same for iron; spikes at \$2.15@2.25 per 100 lbs.; track bolts hexagonal nuts, \$2.70.

Galvanized Sheet Iron.—Agents report that trade last month was the heaviest December they ever had. Demand continues active, and stocks still badly broken. Discounts, though unchanged, are firmer at 67% off on Juniata, and 67% and 5% off on charcoal in large lots. Small quantities are quoted at 65% and 10% from list.

Black Sheet Iron.—Implement makers are inquiring for cut sizes, and some of the larger dealers are feeling the market, but actual business is light. Mill quotations are 290c. Chicago for No. 27 common. Jobbers' price is 310c. from store and demand light.

Bar Iron.—Agents are becoming firmer in their views, and as the amount of business in sight is quite large they are justified in their course. Some orders for car iron have been placed at 170c. Chicago, but most mills are asking 172 1/2 c. on straight bar contracts. On miscellaneous bar orders with half extra 170c. would probably be shaded 50c. per ton. Dealers quote 180@190c., according to quality and quantity, and demand fair.

Nails.—One of the heaviest producers at Wheeling has retired from the steel cut nail business, on account of unremunerative prices and the competition of wire nails. Mills in this neighborhood are well booked up and decline large orders extending beyond March. Regular mill quotations are \$1.65 usual average and \$1.70@1.75 from stock. Wire nails are in better demand and large orders have been secured by manufacturers' agents at \$1.80, deliveries restricted to April 1. Small orders from jobbers are filled at \$1.90.

Scrap.—Some of the largest consumers in this vicinity have done considerable shopping, but dealers are firm, and declare they have no cheap lots to offer. No. 1 railroad, \$18.50; No. 1 forge, \$18; No. 1 mill, \$13.50; fish plates, \$22.50; axles, \$22; horse-shoes, \$18.50; pipes and flues, \$11; cast borings, \$7.50; wrought turnings, \$9.50; axle turnings, \$12.50; machinery castings, \$12; stove plates, \$7.50; mixed steel, \$10.50; coil steel, \$14.50; leaf steel, \$15; tires, \$15.50.

Old Material.—The movement continues light, but prices are steadier as the condition of the iron market improves. Iron rails are \$22; old steel rails, \$13.50@15.50 as to length; old car wheels \$16.25.

Philadelphia. Jan. 15.
(From our Special Correspondent.)

Pig Iron.—Several producers and brokers are asking a slight advance on medium and standard brands simply because they think a stronger market is assured in the near future. There is talk of an improvement but sales do not show it. Some Southern iron has been sold, but at concessions. Strong Pennsylvania companies are simply waiting. The quotation for best No. 1 is \$18; No. 2, \$16.50; forge, \$15, with shadings of 50c.@1.00 for quality, or rather its absence. Bessemer has sold quite freely at \$16.50@17 and \$18.25@18.50 for phosphorus.

Muck Bars.—Any quotation over \$26 at mill for a good article receives no attention.

Billets and Slabs.—Interior deliveries have been accepted this week at \$26 and seaboard at \$27. Buyers have been discouraged from placing large orders for billets by the high quotations given. Manufacturers in reply say they are not anxious to sell March production just now.

Merchant Iron.—It will take quite an improvement in demand over the present to bring about stronger prices. The market is not dull and yet not active. Quotations are \$1.60@1.75.

Nails.—Nails have not begun to move yet and quotations are \$1.55@1.75.

Sheet Iron.—The movement in sheet iron has been of such character during the past few days as to hurry up several large consumers who fear they might have to wait for February and March deliveries if they waited longer.

Skelp.—A few small orders were hooked.

Wrought Iron Pipe.—Manufacturers are not in a position to dispute prices offered by large buyers. The mills must be kept going, pretty full to pay, and this accounts for some very low quotations.

Plate and Tank.—What has been said for three months past applies to day even with greater force. Manufacturers repeat the statement that there is a large amount of business; that boiler plate is much needed, and other kinds as well; but for reasons that only buyers know the new business coming in is barely enough to guarantee steady operation of mills. Tank, \$1.90; refined plates, \$2@2.20; sheet, \$2.20@2.30.

Structural Material.—There is this week enough new business spoken of, if placed next month, to make prices stronger than they have been for six months, and that is saying a good deal. To-day angles are \$1.95; plates, \$2@2.10; tees, \$2.50; beams, \$3.10.

Steel Rails.—This week's business amounts to 8,000 tons. The quotation is still \$30. Large rail orders are heard of in the West.

Old Rails.—Several lots are offered at \$22.

Scrap.—Yards are rather bare, and buyers are anxious for railroad, which is held at \$21 when it can be had.

Pittsburg. Jan. 14.
(From our Special Correspondent.)

Trade during the past week was not as active as the preceding, the volume of sales not being so large; still, all things taken into consideration, we see no reason for complaint. The amount of raw iron and steel sold the last week in December was 72,192 tons; the first week in January 71,900 tons, and 38,000 tons of Bessemer, making a total of 182,092 tons. The entire sales for the last week in 1890 and first week in 1891 were 50,976 tons, being a deficiency compared with the past two weeks of 131,116 tons. These figures show very conclusively that the Pittsburg iron men are making the necessary arrangements for a big trade during the present year.

The advance noted in our last has been maintained and furnace men and sellers feel that they can take a rest and wait for consumers to enter the market for fresh supplies; at the present rate of consumption they will not have to wait long. There is no speculation of any account, the purchases being made principally by actual consumers. Some apprehension was felt that there might be an accumulation of iron at the furnaces, owing to the cessation of consumption, and that holders would be disposed to force sales and thereby endanger the stability of the market. Fortunately, nothing of the kind has occurred, but, on the contrary, there has been a good trade demand and at firm or unchanged prices. Developments, so far, therefore have been unexpectedly favorable. The crisis is believed to have been passed, without any symptoms of weakness whatever. As a matter of fact, all the changes within the past 20 days have been in the direction of higher prices.

Taking everything into consideration, the New Year's business, so far, has been equal to the best expectations and in some cases very much better than many people thought it would be. We have certainly made an excellent beginning and those who are not looking for a "boom" ought to be entirely satisfied. A well-informed dealer says: "While there has been no change in the tone of the market, as regards prices, manufacturers generally recognize the many evidences that are present of prosperity in the various branches of trade and industry, and are therefore cautious in making sales for delivery too far in the future."

Steel billets are less active; holders are firm showing no signs of weakening. The sales for some time past have been large; the stock in first hands is not large. Muck bar is weak. The steel rail market has not been very active, prices well maintained at \$30 f. o. b. works, this being the syndicate price. The same prices at present governs the Eastern markets. The demand for finished material is improving and orders are said to be coming in pretty freely; the next movement will be an advance in prices. Old material has been neglected for some time past. Old iron rails are dull and prices unsettled.

Coke Smelted Lake and Native Ores.

5,000 Tons Bessemer, February, March.....	\$15.75 cash.
5,000 Tons Bessemer, January, February.....	15.75 cash.
5,000 Tons Bessemer.....	15.75 cash.
3,000 Tons Bessemer, first 3 m.....	15.75 cash.
3,000 Tons Bessemer.....	15.75 cash.
2,000 Tons Bessemer.....	16.00 cash.
2,000 Tons Bessemer.....	16.00 cash.
1,500 Tons Bessemer.....	15.85 cash.
1,500 Tons Grey Forge.....	15.50 cash.
1,500 Tons Grey Forge.....	15.60 cash.
1,000 Tons Grey Forge.....	15.50 cash.
1,000 Tons Grey Forge.....	15.50 cash.
1,000 Tons Bessemer.....	15.75 cash.
1,000 Tons Grey Forge.....	15.50 cash.
1,000 Tons Bessemer.....	16.00 cash.
1,000 Tons Bessemer.....	15.75 cash.
1,000 Tons Grey Forge, delivered at Wheeling	13.90 cash.
1,000 Tons Grey Forge.....	13.50 cash.
500 Tons Grey Forge.....	13.75 cash.
300 Tons No. 2 Foundry.....	14.50 cash.
300 Tons No. 2 Foundry, all ore.....	15.75 cash.
200 Tons No. 1 Foundry, all ore.....	16.25 cash.
100 Tons No. 1 Foundry.....	15.50 cash.
100 Tons No. 1 Silvery.....	17.50 cash.
100 Tons No. 2 Silvery.....	15.50 cash.

Steel Slabs and Billets.

3,000 Tons Billets at Works.....	25.00 cash.
2,000 Tons Billets at Works.....	25.00 cash.
1,500 Tons Billets at Works.....	25.00 cash.
1,000 Tons Billets.....	25.35 cash.
500 Tons Nail Slabs.....	26.00 cash.

Muck Bar.

1,000 Tons Good Neutral, Jan., Feb.....	26.00 cash.
500 Tons Good Neutral.....	25.75 cash.
500 Tons Good Neutral.....	26.00 cash.

Ferro-Manganese.

300 Tons 80%, Imported, delivered Pittsburg.....	62.40 cash.
200 Tons 80%, Domestic.....	63.00 cash.

Steel Wire Rods.

700 Tons American Fives, at Mill.....	34.25 cash
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Bloom, Beam, Rail and C. Ends.

1,000 Tons, Jan., Feby., Mar.....	18.00 cash
500 Tons Rail Ends.....	17.50 cash.

Skelp Iron.

750 Tons Sheared Iron.....	1.80 4m.
600 Tons Narrow Grooved.....	1.62 1/2 4m.
400 Tons Wide Grooved.....	1.65 4m.

Old Iron and Steel Rails.

1,000 Tons Long Steel Rails.....	18.00 cash.
500 Tons Short Steel Rails.....	17.50 cash.
300 Tons Short Steel Rails.....	17.50 cash.
250 Tons Short Steel Rails.....	17.00 cash.
100 Tons Old Iron Rails.....	23.50 cash.

Iron Ore.

38,000 Tons Bessemer Ore on wharf, Clevel'd.	4.50 cash.
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Scrap Material.

400 Tons Light Steel Scrap, gross.....	14.50 cash.
300 Tons Soft Steel Scrap, gross.....	15.50 cash.
200 Tons Light Steel Scrap, gross.....	14.85 cash.
200 Tons No. 1 W. R. R. Scrap, net.....	19.00 cash.
200 Tons Iron Axles, net.....	25.00 cash.
120 Tons Coil Steel, gross.....	19.00 cash.
100 Tons Leaf Spring Steel, gross.....	21.50 cash.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENT, DIVIDENDS, NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENT. Lists 150+ mines with their respective financial details.

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. + This company, as the Western, up to December 10th, 1881, paid \$1,400,000. \$ Non-assessable for three years. \$ The De a wood previously paid \$275,000 in eleven dividends and the Terra \$75,000. Previous to the consolidation in August, 1884, the California had paid \$31,500 in dividends, and the Virgind-40,000. \$ Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,850,000 in dividends.

STOCK MARKET QUOTATIONS.

Aspen, Jan. 11. The closing quotations were as follows: Agnes C., Argentinum Junata, Aspen Deep Shaft, Aspen Contact, Best Friend, Bimetallie, Bushwacker, Carbonate Chief, Della S., Homer & Alta, Justice, Little Annie, Mollie Gibson, Nolan Creek, Park, Mamie & Queen, Pontiac, Sheep Mountain S. & M. Co., Smuggler, St. Joe & Mineral Farm, Yellow Boy.

Baltimore, Md., Jan. 14. COMPANY. Atlantic Coal, Balt. & N. C., Big Vein Coal, Conrad Hill, Cons. Coal, Diamond Tunnel, George's Creek Coal, Lake Chrome, Maryland & Charlotte, North State, Silver Valley.

Pittsburg, Pa., Jan. 14. Prices highest and lowest for the week ending Jan. 14: COMPANY, H., L. Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas, Columbia Oil Co., Consigne Mining Co., Consolidated Gas Co., East End Gas Co., Fisher Oil Co., Forest Oil, Hazewood Oil Co., Hidalgo Mining Co., La Nora Mining Co., Luster Mining Co., Mansfield C. & C. Co., Manufacturers Gas Co., Nat. Gas Co. of W. Va., N. Y. & Clev. Gas Coal Co., Ohio Valley Gas Co., Pennsylvania Gas Co., People's Natural Gas Co., People's N. G. & P. Co., Philadelphia Co., Pine Run Gas Co., Pittsburg Gas Co., Red Cloud Mining Co., Silverton Mining Co., South Side Gas Co., Sterling Silver Mining Co., Tuna Oil Co., Union Gas Co., Washington Oil Co., W'moreland & Caub., Wheeling Gas Co., W'house E. Light, W'house Air Brake Co., W'house Brake Co., Ltd.

Helena, Mont., (Special report by SAMUEL K. DAVIS.) Prices highest and lowest for week ending Jan. 9, 1892: Bald Butte (Mont.), California (Castle), Mont., Champaign (Oro Fino), Mont., Combination (Phillips'g), Mont., Copper Bell (Cataract), Mont., Cumberland (Castle), Mont., Elizabeth (Phillipsburg), Mont., Florence (Neihart), Mont., Fourth of July, Wash., Glengary (Butte), Mont., Helena & Victor, Mont., Iron Mountain (Missoula), Mont., Iron Mountain Ext., Jersey Blue (Butte), Jumbo (Castle), Mont., Lone Pine Consolidated, Mac (Unionville), Mont., Milwaukee (Butte), Mont., None Sub (Unionville), Mont., O. R. & N. (Missoula), Mont., Poorman (Coeur d'Alene), Idaho, Queen of the Hills (Neihart), Southern Cross (Deer Lodge), Mont., Yellowstone (Castle), Mont.

St. Louis, Jan. 13. CLOSING PRICES. Bid. Asked. Adams, Colo., American & Nettie, Colo., Aztec, N. Me., Bi-Metallic, Mont., Central Silver, Elizabeth, Mont., Granite Mountain, Mont., Hope, Mont., La Union, Leo, Little Albert, Montrose Placer, Colo., Mickey Breen, Pat Murphy, Colo., Small Hopes, Colo., Silver Age, Yuma, Ariz., Mountain Key.

Trust Receipts.

Sales at the New York Stock Exchange for week ending Jan. 15: American Cotton Oil, National Lead.

Trust Stocks.

Special report by C. I. Hudson & Co., members New York Stock Exchange. The following are the closing quotations Jan. 15: CERTIFICATES, Am. Cotton Oil, Am. Sugar Refineries, Distillers' & Cattle Feeders', Linsced Oil, National Cordage, National Lead Trust cts., Standard Oil, W. U. Beef Co.

Foreign Quotations.

London, Jan. 2. Highest. Lowest. Amador, Cal., American Belle, Colo., Appalachian, N. C., Can. Phosphate, Can., Colorado, Colo., Cons. Esmeralda, Nov., De Lamar, Idaho, Deekens Custer, Idaho, East Arevalo, Idaho, Elkhorn, Mont., Elmore, Idaho, Emma, Utah, Flagstaff, Utah, Garfield, Nev., Golden Feather, Golden Gate, Cal., Golden Leaf, Mont., Golden River, Cal., Jay Hawk, Mont., Josephine, Cal., Kohnmoor, Colo., La Luz, Mex., La Plata, Colo., La Valera, Mex., Mald of Erin, Colo., Mammoth Gold, Ariz., Montana, Mont., New California, Colo., New Consolidated, New Eberhardt, Nev., New Gold Hill, N. C., New Guston, Colo., New Hoover Hill, N.C., New Russell, N. C., New Viola, Idaho, Old Lou, Colo., Parker Gold, N. C., Pittsburg Cons., Nev., Richmond Con., Nev., Ruby, Nev., Sam Christian, N. C., Sierra Buttes, Cal., Plumas Eur., Cal., United Mexican, Mex., U. S. Placer, Colo., Yankee Girl, Colo.

Paris, Dec. 31.

Frances. East Oregon, Ore., Forest Hill Divide, Cal., Golden River, Cal., Laurium, parts, Lexington, Mont., parts, Nickel, Rio Tinto, Spain, Tharsis, Spain, Vieille-Montagne.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, No. 8, pure, 1.040, Carbonic, liquefied, Chromic, chem. pure, for batteries, Hydrobromic, dilute, U. S. P., Hydrocyanic, U. S. P., Hydrofluoric, Alcohol-95%, Absolute, Ammoniated, Alum-Lump, Ground, Powdered, Lump, Aluminum-Chloride-Pure, Amalgamating solution, Sulphate, Ammonia-Sul., in bbl. lots, Carbonate, white, English and German, Aqua Ammonia, Antimony-Oxydum, Regulus.

Argols-Red, powdered, Arsenic-White, powdered, Red, White at Plymouth, Asbestos-Canadian, Italian, Ashes-Pot, 1st sorts, Pearl, Aspidium, Prime Cuban, Hard Cuban, Trinidad, refined, Egyptian, Californian, at mine, Barium-Carbonate, Chlorate, crystal, Chloride, commercial, Iodide, Nitrate, powdered, Sulph., Am. primo white, Sulph., foreign, floated, Carb., lump, f. o. b., No. 1, Casks, Runcorn, No. 2, bags, Bauxite, Bichromate of Potash-Scotch, American, Bichromate of Soda, Borax-Refined, San Francisco, Concentrated, in car l's, Refined, Bromine, Cadmium Nitrate, Cadmium Iodide, Chalk, China Clay-English, Chlorine Water, Chrome Yellow, Chrome Iron Ore, Franciscan, Chromalum-Pure, Commercial, Cobalt-Oxide, Copper-Sulph., English, Vitriol (blue), ordinary, Nitrate, Copper-Carbonate, Best, 100 lbs., Liverpool, in casks, Corundum-Powdered, Flour, Cryolite-Powdered, Emerald-Green, Fluorspar-Powdered, No. 1, French Chalk, Fuller's Earth-Lump, Glauber's Salt-in bbls., Glass-Ground, Gold-Chloride, pure, crystals, s. v., Chloride and sodium, Gypsum-Calcined, Land Plaster, Iodine-Resublimed, Iron-Nitrate, Kaolin-Sec China Clay, Kieserite, Lead-Red, White, American, in oil, White, English, in oil, Acetate, or sugar of, white, Granulated, Nitrate, Lime Acetate-Am. Brown, Gray, Litharge-Powdered, English flake, Magnesite-Crude, kilos, Calcined, ton of 1,015-kilos, Brick, ton of 1,015 kilos, Manganese-Ore, per unit, Oxide, ground, per lb., Mercuric Chloride-Corrosive Sublimite, Powdered, Marble Dust, Metallic Paint-Brown, Red, Mineral Water-Ordinary slag, Ground, Mica-In sheets according to size, 1st quality, Naphtha-Black, Napth Cake, Ochre-Rochelle, Washed Nat Oxid, Lump, Washed Nat Oxid, Powder, Golden, Domestic, Oils, Mineral, Cylinder, light filtered, Dark filtered, Extra cold test, Dark steam refined, Phosphorus, Precip., red, white, Plumbago-Ceylon, American, Potassium-Cyanide, Bromide, domestic, Chlorate, English.

Chlorate, powdered, English, Carbonate, per lb., by casks, 82%, Caustic, per lb., pure silex, Iodide, Nitrate, refined, Bichromate, Yellow Prussiate, Red Prussiate, Pumice Stone-Select lumps, Original cks., Powdered, pure, Pyrites-Non-eupreous, p. units, Quartz-Ground, Rotten Stone-Powdered, Lump, Original cks., Rubbing stone, Sal Ammoniac-lump, in bbls., Salt-Liverpool, ground, Common, fine, Turk's Island, bush, Salt Cake, Saltpeter-Crude, Soapstone-Sodium-Prussiate, Phosphate, Stannate, Tungstate, Hyposulphite, in casks, Strontium-Nitrate, Sulphur-Roll, Flour, Sulfuric, S. O. F., per unit, Tale-Ground, French, Terra Alba-French, English, American, No. 1, American, No. 2, Tin-Crystals, in kegs or bbls., feathered or flossed, Muriate, single, Double or strong, 54° B., Oxy. or nitro, Tin Plates, box, Swansea, best charcoal, best coko, Vermillion-lump, English, Am. quicksilver, bulk, Am. quicksilver, bags, Chinese, Trieste, American, Artificial, Zinc White-Am., Dry, Antwerp, Red Seal, Paris, Red Seal, Muriate solution, Sulphate crystals, in bbls.

THE RARER METALS.

Arsenic-(Metallic), per lb., Barium-(Metallic), per gram, Bismuth-(Metallic), per lb., Cadmium-(Metallic), per lb., Calcium-(Metallic), per gram, Cerium-(Metallic), per gram, Chromium-(Metallic), per gram, Cobalt-(Metallic), per lb., Didymium-(Metallic), per gram, Erbium-(Metallic), per gram, Gallium-(Metallic), per gram, Germanium-(Metallic), per gram, Indium-(Metallic), per gram, Iridium-(Metallic), per oz., Lanthanum-(Metallic), per gr., Lithium-(Metallic), per gram, Magnesium-(Powdered), per lb., Manganese-(Metallic), per lb., Cbem. pure, per oz., Molybdenum-(Metallic), per gm., Niobium-(Metallic), per gram, Niobium-(Metallic), per oz., Palladium-(Metallic), per oz., Platinum-(Metallic), per oz., Potassium-(Metallic), per lb., Rhodium-(Metallic), per gram, Ruthenium-(Metallic), per gm., Rubidium-(Metallic), per gram, Selenium-(Metallic), per oz., Sodium-(Metallic), per lb., Strontium-(Metallic), per gm., Tantalum-(Metallic), per gram, Tellurium-(Metallic), per lb., Thallium-(Metallic), per gram, Thallium-(Metallic), per gram, Thorium-(Metallic), per gram, Tungsten-(Metallic), per lb., Uranium-(Oxide), per lb., Metallic, per gm., Vanadium-(Metallic), per gm., Yttrium-(Metallic), per gram, Zirconium-(Metallic), per oz.

BUILDING MATERIAL.

Bricks-Fronts, nominal, Croton, Wilmington, Philadelphia, Trenton, Baltimore, Building Stone-Amberst, freestone, cu. ft., Brownstone, Portland, Granite, rough, Portland, foreign, Portland, American, Portland, special brands, Roman, Keene's coarse, Keene's fine, Slate-Purple and green roofing, square, Red roofing, square, Black roofing, square, Lime-St. Johncom, and finish, Glens Falls, com. and fin.