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We had not expected that steel prices would go below the very low point noted a few weeks ago; but in another column we record a sale of 5,000 tons steel billets in Pittsburg at \$16.75 per ton cash, deliveries to run from January to May. This is certainly low-water mark, and it does not seem possible that a lower point can be reached.

THE Ways and Means Committee has made a few changes in its proposed tariff schedules, the most important being an increase in the duty on sheet and pipe lead to 1 1/2 cents per pound, or one-half the present rate, instead of one cent, as at first proposed. The date when the bill shall take effect, if passed, has been changed from March 1st to June 1st.

It is now announced that the bill will be introduced on Tuesday next, December 19th, but will not be brought up for debate until after the holiday recess. Delay in settling the question of changes in the tariff is greatly to be deprecated.

THE convention which Governor WAITE, of Colorado, called to petition for a special session of the State Legislature to authorize the coinage of silver was a melancholy failure. Only 18 delegates assembled at Salida in response to the call, and there were no representative men among them. The Governor's wild propositions did not meet the approval of even the limited number present, and the resolutions endorsing them passed only by a vote of 10 to 8. The Governor has ceased to have any influence. The injury which he did Colorado with his wild utterances is now well understood by all its citizens.

THE December report of the blast furnaces shows a considerable improvement, the number of furnaces in operation having risen from 119 to 130, and the weekly output of pig iron from 82,000 to 99,000 tons. This increase in production has not apparently been accompanied by any increase in stocks; the market seems to be taking the iron, although prices do not improve. Under present conditions, however, a furnace is not likely to blow in unless there is a fair prospect of disposing of its iron without loss at present prices, for there is no prospect of any important advance in prices while general trade continues so dull.

THE ELMORE COPPER COMPANIES.

We have before referred to the ELMORE copper depositing process and the peculiar methods which attended the promotion of the companies to operate under the patents. One of the largest of these companies has just come to the end that we anticipated. The report of Mr. C. J. STEWART, the official liquidator of the French Elmore Company, which has just been made public in London, is anything but cheerful reading for the stockholders. The capital stock paid in was £178,332, besides £66,500 allotted to the vendors, and on the shares issued for cash there were premiums amounting to £33,375. All this money has disappeared, and in addition there is £53,459 due to creditors and unpaid. In all the sum of £331,674 has been spent, while the actual result in business for six months past has been sales amounting to £7,902, made at a net loss of £5,187. The only asset of the company, besides the patents, is the works at Dives, on which the books show an expenditure of £137,264, but the actual value of which is not given.

The best terms that the liquidator finds himself able to make are the acceptance of an offer of £8,600 in cash and £65,000 in securities of a new French company at the head of which is M. SECRETAN, who was secretary of the old concern. That is, assuming the new shares to be worth par—which is a very violent assumption—the stockholders of the old company will get less than 25 per cent. of the money expended. In reality the return—for only the cash can be considered—will be about 2 1/2 per cent.

From the report it seems that most of the directors' time was spent in "financiering," or in attempts to raise money at exorbitant rates of interest, in some cases as high as 18 per cent. The end is bad, but not worse than might have been anticipated by anyone who read the several editorials published in the ENGINEERING AND MINING JOURNAL. Not only was the product of uncertain and poor quality and its cost excessive, but the financial methods of the Elmore company were still worse. The timely exposure by the ENGINEERING AND MINING JOURNAL prevented the floating of an American company.

THE LAKE SUPERIOR IRON ORE TRADE IN 1893.

The close of the lake shipping season has come, and the making up of the accounts shows that the shipments of iron ore by water from the Lake Superior regions have been 5,837,000 tons, a total which the all-rail shipments will bring up to 6,000,000 tons, or about two-thirds of the total shipments in 1892. This is somewhat better than had been expected when the general condition of the iron trade for several months past is considered, but it is not a showing to please the miners or operators. The reduction in demand and in shipments of ore was noticeable from the very beginning of the navigation season, when mines began to work with less than their usual forces, and the process of further reduction began

early in the season. Apart from the smaller demand, the Schiesinger failure in July and some local embarrassments affected the trade, and the later months of the season were the worst that it has known for at least ten years back. During the past month there has been some improvement, and at the end of the season more mines were at work than a month before; but the prospects for next spring are still far from encouraging.

While the entire district has suffered from hard times, the worst pinch has come on the older ranges—the Marquette, the Menominee and the Gogebic—which have had to fight not only the lessened demand for ore, but also the competition of the new Mesaba range mines, which were this year in the market for the first time, and for which exceptional advantages in cheapness of working and quality of ore are claimed. Mines in which ore can be loaded directly on cars by steam shovels, and where no costly hoisting or pumping machinery is required, have certainly an advantage in competing for business which is not to be disregarded, even if it is easily overestimated.

Perhaps the most unfortunate thing in connection with the season's operations has been the personal suffering and distress among the miners. Not only were a large number thrown out of work, but there naturally followed a great reduction in the wages of those who were still employed. The current rates at present are \$1.50 per day for mining and \$1 for outside work, the reductions being from 35 to 40 per cent. on the old rates, which were by no means extravagant. Well informed local authorities estimate that there were in November fully 12,000 fewer men at work in the iron district than at the same time in 1892. Hardly any of these men have the means to go elsewhere in search of work, even if it were likely to be found, and there will probably be much suffering through the winter. It is to the credit of the Lake Superior miners that they have borne their troubles bravely and peaceably. We sincerely hope the improvement in consumption may soon bring them relief.

There is a prospect of much better times with the opening of the next season, though some of the older mines will continue to feel the competition of the Mesaba severely.

THE STEEL RAIL TRADE.

A report recently made to the British Iron Trade Association by Mr. J. S. JEANS, while it contains some estimates and conclusions which are to be accepted with caution, draws attention to some points of interest and gives some facts which are worth careful consideration as affecting the future of that important branch of the steel trade which is concerned in the supply of material to the railroads.

According to this statement the total mileage of railroads in the world in 1881 and 1891 was as follows:

	1881.	1891.	Increase.
Europe.....	103,286	134,409	31,123
American Continent.....	98,819	194,978	96,159
India and British Colonies.....	23,943	44,797	20,854
Egypt, China and Japan.....	1,018	2,556	1,538
Total.....	227,066	376,740	149,674

In round figures 150,000 miles of new railroad were built during the ten years. The actual mileage of new track is difficult to ascertain exactly, but an allowance of 50,000 miles for second tracks, sidings and for additional tracks built on older roads is certainly a moderate one; this would make the total mileage of new track built during the ten years 200,000 miles. Some addition should also be made for street railroads, the extension of which during the period named was considerable; but for the present they may be disregarded. A fair estimate of the amount of steel rails needed for the new lines is 100 tons to the mile. Ten or fifteen years ago this would probably have been high, but there has been a constant tendency to increase the weight of rails. A 70-lb. rail is as common now as a 56-lb. rail was ten years ago; 80-lb. and 90-lb. rails are used, and even 100-lb. sections are not unknown. As the manufacture of iron rails had practically ceased in 1881, the new mileage must have been laid with steel rails, and on the estimate given above would have taken some 20,000,000 tons.

It is probably not unfair to assume that of the 227,000 miles of railroad existing in 1881 two-thirds, or about 150,000 miles, had been laid with iron rails, and that, allowing for second tracks and sidings, there were at that date nearly 200,000 miles of iron track. The exact amount of this which has been replaced with steel can be estimated approximately by taking those countries for which we have statistics. According to the figures of *Poor's Manual*, in the United States in 1881 about 68 per cent. of the track was in iron rails, but in 1891 not more than 16 per cent. was of iron. If the same proportion held good elsewhere, nearly 120,000 miles of the iron track of 1881 was replaced by steel during the ten years under consideration, requiring 12,000,000 tons of rails. To this must be added a considerable amount used for replacing rails too light for the traffic. On nearly all the lines of heavy traffic both in this country and Europe, the rails in use twelve years ago have been replaced by new ones of heavier section, although most of the light steel removed has probably been used again in branches and sidings. Moreover, during the narrow-gauge and light railroad craze which prevailed for several years after 1873, many thou-

sand miles were laid with 30-lb., 35-lb. and 40-lb. rails, very little of which now remains in use. Making all the allowances which we have mentioned it would appear that the consumption of steel rails for the ten years must have been from 33,000,000 to 35,000,000 tons.

The report to which we refer gives an estimate of the production of steel rails, not for the ten years under consideration, but for eleven years; moreover it estimates the production when exact figures are attainable, and for the United States its estimate is 800,000 tons too high. Taking the full returns given in the MINERAL INDUSTRY for this country, and accepting the estimates for ten years only, we find that the total output of steel rails for the ten years ending with 1891 was as follows: United States, 14,196,000; Great Britain, 9,204,000; Germany, 5,400,000; France, 4,000,000; other European countries, 4,000,000; total, 36,800,000 tons, or not much in excess of the amount estimated above as consumed. The difference would easily be explained by an increase in renewals over a somewhat conservative estimate, or in part by the greater demand in recent years for street railroads. The growth of these has been rapid for some years, and, especially since the introduction of the electric motor, they have taken better and heavier rails than formerly, increasing the tonnage used by them.

The future demand for steel rails must depend more largely than the past on new construction; and what that will be is somewhat difficult to predict. Europe, outside of Russia, Turkey and the Danubian states, is pretty well supplied with railroads: many parts of our own country are in the same condition, and while we still have room for more, we are not likely to see a repetition of the railroad building "booms" of 1870-72, 1882 or 1888-89. The Australasian colonies are overbuilt for the present; in Asia and Africa new lines are slow in coming, and in South America not much can be looked for till financial conditions improve. The most important new construction now in progress is in South Africa and Siberia; but the Cape lines are delayed for financial reasons, and the material for the Siberian road will come mainly, if not entirely, from the Russian mills.

The element of greatest importance in the future of the trade is the demand for renewals. In a few years more iron rails will have practically disappeared; and this demand will depend upon the wearing out of the steel now in use. But the average life of a good steel rail under ordinary traffic has not yet been determined. They have worn out and given way under extraordinary traffic, as in the approaches to great terminal stations, and on sections of main lines where a very large number of trains are concentrated; but under such demands as are found on more than 95 per cent. of the railroads of the world it has not yet been proved that a good steel rail will not last for 30 or even 40 years. It is fairly certain that for a short time at least the sale of steel for renewals will decrease year by year and the demand will depend chiefly upon new work. Under these circumstances the steel rail mills cannot look forward to an early increase of business unless conditions change in a way that we do not now anticipate, and the probabilities are that some of them must remain idle or turn their attention to other work.

NEW PUBLICATIONS.

THEORETICAL MECHANICS, PARTS I. AND II. By Alexander Ziwet, Assistant Professor of Mathematics in the University of Michigan. New York and London: Macmillan & Co. Two volumes, pages 188 and 184; with diagrams. Price, \$2.25 each.

We do not hesitate to recommend this book to the student of the higher mathematics. It has been written with a view to the requirements of the American student, who, unlike his European brothers, usually takes up the study of mechanics after having acquired a knowledge of the elements of higher mathematics. In English and German, as well as in some French treatises the authors pre-suppose that the student has been through a thorough course in elementary mechanics before entering upon the study of higher mathematics. Professor Ziwet's definitions and demonstrations and generalizations are short, clear and to the point—and the arrangement of the matter treated is good.

He has throughout the book kept in mind the particular wants of engineering students aiming to make it serve as a preparation for the practical application of the science, and to bring out the utility and importance of purely mathematical training. General theories are illustrated by special problems and applications in the text, and sets of exercises are inserted throughout the book to be worked out by the student. The answers to these exercises are also given at the end.

The author has not attempted to treat the more advanced parts of the subject. Very complete bibliographical references to such standard treatises as can probably be found in a well assorted college library have therefore been given for the use of those desirous of pursuing the subject farther. The work is in three volumes of about 200 pages each. Vol. I. is divided into two parts: the geometry of motion and kinematics proper. Before entering into the subject of kinematics the author gives a short introductory but concise chapter on the measurement of time. Vol. II. is also divided into two parts: Introduction to Dynamics and Statics. Vol. III., which is not yet published, will be devoted to kinetics.

The books are well bound, well and clearly printed on thick paper and the chief matter of every paragraph is in heavy type, so it is easy to tell at a glance on what subject it treats.

THE GENESIS OF ORE DEPOSITS. By Prof. F. Posepny. New York; the American Institute of Mining Engineers. Pages 173; with diagrams and plates.

Of the many elaborate and valuable papers presented in Divisions C and D of the late International Engineering Congress (both of which were conducted by the American Institute of Mining Engineers), it is safe to say that the most important was that of Prof. Franz Posepny, whose eminence was recognized long ago by his election as an honorary member of the Institute. For more than a quarter of a century his monographs upon various branches of the science of mineral deposits, and particularly his acute and thorough discussions of individual localities, have enriched technical literature; and when in 1879 a new chair of "the geology of mineral deposits" was established at the Mining Academy of Prizbram, in Bohemia, it went without saying that Franz Posepny should be called to occupy it. This he did for ten years, and the substance of his annual course of lectures, never before published as a whole, has been arranged and brought up to date, to form the paper which was presented at Chicago. It sees the light first, therefore, in its English translation, which, having been approved by the author, may be accepted as an accurate expression of his views. It is a pamphlet of 173 pages, with 100 illustrations, and constitutes a complete treatise on the subject, comparable in importance with those of Cotta, Groddeck and Grimm. Indeed, this essay will prove more valuable to American students than any of those I have named. In the first place, its distinguished author has traveled in the United States, and possesses a considerable personal acquaintance with our ore-deposits and the geological conditions under which they occur. In the second place, he is thoroughly familiar with the mining districts of eastern Europe, including Bohemia, Hungary and Transylvania—a region which presents closer analogies to our American deposits than does Saxony or the Hartz or the Rhine. For the recognition of similarities and the correlation of genetic processes in the New and the Old World, probably no man living is better prepared.

The present treatise has another special value, as a corrective to the tendency of recent years toward the lateral-secretion and descension theories of ore-deposition, the former of which, especially, received a new impetus from the ingenious labors and fascinating speculations of Sandberger. It is true that the battle has been fought on that line, and is practically over, for those who keep themselves acquainted with foreign technical literature. The limitations of Sandberger's theory and the weakness of its support in facts, when offered as a comprehensive generalization, are as well understood as are its merits within a narrow sphere. But it continues to exert upon many experts in practice, who have not closely followed the discussion of it, an influence disproportionate to its just weight.

Professor Posepny's attitude on this point is frankly partisan. To some extent, he fights over again the battle in which he has borne a leading part already, but this does not impair the force of his arguments, or the wholesome effect of his essay as rescuing the investigation of ore-deposits from the exclusive sphere of the chemical laboratory, and vindicating the right of the physicist, the geologist and the mining engineer to take part in the inquiry. I shall give here a condensed statement of the contents of his paper, reserving for another occasion some further comments upon special portions of it.

After an appropriate introduction, the author presents an excellent survey of the history of his subject, as exhibited in technical literature. While this cannot be said to be absolutely exhaustive, it covers with intelligent critical comprehensiveness the leading types of theory in vogue from time to time hitherto. I take this opportunity to say that Prof. Posepny, in a private letter, has expressed to me his regret that his survey of this subject omits the "Ore Deposits of the United States," the new work of Professor Kemp, of the Columbia School of Mines, which came to his notice too late to be included.

Passing to the definition of his own standpoint and purpose, the author bases his proposed genetic classification upon the primary distinction between idigenous and xenogenous mineral aggregates, of which the former are contemporaneous in formation with the country-rock, while the latter have been subsequently formed in it. The xenogenites are further divided into such as penetrated pre-existing cavities (which are again subdivided according to the nature of these cavities as primitive pores, etc., spaces of dissection and spaces of dissolution) and the metamorphic or metasomatic deposits, which made room for themselves by the expulsion of an earlier material. To the two main classes of idigenites and exogenites, a third, comprising the hysterogenites or latest formations (deposits of debris) is added, in harmony with some older systems, though, strictly speaking, the hysterogenites should be considered as a division of the xenogenites, so far as genetic relations are concerned.

In this way certain types of deposits are established, without reference to their exterior form, upon purely genetic grounds. It is not pretended that this classification is final and complete in detail, or that it can supersede, for the purposes of the mining engineer, the convenient, though unscientific, systems based largely upon form. But it is fairly claimed that a genetic system will be more helpful to the student of the science of mineral deposits.

The chapter which follows presents a highly interesting and valuable discussion of the subterranean water-circulation, which is divided by the underground water-level into two zones, the regions respectively of the vadose or shallow, and the deep underground circulation. This discussion, together with the chapter which follows it, and concludes the first part of the treatise, develops very clearly the author's theoretic argument, that in the two regions of underground circulation, the formation of ore deposits must have taken place according to different, almost diametrically opposed, principles: in the vadose region through descension and lateral secretion, and in the profound region by ascension; that is, that the deposits formed below the underground drainage-level are precipitates from ascending springs.

The second and larger part of the paper gives numerous examples of the different classes of deposits, and discusses them from the

standpoint of the theory already sketched. Many of the descriptions are given from personal knowledge; others are compiled from monographs which have appeared from time to time. In all cases, the reader is referred to the sources of information with an accuracy and fullness which all writers of technical treatises ought to imitate.

Perhaps the most interesting passages in this essay are:

1. Professor Posepny's discussion of Sandberger's lateral-secretion theory.
2. His discussion of the theory of contemporaneous deposition as illustrated in the Mannsfield copper-schists.
3. His discussion of the zinc and lead deposits of Missouri and Wisconsin.

Under each of these three heads, and in other particulars also, his conclusions are vigorously (though I do not think successfully) disputed. The discussions at Chicago developed opposing views on the part of such authorities as W. P. Blake, Arthur Winslow, Frank Nason, etc., and doubtless the list will be enlarged by the contributions of those who were not present at Chicago, but who will send their criticisms by mail to the secretary. It is hoped that a continuation of the debate on this subject will form one of the features of the next meeting of the Institute, in February, 1894.

R. W. RAYMOND

BOOKS RECEIVED.

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

Virginia: A Hand Book. Prepared by Thomas Whitehead, Commissioner of Agriculture, Richmond, Va.; State printers. Pages 360; illustrated and with maps.

Annual Report of the City Engineer of the City of Providence for the Year 1892. J. Herbert Shedd, City Engineer. Providence, R. I.; issued by the city. Pages 90; illustrated.

The Corliss Engine and Its Management. By John T. Henthorn and Charles D. Thurber; edited by Egbert P. Watson. Third Edition. London: E. & F. N. Spon, and New York; Spon & Chamberlain. Pages 96; illustrated. Price \$1.

The Choice of Coarse and Fine Crushing Machinery and Processes of Ore Treatment Part II. By A. G. Charleton. (Paper read before the North of England Institute of Mining and Mechanical Engineers. London, England; Andrew Reid, Sons & Co. Pamphlet, pages 102.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

The Carboniferous Age and the Origin of Coal.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: "Conservative's" criticism on this subject is fair, but the points he objects to are sustained by very strong evidence which can be easily pointed out; but I would prefer to see the matter discussed by some one more competent to deal with the subject than I am. As stated in my previous article, the accepted theory admits that tropical heat is necessary for the formation, a fact proved by its fauna and flora. This being accepted, it follows logically that during this period tropical conditions must have prevailed in the frigid zone as well as near the equator, as both sections contain coal and deposits of the same age. If then, as now, the sun was the source of all climatic heats, its relative distribution must have been the same, and tropical heats could not have existed at the poles with life at the equator*; hence, if these conditions are adhered to, it becomes necessary to change either the distribution of solar heat or the relative position of the earth. It might be reconciled upon the assumption that carboniferous conditions existed near the poles during the Archaean period at the equator, but this claim has never been made by any authority, to my knowledge, and involves many more difficulties than my current transportation theory. "Conservative" says further: "It would seem that the assumption of an ocean covering the location of the present coal measures was quite as violent as any of those to which the objections in the article are made."

That the ocean did cover this area at the beginning is clearly demonstrated by the sub-carboniferous limestones which could have been built nowhere else, upon every accepted theory; and that it was present again, after 2,000 ft. of true carboniferous strata had been deposited, is proved likewise by a persistent and uniform stratum of coralline limestone, high in the lower barren measures, and filled with spirifer crinoids and other marine life, which could not have existed in swamps or fresh water. In addition to this evidence marine life and marks abound in every ledge of sandstone and shale separating the different coal measures, and I have been under the impression that the best authorities assumed the formation of these sandstones and shales under oceanic waters, hence my reference to the alternating necessity of fresh and salt water for each coal measure and its overlying rocks.† It seems to me that no agency less than the ocean could have disintegrated and deposited such enormous masses of silica and alumina as are contained in the Appalachian carboniferous, and to which action the ripple marks and rounded pebbles are additional witnesses.

* Sir John Lessli and Mr. Traill compute the sun's relative distribution of heat at the equator and poles in constant sunshine as 115.14. And since Dana names 66° F. as the minimum temperature for existence of certain carboniferous fauna, such heats at the 75th parallel would be equivalent to more than 300° F. at the equator. In Lyell's "Principles of Geology," Vol. I., he admits this difficulty, in connection with semi-annual darkness, and attempts to reconcile the necessary conditions by assuming a change of the earth's axis to the ecliptic, in regard to which he consulted Sir John Herschell.

† See Dana's "Manual of Geology," third edition, pp. 357 to 359. In his "General Observations," beginning at p. 351, a very full substantiation of my assumption will be found, and he freely admits the many alternations of fresh and salt waters. Mr. Dana also refers to erosions in the carboniferous strata by ocean currents.

My reference to the violation of Nature's laws bore upon this very point, where ocean currents and wave action were plainly marked in a sandstone ledge, immediately over and under which are coal measures necessitating diametrically opposite conditions and fresh waters, and yet the thickness of these sandstone deposits are in some strata only a few inches and in others hundreds of feet. Grant that the sandstones have been deposited by the ocean, as Mr. Dana and others affirm, then, under their theory, a subsidence and elevation of the entire coal area becomes necessary for each and every coal seam; while deep water sedimentation and the separation of carbonaceous matter on the jigger principle requires nothing more than a single elevation, presupposing a submergence which was probably gradual. Subsidence and elevation of the surface are essential to both theories, and it seems more reasonable to assume one than a hundred.

ANSTED, W. V., NOV. 28, 1893.

WM. N. PAGE.

The Use of Plain English in Geological Discussions.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I do not think it quite fair in Dr. Raymond to jump on the youngsters so savagely as he does in your last number. Professor Posepny made his answer in good spirit on the whole, though his remark about Rickard's "mission to purify the English used by miners" is too much like a sneer. Mr. Rickard's remarks on the subject were just and entirely in the line of modern educational work under the lead of such masters as the late John Tyndall. Still Professor Posepny took a position which is unreasonable and defends it without offense. His position is, of course, a well known one, that a definite conception, however complex, can be brought to mind instantly, if we give it a name, and that the expression of new ideas in familiar language is often tedious and not perfectly exact. There is much more in the argument, but he, like Rickard, does not attempt to discuss the question in all its bearings.

Confining myself also to the subject as it is presented it seems to me that Professor Posepny and Dr. Raymond are clearly wrong. I consider it an error to give a new coined name to any conception that has not received the approval of the scientific world. There are various degrees of anticipation. We have all of us known some eager young couple who named their baby long before it was born, but most of us consider birth a necessary, or at least a desirable antecedent to a christening, and the Chinese give the boy his name when he becomes of age. Before that he has a "nursery name." I recommend the Chinese method to scientific writers. First express the conception in the vernacular of some country, no matter what. If it is a real discovery it will be discussed in the vernacular of other countries, it will receive accurate definition, and if it contains anything that cannot be expressed by current speech, an addition will be made and recognized. Only after such discussion and definition as this in the vernacular of the various countries is any conception worthy of a special name.

Our electrical friends owe the excellence of their nomenclature to precisely this mode of proceeding. In the discussions of the formative period of electrical science certain ideas were found to require expression, and at length the constant iteration of descriptive, and often circumlocutory, phrases get to be wearisome. I believe many terms were invented to express these ideas, and all of them were from the Greek or Latin, but when the electricians finally decided that new words were really necessary they rejected all these and gave us the admirable and suggestive "ampere," "ohm," "watt," etc.; words taken from no language, indeed, but for that very reason superior to the awful results of dead language-hybridization.

Geologists have been too prone to take the opposite course, and their writings are loaded with novel terms or attempts at systematic nomenclatures, ill-considered, unnecessary, and finding no acceptance by other writers. I doubt if the whole space of the "Journal" would be sufficient to contain a mere list of the terms proposed and forgotten by geologists, and I hold that Mr. Rickard's criticism was well taken and timely. If Dr. Raymond's writing is as clear as he thinks his thinking in this very case is a flagrant instance of too hasty word-invention. He says: "In translating Professor Posepny's paper, I had occasion to try to express his term 'idiogenous,' for instance, by some English phrase; and I could devise nothing briefer than contemporaneous with the inclosing rock." If this means anything, it means that Posepny did not give a definition in German of what he meant by "idiogeneous," but left his readers to imagine its meaning from the context. If that is so it is not Posepny's paper that we have had the pleasure and profit of reading, but Raymond's conception of what he meant to say! It seems to me that Dr. Raymond has afforded strong confirmatory proof that Rickard's position was well taken. If any thinking is to be called "muddy" it is certainly that which produces exactly the opposite effect to the effect intended.

There is great talk about the use of the dead languages for word-inventions, and Professor Posepny gives the argument for it briefly and well. To me there is something barbarous in most attempts to construct words on a Greek or Latin basis. Old Kikero's eyes would surely bulge if he were shown these inventions and told that he had been talking that kind of thing from his youth up! I notice that often the aptness of the new term is in direct relation to its recognized usefulness. I say "recognized" usefulness, for I believe that when a conception has been thoroughly threshed out and separated from other ideas by discussion in the vernacular of many countries, a name will be found for it that is likely to be fit and commendable. On the other hand hasty inventions made to suit ideas that lie in only one man's conception, and satisfy no acknowledged want are dead wood on the tree of literature.

It seems to me that Mr. Rickard was fully justified in objecting, first to the hasty invention of words that are not needed, and second to the awful botches that result from tinkering with languages for which we have no feeling. It is a libel to accuse the Latin and Greek languages of many of the terms we are asked to use, and many of them are so ridiculous that our own language will have nothing of them, whatever their pretended origin.

I confess to some muddiness myself, for the stream of this subject would have to run a long time to run clear, and I want to make a stop

somewhere. So I will close by saying that the word "replacement" as used in mineralogy suffers no lack of exactitude by its use in homely English. The word "substitution" which I suggested for the replacement of wall rock by vein material has been used by other writers with just as accurate meaning as "metasomasis." In his paper on "Fault Rules," Mr. Freeland pitches into the word "fault," used as a geological term, but in the thousand instances of its use by geologists, I have never noticed one in which it was ambiguous or misunderstood in the slightest degree. So of Mr. Becker's "chambered-vein." Certainly that excellent suggestion is as exact and much more luminous than any "jaw-breaker" of the same meaning is likely to be. I hold that the employment of these familiar words is not evidence of muddy thinking as Dr. Raymond asserts, but that they are well chosen, accurate, and descriptive, and that their use is better than the use of any nondescript invention whatever.

NEW YORK, Dec. 11, 1893.

JOHN A. CHURCH.

KEMP'S "ORE DEPOSITS OF THE UNITED STATES."

Concerning Professor Kemp's recently published work on the "Ore Deposits of the United States," the "Iron Trade Review," of Cleveland, O., says: "Furnishing in convenient and compact form the general character of the ore deposits of the United States, the volume will specially commend itself to schools of mining engineering and to the geological departments of all technical institutions."

Prof. R. A. F. Penrose, Jr., of the University of Chicago, writes: "I have just received the copy of Professor Kemp's 'Ore Deposits of the United States' and shall preserve it as one of the most valuable books in my library. Professor Kemp has done an excellent piece of work in writing this volume, and one that reflects great credit both on himself and the Scientific Publishing Co."

The San Francisco "Mining and Scientific Press" says: "Professor Kemp's work is now not only the only book giving full and latest information relating to the ore deposits of this country, but it is also the only book giving modern ideas on this important subject. The treatment of the subject is consistently geological and the principles of origin have been made as prominent as possible."

Prof. Floyd Davis, of the New Mexico School of Mines, at Socorro, writes: "I have examined Kemp's 'Ore Deposits of the United States,' and it affords me pleasure to say that this is the best work of its kind I have ever seen. The information is certainly fresh and up to date, and is of the kind which mineralogists, geologists, mining engineers and metallurgists need most. I am especially pleased with the elaborate bibliography which Professor Kemp has given in his work. This is one of the most valuable chapters in any scientific publication, and I congratulate the author in the completeness of his work."

The "Engineering News," New York, says: "Although written primarily for the mining engineer and student, this book should prove a useful addition to the library of the civil and mechanical engineer as well. Aside from the reports of the Geological Survey and other public documents and reports, and the proceedings of technical societies, all of which is scattered through many volumes, there has been no work of recent date treating of the deposition and characteristics of the great ore beds of this country. The present volume thus occupies a useful place in recent technical literature."

Prof. M. E. Wadsworth, director of the Michigan Mining School, at Houghton, writes: "Since the publication of the classic work of Whitney, in 1854, on 'The Metallic Wealth of the United States,' nothing has been published of a satisfactory kind in the United States that has given proper attention to the ore deposits of this country. Professor Kemp has placed all teachers of economic geology under a debt of obligation in issuing this book. I have no hesitancy in saying that we shall use Kemp's 'Ore Deposits' with our classes, as being the very best publication available for our purpose."

The "American Geologist," of Minneapolis, Minn., says: "This is a work which marks an epoch in this age of marvelous progress in all that pertains to industrial development. We have long felt the need of such a volume as this, and are sure it will find an honored place in many a library. Appreciating the wide range of the subjects embraced and the impossibility of any individual acquiring a personal knowledge of it all, we feel that Professor Kemp has rendered to economic geology and to mine-owners and operators a service which places him in the front rank with such authorities as Von Cotta, Whitney and Phillips."

The Denver "Mining Industry" says: "Mr. Kemp has added an American work to the standard textbooks on this subject. It is an excellent and comprehensive compilation and condensation of the leading points on each branch of the subject made by leading authors, such as Von Cotta, Von Weissenbach, Le Conte, Callon, Whitney and others. In this respect it may be said to be a veritable cyclopaedia. Its description of the various mining regions in the West shows enormous study of all literature bearing upon the subject, and a painstaking condensation. As a work of reference, constituting a veritable dictionary of the science, it fills a place no other book has attempted to fill, and is exceedingly valuable to the student."

"Public Opinion," of Washington, says: "Since the publication in 1854 of Whitney's 'Metallic Wealth of the United States,' we have had no systematic treatise on the ore deposits of America, and the time is therefore peculiarly favorable for the appearance of the book just issued from the press of the Scientific Publishing Company. Moreover, Professor Kemp, who is well known as an original investigator, as well as an instructor in economic geology in Cornell University, and the School of Mines of Columbia College, is, of all men likely to undertake such a work, probably the best fitted for its accomplishment. It is, therefore, with a strong predisposition in its favor that we take up the present volume, and with equal satisfaction that we find our prejudices undisputed on close perusal."

THE MINES OF SADOU, RUSSIA.*

By N. de Filkovitch.

The mines of Sadou, in Russia, are in the Government of Terec, near the city of Valdikavkas, and 60 kilometers from Darkok, a station on the railroad from Valdikavkas, to the port of Novorosysk, on the Black Sea. Near the mines is the village of Nijne-Sadon, which is at the confluence of a mountain torrent called the Hod, with the river Sadou. An excellent road built by the government runs from the mines to the railroad station; 3 kilometers distant it crosses the Osetin military road.

The mineral deposits are found at a height of about 1,250 meters above sea level. The mines have been known from a very early date, and there is historical evidence of their working by the Greeks, the Turks and the Georgians. Since the year 1851 they have been in possession of the Russian Government, and worked under its direction. The mineral deposits are found in veins in a rock formation of granite and micaceous porphyry, and are divided into many small veins, almost vertical. The general direction of the veins is toward the west. In some of them are found silver-bearing lead, and in others blende. The average result of a number of analyses of the blende is as follows: Zinc, 53 to 58%; iron, 10%; lead, 2%; silver, 0.013%; sulphur, 34 to 29%.

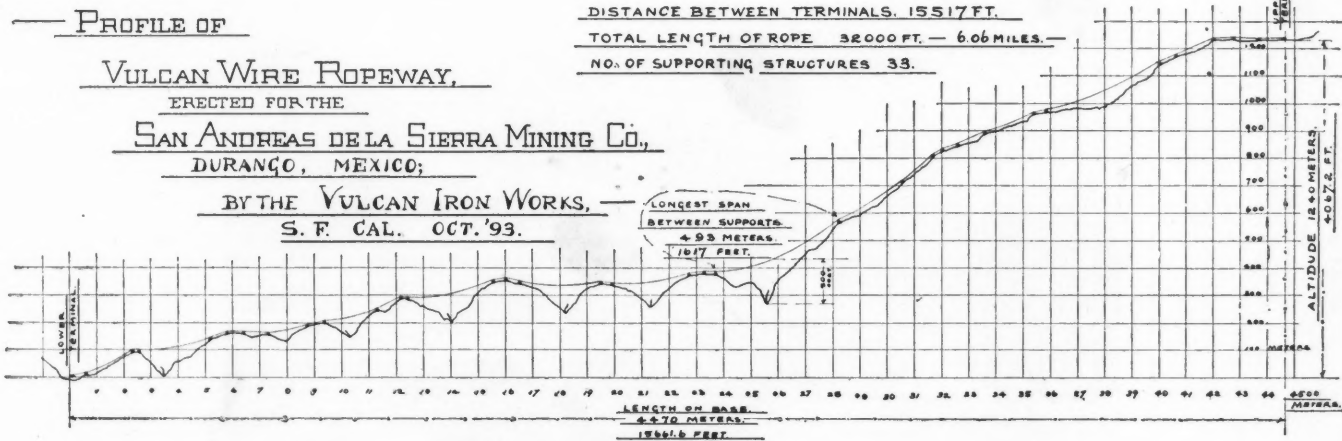
According to assays made by Russian Government engineers a cubic meter of ore contains on an average 167 kg. of silver-bearing lead, containing about 60% of lead and 2 kg. of silver; 500 kg. of blende containing 53 to 58% of zinc and 0.013% of silver; 500 kg. of copper pyrites, magnetic iron ore, calamine, etc. Near the surface

giving them a capacity for treating 25,000 tons of lead and 20,000 tons of blende, reserving for export 50,000 tons of blende and a certain quantity of copper and iron pyrites concentrated from the tailings. Graphite can also be obtained in considerable quantities. This report of the engineers has not yet been acted upon, and it is uncertain whether the extension of the workings will be made. In this connection, it may be noted that Russia in recent years has imported from Germany an average of 40,000 tons of lead and 5,000 tons of zinc yearly, in spite of the existence of a heavy protective duty.

THE VULCAN ROPEWAY AT SAN ANDREAS, MEXICO.

At the San Andreas de la Sierra Mines, in Durango, Mexico, there is now under construction an aerial ropeway, furnished by the Vulcan Iron Works, of San Francisco, Cal., which is one of the boldest structures of its kind attempted this far. The line is 15,517 ft. long, not being so remarkable in that respect, but the inclination is over 4,000 ft. in that distance, and two single spans are over 1,600 ft. between supports. This ropeway was put in to carry wood and charcoal to the mill. A great saving is made by this system, as the material had to be packed over a very circuitous route on mule-back. The country over which the line travels is exceedingly rough, and it crosses gorges 600 ft. deep. At one place the grade is at an angle of 48°. A profile of this tramway is shown in Fig. 1.

The Vulcan system of ropeway consists mainly of an endless wire rope supported at convenient intervals on grooved sheaves, which are elevated on supporting structures, the height and construction of which will vary with the character of the ground; and passing around large



there are also found some oxides and carbonates of copper and of lead, but after reaching a depth of 100 m. the ore is generally much richer in blende. Beyond this depth the veins of blende extend through a width of about 25 m.

The Government established, soon after it took charge of the mine, metallurgical works at Alagir, where the lead and silver are extracted. The blende is sold to foreign works. A test of the latter mineral was made in February, 1892, at Swansea, Wales, and this trial was followed by the sale of 5,000 tons at a price of £6 per ton, free on board at Swansea. A large amount was spent on the works at Alagir, which have been, like all the early Russian buildings in the Caucasus, built in the form of a fort and prepared for defense against hostile attack. The following table shows the total production in metric tons, during the five years 1887 to 1891, inclusive:

	1887.	1888.	1889.	1890.	1891.
Silver-bearing lead.....	267	212	266	260	258
Silver-bearing pyrites.....	99	99	104	97	98
Silver-bearing lead, concentrated	300	300	300	300	300
Blende.....	1,613	1,600	1,612	1,610	1,608

The mountainous country surrounding the mines is full of small streams, from which a considerable water power is obtained. In the service of the mines and the works there are nine hydraulic motors representing a total of about 80 H. P. The number of workmen employed is about 270. The following table shows the actual production of metal at the Alagir works for five years, the lead being given in metric tons and the silver in kilograms:

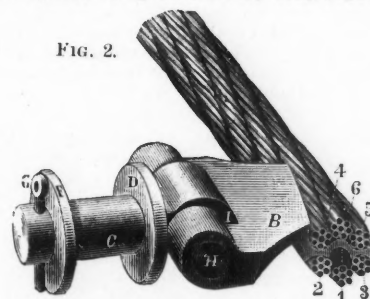
	1887.	1888.	1889.	1890.	1891.
Silver, kg.....	600	517	550	545	567
Lead, tons.....	145	137	140	133	142

The expense per metric ton of mineral taken from the mines during the five years has been as follows, including labor, fuel, supplies of all kinds, explosives, cost of transportation from the mines to the works, office and general expenses:

	1887.	1888.	1889.	1890.	1891.
Silver bearing lead.....	\$41.66	\$41.68	\$40.99	\$40.33	\$42.71
Silver-bearing pyrites.....	5.95	5.95	5.95	5.95	5.95
Silver-bearing lead, concentrated.	1.34	1.34	1.34	1.34	1.34
Blende.....	2.38	2.38	2.38	2.38	2.38

Thorough explorations have been made by the Government engineers of the country in the vicinity of these mines, and their report is that within a circle of 10 km. radius, drawn with the mines as a center, there are at least 20 deposits of mineral. The estimate is that by extending the workings there could be secured a yearly output of at least 25,000 tons of silver-bearing lead and 70,000 tons of blende, of an average assay approaching that given above for the Sadou workings. It is proposed to increase the size of the works,

grip wheels at ends of line. Carriers of suitable shape to hold the material to be transported—such as ore, wood, sugar cane, or any other similar material in sacks or in bulk—are fastened to the rope at intervals dependent on the amount to be transported. The ideal ropeway is one with sufficient grade to run by gravity, the loaded buckets pulling the empty ones back to the base of supplies. In any case, however, the power required to operate a very long ropeway is very small,



for the friction is low. The surplus power generated on gravity lines is taken up by friction brakes at the terminals, which are automatic in their action.

The advantages of this ropeway over any other mode of transportation are unquestioned, where the freight is in quantities not to exceed 300 tons in 12 hours. The first cost is comparatively low, as little preparation is needed on the ground. The cost of operation is extremely low; four men will operate and look after the line. In one case, of a ropeway run in Mexico, a saving of \$33,580 was made the first year, after deducting the entire cost of the ropeway, \$19,400. This line was used for transporting cord wood. The principal point is that no matter how rough or precipitous the country is, a ropeway can be strung across it, requiring no tunnels, nor bridges, nor excavations, ascending the steepest hillsides and spanning the deepest canyons. Snow or floods offer no impediment to the operation of the ropeway, and it requires no skilled labor.

The vital point of a ropeway is the clip or piece on which the carrier is hung to the rope. The Vulcan clip, which is shown in Fig. 3, has certain advantages claimed for it. Being inserted in the rope it is impossible for it to slip on the rope; it can be readily attached to the rope, and does not make any appreciable difference in the size of the rope. It has a hinged joint by which any jar in passing a sheave is taken up; this eliminates any tendency to swing in rope and load. The clips are made of Norway iron and have been subjected to some

* Translated from article in "Le Genie Civil."

very heavy tests; in one case the test consisted in weighting the hanger until a load of 2,000 lbs. was suspended from the clip; at that point the shank C gave way, but the web inserted in the rope showed no signs of bending or of stretching the rope.

In Fig. 2 is shown the terminal station of a Vulcan ropeway used in Washington for carrying wheat. In this engraving the method of loading the carriers is clearly shown, and the arrangements at the station are also brought out. The fact that the working of the tramway is continuous, and there is no delay in switching or transfer of carriers is another point in its favor.

THE CANADIAN MINERAL EXHIBIT AT CHICAGO.

Specially Reported for the Engineering and Mining Journal.

Judging by its display in the Mining Building, Canada seems to have early been alive to the opportunities afforded by the Exposition for bringing her natural resources to the conspicuous notice of the world. Thanks to the efforts of late Executive Commissioner Hon. Wm. Saunders, and his successor, the present incumbent, Hon. J. S. Larke, the possibilities of a fine mineral display from Canada were early realized. The Canadian Geological Survey has long been known for the work it has performed in opening up the great tracts of mineral country, and some of its members through their study of Canadian minerals and strata have become eminent in different branches of science. Besides this, the different provinces are active in promoting the mining interests within their boundaries, and in some cases have special mining commissions, whose duty it is to inquire into the practical working of mines, as well as to promote further extension of the industry. The Executive Commissioners therefore had a good field for operations. The Survey and its workers were at their call and duplicates from the large Geological Museum at Ottawa at com-

contains less illuminating oil than the Pennsylvania crude, it is richer in lubricating oils and paraffine. A bust of Sir John MacDonald made of paraffine wax was exhibited; it was executed by Hamilton McCarthy, of Toronto. The principal oil districts are Petrolia, Oil Springs, Essex and Manitoulin Island, all situated in the counties bordering the St. Clair and Detroit rivers. These counties make Ontario the leading, almost the only, producer of both oil and salt in the Dominion. The salt shown was from Warwick, and was singularly pure, running over 97% chloride of sodium. The exhibit was made by the Elarton Salt Works, which works the beds at a depth of 1,000 ft. The mineral waters were from the celebrated Caledonia Springs.

The visitor was confronted, as he entered the main court, by the great nickel exhibit that formed the central feature of the display, as the mining of the metal itself is the most prominent industry in the Province. This exhibit was fully described and illustrated in the "Engineering and Mining Journal" for September 16th, page 289, and the engravings there given show also the general arrangement and appearance of the Ontario Exhibit.

The remainder of the court was filled up with select collections of the exceedingly varied economic minerals of the Province, such for instance as lithographic stone, coal, marl, kaolin, molding clay, mica, feldspar and gypsum. Graphite occurs in workable quantities in three counties. The asbestos exhibited was of the hornblende type, and is found in the County of Addington as well as in the Ottawa Valley. The crystalline prisms of apatite vary from 1 in. to 1 ft. in length. This material is found in the lower Laurentian rocks of eastern Ontario. Dark green and brown crystals of apatite were shown by Renfrew, Frontenac and Leeds counties. This phosphate carries from 70 to 90% of phosphate of lime to the ton.

Altogether some 1,557 specimens were catalogued in the entire display, and covered nearly all of the formations and varieties found in

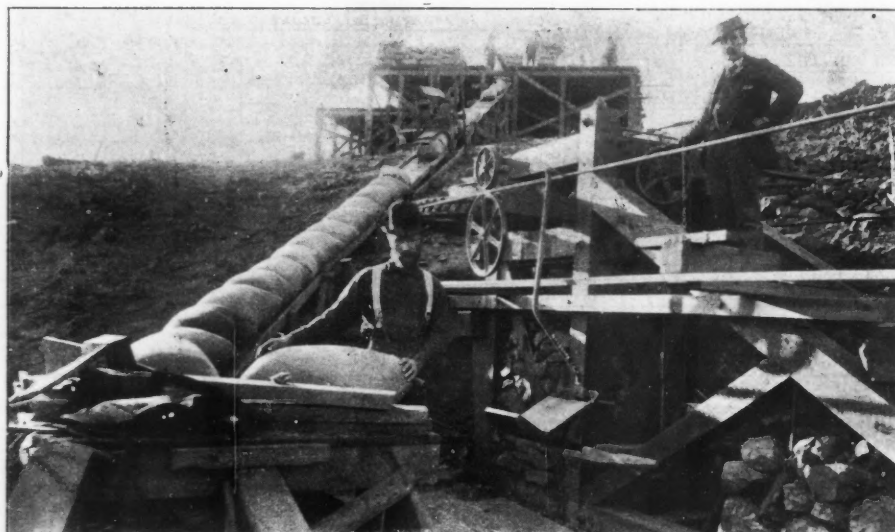


FIG. 2.—TERMINAL STATION OF VULCAN ROPEWAY.

mand. For a presentation of the special and local minerals they depended upon the pride and patriotism of the several provinces. Four came forward and signified their intention of making competitive exhibits. First and most prominent was

ONTARIO.

Ontario is a province abounding in mineral wealth, has a great amount of capital invested in mining, and proposed to make the largest exhibit of minerals. Therefore she was granted the conspicuous position she occupied upon the main central aisle of the building. This frontage was treated in an elaborate fashion, a central arch being appropriately decorated with the emblems of the province. At the right of this arch, slabs and cubes of the marbles and building and ornamental stone of the province were built up to form series of trophies representing the products of its leading quarries. The granites exhibited by the Canadian Granite Company are found in the Thunder Bay and Nipissing districts, quite close to the Canadian Pacific Railway, and are largely used for monumental work. The most beautiful slabs were those of the conglomerated jaspers, deep red in tone with veins of red or green. In the collection were a number of very attractive serpentines, sandstones, and limestones. The marbles vary in color from black to green, gray, pink and white. This exhibit was largely made by the Hungerford Marble Company. The samples were of high structural strength as shown by special tests, and the quarries from which they come are most advantageously worked, the stratification being almost vertical. A collection of polished cubes from the Nipigon district, north of Lake Superior, showed peculiar richness in banded and clouded colors, and they can be used to good effect for paneling and interior work.

To the left of the main arch the mineral waters, oils and waxes and salts were ranged in a series of pyramids, and formed a particularly striking contrast with the dark ores which form the background of the exhibit. The oil was exhibited by the Imperial Oil Company, the largest producer in the Province. This company commenced operations in 1859, at the very inception of the Canadian oil industry. The principal wells are at Petrolia, but the works extend over an area of 65 acres, and then have pipe lines running to all parts of the oil producing territory. Although the Canadian crude

the province. As stated by Mr. David Boyle, Superintendent of Mineralogical Exhibit for the province: "The object kept constantly in view was rather to make a good, general, average display, than to bring together a quantity of unusually rich specimens." The Ontario government by placing its mineral interests at the Exposition in the hands of Commissioner Awrey and Superintendent Boyle, fortunately secured two able representatives. Mr. Awrey was in charge of all the Ontario exhibits at the Exposition. Mr. Boyle, who has long been Curator of the Canadian Institute at Toronto, is familiar with the resources of Ontario in minerals, and to his acquaintance with the subject and with Exposition requirements is due the systematic and representative method in which the presentation of the minerals of the province has been carried out. He prepared especially, to accompany the collection and to explain and give it further value, a map of the province 12 by 18 ft., giving the trend and comparative areas of the different geological formations and indicating the exact localities of the metals and minerals mined. In addition to this there were some very interesting detail maps of special districts, such as the nickel lands of the Nipissing and Algoma districts, the Silver Mountain mining district, Thunder Bay and the mining regions of Lake Superior.

BRITISH COLUMBIA.

In the space of British Columbia there was as a central trophy a pyramid of gilded bricks. This showed in a comprehensive and interesting manner the output of this gold producing region. A small card label showed that it represented the \$53,512,651 mined in that province since 1858. The ores exhibited were mostly of auriferous quartz, very rich in appearance and said to be easily worked. A case containing specimens of placer gold was shown from the Cariboo, Omenica and Kootenay districts.

The collection of nuggets was valued at over \$4,000. A quantity of pure gold was shown side by side with a pan of dust as adulterated by the Chinese. Some of the creeks in this district yielded at an early date as high as \$1,000 to the foot, and the loose gravel of the glacial period, denuded from bordering mountains, average as high as \$200 to the running foot. British Columbia is pre-eminently the gold country of Canada, and the exhibit was calculated to make this fact conspicuous.

The history of gold prospecting in British Columbia is exceedingly interesting, and can be found summed up with conciseness and unusual interest in the excellent treatises of Dr. G. M. Dawson, on the "Mineral Wealth of British Columbia." It was in 1857 that fine gold was discovered along the lower reaches of the Fraser River by prospectors from the States. The coarser gold constantly found further up stream led to the opening up of the famous Cariboo country, 400 miles inland, and this district is by far the richest of all Fraser mining districts. Although continually worked, the river beds of the Cariboo district still produced in 1892 about \$200,000 worth of the yellow metal; while the district to the north, as far up as Alaska, is believed to be auriferous. The banner producing region of British Columbia at the present time is found in the extreme southeast corner of the province, and is called the Kootenay district; the greatest discoveries in this region were in the years 1891 and 1892. Nearly all the silver-lead ores exhibited in the British Columbia court were those mined in this region. Rich oxides and carbonates of copper were also displayed, and came from a portion of the district where the mineral belt seems to be a continuation of the famous copper districts of Montana. The great bulk of the ores in this district are transported to the Montana smelters, and in 1893 over 1,000 tons, valued at \$250,000, were brought down to the warehouses to await shipment in the spring. Native smelters have not been developed to any great extent, but one has recently been established at Golden, on the Columbia River, and draws its custom from the mineral regions in that vicinity.

Two monuments of coal at the main entrance to the Court, called attention of the products of the Vancouver Island coal measures. The mines of this island furnish one-third of the supply for San Francisco, the rest being exported to Japan and various naval coaling stations, or utilized in home markets. The great coal districts of the island are the Nanaimo at the south, and the Comox, covering the central districts on the Sound. The largest producer of the Nanaimo district is the New Vancouver Coal Company, and the most extensive mine of this company is worked in a singular manner. The principal shaft, which is 650 ft. deep, is on the mainland, but by means of a tunnel two miles long, beneath the harbor of Nanaimo it connects with a shaft in Protection Island, a small island in the bay. Statistics of the coal mining industry, show a growth in the output from 81,000 tons in 1874 to 1,029,097 tons in 1891, with a falling off in 1892 to 826,335 tons, due to the glut of foreign coal in San Francisco. A small quantity of coke of good quality was exhibited in connection with the coal, but the manufacture of this product is not extensive.

Perhaps no country possesses a greater interest to the miner and the mining industry, because of its great possibilities, than does British Columbia. It seems to be universally conceded that great bodies of rich ores are located in its mountain fastnesses. The quantity of placer gold washed down into its river beds seems to be ample proof of this. With the advent of improved mining machinery, skilled labor, and above all, adequate transportation facilities, its productiveness will be much increased. It is significant that, with American capital, American skill and knowledge have been invested, for the gentleman who had charge of the British Columbia Mineral Exhibit, Mr. S. S. Fowler, of Golden, is himself a graduate of the Columbia College School of Mines. With great faith in the future of this country, he has established a smelter at Golden where he resides.

QUEBEC.

Quebec rivaled both Ontario and British Columbia in the abundance of its mineral exhibits. Ores and minerals in bulk or in cabinet collections filled every available portion of the floor, while the wall space was elaborately decorated with sheets of mica artistically arranged. The mica which was in such large plates as to attract general notice, was free from cracks and in some cases measured 30 in. both ways. It was exhibited by the Lake Girard Mine in the Town of Wakefield. The syndicate controlling this mine has extensive factories at Ottawa. Since the application of mica to electric machinery, both amber and white mica are becoming staple productions.

Quebec leads in the production of the finest fibered asbestos of all the different varieties. The specimens from Thetford and Black Lake seemed to have the best fiber. Large boulders of serpentine rock were exhibited showing the interwoven asbestos veins, crossing and recrossing each other at various angles, and attracted the attention of every passer-by. The asbestos industry was started in 1878, and in 1891 and 1892 the production amounted to over 7,300 tons. A complete fireman's suit and helmet of asbestos illustrated one of the many uses of the material.

Next to asbestos the exhibit of phosphate of lime was most important. A trophy of phosphates was built up in one section of the court, and many of the crystals were of unusually large size. Although the rapid development of the South Carolina and Florida pebble phosphates has been inimical to the success of the Canadian phosphate industry, the high grade phosphates of Ottawa County are drawn upon when a particularly rich fertilizer, running from 80% to 90%, is required. The highest grades are shipped to England, and the low grades to the United States. In 1891 and 1892 the production was 17,243 tons, valued at \$1,380,462. Mr. MacIntosh, Superintendent of the Mineral Court, predicts that "the day is not far distant when the manufacture of this mineral will become one of our national industries, making Canadian farmers large consumers, thus utilizing the copper pyrites, so abundant in the Eastern Townships, in the production of sulphuric acid."

An exhibit of copper ores from the Eastern Townships and of iron were among the other principal mineral exhibits. The Kennedy Iron Furnace Company showed the lake and bog ores, which are worked in the vicinity of Three Rivers. The lake ores are found chiefly in the bed of Turtle Lake, where the deposit is unusually large and yields 40% of metallic iron. Hematite, loadstone, chromic iron, and titanite iron ores are also found in the province, but have not as yet been worked. In 1892, about 58,000 tons of copper ore were extracted, averaging 35% to 40% of sulphur, and hence mostly worked

for sulphur or exported to the United States for sulphuric acid manufacture.

Nickel, lead, antimony, silver and manganese, as well as ochres, bismuth, graphite, talc, etc., and buildingstone were also exhibited. Although it is estimated that at least \$2,000,000 worth of gold has been extracted in this province, active gold mining is not pushed except in one county. The exhibit for Quebec was made under the able direction and supervision of Mr. Wm. MacIntosh, the Superintendent of the Quebec Mineral Section.

NOVA SCOTIA.

The central feature of the Nova Scotia court was a gilded shaft representing the product of gold in the province from the first discovery of this metal up to 1893. The amount thus represented was 531,000 oz., extracted from 762,036 tons of quartz. Around the base of this trophy was shown a number of specimens from the Cariboo district. In a separate case were some fine specimens of free gold in quartz from the Hants County field. An enterprising firm mounted some of this free quartz on pins for scarfs, etc., and it certainly made a handsome ornament. In the same case was a gold brick containing 83 oz. of fine gold from Nova Scotia fields. These specimens had an intrinsic value of about \$4,300. Alluvial gold is not found in Nova Scotia, but the gold is derived from vein workings. As yet the ruder processes of mechanical concentration and amalgamation are in use, consequently the loss is considerable; but as the gold occurs coarse in the veins the industry is remunerative. The gold districts are situated in the counties lying along the Atlantic Coast, and the area of the belt is estimated at over 3,000 square miles.

The most prominent exhibit in the Nova Scotia space, as it is the leading mineral industry in that country, was that of coal. The extensive fields of Pictou and Cumberland counties as well as of Cape Breton Island had their representation in a series of neat cases of coal exhibited by the principal producing companies; the Caledonia Coal Company, the Canadian Railway & Coal Company, the General Mining Association and the International Mining Company. Over 3,000 men are engaged in the coal industry, and the bulk of the product is exported.

In iron ores, brown hematite, spathic and specular iron ores are found in close proximity to the coal fields, with supplies of limestone. The combination of these three essentials in some localities are very promising conditions for the development of the future iron industry of the province.

In copper, the Eastern Development Company, of Cape Breton, exhibited gray and sulphurets and carbonates. Specimens of gypsum from the Windsor quarries of Cape Breton, which produced some 100,000 tons annually, together with a variety of building stones from Cumberland, Pictou and Halifax counties completed the exhibit, which was made under the direction and superintendence of Rev. Mr. McKay, by the government of Nova Scotia.

(To be Continued.)

Effect of Lighting on a Coal Pit.—In a paper read recently before the Mining Society of Nova Scotia, Mr. Charles Fergie says: "The Scott pit shaft is 226 ft. deep and down to the second seam, which is 12 ft. thick, some 8 ft. being worked. For some months past the only work done on this seam has been the driving of a pair of slopes to the deep to intersect the main seam by way of a tunnel already driven. The slopes are 2,000 ft. down, and the driving of them was proceeded with until about the end of July last, when, in consequence of the colliery supply of water for steam purposes showing signs of giving out, they were stopped, and all work confined to the main slopes, the Scott pit being laid idle. Previous to this the mine had been ventilated by a Schiele fan, but having no steam to spare, in consequence of the scarcity of water, the fan was stopped and the mine received its supply of air by natural ventilation only. The seam being a very gassy one this mode of ventilation would not be sufficient to keep the mine clear, but as no person was to enter the mine until the normal state of affairs was again restored, it was not anticipated that any danger from an explosion of gas could possibly occur. The air of the mine being highly charged with fire-damp, the necessary means of ignition were soon to be forthcoming. On the afternoon of August 8th there was an electric storm passing over the vicinity of the colliery, which discharged itself. The general office was struck by lightning and the front part of the building demolished. At the same time it struck the iron pulleys of the head frame at the Scott pit and traveled down the steel winding rope, entering the mine and instantly igniting the gas accumulated therein, which caused a severe explosion, the force of which demolished the buildings on the surface at the upcast, and at another shallow shaft called the 'Stair pit.' The writer could not distinguish any lapse of time between the thunder clap and the explosion of the mine, so simultaneous were they. It being the opinion after the explosion that fire existed below, it was decided without delay, seeing that the ventilating shaft and fan were damaged, to seal up the mine, and this was done without mishap within about an hour and a half. The mine has since remained sealed. The writer will soon be in a better position to state the actual effects of the explosion underground. Though he has read of lightning having entered a mine by way of steel ropes, etc., the writer is not aware of any explosion having been directly traced to that cause before the one now referred to. This accident, which was happily unattended by loss of life, clearly demonstrates that no mine where gas is allowed to accumulate to an explosive point can be considered safe from an explosion when it is connected with the surface by conductors of electricity such as wire ropes, water-pipes, steel rails, etc. It also serves to point out that where boreholes are put down from the surface for the purpose of rope haulage underground these holes and ropes should not pass through a return airway or where gas is likely at any time to be mixed with the air in high percentages."

THE PROPOSED NEW TARIFF LAW.

Since we published the abstract of the new tariff bill prepared by the Ways and Means Committee (in the "Engineering and Mining Journal" for December 2d) a few changes have been made by the committee. Those affecting the mineral industries are as follows:

Magnesian firebrick, \$1 per ton. Pottery classification changed and rates made 35 and 40%. Ferro-manganese, from 22½% to 10%.

Common black plate, from 35% ad valorem to a specific duty of 9-10 of a cent. Tin plate from an ad valorem duty of 40% to a specific duty of 1 1-5 cents per pound, taking effect October 1st. Wire, from 30 to 35%. Lead sheets, etc., made specific at 1¼ cents per pound. Petroleum, crude or refined, is made free if the country producing it admits ours free.

The committee has also decided to recommend that the new law take effect June 1st, instead of March 1st, as originally proposed. The latest announcement from Washington is that the bill will be introduced in the House of Representatives on Tuesday next, December 19th. This will throw the discussion over until after the usual holiday recess.

LAKE SUPERIOR IRON ORE SHIPMENTS.

The shipping season for iron ore from the lake ports has now closed, and the total shipments for four years past are given by the Cleveland "Iron Trade Review" as follows, in tons of 2,240 lbs.:

	1893.	1892.	1891.	1890.
Escanaba.....	2,018,981	4,010,085	3,038,590	3,714,662
Marquette.....	1,043,988	1,026,338	1,056,027	1,307,399
Ashland.....	1,117,520	2,223,683	1,261,638	2,123,556
Two Harbors.....	907,252	1,165,076	890,239	836,063
Gladstone.....	203,343	115,886	177,866	91,091
Superior.....	80,273	4,245	.....	.....
Duluth.....	440,292	.....	.....	.....
Total by lake.....	5,836,749	8,545,313	6,444,440	8,063,067
Total all rail.....	.....	528,939	650,541	910,631
Total shipments.....	.....	9,074,253	7,094,981	9,003,701

The all-rail shipments are not yet made up; they will show a considerable decrease from last year, but will bring the total up to over 6,000,000 tons, or a decrease of about 33 1-3%, as compared with 1892.

As the receipts at Lake Erie ports for the season are given by the same authority at 5,333,061 tons, the balance of 503,688 tons shows the ore shipped to Bay View, South Chicago and other points on Lake Michigan.

It will be noted that Duluth appears as a shipping port for the first time this season, taking a lot of the ore which formerly went to Two Harbors, and in addition some from Mesaba mines.

THE CHILEAN MINING AND METALLURGICAL EXPOSITION.

The Chilean Government, in accordance with the suggestion of the National Society of Mines, which is an organized corporation, composed of the most intelligent and experienced miners of the nation, has issued a decree sanctioned by an act of Congress, granting the most ample protection to the development of the mining industry in all its branches. The ancient mining code has been completely revised, and facilities given for the acquisition of mining properties, the liberal laws guaranteeing a perpetual ownership, alike for natives and foreigners, without onerous charges. The government also protects the construction of roads, and railroads for mining purposes, and in a number of localities, they have already been built, at public expense.

The government has also established mining schools in the principal cities, for the diffusion of elementary, practical, and scientific knowledge of this industry, which has produced, and is still producing so much wealth to the nation. All these schools are under the direction of competent professors, and sustained on a broad and liberal basis.

The government also permits the introduction of foreign manufactures of every description applicable to the working of mines, and to metallurgical arts, absolutely free of duty.

With the same favorable disposition to the mining interests, it has now decreed the celebration of an international mining and metallurgical exposition, on more liberal conditions than have heretofore been customary. The idea of this exposition, which will be held in Santiago, the capital of Chile, beginning in the month of September, 1894, was in part the desire that many of the notable exhibitors from Chicago would accept the invitation that is extended to them, especially. There is every reason to believe that exhibitors of new or improved methods in machinery, apparatus, etc., for mines and metallurgical treatment would secure a valuable market for their manufactures, which would be a mutual benefit to the parties directly interested.

Notwithstanding that Chilean trade has been chiefly with the markets of Europe, large orders have been sent to the United States for machinery, especially for mining purposes. This trade has now opened an excellent opportunity of profiting, by the facilities offered, not only in regard to Chile, but the neighboring republics of Peru, Bolivia, and the Argentine, which will take part in the Exposition. These countries will, without doubt, adopt improvements that would convert into successful industries the mining enterprises which are not at present prosperous.

It is worthy of note that the romanticisms and the miners' legends of ancient times have also disappeared in South America. The exhaustion of the rich deposits of the precious metals has rendered it impossible to acquire great wealth in these days. The time has come when modern industrial methods, must be inaugurated. Labor-saving machinery, and the latest discoveries for the reduction of metals can alone insure the miners fair profits, for their capital and labor.

Among the first in this new departure is the Huanchaca Mining Company, owned by Chileans and Bolivians. This model plant, one of the most extensive and perfect in the world, at Playa Blanca, on the Pacific Coast, near Antofasta, in Northern Chile, is now in successful operation. The United States provided the machinery, and American Engineers and experts have control of its operation.

The specialties in the Exposition at Santiago, that will demand particular attention, will be appliances for the economical working of mines, particularly those of gold, silver, copper and lead; to the working of the coal deposits which extend through a large zone along the southern coast, to the extraction of the inexhaustible deposits of mineral salts, such as saltpetre or nitrate of soda, alkaline and aluminous earths, borax and sulphur, which exist in great abundance; to stone and marble quarries; to the boring of tunnels for mines, railroads and irrigating canals; drilling and boring for exploration of mines; and to boring for artesian wells, perhaps the most useful of all. Determined efforts have been made in Chile, for the proper development of these industries. Capitalists lend their aid to legitimate undertakings, and the government never refuses assistance. There is no doubt that a ready market will be found for machinery, implements and appliances, adapted to the wants of miners and metallurgists. It must be remembered that 40,000 tons of copper are exported annually from Chile, and this without working the great deposits of low-grade ores which in the United States would be considered a prize to their fortunate owners.

The smelting works that exist in Chile are conducted with the strictest care; especially with regard to the capacity of the furnaces, and economy in the use of fuel, which is dearer there than in any other mining country, so that new appliances and improvements in the construction of furnaces using coal, petroleum, or gas will meet with careful examination and acceptance.

The metallurgical treatment of gold ores has been submitted to many experiments, and many inventions have found a field for practice; but much is to be expected from concentrating machines, and means for beneficiating the lower grades of gold bearing ores, which there exist in abundance, and also from extraction of gold from auriferous pyrites, which has not yet been successfully accomplished in Chile. Rebellious ores of this class are found in the greatest abundance in all sections of the country. Hydraulic methods for obtaining gold in the gravel of the river valleys are not used, the placers still being worked by the old manual system.

No lead mines are now worked in Chile, but anything that would conduce in the smelting of auriferous and argentiferous lead ores would be an important step in progress. Electrolytic methods have scarcely been attempted, because electric plants are few, but the numerous streams running from the Andes to the sea, offer many good water powers for the working of dynamos.

The nitrate regions in the north of Chile will offer for generations a market for machinery and vehicles for transportation, extraction and trituration of this substance, which is frequently found at such depths, that machinery be employed.

Finally, the application of modern improved apparatus for boring wells in the rainless desert section bringing to the surface the underground waters, would secure the development of the richest mining territory yet discovered, besides supplying water for irrigating the desert lands.

The Chilean government, it is understood, will pay the freight on exhibits from either New York or San Francisco to Santiago, exhibitors being required only to pay the charges to whichever one of these ports may be most convenient for them. Some particulars in relation to the Exposition will be found in the advertisement published in another column, and those who desire to take part can secure full information from the Chilean Legation in Washington, or from the special commissioner, Senor Francisco J. San Roman, whose address for the present is Sturtevant House in New York.

Coal in Chile.—Mr. M. J. Wilson, Consular Agent at Lota, in a recent report to the British Foreign Office, states that coal is transported from the Maquegna coal mines, a distance of 12 miles, by railway to Laruquete, where it is shipped from lighters loaded at a wooden pier to steamers and sailing vessels; but, as the anchorage is exposed to the north and northwest gales, which prevail during the winter months, it is not a very safe place, and the loading is often prevented by wind and sea. Nevertheless, when weather permits, they are able to ship with lighters, which carry 25 tons to 30 tons each, 500 tons in 10 working hours. The coal is all shipped for the west coast of South America. The Maquegna coal mines are the property of the Arauco company, which is also working extensively in coal mines at Colico 7½ miles, and Curanilahue 15 miles south of Maquegna, and this portion of their production is transported by a separate railway. The remainder of this production is shipped in Coronel in lighters from an iron pier, the property of the Arauco company.

Coal Consumption for Air Compressors.—In a recent article in "The Gentle Civil." L. de Munmont describes some trials made with the air compressors of the Paris Compressed Air Company. To run these compressors there are four triple-expansion Corliss engines of 2,000 H. P. each, with 20 Babcock & Wilcox boilers, furnished with Green's economizers, the whole made by Schneider & Co., of Creusot. The specifications prescribed as a maximum for coal consumption on trial 1:54 lbs. per horse power hour, the fuel being briquettes from Anzin. The trial was specified to last eight hours, the speed to be 60 revolutions per minute, the steam pressure on the smallest pistons about 150 lbs. per square inch, and the compressed air pressure 114 lbs. per square inch. A deduction was to be made from the total consumption for condensation in the steam pipes. All observations and calculations were made in duplicate by independent engineers. The eight hours' trial was divided into 16 periods, and diagrams taken simultaneously from the three cylinders in the middle of each period. The springs of the indicators were tested before and after each diagram. The condensation in the steam pipes was ascertained by special experiments subsequently. The results of the trials showed, for a total of 1,996 H. P., a consumption of 1:29 lbs. per horse power hour.

Other experiments, made in December, 1891, on the efficiency of the machinery, to determine the ratio between the indicated work done by the air pistons and the indicated work in the steam cylinders, showed a ratio of 0.8097. The engines had then only been in use a few days.

A NEW MERCURIAL PYROMETER.

The accompanying engraving shows a new mercurial pyrometer for use in stacks, flues, stills, ovens, etc., recently brought out by Queen & Co., of Philadelphia. This instrument is essentially a mercurial thermometer tube encased in a heavy brass case with glass front as shown in cut. The top of the tube is filled with nitrogen gas, which exerts a pressure, directly proportioned to the increase of temperature, upon the mercury, causing it to expand regularly to a very high degree of heat; the makers guaranteeing 800° Fahrenheit. This is a gain of 200° over the ordinary forms of thermometers, whose tubes contain a vacuum, in which mercury becomes volatile at about 600°, and at a point where accurate measurements are greatly needed, as in the making of boiler tests, tempering metal for guns, taking stack temperatures, etc. The mercurial pyrometer is both strong and legible, and can be constructed to meet almost any requirements. Its great accuracy and the permanency of the scale readings (which will not change with age) should recommend its use.

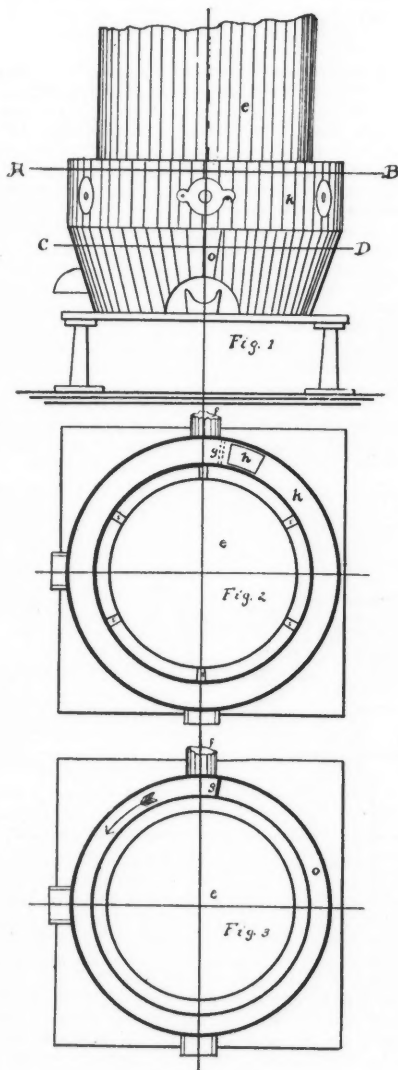
A NEW HOT BLAST FURNACE.

Written for the Engineering and Mining Journal by Louis B. Walker.

The furnace which is illustrated herewith is so simple in construction and at the same time so effective in its operation that it ought to



MERCURIAL PYROMETER.



A NEW HOT BLAST.

attract the attention and interest of blast furnace managers, especially in out-of-the-way places like Arizona, which is so far the only place to the writer's knowledge where it is in use, where coke is so high as to be one of the most important items of expense; the most important by far in some localities. The furnaces are running at the smelting plant of the Old Dominion Copper Company, at Globe, Ariz., and are 42 in. water-jacket furnaces of the well known type, manufactured by Fraser & Chalmers, the hot blast arrangement described having been added to them.

By referring to the cuts it will be seen that Fig. 1 is a front elevation; Fig. 2 a section through AB, and Fig. 3, a section through CD. From the drawing it will be noticed that the modification of the furnace consists of an auxiliary wind-jacket around the crucible, through which the blast circulates before entering the windbox; on entering the jacket *o* through blast pipe *f* it meets the partition *g* on one side, which forces it to travel in the direction indicated by the arrow, until it has made a complete circuit of the crucible, when its course is again changed by partition *g* so that it flows into the

windbox through opening *h*, and thence to the furnace proper in the regular manner.

Probably many blast furnace managers have experienced much trouble and annoyance from their crucibles getting abnormally hot, so that some means had to be resorted to to bring the temperature down to a safe point, either by blowing down the furnace and introducing cool air through the tuyeres, or by some other means, as local conditions might direct. In the above mentioned plant this was the case until the crucible wind-jacket was placed on the furnaces, much time being thus lost, besides causing the hottest and most irksome work which was known to their furnacemen. On introducing the jacket this trouble was entirely eliminated, owing to the cooling influence of the air, and although it has now been in operation for over two months and a half the crucibles have not once gotten nearly to a point which was dangerous to the iron. The heat which was formerly lost in this way by radiating into the atmosphere, much to the annoyance and discomfort of those working in the vicinity of the furnace, is now taken up by the blast in its passage and returned to the furnace, there to be of use by reducing the consumption of fuel.

When this jacket was first put in operation by the Old Dominion Copper Company it was placed on one furnace only, while another furnace, identical in every respect, with the exception that it had not the wind-jacket, was run alongside of it, on the same ore and coke, all conditions being as nearly the same as it was possible to make them, both being 42-in. furnaces of the above named type. In this way a comparative run of 20 days was made, which showed that the wind-jacket effected a saving of 5 lbs. of coke to every charge of 600 lbs. of ore, besides allowing more ore to be smelted at the same cost for labor and fixed charges, owing to the fact that there were no delays in the furnace in question caused by the overheating of the crucible. Had the test been kept up for a longer period it would undoubtedly have shown a considerable saving in repairs, since maintaining the temperature of the crucible at a comparatively steady point manifestly decreases the wear and tear.

When this jacket was first placed on the furnace it was found advisable, for local reasons, to make its mean sectional area much smaller than the area of the blast supply pipe, the former being made only 104.5 sq. in., while the latter was 176.72 sq. in. Judging from observations made since, the writer feels confident that this area could be made much larger with safety and increased economy, the maximum area being, of course, governed by the blast going through the jacket so sluggishly that it would fail to carry off the heat at a sufficiently rapid rate to keep the temperature of the crucible at a normal point. When a similar jacket was placed on a second furnace the sectional area was made slightly larger than the first, being 112 sq. in., with the result that the blast in this case was raised 83.5° Fahrenheit during its passage, while that in the first furnace was only raised 55° Fahrenheit. These temperatures are the average of many readings, taken at all hours of the day and extending over a period of a week or more, the thermometers being inserted just before entering, and just before leaving the jacket.

This furnace is now running on 1 lb. of coke less per charge than the first, or 6 lbs. less with the jacket than without; this is due undoubtedly to the increased area of the jacket, whereby the blast is subject to the radiated heat from the crucible for a longer time. This company is now putting a similar jacket on the spare 36-in. Fraser & Chalmers furnace, and is making the area much larger comparatively, hoping to obtain even more favorable results than with the first two. In conclusion I might add that the inventors of this improvement have applied for protection by patent.

BORON-IRON.*

By H. N. Warren.

Silicon-iron, chromiron, alumin-iron, zinc-iron, and various other ferro-compounds, are all familiar names, either in the works or laboratory; there still, however, remain gaps to be filled, as in organic regions; one of which, namely, the boron compound, which has lately been successfully procured, is now being further experimented with by the writer, and to which the name boron-iron has been given, signifying boron-iron.

Boron, unlike most other elementary substances, presents so much difficulty in its estimation that, when present in small quantities, it is too often entirely overlooked; its slight affinity also for other elements presents a grave difficulty in obtaining a regulus; not unfrequently have the buttons procured from the dry assay of iron ores that have been performed under my notice, when subjected to analysis, revealed a total of one or two per cent. wanting, and in most cases where borax had been employed as a flux the difference has been found to be boron.

The first preparation of this substance of a definite character was brought about by the addition of a solution of borax to one of ferrous chloride; the white precipitate of ferrous borate thus obtained being pressed to free it from adhering water, and after thoroughly drying, reducing it with an equivalent proportion of carbon in plumbago crucibles. In this way boron from 4 to 5% enters into union with the iron, producing a compound breaking with the fracture of metallic manganese, and presenting sufficient hardness to readily scratch glass, at the same time being with difficulty soluble in acids; the melting-point of the compound approaching that of cast-iron.

A more economical method has since supplanted the former—by reducing ferric carbonate, or oxide, in admixture with boron oxide and charcoal. In this, as in the former method, a number of minute precautions are necessary in order to obtain the desired compound, which if performed dexterously results in the boric oxide gradually reducing and alloying with the iron. The most peculiar property of this

* "Chemical News," October 27th, 1893.

compound is its great predominancy when in admixture with large quantities of iron; one ounce of the boride thus melted with about two pounds of iron cause the whole to break with almost an analogous fracture of the boron compound itself, while at the same time it contains but the fraction of a percentage of boron. The boron iron thus produced casting more soundly, expanding slightly, and being free from blowholes.

The average of several analyses of the compound prepared at high temperatures are the following: Iron, 94.08; boron, 4.02; combined carbon, 1.50; phosphorus, 0.09; sulphur, 0.31; silicon, trace; manganese, trace; total, 100.00. Several other curious compounds of boron not hitherto dealt with will shortly appear.

THE WORTHINGTON CONDENSER.

The condensing apparatus shown in the accompanying illustrations is manufactured by the well known pump works of Henry R. Worthington. Fig. 1 is a sectional view of one of these condensers, having a capacity of 200 H. P. In this apparatus the operation is as follows: Steam being admitted to the cylinders K, so as to set the pump in motion, a vacuum is formed in the condenser, the engine cylinder, the connecting exhaust pipe, and the injection pipe. This causes the injection water to enter through the injection pipe attached at B and spray pipe C into the condenser cone F. The main engine being then started, the exhaust steam enters through the exhaust pipe at A and,

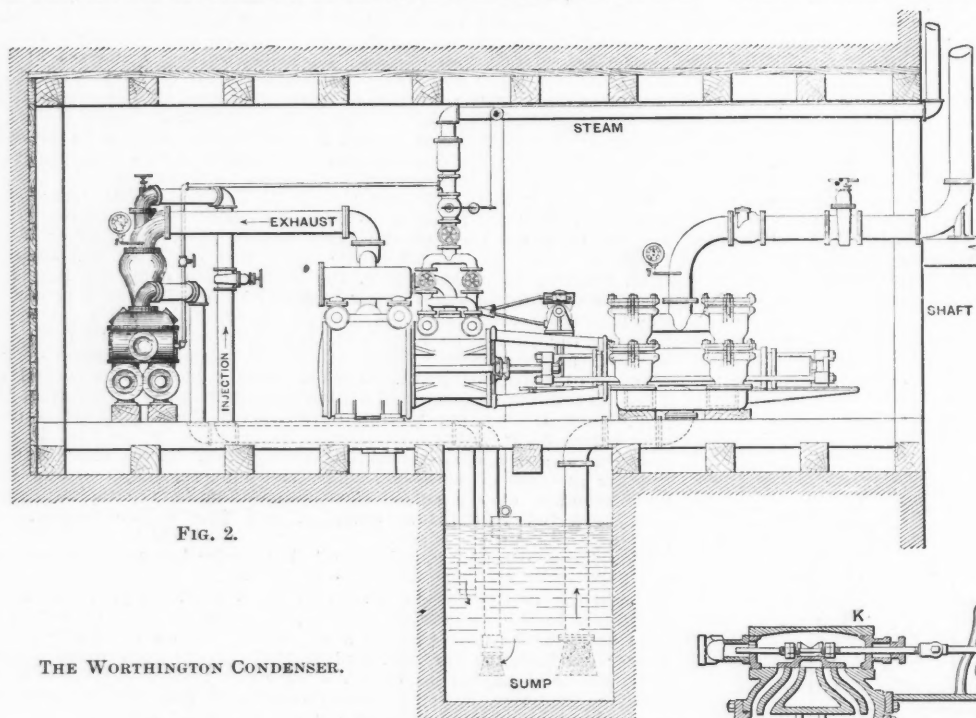


FIG. 2.

THE WORTHINGTON CONDENSER.

coming in contact with the cold water, is rapidly condensed. The velocity of the steam is communicated to the water, and the whole passes through the cone F into the pump G at a high velocity, carrying with it, in a thoroughly commingled condition, all the air or uncondensable vapor which enters the condenser with the steam. The mingled air and water is discharged by the pump through the valves and pipe at J, before sufficient time or space has been allowed for separation to occur.

It will be seen that the zone in which the condensation takes place is quite small, and the rapid effect is due only to the immense surface exposed by the spraying water. In case the water accumulates in the condenser cone F, either by reason of an increased supply, or by insufficient speed, or even stoppage of the pump, as soon as the level of the water reaches the spray pipe and the spray becomes submerged, the vast surface is reduced to a minimum, only a small annular ring being exposed to the overpowering steam from the main engine. The vacuum is immediately broken, and the exhaust steam escapes by blowing through the injection pipe and through the valves of the pump, and out at the discharge pipe at J, forcing the water ahead of it; consequently, flooding does not occur.

The exhaust steam from the engine is conveyed directly to the condenser, as the illustration plainly shows. The injection water is lifted through the injection pipe from the water supply. A substantial strainer is placed around the lower end of the pipe, and is arranged so that the lower end can be turned up and the strainer examined or cleaned of foreign matter, if necessary. The injection water can be lifted vertically a distance of 20 ft. The distance horizontally that the water may be brought is limited only by the size of the injection or suction pipe.

In Fig. 2 the condenser is shown as applied to a compound mine pumping engine. In this case, as shown by the cut, the condenser obtains injection water from the cooler part of the sump and discharges the heated water back into the sump, from which it is elevated to the surface of the mine by the main pump. In case the head against which the station pump is working is so great in proportion to the amount of seepage as to cause the water in the sump to be overheated by the discharge from the condenser bringing with it the heat of the exhaust steam; then a desirable and effective arrangement is one in which the condenser

pump alone lifts from the sump and discharges into a suitable tank, which serves as a suction reservoir to the main pump. By this means the main pump is supplied with water under a head and a thorough tilting of the cylinders with water without any separation of vapor is accomplished. The ability of the condenser to elevate the discharge water is often convenient, as the suction tank can be located at any place or level above the main pump which may be available. A number of these condensers are in use, and have given excellent results.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Board of General Appraisers.

Duties on Asphalt Epure.

In the matter of the protest of Middleton & Co. against the decision of the Collector of the Port of New York, regarding duties on "asphalt epure," the Board of General Appraisers gave its decision December 9th. The importer claimed that the asphalt which was mined in the island of Trinidad should be entered free of duty as a crude article. The board sustained the action of the collector and held that the substance had been purified and its value thus increased, and it was therefore liable to the duty of 20%, which had been charged upon it.

Supreme Court of Pennsylvania.

Liability for Negligent Mining.

Where one has the title to a coal vein or to a coal mine, and leases

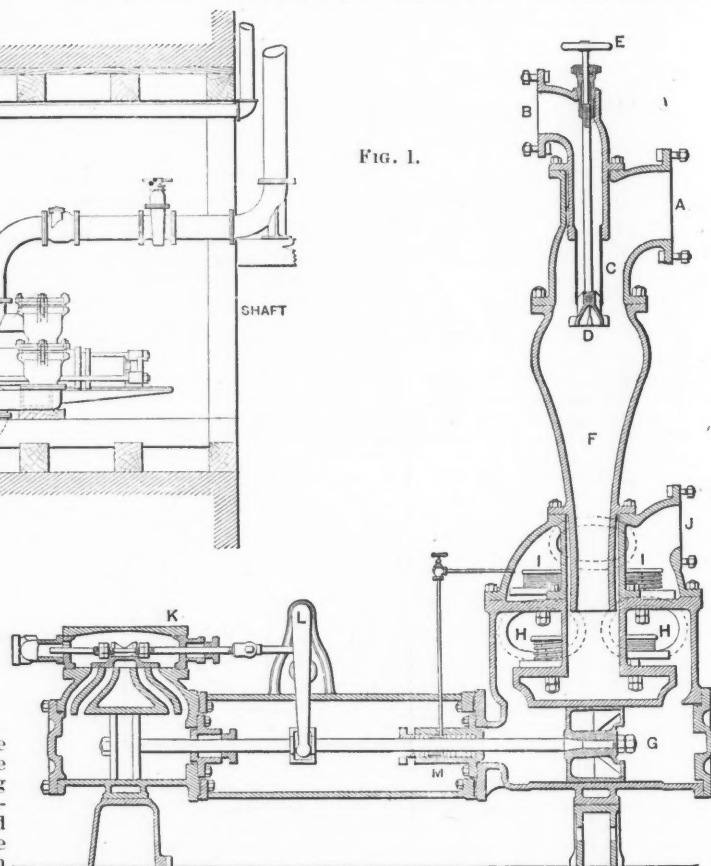


FIG. 1.

it in general terms to another, and the lessee operates it, with full control over the mine, as to the manner of operating, and the lessee withdraws the support, or fails to leave sufficient support, the lessee is liable, and not the owner of the mine, who in that instance would be the lessor. But, on the other hand if, by the lease that is made, the lessor provides how the coal shall be mined, the extent of the support that is to be left, designates the size of the rooms, and the extent of the pillars or stumps or ribs that are to be left, and the lessee, accepting the conditions, mines the coal in accordance with the terms specified in the lease, leaving the support that the lessor specifies, and that is insufficient, and the surface would fall, then the owner of the vein of coal—the lessor—would be liable, because he, in his lease, had indicated the support that ought to be left, and he would be liable, as well as the lessee who took out the coal. Or if, after a lease is made, which might be general in its terms, without any qualifications as to the manner in which the coal should be taken out, the lessee and lessor would agree and have an understanding that certain coal should be taken out, or certain supports then existing should be removed, and they were removed in consequence of that mutual agreement, subsequently made by the lessor and lessee, then the lessor, or the owner of the vein of coal, would be liable, as well as the lessee.—Kistler vs. Thompson. 27 At. Rep., 874.

A Virginia Exposition.—It is proposed to establish in Richmond a permanent exhibition of the mineral and agricultural productions of Virginia, with which a bureau of information will be combined.

Spanish Iron Ore in Great Britain.—The receipts of Spanish iron ore at the Scotch ports of Glasgow and Greenock for the 10 months ending October 31st were 327,996 tons, a decrease of 157,556 tons from the corresponding period in 1892.

Coal in New Zealand.—The total production of coal in New Zealand in 1892 was 673,315 tons from 148 mines. Many of these are small, however, and 10 mines furnished 80% of the total. There were 1,681 men employed, the average output being 400 tons per man. Only one life was lost during the year and 18 persons were injured.

Mining in Italy.—The miner's lot in Sardinia does not appear a very enviable one, to judge from a new work on "L'Italie telle qu'elle est." In that island the miners are said to inhabit huts made of branches of trees covered with dry leaves, and the huts, built on the mountain side, are isolated, so as not to present too great resistance to the descending torrents. In the sulphur mines of Sicily it is stated that children of both sexes are compelled to descend slopes nearly perpendicular, and difficult steps made in the wet and loosened soil or rock, and must then bring up to the surface ore laden on their backs, with imminent risk of slipping and falling to the bottom of the mine. There should be a market here for some simple lifting plant.

Steelmaking in Japan.—The Japanese Government has for some years past projected the establishment of steel works. Up to the present there has been only one steel making plant in Japan—that at Sakai, in Izumi province—which was established by Mr. Moriyama Moriyuki, ex-director of the Osaka mint, in 1889. The steel manufactured here is said to be of the best quality, but its proprietors have so little capital that they cannot extend the works. Several native noblemen have now taken up the matter, with the result that works are now being built in Osaka for the Japan Steel Manufacturing Company, which are to have the latest improved machinery, and to manufacture different qualities of steel from native ores.

Variations in the Intensity of Gravity.—A report upon a memoir by M. Defforges entitled "The Distribution of the Intensity of Gravity at the Surface of the Globe" was recently read before the Paris Academy of Sciences by MM. Flizeau, Daubree, Cornu, Bassot and Tisserand. This memoir, submitted to the judgment of the Academy by the Minister of War, summarizes the theoretical and experimental researches made during eight years in the geographical service of the French army, with the object of determining the absolute intensity of gravitation for a small number of primary stations, and the relative intensity for a large number of secondary stations, with simplified apparatus. The latter were determined by means of the reversible invertible pendulum, invented by M. Defforges, which easily gives an approximation to within one part in 100,000. The anomalies extending along a line from Spitzbergen through the Shetlands, Scotland, England, France and Algiers considerably exceed any possible experimental errors, and the excess of gravitation on the islands and its defect on the continents are well established. The report, which was adopted by the Academy, advises the government to supply M. Defforges with the means to extend his work to the islands of the southern hemisphere, and especially the Pacific.

Gold Mining in Uruguay.—A recent British consular report from Montevideo contains a summary of a report by the Uruguayan inspector of mines on the present condition of gold mining in that country. The chief mines which are at present working are the Oriental and Argentina at Zupucay, Santa Barbara at Guayaberas and the Peru and San Gregorio at Corrales. Gold is extracted from many other veins and beds, but these workings are of little importance. The works carried on in the first two mines mentioned are solely for the purpose of retaining the right to the concession, and for the preservation of the mills belonging to the company, which is not provided with the necessary capital for developing the mine. During 1892 quartz to the amount of 490 tons was extracted and crushed in the mills at Zupucay, yielding 11,201 grams of gold, an average of 23 grams per ton. The important workings carried on at Santa Barbara some years ago were resumed last January. The quartz extracted at present is crushed in the mills of the French company at Cunapiru, and yields an average of 15 grams of gold per ton. The Peru mine belongs to the French Gold Mining Company, of Uruguay, at present in liquidation, and the work carried on is merely to maintain the rights of the concession. The quartz is crushed in the company's mill at Cunapiru. On account of the failure of the French company this mill lay idle for many years, but resumed work at the end of last December. Since then the 30 stamps, which it possesses, have been working regularly, crushing quartz either for the company or for others. To the total production of 1892 it contributed 114 tons of quartz, yielding, when crushed, 948 grams of gold. Of all the mines San Gregorio has been worked the most regularly. During 32 months 95,945 tons of quartz were crushed, yielding 544 grams of gold, valued at \$224,700.

Utilization of Peat in Iron Smelting.—It has long been regarded as probable, says "Industries and Iron," that the many acres of peat to be found on the moors at Dartmoor, England, can be utilized in a manner that will make it available as a fuel for iron smelting purposes. The first attempt was made some two years ago, when machinery was erected near Bridestowe by the Dartmoor Peat and Iron Smelting Company, Limited, which also acquired the right of working two square miles of peat deposit. Several difficulties, however, were found to exist in bringing the peat to the combustible condition which had been bespoken for it. Nothing daunted, however, the company has erected a plant at Bridestowe in order to practically test an invention of Mr. J. D. Brunton, of London. The peat when first removed is full of moisture, but by Mr. Brunton's arrangement the drying of this is done by means of evaporation. The peat is first of all delivered by means of a revolving band into a hopper, from whence it is pressed through a perforated iron plate by which the fibers are destroyed and entirely macerated, bringing the peat to a condition of soft mud or clay. By means of revolving bands this substance is then carried to molding machines, where it is shaped into bricks, and afterwards delivered automatically into a drier, by which means the moisture

is evaporated. During these processes, however, the bricks shrink in bulk so much as to lose something like six-sevenths of their weight. The inventor claims that these bricks, when properly prepared, will be found superior to coal for the purpose of iron smelting. A considerable quantity is now in course of manufacture for the purpose of forwarding it to Birmingham, where it will undergo severe tests in the blast furnaces. In the event of these experiments turning out a success, blast furnaces will be erected at Dartmoor, and the many thousands of tons of iron ore now being taken from the works in Cornwall and Devonshire will be smelted there, thus saving the present heavy costs in transhipment to the Midlands.

Gas from Peat.—A report by T. C. Linton, engineer of the Leith (Scotland) Works, was submitted at the last meeting of the Edinburgh gas commissioners as to the manufacture of gas from peat. A quantity of black peat was procured from the Wellington Reformatory Farm, Penicik; but as the results from it were entirely worthless, owing not only to the quality of the peat, but to its being in an undried state, it was resolved to procure other samples of peat dried in the usual manner. One of these samples was procured from the Leadburn district, the other was obtained from Orkney. The results were as follows: Wellington Farm peat, 88.40% of water, 7.80% of volatile matter and 3.80% of coke. As it was found useless to attempt the distillation of material so saturated with water, the peat to be experimented with was dried as much as possible in one of the retort houses for 24 hours, and thereby deprived of water to the extent of 72% by weight. The average result of four trials, stated per ton of peat as received, and costing 80 cents per ton, was as follows: Gas per ton of peat, 2,116 cu. ft.; illuminating power of gas, 1.28 candles; coke, 378 lbs.; tar, 5¼ galls. From dried peat from Leadburn, costing \$6.48 per ton, the gas per ton of peat was 5,404 cu. ft.; illuminating power of gas, 2.26 candles; coke, 1,372 lbs.; tar, 7 galls. In the Orkney peat the gas per ton of heat was found to be 9,791 cu. ft.; illuminating power of gas, 9.69 candles; coke, 812 lbs.; tar, 10½ galls. This peat costs also \$6.48 per ton, but it was stated that as common splint coal just now cost about \$2.04 to \$2.16 per ton, yielding 10,000 ft. of 15-candle gas per ton, and 12 to 13 cwt. of excellent coke, worth about \$1.20, and also 20 galls. of tar, and 35 galls. of ammoniacal liquor, worth 64c., it was evident that even the best quality of peat could not compete at all, in this country, with coal for gas-making purposes. There were, moreover, other drawbacks, besides the hopelessly inferior results yielded, to be considered. The excessive proportion of carbon dioxide produced (from six to seven times as much as in crude coal gas), which had to be removed from the gas, would make the cost of purification enormous.

PATENTS PUBLISHED IN GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:
 WEEK ENDING DECEMBER 2D, 1893.
 17,661 of 1892. Preparation of Reagents for Working Gold and Silver Ores. H. H. Lake, London (E. Noriega, Mexico City).
 20,025 of 1892. Method of treating Gold and Silver Ores. F. G. Fuller, London.
 22,819 of 1892. Preparation of Pure Chromic Acid. E. Placet and J. Bonnet, Paris.
 8,176 of 1893. Electrolytic Apparatus. C. Hanbury, London.

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, DECEMBER 5TH, 1893.
 509,863. Water-Wheel. Francis M. Bookwalter, Springfield, O.
 509,868. Tile-Dressing Machine. Isaac Broome, Beaver Falls, Pa.
 509,890. Brick Kiln. Philip Gonder, Canton, O.
 509,895. Metallic Rod Packing. John L. Halyburton, Philadelphia, Pa. Assignor, by mesne assignments, to Jehu Wood Jr., Haddonfield, N. J.
 509,897. Drop Hammer. Walter P. Hatch and Thomas Murphy, Chicago, Ill., said Murphy Assignor to said Hatch.
 509,912. Amalgamating and Reducing Sluice. Joseph H. Jory, San Francisco, Cal.
 509,924. Artificial Stone. John Lopez, Chicago, Ill.
 509,935. Cover for Coal Cars. Thomas L. Nalton, Syracuse, N. Y.
 509,951. Manufacture of Metal Foil. Ehregott Schroder, Berlin, Germany.
 509,957. Process of and Apparatus for Making Cyanides. Wilhelm Siepermann, Leopoldshall, Assignor to the Stas fuerter Chemische Fabrik (vormals Vorster-Grunneberg Actien-Gesellschaft), Stasfurt, Germany.
 509,953. Insulator for Heating Pipes, Tubes, or Flumes. Samuel D. Stauffer, Lancaster, Pa.
 509,973. Method of Casting Solid Ingots of Steel. William P. B. Urick, Newark, N. J.
 950,676. Attachment for Brick Machines. Samuel J. Van Stavoren, Philadelphia, Pa. Assignor of two-thirds to Samuel W. Clark, Delanco, N. J., and Charles F. Van Horn, Philadelphia, Pa.
 509,997. Means for Utilizing Tide-Water as Motive Power. Gustave H. Carlson, Hoquiam, Wash.
 510,008. Valve for Gas Furnaces. Patrick R. Dillon, Pittsburg, Pa.
 510,013. Method of Producing Metal Film and Metal Paper. Carl Endruewit, Berlin, Germany.
 510,041. Overhead Traveling Crane. William H. Morgan, Alliance, O. Assignor of three-fourths to Thomas R. Morgan, Sr., Thomas R. Morgan, Jr., and John R. Morgan, same place.
 510,051. System for Concentration of Ores. Charles E. Seymour, Lake Geneva a Wis.
 510,062. Device for Pouring Metal. John Downs, Johnstown, Pa.
 510,103. Mechanism for Making Crank-Shafts. Edmund Thomas and Thomas L. Fitzgerald, Erie, Pa.
 510,134. Chain Link. Charles R. Harris, Williamsport, Pa.
 510,135. Continuous Brick-Kiln. James Henney, Cloverport, Ky.
 510,153. Apparatus for Burning Fluid Fuel. Benjamin Brazelle, St. Louis, Mo., Assignor to Frank Flanner, Indianapolis, Ind.
 510,170. Apparatus for Burning Hydrocarbon or other Oils. George Gerrard, Glasgow, Scotland, Assignor to John C. Wilson & Co., same place.
 510,173. Apparatus for Coating Tin and Terne Plates. Thomas H. Griffiths, Philadelphia, Pa.
 510,198. Pile-Driver. Frederick E. Shaw, Providence, R. I.
 510,223. Pottery-Kiln. Carl F. Wonschlegel, Rossville, Assignor of one-half to George W. Slaughter, Prince's Bay, N. Y.
 510,228. Apparatus for Making Artificial Fuel. Herman S. Albrecht, St. Louis, Mo.
 510,251. Reverberatory Smelting and Refining Furnace. Joseph L. Giroux, Jerome, Ariz.
 510,265. Brick Mold. Carl F. Kaul, Madison, Neb.
 510,270. Hydraulic Motor. Edgar W. Kirk and James F. Hazel, Kansas City, Mo.
 510,276. Process of Electrolytically Decomposing Fused Metallic Chlorides. Fernham M. Lyte, London, England.
 510,318. Process of Coating Iron with Magnetic Oxide. Pierre H. Bertrand, Paris, France.
 510,366. Boring Apparatus for Deep Borings. Anton Raky, Durrenbach, Germany.
 510,376. Process of Depositing Metal on Metal. Pierre H. Bertrand, Paris, France.

PERSONALS.

Mr. Frank Lewisohn has been spending a few weeks in Butte, Mont.

Mr. C. B. Rustin, of Omaha, was recently in Boise City, Idaho, on professional business.

Mr. M. H. Pierce has been appointed sales-agent of the Lehigh Valley Coal Company for the State of Michigan.

Senator Wolcott, of Colorado, is in Butte, Mont., on business connected with the Colorado Smelting and Mining Company.

Mr. Robert M. Raymond, superintendent of the Diamond R. Mines, of Nelhart, Mont., is in Butte as expert on the Estrella case.

Mr. Eduardo J. Chibas, chief engineer and superintendent of the Caribbean Mining Company, of Colon, Republic of Colombia, has returned to the company's property.

Prof. T. E. Schwarz has resigned his position as superintendent of the Genesee-Vanderbilt mines, in Onray County, Colo. His successor is Mr. Wm. Sheehan, recently foreman.

Mr. Paul A. Fusz, president of the Bi-Metallic Mining Company, and Mr. Charles D. McClure, a director and large stockholder of the company, recently visited Montana on business connected with the mines.

Mr. Miyazaki, who is secretary of the Province of Ishikawa Ken, and who has been spending some time at the Columbian Exposition, in Chicago, has just returned to Japan. Mr. Miyazaki is at the head of the great Industrial School at Kanazawa.

Mr. Otto Abeling, for seven years past superintendent of the Tiger Concentrating Works, at Burke, Idaho, has resigned and has accepted a position as superintendent in charge of the erection of a concentrating plant at the No. 1 mine, near Ainsworth, B. C. His address is at Ainsworth.

Prof. Anthon Winslow, State geologist of Missouri, recently visited Joplin and the neighborhood to make some examinations of late developments. He hopes to be able to issue his report on the lead and zinc during the coming winter. It is the desire of every man in the district that this work be issued as soon as possible, and full information be given concerning the geological structure of this lead and zinc district.

Dr. Vitor, of Osnabruck, Germany, who was representative of the Georgs-Marien Bergwerks und Hutten-Verein at the Chicago Exposition, and who made many friends there, had the misfortune to break his leg in the Transportation Building just before the close of the Fair, and has since been confined to the hospital. His friends will regret to hear that his accident will have a permanent effect, as he has been compelled to undergo an operation which will leave the broken limb shorter than the other one.

Mr. T. E. Schwartz, mining engineer, of Denver, Colo., who has been for some time past in charge of the Genesee-Vanderbilt mine, at Red Mountain, has resigned his position and returned to Denver, where he will devote himself to his business as a consulting engineer. Mr. Schwartz has been connected with the Red Mountain district for nine years past, and was remarkably successful with the Genesee-Vanderbilt property, having taken charge when it was producing nothing and brought it up into good condition.

OBITUARY.

Stephen Wilcox, of the well known Babcock & Wilcox company, died in Brooklyn, N. Y., on November 27th.

Eugene Lellmann, who died in Giessen, Germany, December 9th, aged 37 years, was born in New York, but educated in Germany. He had been assistant professor of chemistry at Tubingen, and professor at Giessen for several years.

Thomas Davis, who died in Youngstown, O., December 6th, aged 83 years, was born in Wales, but settled in Youngstown about 1840, having been previously in Pottsville, Pa., for some years. In 1841 he discovered coal near the town and opened the first coal mine in that section of Ohio.

Ransom C. Scowden, of Louisville, Ky., died at the Poughkeepsie, N. Y., on December 12th, aged 50 years. He was the engineer in charge of a newly invented water purifier at the water-works in Poughkeepsie. He was at one time chief engineer of the city of Louisville. He was also the chief engineer in charge of the Louisville & Portland Canal while it was being constructed on the Ohio River.

Charles H. Aaron, of California, the noted miner, metallurgist and author of several works on assaying and metallurgy, was attacked and struck with a sandbag by a highway robber in San Francisco, November 4th. Before that time he had showed signs of being afflicted with locomotor-ataxia in its incipient stages and the murderous assault made upon him excited the disease to such a degree that he became despondent. On Thanks-

giving Day Mr. Aaron fell down a flight of steps and, striking his head on the pavement, fractured his skull. From this injury he died at the German Hospital, in San Francisco. Mr. Aaron was born in Birmingham, England, and settled in California in 1858. He was with Walker's expedition in Nicaragua, but left the party very soon, disgusted with its purpose. He joined his brother, who was an assayer, at Maysville, Yuba County, Cal., and became much interested in the "wet processes," and wrote largely on chlorination and lixiviation.

More lately he devoted attention to the cyanide process. In the course of his career he visited most of the Central American Republics, his last work being in Honduras, from which place he returned to San Francisco in poor health. Mr. Aaron, while he never had much education in schools, was ever a close student. Among his publications in book form were Aaron's Leaching Gold and Silver Ores, and Assaying. Kustel, Phillips and Aaron were the three Californian authorities on these subjects, and the trio have now all passed away. A biography of Mr. Aaron, with an excellent portrait, was published in the "Engineering and Mining Journal" for June 6th, 1891, page 653.

SOCIETIES AND TECHNICAL SCHOOLS.

Michigan Mining School.—This school at Houghton has now 76 students, the largest number enrolled in any year except 1892.

Foundrymen's Association.—At the regular meeting in Philadelphia, December 6th, reports were received on the state of trade. Mr. Harris Tabor read a paper on "Molding Machines," which was generally discussed.

American Society of Civil Engineers.—At the regular meeting in New York, December 6th, Mr. Howard G. Kelley read a paper on the "Removal of a Defective Pivot Pier and its Reconstruction." This paper was generally discussed by members present.

Southwest Pennsylvania Mining Institute.—At the regular meeting in Connellsville, December 6th, the following officers were elected; President, George C. Marshall; vice-president, Charles Conners; secretary and treasurer, George Wheyl. There was a general discussion on the new bituminous coal mining law of Pennsylvania, which was carefully examined and criticised.

Cornell University.—The non-resident lecturers during the present year for the College of Civil Engineering are as follows: February 2d—Mr. Clemens Herschel, on the "Construction of Roman Water-Works." April 20th—Prof. T. C. Mendenhall, on the "Pendulum Investigations Upon the Form of the Earth." May 4th—Mr. M. R. Freeman, on "Experiments Upon the Flow of Water in Large Mains." May 11th—Mr. A. P. Boller, on "New Phases of Bridge Construction." May 18th—Mr. Frank Washburn, on "High Masonry Dams."

Engineers' Club of St. Louis.—At the regular meeting, November 6th, a number of committees' reports on nominations were made of officers to be voted for at the annual meeting. The paper of the evening, by Prof. J. H. Kinealy, on "The Ratio of Fuel Burned Per Hour to Heating Surface for Minimum Yearly Expense of Plant," was read. Professor Kinealy used Rankine's formula, showing the relation between efficiency of evaporation, heating surface and grate surface, and deduced an expression for the cost of plant per square foot of heating surface, and also an expression for the cost of coal used in terms of heating surface. He showed curves indicating the change in economy of combustion and capacity of plant for changes in rate of combustion, also curves showing how the first cost of boiler plant, not including cost of land, varied with the number of square feet of heating surface. The paper was discussed by Professor Johnson, Messrs. Bryan, Laird and McMath.

Engineers' Club of Philadelphia.—At the regular meeting, December 2d, the tellers reported that the amendment to the by-laws, making the yearly dues for resident members \$15 and for non-resident \$5, was carried. Nominations were made for officers to be voted for at the approaching annual meeting, and a committee on nominations was appointed. The question of inviting ladies to the social meetings was referred to the committee. Mr. Max Uhlmann read a paper on "Some Novelties in Bevel Gearing," in which he described the method of designing and cutting bevel gears with involute teeth, so that one wheel would be able to gear with several pinions of different diameters and numbers of teeth. Mr. H. V. Loss exhibited a number of indicator cards taken by him from a bridge riveter at Pencoyd Bridge Works, showing that a variation of from 25 to 50% existed in the pressures with rivets of the same dimensions. It was shown that greater pressure was required for boiler than for bridgework; this question was discussed at some length by members present.

Lehigh University.—The annual register of the university, published last week, shows the number of students to be 527. According to courses of study, the division is as follows: 144 in civil engineering; 141 in electrical engineering; 115 in mechanical engineering; 51 in mining; 42

in chemistry; 22 in classical and literary courses, and 15 in architecture. A description of the new physical laboratory, opened for use in September, is given. The usual programmes of studies, lists of thesis of class of '93, list of alumni and samples of entrance examination papers are also given. The number of graduates of Lehigh is now 584, of whom 558 are living, and the record shows that most of these are holding positions of trust and responsibility. A tuition fee of \$100 per annum is now charged in the technical departments, and \$60 in the school of general literature. Examinations for admission will be held on January 9th and 10th, 1894, at the opening of the second term. The trustees have placed at the disposal of the faculty a number of free scholarships, to be awarded to applicants of good moral character, who shall pass the entrance examinations creditably, and who for other cause shall be regarded as worthy by the faculty.

INDUSTRIAL NOTES.

The Slatington (Pa.) Rolling Mill resumed operations December 12th.

Andrews Brothers' mills at Haselton, O., are now running full time.

Jones & Laughlin's puddling mill in Pittsburg was put on full double turn December 11th.

The Troy Steel and Iron Company's Bessemer steel works and blast furnace were started up December 11th.

The Mechanical Gold Extractor Company, New York, is putting up two mills at a mine in North Carolina, which will soon be in operation.

It is officially announced that there is a probability of the resumption of the Lebanon, Pa., furnaces and No. 1 Colebrook furnace within the next two weeks. This will give employment to between 500 and 600 idle men.

The stockholders' committee to act with the creditors' committee in reorganizing the Pennsylvania Steel Company consists of N. Parker Shortridge, J. Livingston Erringer, Henry N. Paul, Edward Lewis and Joseph M. Shoemaker.

The sheriff has levied on the personal property of J. J. Kennedy, who operates the National Iron Works, at Marcus Hook, near Chester, Pa. The levy was made on a judgment of \$28,656.57, held by J. G. White, of New York. The place employs about 40 hands and had been making specialties.

The Burden Iron Company, of Troy, N. Y., has made a reduction of 10% in wages, with the assurance that when business improves an increase of 10% will be made. The men—1,500 in number—accepted the terms, and the mills are running. This is the first reduction in 10 years at these mills.

The Phosphor-Bronze Smelting Company, Limited, has removed to its new offices, at No. 2200 Washington avenue, Philadelphia. The company has completed its new foundry and smelting works, largely increasing its facilities in all departments and concentrating its management and shipments.

Two more furnaces in the works of the Reading Iron Company, Reading, Pa., were started on December 11th. There are nearly 1,000 hands employed in this department and the prospect is that work will be continued through the winter, the company having recently secured several large contracts.

James Leffel & Co., Springfield, O., are shipping to the Sultan of Turkey the engine and boiler which they exhibited at Chicago. The two great turbines (1,100 and 1,200 H. P.) made by this company for the Cliff Paper Company, at Niagara Falls, are now running successfully under the head of 125 ft.

The Lunkenheimer Company, in Cincinnati, reports a material improvement in business during the past few weeks. Many orders have been received for the "Lunken" renewable seat gate valves, which have given excellent results wherever they have been tested. In other specialties of the company there is a good demand.

The Chesapeake & Ohio Transportation Company has been organized at Hagerstown, Md., to introduce electrical traction on the Chesapeake & Ohio Canal. The capital stock is \$250,000, and the directors are Charles K. Lord, H. Crawford Black and Alexander Shaw, all of Baltimore; Lloyd Lowndes, of Cumberland, and J. Clarence Lane, of Hagerstown.

The Reading Traction Company, Reading, Pa., has placed the order for the new car house with the Berlin Iron Bridge Company, of East Berlin, Conn. The side walls will be of brick, the roof of iron. The building will be 85 ft. in width and 180 ft. in length. The width is divided into two spans of 42½ ft. each, a row of columns supporting trusses at the center.

A new product of rawhide, called "Dermaglutine," by the manufacturers, A. Groetzinger & Sons, Allegheny City, Pa., is used for pinions and gears for electric street railroad service, and is meeting a steady and growing demand. It is claimed that uniform wearing qualities are secured and that the fiber of the hide in its original state is fully

preserved by a peculiar process, making the gearing more reliable under trying work than iron or steel.

After an investigation lasting about three weeks, the commissioner of public works, of New York, Michael T. Daly, has awarded the contract for the high-duty pumping engines for the new aqueduct to the Geo. F. Blake Manufacturing Company. This contract is for four of the highest grade of vertical triple-expansion crank and flywheel pumping engines to be automatically controlled. They are to be operated with 160 lbs. of steam pressure, and are to be built on the most advanced ideas of engineering. These pumping engines are to be placed in a structure located between High Bridge and Washington Bridge, and the plant is to be one of the finest that has ever been built in this country. The engines when completed will be thoroughly tested, and the results will be looked upon by expert engineers with a great deal of interest, for the reason that with these newly designed engines many of the oldtime customs will be abandoned, such as low steam pressure, slow piston speed and complicated mechanism in the way of attachments. The Blake company's works, East Cambridge, Mass., with modern system and thorough equipment, are one of the finest plants of the kind in this country. The company is also largely interested in the manufacture of pumping machinery for marine purposes, and its pumps have been adopted by the Navy Department. The famous three-screw cruiser "Columbia" is equipped with an entire outfit of Blake steam pumps; also the well known cruiser "New York," the cruisers "Brooklyn," "Minneapolis," "Philadelphia," "Marblehead," "Montgomery," "Detroit," "Chicago," "Boston" and "Atlanta"; the battleships "Maine," "Indiana," "Massachusetts" and "Iowa"; the gunboats "Dolphin," "Machias," "Custine"; the monitors "Puritan" and "Miantonomah"; the ram "Katahdin" and the dynamite cruiser "Vesuvius."

MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" of what he needs he will be put in communication with the best manufacturers of the same.

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.

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.

GENERAL MINING NEWS.

The November report of the "Derrick" shows for the New York & Pennsylvania oilfield a total of 137 new oil wells completed with a production of 6,458 barrels daily. There were 398 wells in progress at the close of the month. In the Buckeye field, in Ohio, 132 wells were completed with a production of 4,205 barrels, and 184 wells were in progress. The Southeastern Ohio field shows 7 new wells with 37 barrels production, and 22 wells in progress. In the Indiana field 56 wells were completed, their total daily production being 2,305 barrels; 63 wells were under the drill on November 30th.

CALIFORNIA.

The California Debris Commission has granted a license to Westall & Hughes to conduct the New York mine by hydraulic process. A stone dam has been constructed across Harvard Creek, in Sierra County, to restrain the debris, and this construction is approved by the commission. The commission granted the Quincy Water and Mining Company permission to construct four dams according to plans submitted to the commission and approved, to restrain the debris from the Spanish Ranch mines, in Plumas County. This permission is more important than any other granted by the commission. The mines on Spanish Creek are large. Spanish Creek, which empties into the Feather River, is to be dammed by a stone wall. Two log and brush dams are to be built at the old pits, and a third dam of logs and brush will be made to restrain the debris in a dry ravine. If these dams are built according to the plans a license to mine will be issued to the Quincy company.

Butte County.

(From our Special Correspondent.)

Idlewild Gold Mining Company.—Presiding Judge Sanderson, of the Superior Court, has given judgment for the defendant in the case of Roberts vs. Ball. It will be remembered that W. S. Roberts entered suit against A. E. Ball, as administrator of the estate of E. S. Chester, deceased. Roberts, Chester, A. E. Straut and a man named Brown held controlling interests in the above corporation. Originally, however, Roberts and Chester were partners in an enterprise known as the Taylor Milling and Mining Company, and they sold 11-40 of the stock to Straut for \$20,000. Later the shares were pooled and merged into the Idlewild company, Roberts getting 7,500 shares. Shortly after this arrangement litigation ensued between the Idlewild company and W. S. & E. W. Chap-

man, but was compromised by the Chapmans paying \$24,000. It was over the distribution of this money that trouble arose. The court held, that Roberts had acquiesced in the business arrangement made by accepting 7,500 shares of Idlewild stock allotted to him.

COLORADO.

El Paso County.

The Midland Terminal Railway, between Denver and Midland, formally opened its line for freight and passenger traffic on December 12th, and Cripple Creek goldfields now have a standard gauge railway.

Gilpin County.

Ada.—This mine, located in Russell district, is worked under lease and bond to G. H. Busch. The last shipment from the 80-ft. level went over 4½ oz. of gold to the cord. The shaft is now down 150 ft. From this point two drifts have been started.

Argyle Mining Company.—The superintendent of this company's Topeka group at Russell reports that in sinking the main shaft a better body of ore has been passed through the last 75 ft. of the shaft than any which had been found previously. The ninth level will be started next week.

Centennial.—The lessees of this mine in Russell district recently sold a lot of smelting ore which netted \$56 per ton. The stamp mill ore is of low grade. The lessees thus far have been working at a depth of 75 ft., but are preparing to pump the water out of the shaft, which is nearly 250 ft. deep. There is said to be a good sized vein of smelting ore in the lower workings which is reported to yield \$100 per ton.

Dump.—This mine, which is situated close to the Gregory, is producing some good ore, says the Gilpin County "Observer." The last run of milling ore taken from the mine is said to have yielded 7 oz. of gold to the cord. The property is developed by three shafts from 50 to 100 ft. deep, which are connected by levels. The last ore taken from the middle shaft yielded from 5 to 7 oz. of gold to the cord.

First Centennial.—This mine, in Chase Gulch, has been sold for \$55,000.

German.—The upraise of 50 ft. to connect the 125-ft. level with the old shaft on this property has been completed, thereby securing perfect ventilation. From three to four cords of milling ore running 2¼ oz. of gold to the cord, are shipped monthly.

Gregory.—The cross-cut started recently from the 900-ft. level west of the incline shaft has been driven 135 ft. The cross-cut will intersect the Mammoth vein at a depth of 850 ft. below the level of the Bobtail tunnel.

Grover Cleveland.—A 10-ton lot of ore from this property was recently shipped to Denver smelters and returned more than \$100 per ton. The development work on this mine has shown a good-sized vein of similar ore in the bottom of the shaft. The shaft will be sunk for 150 ft. deeper.

New Gregory Mining, Milling and Leasing Company.—This company has commenced tearing down the south 25-stamp section of the Bobtail 125-stamp mill, at Black Hawk, which will be replaced with new battery beds, mortars, stamps and framework, and in new bumping or concentrating tables. The new section, which was commenced some weeks ago, is in readiness for the reception of the stamps. This section has also been provided with new concentrating tables. The full capacity of the mill will be running by next January.

Star of the West.—Operations have resumed on this property, which is developed by a tunnel 375 ft. long. This tunnel will be extended 100 ft. The ore is high-grade and yields from 4 to 5 oz. of gold to the cord.

Tascher-Kansas Mine.—At this property the management is developing and stoping in the 250 and 300-ft. levels. Recently 16 cords of milling ore yielded 52 oz. of gold; and some smelting ore returned \$102 per ton for first-class, and \$20 per ton for second class ore.

West Topeka Mining Company.—According to the Central City "Register-Call" this company is raising money to enable it to resume development work on its property in Russell district.

Lake County.

(From our Special Correspondent.)

There is a curtailment in the iron production at Leadville this month, the Grey Eagle having laid off 50 men. The Maid and Henriett combination has cut down and the December output will be greatly reduced. In the Penrose the ore is principally chloride, carbonate and sulphide, and quite a quantity is being mined.

Granite Section.—There is considerable work being carried on in this gold district of Lake County. The producing area is about three miles square, although there are additional placer fields. Bitners & Graves have just made a shipment of about six tons of ore. De Masters & Co. have 16 in. of high-grade ore in the Magneta, while a shipment of high-grade stuff has been made from the Snowdrop. The Belle of Granite and Solix Tyece both ship gold ores. McCannon & Co. have a number of fine prospects on the B. & M. property, and are taking out high-grade ore from a 2½-ft. vein. The Hattie Waters has a 4-ft. vein, and a lot of ship-

ping ore is on the dump. At the Birthday they have several tons out and have 12 in. of ore in the breast of the tunnel from top to bottom. The Bi-Metallic is on the vein which is 7 ft. between walls, some of it panning free gold. Quite a number of new prospects have just been started and there is promise of vigorous work in that section throughout the winter.

Hartzel Placers.—Mr. W. W. Cobble, an old Leadvilleite, has just returned from the Hartzel gold fields and says that the excitement about the big finds in Buffalo wallow, near Hartzel, is greatly overdone. There is but little there and that little consists of the relocation of some old workings that were first staked off in 1882 by Colonel Duggan. The country rock is a broken up, conglomerate porphyry, burned and dried up, and what are supposed to be fissure veins are in this rock. Colonel Duggan in 1882 expended \$20,000 in that section and got no returns. The country is perfectly level and as a gold field does not amount to a row of pins.

New Gold Mill.—The new gold mill for the treatment of gold ores, already described in these columns, is being rapidly pushed to completion. It is located about 900 ft. from the American smelter. The idea is to treat Cripple Creek ores as well as ores of this vicinity by an adaptation of the cyanide process.

Saguache County.

Amethyst.—Some 300 ft. of the hanging wall in this mine caved in on No. 3 shaft December 5th. This compels the mine to shut down for two weeks to repair the damage. The cave-in extended from the surface to the third level.

Ridge.—Advices from Creede state that interest in the claims on Campbell Mountain was re-awakened last week by late developments in the Ridge, and there is now considerable demand for claims on the lead belt. Having been driven from work on the upraise to the right, the Ridge owners early in the week returned to the left drift, in which the first strike was made early in the summer, and from which the great flow of ore at first occurred. This had been timbered up during the attempt to work the vein through the upraise, but in this the lead widened out to 16 ft. and it was no longer possible to catch up the ore flow with the timbers, so the left drift was returned to, the timbers knocked out and the ore allowed to flow again into the tunnel. The ore which comes from this portion of the mine is reported to be richer than that in the right drift and upraise, it running, it is said, from 300 to 3,000 oz. in silver, about 80% lead and a considerable quantity of gold. Although not to be reckoned a new strike, since quantities of the high-grade were found in the flow and the presence of it in the mine has been known, it was not thought to be in any considerable quantity until the new development was started. As it is now, the Ridge promises to prove not only the largest vein yet opened in the camp, but the richest as well, and this aside from its lead and zinc product. The new-found high-grade ore will be shipped to the smelter as it comes from the mine, while the mill is kept steadily at work day and night concentrating the low-grade and separating the lead from the zinc. A car of zinc concentrates was shipped to Joplin, Mo., during the week.

Schuylkill Company.—This company is developing a group of claims lying 3,000 ft. to the north of the Ridge, along the lead, and the interlying group of four claims was sold on November 29th on a working bond for \$10,000 and will be developed extensively in the expectation of showing a continuation of the Ridge pay vein. The sellers are John Ostrum, L. P. Akin and C. F. Nelson, and the purchasers, W. S. Harbison, L. P. Akin, J. S. Courtney and others.

FLORIDA.

Citrus County.

Cove Bend Land and Phosphate Company.—This company has recently added new machinery to its works, at Inverness, and has increased its working force. The intention is to develop the property as rapidly as possible.

Florida Hard Rock Phosphate Company.—This company has resumed operation on its property near Hernando.

GEORGIA.

Cherokee County.

Holly Springs.—A company is to be organized to develop the gold mines at this place, which have been worked at intervals in the past.

Floyd County.

Asbury Mining Company.—This company is increasing its operations in its mines at Cave Springs, and will shortly be able to ship 100 tons daily.

IDAHO.

Boise County.

Gold Hill Mining Company.—It is said that this company will put up a cyanide plant to work its sulphurets.

Homestake Mine.—Recently, says the Boise "Statesman," an upraise from the old workings struck a vein from 20 to 24 in. wide, and rich in gold. A cross-cut run from the tunnel struck the same vein, about 75 ft. from the surface.

South Africa.—The owners of this mine have put

in supplies and intend to work all winter, shipping their ore to the Blaine mill.

Shoshone County.

Tiger Mine.—This mine, at Burke, has resumed operations. At first 18 men were employed, but last week 25 more were added.

ILLINOIS.

Macon County.

Decatur Coal Company.—This company is now working a force of 350 men on half time.

Macoupin County.

Bremen Coal and Mining Company.—This company has acquired the property of the Chesterfield Coal Company, including a large tract of land near Carlinville.

INDIANA.

Sullivan County.

Carbon Hill Coal Company.—This company, which has its office in Terre Haute, has leased 2,000 acres of land near Duggar, and will sink several shafts to the coal vein.

IOWA.

Wappello County.

Appanoose Coal Company.—This company has been organized, with office at Ottumwa, to develop coal property on the line of the Chicago, Milwaukee & St. Paul Railroad, about 11 miles from Ottumwa.

KENTUCKY.

Bell County.

Mt. Vincent Coal Mines.—Work has been begun on shaft by J. H. Allen, who intends also to put up a coke plant.

Floyd County.

Prestonburg Coal and Iron Company.—This company is in trouble owing to a contest for control among the stockholders. Suits have been begun at Louisville to settle the disputed questions.

MARYLAND.

Allegany County.

American Coal Company.—This company has just completed a new building to be used as a blacksmith and machine shop.

Bartow & Georges Creek Valley Coal Company.—At the annual meeting in Cumberland, last week, H. C. Black, John Sheridan, Lloyd Lowndes, Adam E. Hitchins, Howard Hitchins and W. E. G. Hitchins were elected directors.

MICHIGAN.

Copper.

In the Red Jacket shaft last week the Calumet conglomerate was struck at a depth of 3,250 ft. The size of the vein cannot, of course, be determined as yet. This shaft was started in the fall of 1889, and a large amount of money has been expended upon it and upon the necessary hoisting and pumping works. The shaft is in six compartments and is timbered throughout. The machinery is of sufficient capacity to carry the shaft to a depth of 5,000 ft.

Atlantic Mining Company.—The copper production for the month of November was 217½ tons.

Calumet & Hecla Mining Company.—This company has declared its fourth dividend of \$5 per share for this year; it is payable December 23d to stockholders of record on December 12th. This will make \$20 per share—\$2,000,000 in all—for the year.

Franklin Mining Company.—The November output of copper from this company's mine was 170 tons—1,830 lbs.

Osceola Mining Company.—As noted last week this company has declared a dividend of \$1 per share, payable December 30th. At the mill a new boiler has just been put in place and an additional head of stamps is being erected, making six stamps in all.

Quincy Mining Company.—The copper output of this company for the month of November was 1,001 tons.

Wolverine Mining Company.—This company reports its production for the month of November at 76 tons, 405 lbs. copper.

Iron—Gogebic Range.

Newport Mine.—This mine started up December 11th with 75 men, or about one-fourth of a full force.

MINNESOTA.

Duluth.

(From our Special Correspondent.)

Some of the wildest and most absurd stories have been sent out lately, chiefly from other cities than Duluth, regarding combinations and consolidations in the iron ore and steel trades. So far as these stories relate to the consolidation, in any way, of the Minnesota Iron Company and the new Mesaba combination, they are utterly false, as they probably are in every other detail. The fact that every story tells of the desire of capitalists to secure the "gigantic" West Superior steel plant—which consists of two 4-ton Bessemer converters, a plate and angle mill and a pipe foundry, which is now in financial straits—seems to point to the direction from which these stories emanate.

Iron is claimed to have been found in Carlton County, about 20 miles west from Duluth. The surface formation thereabouts is slate with gabbro overflow.

Stories of coal discoveries northwest of the Mesaba still continue and grow quite circumstantial. Mining men are loath to believe them.

Iron—Mesaba Range.

(From our Special Correspondent.)

Canton.—Seven hundred tons of ore are being hoisted daily, and 200 men are at work.

Chicago & Minnesota Iron Company.—The notes given by this company for deferred payments on the Iron King are all indorsed by the Minnesota Iron Company and secured by a bond on the land. These deferred payments draw 7% and part run as long as 24 months. Contractor Winston is now figuring on extensive steam shovel stripping at the Iron King for next season's mining. Contracts are to be let next week, probably.

Longyear.—E. S. Longyear, of Marquette, has gone into 90 ft. of ore in about the center of town 57-21, using a shot drill. A considerable body of ore has been exploited.

Mahoning Ore Company.—This company, under Superintendent Agnew, has begun work in 23-57-22, west of its present finds, and near the Mesaba Chief and Lackawanna ore bodies.

West Mesaba.—Several of the sellers of the Wyoming properties to the Chicago & Minnesota Ore Company have taken a \$75,000 option on West Mesaba lands and will do a large amount of exploring this winter.

MISSOURI.

Clay County.

Missouri City Coal Company.—This company has been organized by S. J. Henshaw, O. G. Craven and others to mine coal near Missouri City.

Jasper County.

(From our Special Correspondent.)

Joplin, Dec. 11.

The production and sales of ore from this lead and zinc mining district for the past week show a marked improvement. Zinc ore was in good demand and prices slightly advanced; \$20.50 per ton was the top price, with \$19.50 a fair average for the entire district. The price of lead ore declined from \$18 to \$17 per thousand, owing to the sudden fall in the price of pig lead in St. Louis. Following are the sales of ore from the different camps: Joplin mines, 1,429,030 lbs. of zinc ore and 425,380 lead, value \$21,481; Webb City mines, 1,014,910 lbs. of zinc ore and 61,040 lead, value \$10,978; Cartersville mines, 1,306,290 lbs. of zinc ore and 310,490 lead, value \$18,247; Zincite mines, 127,370 lbs. of zinc ore and 10,020 lead, value \$1,418; Oronogo mines, 85,890 lbs. of lead ore, value \$1,384; Galena (Kan.) mines, 924,000 lbs. of zinc ore and 84,000 lead, value \$9,326; district's total value \$62,834; Wentworth mines, 83,700 lbs. of zinc ore, value \$760; Granby mines, 281,650 lbs. of zinc ore and 49,800 lead, value \$3,080; Peoria (I. T.) mines, 29,600 lbs. of lead ore, value \$366; Aurora (Lawrence County) mines, 840,400 lbs. of zinc ore and 227,040 lead, value \$9,378; lead and zinc belt's total value \$76,418.

MONTANA.

Cascade County.

Belt Coal and Coke Company.—This company has been organized to work the old Castner mine, near Belt, and some adjoining property.

Granite County.

Royal Mining Company.—The 10-stamp mill at this mine is now running steadily and crushing 20 to 25 tons per day. The ore is said to carry about \$30 per ton in gold. The vein is from 5 to 10 ft. between walls and has a pay streak 30 in. wide. About 600 ft. of drifts have been run on the vein.

Lewis & Clarke County.

Bald Butte Mining Company.—This company has declared dividend No. 20, of \$5,000, which was paid December 4th. The company has paid \$120,000 in dividends to date.

Missoula County.

Iron Mountain Mining Company.—The men in this mine at Pardee are on a strike, the company having issued an order December 1st reducing wages to \$3 per day for miners, and \$2.50 for muckers.

Nine-Mile Mining Company.—This company's miners, at Martina, struck December 1st, against a reduction from \$3.50 to \$3 per day. At latest accounts no agreement had been reached and the men were still out.

Silver Bow County.

(From our Special Correspondent.)

Amy-Silversmith.—R. G. Huston & Co. are making small shipments of high-grade ore from the part of this property which they have under lease. There are two other sets of leasers on this ground who make occasional shipments.

Enterprise.—The water is still being kept out of the mine, though scarcely any work is attempted. This property is the most easterly one as yet opened up on the Rainbow lead.

Estella.—The suit of Jas. A. Murray vs. F. A. Heinze, involving this property, is being tried be-

fore Judge Speer. Several interesting questions are involved and the trial is proving a prolonged one. The matter is, roughly, this: Murray owns the Estella and leases it to Heinze for certain considerations, agreeing that Heinze shall be allowed \$12 a ton for treatment of the ores, Heinze agreeing that of any value remaining above this amount 50% shall be paid to Murray as royalty. In January, 1893, Murray enjoined Heinze from working on the property, claiming that he had forfeited the lease by failure to comply with some of its provisions, particularly one in reference to mining the ore properly. His contention is that low-grade ore was mixed with high-grade ore and then concentrated, \$12 a ton being charged against all the crude ore.

Gagnon.—The cross-cut on the 1,100-ft. level has cut the lead and drifts are to be pressed east and west. Only a portion of the mine is in operation. The old column pipe is being renewed in places, being badly corroded by the copper water. Probably here, as in other mines of the copper belt, recourse will have to be had to brass or copper columns.

Parrot Company.—Shipments of ore have been commenced and continued to the smelter and the concentrator has started running. As soon as concentrates and roasted ore accumulate sufficiently, the smelter proper will be started. Meanwhile it is understood that the converters will commence running immediately on Anaconda matte, 1,000 tons of which are to be treated a month. At the mines there has been no move made as yet in the direction of putting on full crews.

Poulen.—The leasers on this property (Bricker & Swank) have completed sinking to the 400 level and are now cutting the station. At this depth the vein is to be looked for at about 25 ft. south of the shaft.

West Elba.—Small shipments of high-grade rock still continue from here.

NEVADA.

Elko County.

Bullion District.—Jiggings shipped by railroad during November were 17 tons.

Eureka County.

(From our Special Correspondent.)

The ore shipments reported by railroad as consigned to Salt Lake City, Utah, and Vallejo Junction, Cal., during the month of November are as follows: Eureka district: From the Eureka Consolidated mine, 224 tons; Jackson mine, 86 tons; Phenix mine, 29 tons; Hamburg mine, 87 tons; Richmond mine, 68 tons; Diamond mine, 89 tons; Rescue mine, 17 tons; McGarry mine, 15 tons; Idaho mine, 8 tons; Silver Lick mine, 3 tons, and Delaware mine, 1½ tons; total Eureka district, 627½ tons. Adding the receipts from White Pine County, 230 tons; Nye County, 5 tons; Elka County, 17 tons, making total receipts for November, 879½ tons.

Lincoln County.

According to the Pioche "Lode" negotiations between the owners of the Monitor mine, Messrs. Reeves, Ellis and Wilson, and the owners representing seven-eighths of the Jim Crow property, Messrs. Nesbitt Brothers and Mrs. J. McFadden, have been concluded with S. T. Godbe. The time is 90 days; the consideration is not known. The deeds are in escrow, to be delivered when all conditions are fulfilled. Messrs. Ellis and Wilson do not convey their entire interests, the negotiations being for all their interests west of the west line of the April Fool property, and including the Monitor, Monitor dump, seven-eighths of the Lucky Bar, one-half of the Cliff, three-fourths of the Millionaire & Princess, while Messrs. Nesbitt Brothers and Mrs. McFadden convey seven-eighths of the Jim Crow.

Keystone Mill.—The gold mill at Keystone, Yellow Pine district, produced \$8,000 worth of bullion, the result of a 33-day run.

Polaris Mining Company.—This company has leased the Yuba, No. 3 and several other mines from the P. C. Company, and will commence operations on the Yuba at a lower rate of wages this week.

Nye County.

Morey.—H. A. Cohen shipped 5 tons of rich ore during the month of November.

Storey County—Comstock Lode.

Consolidated California & Virginia Mining Company.—On December 6th Superintendent Lyman made his first visit to the 1,000 level of the Consolidated Virginia shaft. He inspected the labor done since the beginning of the Rule explorations—the repairs to the shaft, the station constructed and the work done in the drift—and, according to the Virginia "Chronicle," expressed himself as pleased with the condition of affairs. The drift is being pushed along as rapidly as possible. The ground through which it is being driven is soft enough to be worked without difficulty. The drift will be out between 60 and 70 ft. at the end of the week, if nothing interferes to arrest its progress. The work will go on henceforth under Superintendent Lyman and Foreman Harper.

Crown Point Mining Company.—The latest weekly official letter says: The south drift from the 700 level stope has been run a total distance of 55 ft., where it was stopped in low-grade quartz

mixed with porphyry. We have started to connect with the 600 level, from this drift, at the junction of cross-cut No. 2. It is up two floors and the top is in quartz (gold rock) assaying from \$5 to \$7 per ton. We are also preparing to clean out the 600 level, east cross-cut, to meet the raise. We have started a small drift from the shaft below the 230 level on a small streak of ore discovered in repairing the shaft. It is from 1 to 2 ft. wide.

Justice Mining Company.—Judge Hawley, of the United States Circuit Court, in Nevada recently rendered a decision of importance to this company against an appeal in the case of Book vs. the Justice Mining Company. By this decision all question as to title is finally settled, and it is now the intention of the Justice company to go ahead and open up the ground in dispute.

Savage Mining Company.—The latest weekly official letter says: On the 1,100 level we are extracting fair-grade ore from the 11th to the 21st floors. The north drift from the station on this level was advanced 15 ft., making its total length 65 ft.; face in quartz and porphyry. In the east drift, 1,050 level, at a point 45 ft. east from the shaft, we have turned the drift southeast and have advanced the same on this course 22 ft.; face is in quartz giving low assays. During the week we have hoisted 199 cars of ore, shipped to the Nevada mill 210 tons and milled 300 tons. Car samples average \$26.03. Battery samples average \$24.35. Bullion yield for the week, \$5,115.60. Shipped to the United States mint at Carson 377 lbs. crude bullion.

Segregated Belcher & Mides Mining Company.—The latest official weekly letter says: The north drift from the south raise above the 1,100 level is now out 13 ft. The quartz in the face has improved somewhat in value and is now saved for pay. It runs from 2 to 3 ft. in width, assays from the face running from \$20 to \$30 per ton. The south drift from the 1,200 level is now out 25 ft. The face is in a mixture of porphyry and low-grade quartz.

Yellow Jacket Mining Company.—This company extracted and shipped to the mill, during the month of November, 316 tons of ore, showing an average value of about \$36 per car sample assays. The bullion product of this ore was about \$11,000. Superintendent Sharon says this ore is from the raise above the 1,100 level and carries about 30% gold, the usual average of that extracted from the main Comstock, from which this ore is obtained. Daily ore shipments are being made to the Brunswick mill.

White Pine County.

(From our Special Correspondent.)

White Pine District.—During the month of November the following lots of ore were shipped to Salt Lake City, Utah, and Vallejo Junction, Cal.: From Louis Lani, 14 tons; F. Paul, 19 tons; C. A. Mathewson, 71 tons; A. Muir, 53 tons; E. J. McEllin, 51 tons, and G. Siri, 14 tons; total White Pine district, 222 tons. From Bay State mine, Newark district, 8 tons.

NEW MEXICO.

Grant County.

Mountain Key.—Eighteen men are now employed on the Mountain Key mine, at Pinos Altos, and the new mill has started up. There is a great amount of ore ready for treatment.

Pacific Gold Company.—The Aztec tunnel is again being driven. Work was suspended for a time on account of lack of money to pay the employees, but that difficulty was overcome through the action of the company in meeting all obligations to November 1st.

Pacific Mill.—This mill is running night and day with good results. About 30 tons of ore per day are being treated.

Sierra County.

A late issue of the Albuquerque "Democrat" says: The unusual attention being drawn to new strikes at Hillsborough led to an investigation by O'Connor Roberts, Col. John S. Crawford and Thomas S. O'Neal, three mining engineers, from whose statements the following is taken: With a capital of \$175,000 this camp has produced this year, from January 1st to December 1st, 20,198 tons, approximating \$500,000 in value. Within a radius of eight miles are 26 true fissure veins, converging to a common center in a mammoth basin, all distinctly traceable on the surface from 1,500 to 6,000 ft. The veins are large, strong and well defined. The average of the camp so far has been about \$20 in gold per ton, although several mines have produced more. A new quartz strike averages \$100 from an 18-in. pay streak, and a placer streak of 6 in. runs from 75 cents to \$1.50 a pan. The miners are deserting the silver camps and crowding to the new camp. Mines and mills are now working night and day.

NEW YORK.

Warren County.

Sherman Lime Company.—This company has been organized at Ghens Falls with a capital of \$66,000. The trustees are Darwin W. Sherman, Augustus S. Rugge, John H. Burnham, Henry L. Sherman and Arthur W. Sherman.

NORTH CAROLINA.

Chatham County.

Egypt Coal Company.—Since this company's mines were shut down four months ago, extensive improvements have been made and some new machinery put in. Work in the mines is to be resumed about January 1st.

Gaston County.

It is said that negotiations are in progress for the sale of iron ore property near here to John M. Patterson and others, of Pittsburg, who have recently been examining this property, and also some of the old iron mines in Lincoln County.

Nash County.

Argo Gold Mining Company.—This company, organized by W. A. Campbell and others, of Rocky Mount, has taken possession of the mines near Nashville, formerly operated by the Mann syndicate. The new company will put in a 20-stamp mill, a concentrator and other machinery.

Wilkes County.

Bushy Mountain Iron and Lithia Springs Company.—This company has been organized, with office at Wilkesboro. The officers are: J. E. Finley, president; T. J. Ferguson, vice-president; J. G. Finley, treasurer.

OHIO.

President Nugent, of the United Mineworkers' Association of America, issued a call December 9th to the Ohio mineworkers to hold a convention in Columbus on Tuesday, January 9th. The call states that the coal trade in Ohio is in a demoralized condition in the competitive fields, and if the present condition of affairs is permitted to proceed much longer the result will be disastrous to the interests of the coalworkers.

OREGON.

Baker County.

Baisley-Elkhorn.—In this mine, says the Baker City "Democrat," a body of high-grade sulphurets has been exposed, the vein running from 3 to 4 ft. wide. Work on development is to be continued through the winter.

Clackamas County.

Baltimore Group.—On this group a tunnel is being run to tap the ledge about 135 ft. below water level. The group includes four claims on Eagle Mountain, shown by exploration to carry copper pyrites with some gold and silver.

PENNSYLVANIA.

Anthracite Coal.

Algonquin Coal Company.—The Pine Ridge colliery, at Miuers' Mills, recently purchased by this company, resumed work on December 9th for the first time since the purchase. This colliery will work on full time for the next three months, giving employment to at least 400 men and boys.

Delaware, Lackawanna & Western Coal Company.—A disastrous cave-in occurred at the Avondale mine of this company, at Avondale, on December 10th. The whole of No. 1 plane and the principal gangway in the Ross vein fell in and buried all the valuable engines and other apparatus used in working that portion of the colliery. The mines will probably be idle for a month until the debris can be removed.

Koh-i-noor.—Fire broke out in an abandoned portion of the Koh-i-noor colliery, at Shenandoah, on December 12th, and burned fiercely for a few hours. All the miners in an adjoining shaft got out safely and operations will resume in a few days.

Lehigh Valley Coal Company.—All of this company's collieries in the Wyoming Valley started up on December 11th, and the prospect for steady work during the winter for all the miners is good.

Bituminous Coal.

About 400 miners at Brown's Coal Works, at Boston, on the Youghiogheny, have struck for an advance in the price of mining. The men have been getting 2¼ cents, and want an advance to 2½ cents. The company refused to grant the advance, and the strike resulted.

The Delegate Convention of Railroad Coal Miners, of the Pittsburg district, on December 8th, decided to accept a 65-cent rate reduction, a reduction of 14 cents. This rate is not permanent, but only until such time as the reorganization of the miners will enable them to make a stand for the 79-cent rate.

Sterling Coal Company.—This company, operating at Hastings, Cambria County, and at Sterling, Clearfield County, Gen. D. H. Hastings, president, has retired from the business, as miners and shippers of coal, contracting the operating of the mines to others. Of the mines at Hastings, W. P. Duncan, of Phillipsburg, and J. L. Spangler, of Hastings, are the contractors, and at Sterling Thomas McHugh is the contractor.

Iron.

An Allentown dispatch says that the Crane Iron Company has sold to the Philadelphia & Reading Railroad Company what is known as the Crane Branch Railroad, three miles long, running from Chapman's to near Fogelsville, for \$15,000. The line was built eight years ago and taps a rich iron ore section.

Oil.

A press dispatch reports that the Standard Oil Company is about to develop the new oilfields in Susquehanna and Bradford counties. It has leased a three-cornered strip extending from Bradford, in McKean County, to Brooklyn, Susquehanna County, where a New York syndicate is erecting derricks. This will include Jefferson, Elk and Cameron counties and part of Clearfield, Clinton, Lycoming and Potter, a small strip of Sullivan and all of Bradford County, lying south of Towanda. Prospecting will at once begin on a very extensive scale.

Slate.

The Chapman Slate Company is busy removing the top of a very valuable tract of slate land. It is expected to have the job completed early in 1894, when operations in the new quarry will commence.

The Pennsylvania Hard Vein Slate Company is removing a large piece of top and will soon be in shape to work another gin. This company has been very successful in its operations.

Franklin Slate Company.—This new company, whose quarry is on the big Franklin vein, in the Lehigh region, is about ready to manufacture slate. The new company is composed of Owen E. Jones, Morris Pierce, Dr. David Williams and others.

Hazle Dell Slate Company.—This company has been organized by D. D. Roper, of Slatington, and others.

Hower Quarry.—A "Diamond" channeling machine, made by the Sullivan Manufacturing Company, Claremont, N. H., has been put in at this quarry.

Imperial Slate Company.—At the annual meeting, December 4th, all the old stockholders and directors were re-elected.

SOUTH DAKOTA.

Lawrence County.

Blue Ridge Mining Company.—This company owns a group of claims situated between Englewood and Ruby Basin, on which considerable work has been done during the past season with satisfactory results. Over 300 ft. of drifts and tunnels were run, following seams of ore on the dip. The incline became so great that trouble from water caused suspension of work. Next season the company will sink a shaft, says the Deadwood "Times," and erect hoisting works for the thorough development of the property. The ore is gold-bearing, similar in character to that of Ruby Basin and other silicious ore districts.

Deadwood & Delaware Smelting Company.—The management of this company still employ six 4-horse teams hauling pyritic iron ore from the Two Bears property situated on Strawberry Gulch, at an average cost of \$2.50 per ton. The Two Bears mill was shut down some days ago and will probably remain so until next spring owing to the high cost of transportation of supplies during the winter months.

Homestake Mining Company.—The shaft at the 80-stamp mill of this company broke down on December 6th, causing the shutdown of the plant, says the Deadwood "Pioneer." Operations will be resumed upon the repairs having been made. Two weeks, and possibly longer, will be required to make the repairs.

UTAH.

Juab County.

Bullion-Beck & Champion Mining Company.—According to Superintendent A. E. Hyde there are at present 125 men employed at the mine. The company still contemplates a mill for the reduction of its ores, but so far, says the Salt Lake "Herald," has not taken any active steps in that direction.

Swansea.—This mine, at Tintic, has started up with a force of 13 men.

Salt Lake County.

In the case of Fraser & Chalmers vs. L. C. Trent, which was argued at Salt Lake City on December 2d, Judge Zane has handed down his decision. The part under immediate consideration was a motion to dissolve an attachment for \$21,989. Mr. Trent, the defendant, who was formerly agent for the plaintiff company, in his motion for the dissolution of the attachment, denied that the pretended indebtedness set forth in the complaint and the affidavit for the attachment was fraudulently contracted. He alleges that he being agent and a director of the company had authority to receive and collect money and that the plaintiffs overdrew their account with him to the amount of \$21,000 and that he received the check of the Mammoth Mining Company and applied \$21,989 to his own credit and deposited the balance to the credit of the company. There was no dishonesty or concealment about the transaction, as he had notified the Chicago house of the disposition he had made of the money. Mr. Trent also denied that he disposed of any of his property with intent to defraud his creditors, and asked for the dissolution of the attachment on the ground that the affidavit by which it was procured is false in so far as it charges him with fraud or being indebted to the company. Judge Zane in giving his decision overruling the motion to dissolve said that the alleged indebtedness had not been proved by either side. Mr. Trent had, however, received a large portion of the amount he claimed to be due him and as

some of his property had been removed from the territory and beyond the jurisdiction of the court, the real estate should be held until the right of the parties was established. That latter question of the right it was not necessary at present to pass upon. Judge Zane overruled the motion, raised the bond from \$5,000 to \$10,000 and allowed 10 days in which to file the increased bond.

The shipments of mine products from Salt Lake City during November were: Bullion, 4,151,894 lbs.; ores, 6,608,930 lbs.; copper ores, 146,810 lbs.; sulphides, 33,434 lbs.; total, 10,941,068 lbs. For 11 months the shipments have been as follows: Bullion, 37,017,202 lbs.; ores, 68,115,677 lbs.; copper bullion, 915,545 lbs.; total, 106,048,424 lbs.

The receipts of ore and bullion at Salt Lake City for the week ending December 6th were to the aggregate value of \$136,591, of which \$78,791 was in bullion and \$57,800 was in ore. For the previous week the receipts were \$145,586, of which \$82,486 was in bullion and \$63,100 was in ore.

For the past 11 months the receipts of ore and bullion have been as follows:

Month.	Bullion.	Ores.	Totals.
January.....	\$308,953	\$212,080	\$521,033
February.....	269,633	151,746	421,379
March.....	331,927	189,923	521,850
April.....	378,344	206,475	584,819
May.....	392,189	266,500	658,689
June.....	425,066	564,172	989,238
July.....	414,576	151,947	566,523
August.....	357,796	111,287	469,083
September.....	396,879	272,507	669,386
October.....	448,387	223,832	672,219
November.....	469,550	212,875	682,425
Totals.....	\$4,133,300	\$2,554,518	\$6,687,844

Summit County.

Home Coal Company.—The miners employed at this company's colliery at Coalville went on strike on December 1st.

Ontario Silver Mining Company.—According to the Park City "Record" this company's mill shipped on November 22d 21 bars of bullion, containing 23,937 oz. of fine silver. Again, on the 28th, 37 bars were put out, containing 22,104 oz., making a total of 46,091 oz.

VERMONT.

Rutland County.

Bennett & Felt.—This new firm has taken the slate quarry and business at Fair Haven of the old firm of Nichols & Co.

Hatch Hill.—The owner of this tract, Mr. Charles I. Baker, has had a number of tests made with a core drill by Thomas Daley, of Claremont, N. H., says the "Slate Trade Journal." After going through surface rock for 20 ft. he brought up a core of fine grade. He drilled three holes in a space of 100 ft. and now has a quarry 100 ft. long or more, 80 ft. wide and over 15 ft. deep, which seems to have an inexhaustible bed of slate. He also struck a fine bed of unfading green on the same lot a short distance away. Mr. Baker will form a stock company, modern machinery will be bought and the quarry put in operation.

VIRGINIA.

Big Stone Gap Coal Company.—This company has now begun to make shipments of coal from its mine. Work is in progress on the coke plant.

Goochland County.

Gilmer.—This mine and the Collins near by have just started up. Two other mines are to be started shortly, negotiations being in progress for machinery.

Rockingham County.

Elkton Iron Mines.—These mines are being worked by Kendall & Flick with a small force. They are putting up a new washer with jigs and screens.

WASHINGTON.

Snohomish County.

Ethel Mining Company.—At this property the tunnel is in but a short distance, but the face is in good ore, which assays well, says the Monte Cristo "Mountaineer," and does not appear to be refractory.

Monte Cristo.—According to the Monte Cristo "Mountaineer," everything at this property is in readiness for the starting of the reduction works. A tunnel has been run high up the mountain side and the face is in good ore. A wire cable tramway delivers the ore at the large bin which is built on a level with the upper windows of the reduction works.

Rainy.—The main shaft of this mine is down 50 ft. and drifting along the side of the vein has been carried on for a distance of 60 or 70 ft., the tunnel developing good paying ore from its mouth in. A covered tramway from the shaft to intersect the tramway from the Pride of the Mountains, about 600 ft. distant, is also in process of construction. At the intersection of the two tramways, an ore bin is also building.

WEST VIRGINIA.

Harrison County.

Cherry Camp Oil Company.—This company has been incorporated, with office at Clarksburg, to develop oil property. The incorporators are B. M. Depard, Nathan Goff, Thomas M. Jackson, of Clarksburg, and George C. Lewis, of Pittsburg, Pa.

Ten-Mile Coal and Coke Company.—This company has been organized to mine coal and make coke. The capital stock is \$1,000,000; the incorporators are J. F. Allen, J. D. Kite and others, of Clarksburg.

Logan County.

Robert Morris Land Company.—This company has filed articles of incorporation to mine coal and other minerals. The incorporators are Adrian Vanderveer, T. Gimbernat and others, of New York, who have recently organized several coal and land companies in this section.

WISCONSIN.

Iowa County.

Mineral Point Zinc Works.—These works and mine, at Highland, started up December 11th, after a stoppage of several months.

FOREIGN MINING NEWS.

GREAT BRITAIN.

Scotland.

Advices from Glasgow state that the miners' strike is over, the men having returned to work at the old rate.

LOWER CALIFORNIA.

Tepustete Iron Company.—It is understood that this company is about to make a contract to supply ore to certain rolling mills in Colorado. The same company intends to erect a landing stage at San Isidro with an overhead ropeway and automatic dumping buckets to facilitate the shipment of its output, says the Mexican "Financier." By the first of the year it expects to be mining 100 tons of iron ore daily.

MEXICO.

Sonora.

Large quantities of machinery are being dispatched from the Torres station of the Sonora Railway to the Baviacora, El Carmen and Lampazos mines, in the Arizpe district.

The Arizpe, Moctezuma and Sahuaripa districts are overrun by American prospectors in search of gold mines.

NOVA SCOTIA.

Ballou.—This property has been sold to Boston parties by R. R. McLeod, who will retain an interest in the new company. The west shaft is to be sunk 100 ft. in the hope that the lead will improve with depth.

Caledonia.—Work has been resumed on this old mine under direction of Mr. F. B. Murehie.

Joggins Coal Mines.—At these mines a new slope, known as the East slope, has been opened; it is in about 700 ft. and from 60 to 70 tons of coal per day are being taken out. This output will be increased to 125 tons before long. The slope is connected by a short drift with the old workings. The old Barnhill slope is being cleared out and will be worked again.

Rhode Island Mining Company.—The drifts at the 150-ft. level have not shown well, and the company has decided to sink its shaft to 200 ft.

Richardson Gold Mine.—The vein in this mine is running from 6 to 8 ft. in width. The 20-stamp mill has been kept fully occupied, and in October crushed 560 tons of quartz, the yield being 263 oz. of gold.

ONTARIO.

Northern Gold Company.—This company has completed its new stamp mill at the mine, in the Lake of the Woods district, and started up December 1st.

Rat Portage Mining and Reduction Company.—This company has been organized with P. Semple, of Oshkosh, Wis., as president, and A. C. Payne, of Rat Portage, as manager. The new company will take the works and other property of the Black Jack Mining Company, and has also made arrangements to purchase the Bull Dog, the Bad Man and other mines in the vicinity.

QUEBEC.

Beaver Lake Mica Mine.—During the past season much development work has been done on this mine, at Petites Bergeronnes. The vein has been traced for nearly a mile, varying considerably in width.

British Phosphate Company.—A drift from this company's Bristol shaft, at Glen Almond, has uncovered a deposit of phosphate, the existence of which had been shown by the diamond drill.

International Asbestos Mining Company.—This company has been organized in Newark, N. J., to work an asbestos property at Denholm, in Quebec. The capital is \$200,000, and the officers are: Herman Schalk, president; Otto H. Heinz, vice-president; Fred. C. Preisel, secretary; John L. Armitage, treasurer.

Jeffrey Asbestos Mine.—This mine, which has been owned and worked for some time by Mr. W. H. Jeffrey, of Richmond, will soon, according to the Canadian "Mining Review," be transferred to a joint stock company, with a capital of \$350,000. The mine has been profitable, but the owner desires to withdraw on account of his increasing age. The property includes 75 acres, and as much as 1,500 tons nearly has been taken out.

SOUTH AFRICA,

Matabeleland.

A dispatch from Cape Town says that although reefs of gold are visible near Bulawayo, now in possession of the forces of the British South Africa Company, no prospecting is allowed.

SUMATRA.

The Royal Netherlands India Petroleum Company of Sumatra is at present producing about 1,600 cases of refined oil daily, from three wells only.

VICTORIA.

The total yield of gold in the Ballarat district for the quarter ending December 30th was 23,957 oz., an increase of 1,320 oz. over the preceding quarter. The number of men employed in this district is about 2,700.

The deepest mines in this colony are now Bendigo, 2,500 ft.; Ballarat, 1,700 ft.; Stewell, 1,600 ft.; Edgerton, 1,400 ft.; Maldon, 1,000 ft.; Daylesford, 900 ft.

Star of the East Gold Mining Company.—At the half-yearly meeting of the stockholders of this company, which has been for several years the leading gold producer in the Ballarat district, it was stated that 25,450 tons of quartz had been crushed during the half year, yielding, inclusive of pyrites, 12,900 oz., an equivalent standard weight of 13,769 oz., realizing to the company £49,939. There was available for future proceedings £2,354; £22,800, representing 19s. per share, had been appropriated to dividend account, making the total amount £260,400, equivalent to £10 17s. per share.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 15.

Statement of shipments of anthracite coal (approximated for week ending December 9th, 1893, compared with the corresponding period last year:

	1893.	1892.	Difference.
	Tons.	Tons.	
Wyoming region.....	404,999	436,552	Dec. 31,553
Lehigh region.....	117,532	132,797	Dec. 15,265
Schuylkill region.....	197,983	252,242	Dec. 54,259
Totals.....	720,514	821,591	Dec. 101,077

Total for year to date., 40,577,377 39,460,833 Inc. 1,116,544

	1893.		1892.	
	Week.	Year.	Week.	Year.
Shipped West:				
Pittsburg, Pa.....	29,721	1,154,101	1,200,885	
Westmoreland, Pa.....	30,461	1,721,540	1,614,384	
Monongahela, Pa.....	15,009	661,589	629,419	
Totals.....	75,191	3,537,230	3,514,428	

Grand totals..... 433,119 21,317,824 20,067,499

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending December 9th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 58,750 tons; year, 3,705,105 tons; to corresponding date in 1892, 5,106,704 tons.

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs. for week ending December 9th, and year from January 1st:

	1893.		1892.	
	Week.	Year.	Week.	Year.
Shipped East and North:				
Phila. & Erie R. R.....	852	71,576	90,753	
Cumberland, Md.....	70,628	3,934,394	3,623,238	
Barclay, Pa.....	417	42,790	64,150	
Broad Top, Pa.....	10,567	541,016	608,615	
Clearfield, Pa.....	30,652	3,614,784	3,783,104	
Allegheny, Pa.....	38,213	1,188,751	1,242,433	
Beech Creek, Pa.....	42,121	2,578,214	2,121,128	
Pocahontas Flat Top.....	54,732	2,716,925	2,507,803	
Kanawha, W. Va.....	62,721	3,075,141	2,541,757	
Totals.....	360,928	17,779,594	16,556,071	

Anthracite.

A repetition of our last week's review of the anthracite trade would be a fair report of the market for the present week. Nothing new has occurred to cause a modification of any of the statements we made then. No new features have developed, and altogether the trade is practically in the same condition that it was a week ago.

The market during the past week has been essentially a "weather" market, going up or down as the mercury in the thermometers hereabouts rises or falls. Stocks in dealers' hands are far from heavy, but as their customers are buying from hand-to-mouth, they are obliged to pursue a similar policy in placing their orders with the operators. For this reason the advent of cold weather, such as we have had during the week, has an almost immediate effect on the trade, stimulating buying. So far, although the cool weather has been here but a few days, trade has been brisker. There is a marked scarcity of pea and buckwheat, both of which sizes are firm in prices and in good demand. Many of the companies, in view of this scarcity, are accepting orders only with the clause "subject to delay" in the contracts. Chestnut is also in demand and scarce, and during the week some of the companies have been obliged, in order to meet their contracts, to buy this size from other companies which had some to spare.

Considerable difficulty is still experienced in the Lehigh Valley coal shipments. The result of the three-weeks' tie-up during the strike and the resumption of operations at the collieries has been a blockade on its line, which extends from Perth Amboy almost continuously to the mines. Some headway is being made in the work of relieving this, but at the present writing the Lehigh Valley Coal Company, as well as the individual operators, are suffering great inconvenience. One of the most important of the independent operators is practi-

cally out of the market and has, to our knowledge, been obliged to refuse several spot orders owing to his inability to deliver the coal when wanted.

The Reading official circular rates, subject to the usual commissions, are as follows, f. o. b. at its New York harbor shipping ports:

	Broken.	Egg.	Stove.	Chestnut
Hard white ash.....	\$4.00	\$1.25	\$1.60	\$4.60
Free white ash.....	3.90	1.15	1.60	4.60
Sbanokin.....	4.50	4.80	4.60	
Schuykill red ash.....	4.50	4.95	4.75	
Lykens Valley.....	5.15	5.80	6.25	5.50

Pea, \$2.75@3; No. 1 Buckwheat, \$2@2.25; No. 2 Buckwheat, \$1.75@2.

NOTES OF THE WEEK.

We understand that there are at present 11 collieries of the Lehigh & Wilkes-Barre Coal Company, running four days each week in the Wilkes-Barre district. The company employs 10,000 men and boys, and the product now being shipped is over 12,000 tons a day. This coal is shipped over the Central Railroad of New Jersey. The company is spending considerable money on permanent improvements, and has recently placed at the Nottingham colliery, at Plymouth, one of the largest air compressing plants in the world.

A press dispatch from Wilkes-Barre, Pa., says that all the Lehigh Valley Coal Company collieries in that region started up work on December 11th, and many of the individual operators along the line of the Lehigh Valley Railroad are also busy mining and shipping coal. The Lehigh & Wilkes-Barre Coal Company issued orders to its men on the same date to work on full time thereafter.

Bituminous.

Compared with last week the bituminous coal trade is slightly better. What business is doing is still doing this side of Cape Cod, as very little trade is done now on contract; almost entirely it is transient trade. Most of the shipments continue to be made from the upper ports.

The Chesapeake & Ohio Canal closed officially on December 9th, with a tonnage for the year of 350,000 tons. The water will be left in some of the locks for the convenience of local concerns. This closes for the season Georgetown and Alexandria, if, indeed, they can be considered as having been opened, so little trade having been done from them coastwise.

Some South American business is still being done. We hear of several orders which were placed during the week. This trade comes at this time on account of the desire of vesselowners to seek the less severe weather of lower latitudes and their willingness to accept lower freights than earlier in the season.

Vessels are in fair supply, and rates are fairly maintained, excepting in sporadic cases, where vessels are desirous of getting home to tie-up for the winter. This tying-up of vessels for the winter will henceforth have to be taken into account in the rate market. All-rail business continues good. We quote ocean freight rates as follows from Philadelphia: To Boston, Salem and Wareham, \$1; Providence, New Bedford, New Haven, Bridgeport and Allyn's Point, 90c.; Portland, \$1@1.05; Portsmouth, \$1.05; Lynn, \$1.10@1.25; Newburyport, \$1.15; Bath, \$1.05@1.10. From Baltimore, Newport News and Norfolk rates are 10c. higher.

To the following Southern ports rates from Philadelphia are: Jacksonville, \$1.25; Savannah, Fernandina and Port Royal, \$1. The "American Coal Trade League," an offshoot of the old Seaboard Steam Coal Association is organized for a quiet defensive and offensive campaign. This is the result of the recent meeting at Philadelphia, which was exclusively announced at the time in this column.

NOTES OF THE WEEK.

A press dispatch from Pittsburg, Pa., says that the trouble that has been brewing for some time over the price of mining remains unsettled and a strike is believed inevitable. The biggest meeting ever held by the railroad coal operators of the Pittsburg district was held this week and after three hours spent in wrangling, an adjournment was made without any action being taken. The disagreement means that operators will run their mines at prices to suit themselves. The action of this meeting can only have one result and that is that the miners will either strike or submit to a reduction ranging anywhere from 19 to 25 cents a ton. The miners employed at W. P. Rend's mines have adopted resolutions condemning the other miners for changing the base from 79 to 65 cents. Henry Floorsheim has notified his Nottingham miners to vacate his houses within 10 days.

Boston.

Dec. 14.

(From our Special Correspondent.)

There has been no appreciable improvement in the anthracite coal market this week. The weather has been both cold and stormy, and a good layer of snow is on the ground, but the benefits have only been felt by the retailers so far. If this weather keeps on, however, retailers will be forced to replenish, as their stocks are rather light for this time of year. The fact that the mining companies' stocks of hard coal are large is well known here, and it tends to make buyers independent and take life out of prices.

The prices quoted here are, net New York: Stove, \$4.45; Egg, \$4; free broken, \$3.75; chest-

nut, \$4.45. Individual white ash coals can be had for the following prices: Stove, \$4.25; egg, \$3.85; free broken, \$3.75; chestnut, \$4.25; Lykens Valley (at Philadelphia) broken, \$4.90; egg, \$5.55; stove, \$6; and chestnut, \$5.25.

There is very little new business doing in bituminous coal. There are shipments being made on old contracts to those mills that want stocks before the winter is too far upon us. Prices here are: Cumberland, \$3.80; New River and Pocahontas, \$3.80; Clearfield, \$3.50.

The Vesselowners Association, which controls freight rates to New England, changed their New York schedule to 70@75c., instead of 75c., as formerly. Rates now are: From New York, 70@75c.; from Philadelphia and Hampton roads, \$1; from Baltimore, \$1.10; to Sound points, from 10 to 15c. per ton less. The extra 5c. is due to the bad weather vessels are liable to encounter rounding the cape.

The retail trade is brisk and prices are very firm in consequence. Prices in Boston market are: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.75; Lehigh egg, \$6.25; Lehigh furnace, \$6; soft coal, \$4.25.

Buffalo.

Dec. 14.

(From our Special Correspondent.)

Navigation has closed at this port; the last arrivals were reported on Tuesday last. Several vessels have coal on board that did not leave Buffalo in consequence of the severe weather.

The anthracite coal trade shows an increased local demand and that orders from near by points continue to be filled. Prices unchanged. Stocks ample. The bituminous coal business fairly good and market steady. Manufacturers unsettled in their notions of enlarging production. Money is now quite plenty at the banks, but yet the bankers say that "there is no material change in the situation."

The bituminous coal shipments from Lake Erie ports (exclusive of Buffalo and Erie) for the season of 1893 aggregated 3,303,594 net tons, divided as follows: From Toledo, 987,149; Cleveland, 943,131; Lorain, 513,268; Huron, 231,447; Ashtabula, 228,000; Fairport, 208,014; Sandusky, 169,000; Connecticut, 23,185 net tons.

The estimated appropriation for the completion of Buffalo harbor for the next fiscal year submitted to Congress is \$146,223.

There are no incidents of importance to relate.

Chicago.

Dec. 13.

(From our Special Correspondent.)

There is just the slightest sign of improvement noticed here, this being on account of the continued cold weather. November statistics showed a great falling off from the same month last year, but December promises even a worse comparison.

The rates on coal by lake for the 196 business days of the season have been: Buffalo to Chicago, per ton, 45.94c.; Buffalo to Duluth, per ton, 29.163c. Lake shipments have now almost ceased.

Country orders are coming in more freely than before and each week ought to add its quota of increase from now on. Retail trade here has assumed almost its usual activity and large amounts of coal are being delivered throughout the city. It is stated that the all-rail anthracite coal business to and via Chicago during October and November has been in excess of any similar month in the history of the market, but the main part of it was consigned to customers in the country. Prices are still being shaded 25 cents on anthracite and 35 cents on bituminous. Anthracite prices are: Lehigh lump, \$6.25; large egg, \$5.85; small egg, range and chestnut, \$6.10; retail prices per ton are: Large egg, \$6.75; small egg, range and chestnut, \$7@7.25.

Bituminous coal trade continues to improve, taking the statistics of tonnage coming into the market. A steady increase is noted in the demand from the Northwest, the call being mainly for Illinois and Indiana coals, though others receive fair attention. Prices of bituminous coal per ton of 2,000 lbs. f. o. b. Chicago, are: Youghiogheny, \$3.40; Pittsburg, \$3.35; Hoeking Valley, \$3.10; Brazil Block, \$2.70; Illinois lump, \$2; Indiana lump, \$2. Coke continues to improve, but with very slow progress. Connellsville operators are holding firmly to \$4.40; crushed, \$4.50; West Virginia foundry is quoted at \$4; furnace, \$3.90; New River foundry, \$4.40; Walston furnace, \$4.10; foundry, \$4.35.

Pittsburg.

Dec. 14.

(From our Special Correspondent.)

Coal.—The boats that left in the late rise, after landing their tows at Cincinnati and other points, started back with empties; the first arrived on Sunday, the balance will arrive before the close of the week. The empties are forwarded to the ports to be loaded as soon as the miners decide to go to work. There is plenty of coal loaded to go as soon as there is sufficient water. Never in the history of the coal mining industry has there existed such a demoralized state of affairs as confronts both the employer and employee to-day.

Although meeting after meeting has been held have tried to effect a settlement, yet all efforts and representatives on both sides of the question have been in vain, so that now the break is even wider than ever before. The miners at Brown's coal works, at Boston, on the Youghiogheny, have struck for an advance in the price of mining. The

men have been getting 2 1/4c. and want 2 1/2c.; the company refused; the men struck. About 400 men are affected.

Connellsville Coke.—A manufacturer says the business is satisfactory, and the president of the McClure Coke Company, says there is no war being waged among the coke operators. Operators are getting as much as they can for coke and the best of feeling exists among producers. Prices of coke are low, but everything else is low. The coke business is good, however, and we are producing nearly as much as at this time last year. The cost of production is somewhat lower. The shipments for the week aggregated 77,620 tons; previous week, 69,300 tons. Shipment as follows: To Pittsburg, 1,640 cars; to points east, 1,100 cars; to points west, 1,350 cars; total, 4,090 cars. Western shipments increased 50 cars; Eastern, 200 cars; Pittsburg decreased 10 cars; net increase, 240 cars.

Price of Coke.—Prices are too uncertain to quote, showing too wide a range. H. C. Frick Coke Company quotes 72 from Foundry coke at ovens, \$1.45; and crushed coke at \$1.75; add 70c. per ton freight to Pittsburg.

Furnace coke is quoted all the way from \$1 at coke ovens, to \$1.25. From all we can learn a fair price would be \$1.10@1.20 per ton.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 15, 1893.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending				From Jan., '92.	From Jan., '93.
	Dec. 16, 1892.	Dec. 15, 1893.	F'ces.	Tons.		
Anthracite.	71	31,046	35	16,410	1,651,188	1,348,321
Coke.....	136	131,405	59	60,507	6,618,219	6,223,162
Charcoal...	44	9,705	25	5,170	512,472	379,586
Totals....	251	172,156	119	82,117	8,782,279	7,961,069

Pig Iron.—Whatever may be the situation in other centers, the iron market here continues in the same dull and featureless condition which we have reported for many weary weeks. Especially during the past week has trade been dull and orders few. The production of pig iron, of late, has been increasing somewhat and stocks are no greater than they were a month ago, so that it is evident that more iron has gone, and is going into consumption at present, than was the case a month ago. However this increase is due more to the greater activity among the steel works in the West than to a better condition of business among foundrymen in the East. In this vicinity we do not note any improvement in the pig iron market. December, for a number of well-known reasons, is always a dull month, and this year it has not been an exception. Consumers will commence business in 1894 with lighter stocks of iron on hand than in former years, and it is owing to this that many pig iron dealers anticipate a good volume of business in January. There is still a good deal of talk concerning the Wilson Tariff Bill; it is claimed that the uncertainty as to the final form of the bill and the time of its passage prevents manufacturers from forming definite plans for the conduct of their business during the coming year.

Prices are absolutely unchanged. In regard to the advance of 50c. per ton announced by a prominent Southern company a short time ago, it may be said that practically it was made only on paper. The company in question has no iron to sell at that or at any other price. It disposed of a large lot at low prices to speculators; being thus provided for, it "raised" prices 50c. a ton. On the other hand, values are no lower and prices no weaker than they have ruled for some time past. Representatives of furnaces making standard brands assure us that they are not selling below the prices which they have quoted for weeks.

The tidewater prices of the Thomas Iron Company are as follows: No. 1, \$14.50 per ton; No. 2, \$13.50; No. 3 or No. 2 plain, \$12.75. For regular brands we quote as follows: Northern brands: No. 1, \$13.75@14.25; No. 2, \$12.50; gray forge, \$12. For Southern iron we quote: No. 1, \$13@13.75; No. 2 F., \$12@12.50; No. 1 soft F., \$12@13; gray forge, \$11@12—all at tidewater. Scotch irons are quoted: Coltness, \$21.50@22; Eglington, \$19.50@20; Summerlee, \$20.50@21.

Billets and Rods.—We do not hear of any business worthy of mention doing in this market; it continues dull, and prices still rule low. Our Pittsburg reports speak of \$16.75 as a price realized for a large order. Quotations are nominally as follows: Domestic billets, \$19@20; foreign billets, \$28@29, tidewater. Wire rods, domestic, \$28@29; foreign, \$39@40, tidewater.

Manufactured Iron and Steel.—Prices of manufactured iron and steel are low, and what business is doing here, which is little, is done at low figures. We quote nominally as follows: Angles, 1'60@1'80c.; axles, scrap, 1'75@2c. delivered; steel, 1'75@2c.; bars, common, 1'40@1'50c.; refined, 1'50@1'85c. on dock; beams, up to 15 in., 1'70@2c.; 20 in., 1'90@2'25c.; car truck channels, 2@2'10c.; channels, 1'70@2c. on dock; steel hoops, 1'75@1'9c. delivered; links and pins, 1'70@1'80c.; plates, flange, 2@2'10c.; firebox, 2'3@2'8c.; flange, 2'10@2'25c.; marine, 2'50@2'75c.; sheared, 1'8c.; shell, 1'65@1'95c.; tank, 1'50@1'70c.; universal mill, 1'50@1'75c.; tees, 1'85@2c., all on dock.

Merchant Steel.—During the past fortnight the volume of business in merchant steel has been slightly greater. Prices continue low. We quote: Tool steel, \$6.25@6.50; tire steel, \$1.90@2; toe calk, \$2.10@2.20; Bessemer machinery, \$2@2.10; open hearth machinery, \$2.10@2.20; open hearth carriage spring, \$2@2.10; crucible spring, \$2@2.10.

Old Material.—No business is reported in this market. Nominal quotations are as follows: Old iron rails, \$12@13; No. 1 wrought scrap at \$9.50@10, both delivered to vessels at this port. Other quotations are as follows: Old steel rails, \$8@10; old wrought tubes and pipe, \$7.50@8.50; wrought turnings at \$9@9.25 delivered at mill.

Rail Fastenings.—This market continues very quiet. Quotations are nominally: Fish and angle plates, 1'30@1'50c. at mill; spikes, 1'75@1'90c.; bolts and square nuts, 2'15@2'40c.; hexagonal nuts, 2'30@2'50c., delivered.

Steel Rails.—The price for steel rails is \$24.80 at tidewater. The only event of importance in the rail market during the week was the Pennsylvania Railroad Company's order for 43,000 tons for delivery in 1894. Of this lot, 36,000 tons were placed with the Carnegie, Cambria and Pennsylvania steel companies, and 7,000 tons with the Illinois Steel Company, at \$24 and \$25 respectively. The railroad company is placing new rails only where they are absolutely required, and few of them are going outside of the main line of the division. Most of the new rails, we are informed, will be 85-lbs. Last year this company ordered 2,000 tons of 100-lb. rails, which were laid at various sections of the road to be experimented with. This year none of this class has been ordered and, in all probability, none will be. The shut-down ordered in the rail department of the Steelton works of the Pennsylvania Steel Company for December 23d will not be affected by this new order. The works will be closed indefinitely just the same. This confirms the news published in this column last week to the effect that the "combine" had pledged the Pennsylvania Steel Company not to roll any standard section rails next year, for which the company is to receive \$80,000. At least, that is what the arrangement amounts to.

NOTES OF THE WEEK.

A late press dispatch from Appleton, Wis., states that Mr. Andrew Carnegie has made two propositions to Mr. Welcome Hyde of that city for the purchase of his one-half interest in the Pewabic iron mines of Dickenson County, Mich. One was to pay Hyde \$800,000 in cash for his interest. The other was to take the 25 year lease, agreeing to take out 500,000 tons of ore each year and pay a royalty of 10c. a ton. Mr. Carnegie at present owns half the mine. Mr. Hyde will go to Pittsburgh next week to close the deal. These rumors may be subject to discount.

The court on December 14th made an order discharging the receivers of the Belleville Steel Company, at Belleville, Ill., and directing the property turned over to the Valley Steel Company, a new organization with \$400,000 capital stock. The works, which employ some 600 men, are to be started up January 1st.

Buffalo. Dec. 14.

(Special Report of Rogers, Brown & Co.)

The past week in this market has been sufficiently dull to serve as an object lesson for almost anybody. Business in pig iron could not show much less life. There are hopes for something better, as it is hard to believe it can be worse. We quote for cash f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, \$13.25; No. 2 X foundry strong coke iron, Lake Superior ore, \$12.75; Ohio strong softener No. 1, \$13.25; Ohio strong softener No. 2, \$12.75; Jackson County silvery No. 1, \$16.80@17.30; Jackson County silvery No. 2, \$16.30@16.80; Lake Superior charcoal, \$15.75; Tennessee charcoal, \$15.75; Southern soft No. 1, \$12.75; Alabama car wheel, \$16.50@17.50; Hanging Rock charcoal, \$18.50@20.

Chicago. Dec. 13.

(From our Special Correspondent.)

Dullness is still the ruling feature of this market and dullness is likely to be the ruling feature throughout the remainder of this winter. Numerous inquiries for medium-sized orders have been received, but little or no business has resulted therefrom. The Southern coke furnaces have stiffened in price on all grades, and this has affected what little business there was going in this market by almost cutting it off, the reverse of this being expected.

An addition to the East Chicago Steel & Iron Works at Valparaiso, Ill., is now being built. This, when completed, will give employment to 250 men. The average freight rates paid on iron ore by lake for the 196 business days of the season was: Duluth to Lake Erie ports, per ton, 77'297c.; Escanaba to Lake Erie ports, 56 164c.

Pig Iron.—The run of small orders continues. With a few houses the aggregate tonnage of the past week has amounted to considerably more than for a long time. One firm reports sales of 2,500 tons Northern coke irons. There is but a slight demand for Southern coke iron. There has been a tendency to shade prices on large inquiries, but no business has resulted therefrom. Quotations are unchanged, which are per gross ton f. o. b. Chicago: Southern coke, foundry, No. 1, \$13.65; No. 2,

\$12.15; No. 3, \$11.65. Southern coke, foundry, soft, No. 1, \$12.40; No. 2, \$11.65; Lake Superior charcoal, \$15.50@16.00. Lake Superior coke No. 1, \$13.50; No. 2, \$12.25@12.50; No. 3, \$12.00@12.25. Lake Superior Bessemer, \$14; Lake Superior Scotch, \$13.75@14.25; American Scotch, \$15.50@16. Ohio silvers No. 1, \$16.50; No. 2, \$16. Ohio strong softeners No. 1, \$16.25; No. 2, \$15.75; Tennessee charcoal No. 1, \$16.50; No. 2, \$16. Standard Southern car wheel, \$18.25@18.75.

Structural Iron and Steel.—Probably 5,000 tons will be the amount needed for the proposed new Milwaukee viaduct. Many expect that when bids are asked for same the market price will change materially. Present quotations are, car lots, f. o. b. Chicago: Angles, \$1.70@1.80; tees, \$1.95@2.05; universal plates, \$1.70@1.80; sheared plates, \$1.70@1.80; beams and channels, \$1.75@1.85.

Plates.—Business in plates continues very quiet. The boiler makers complain of very little work being offered. Prices are: Flange steel, 2'40@2'60c.; best firebox steel, 4'00@4'50c.; tank steel, 1'70@1'80c.; shell steel, 2'15@2'35c.; iron or steel sheets from No. 10 to 14, 2'10@2'25c.

Merchant Steel.—Manufacturers are placing specifications to a limited extent for their current wants. There is no general improvement in the situation. Tool steel remains inactive owing to the short hours adopted by many of the leading factories. Quotations are: Smooth finished machinery steel, 2'10@2'30c.; open hearth tire steel, 1'90@2'10c.; ordinary Bessemer bars, 1'65@1'75c.; toe calks, 2'20@2'30c.; ordinary tool steel, 6'50@7'00c.; special hand tool steel, 1'2@2'0c.; crucible spring, 3'50@3'75c.

Galvanized Sheet Iron.—But little business in warehouse or mill trade is noted. Discounts are steady at 70, 10 and 5% off on Juniata, and 70 and 10% on charcoal. Jobbing quantities at 70 and 7% on the former, and 10% off on the latter.

Black Sheet Iron.—The same conditions prevail as have characterized the market here for some time, viz., hardly any movement. Consequently a dullness that is aggravating in the extreme. Prices are: No. 27 common, 2'75c.; jobbers quote 2'95@3c. for same grade of iron; steel sheets remain same as last week, 10c. higher per 100 lbs.

Bar Iron.—The element of doubt and uncertainty still exists here. A slight disposition on the part of the jobbers to feel the market, though, may soon lead to good results, but nobody is looking for a change for the better until the middle of January. What few orders that are now coming in are mainly specifications to apply on contracts that have been made some time ago. Regular quotations are: 1'30@1'40c. for iron, and 1'50@1'70c. for iron and steel bars.

Billets.—Nothing new to record during past week. New business is exceedingly light. No call for rods, the quotation being nominal at \$27.

Steel Rails.—The Illinois Steel Company has been given a contract to furnish the Pennsylvania Company 7,000 tons at \$24. Outside of that small lots still hold sway, and the aggregate of them are very limited at \$27@29.

Scrap.—A little more vigor is noticeable on account of several mills starting up. Prices are: Railroad, \$10.75; No. 1 forge, \$10; cast borings, \$4.50; wrought turnings, \$6.50; axle turnings, \$3; leaf steel, \$14.50; mixed steel, \$7; tires, \$12.50; iron axles, \$14.50@15.50.

Nails.—In wire nails but small mill trade is being done, while jobbers report light business at \$1.35 from stock. The H. P. Nail Works at Cleveland will be closed entirely by the end of this week on account of lack of orders. In steel cut nails a good run of small orders is noticed, prices being \$1.15@1.25. Small lots from stock are quoted \$1.25@1.35.

Old Rails and Wheels.—One large order of 2,000 tons is said to have been received. Old steel rails remain inactive at \$7.50@10.00; car wheels are quoted \$9.75@11, though these prices are being shaded on large inquiries.

Philadelphia. Dec. 14.

(From our Special Correspondent.)

Pig Iron.—Another week has passed without any improvement worth speaking of in crude iron. Brokers have made quotations on a few small lots of foundry, and an inquiry or two has been made for 200 ton lots of forge; but there will be very little business done until after the new year opens. While foundrymen admit that there is more danger of an advance than of a decline, they cannot be induced to buy. The outlook for January is bright enough, if opinions expressed are correct. The increased production of iron would go to show more confidence on the part of producers at least. Mill owners have, so far, failed to secure orders for the winter, and are, therefore, not willing to buy in advance, because so much iron is being offered to them every day. Quotations are given at \$14.25 for a few standard brands. Anything under \$12 is not sought after by mill men.

Steel Billets.—In this branch of trade there is very little news, excepting that which comes from Western markets. Quotations are about \$19.50@20. Manufacturers are vainly endeavoring to gather in some business before January.

Merchant Iron.—Western iron has come this way this week, and that accounts for the decreased inquiry in this market. Almost every large buyer

of merchant iron is solicited to buy Western iron, and at prices which our people do not care to meet. Ordinary quotations are 1'45c.@1'55c.

Nails.—The only movement in nails is of a speculative character, but the nature of these transactions cannot be learned. A few large purchases have been made by parties who will hold the stock in anticipation of an advance in prices in the spring.

Sheet Iron.—The mill men have no news whatever to give, but storekeepers report a little activity among the retailers who are in need of assortments.

Skelp Iron.—Some work is looming up in this direction, but not enough is known about it to give details. The orders, if there are any in sight, will not be placed until January.

Plate and Tank.—Nothing need be expected of an interesting character in this branch of trade for perhaps a month. Some little business has been picked up; but the competition is so close that manufacturers say they would make more money doing nothing. There are three or four parties in the market who are taking quotations, but not with any intention of placing orders just at present.

Structural Material.—The only business which is heard of is in lots ranging from 100 to 200 or 300 tons each. Quotations may as well be omitted, as actual selling prices cannot be had, and quoted rates are well known.

Steel Rails.—The announcement of the Pennsylvania purchase was made a little too late for last week's report. This large transaction of course gives rise to rumors that other companies who order yearly requirements will soon be heard from.

Pittsburg. Dec. 14.

(From our Special Correspondent.)

Raw Iron and Steel.—The situation in the iron and steel trade remains practically unaltered and no material change is looked for during the present month, the various consumers of iron and steel continuing to show great caution in making contracts for any material not absolutely needed to complete orders on hand. The closing weeks of the year are always periods of restricted demand for both crude and finished material.

The transactions in pig iron have been unimportant in character, the low prices at which first-class material has been offered proving no incentive to consumers to make heavy purchases. During the past two months production has shown an increase over the low rate of output in the early fall months, and is now at nearly one half of the rate during periods of active demand. There are indications in some quarters of an increase in stocks in first hands, which is likely to make further progress owing to the declining consumption that will take place between now and the first of the year. The present price of Southern iron is attracting the attention of some who think it low enough to buy for speculation and warrants for 50,000 tons have been purchased.

They may be right, and we should think so from the price, which was \$7@7.50 per ton at furnace for gray forge iron, but we have known this class of buyers to be mistaken in times past.

Prices of mill iron and Bessemer pig have been fairly maintained. Steel billets again break all records by selling 5,000 tons at \$16 75 cash at maker's mill, deliveries to run from January to May. Prices are quoted as below:

Coke Smelted Lake and Native Ore.		Tons.	Cash.
2,500 Bessemer, Dec.	Jan., Feb.	500 Billets, prompt, at mill	17.00
2,000 Bessemer, Dec.	Jan.	Muck Bar.	
2,000 Bessemer, City Furnace	Jan., Feb.	750 Neutral, Dec., Jan.	21.00
1,500 Bessemer, Dec.	Jan., Feb.	500 Neutral, spot	21.10
1,000 Bessemer, Dec.	Jan., Feb.	300 Neutral, prompt	21.00
1,000 Bessemer, Dec.	Jan., Feb.	Skelp Iron.	
1,000 Gray Forge, Dec.	Jan., Feb.	500 Wide grooved	1'32 1/2 4 m.
500 Mill	Jan., Feb.	425 Narrow grooved	1'32 1/2 4 m.
500 Gray Forge	Jan., Feb.	300 Sheared	1'47 1/2 4 m.
500 Gray Forge	Jan., Feb.	Spelter.	
300 Mill	Jan., Feb.	100 Spelter	3.69
200 No. 1 Foundry	Jan., Feb.	100 Spelter	3.71
200 No. 2 Foundry	Jan., Feb.	Steel Wire Rods.	
100 No. 3 Foundry	Jan., Feb.	1,250 5 gauge American at mill	24.85
100 No. 1 Foundry	Jan., Feb.	500 5 gauge American at mill	25.00
100 No. 2 Foundry	Jan., Feb.	Ferro Manganese.	
100 Mill	Jan., Feb.	100 80% Domestic	53.50
100 No. 1 Silvery	Jan., Feb.	50 80% Domestic	52.50
100 No. 2 Silvery	Jan., Feb.	Sheet Bars.	
Charcoal.		400 At maker's mill	\$23.00
100 Cold Blast		Steel Skelp.	
150 No. 2 Foundry		400 Wide grooved	1'20 4 m.
75 No. 1 Foundry		Old Rails.	
50 Cold Blast		500 Iron, Cleveland	14.75
Steel Blooms, Billets and Slabs.		300 Iron, light	14.25
5,000 Billets, Jan., Feb., March, April, May, at mill		300 Steel, mixed lengths	10.70
1,500 Billets and Slabs, next 3 mos. at mill		50 Steel, short pieces	12.25
1,200 Billets and Slabs, Dec., Jan., at mill		Scrap.	
1,000 Billets, Jan., Feb., at mill		300 No. 1 R. R. W. scrap, net	10.00
1,000 Billets, Dec., at mill		150 No. 1 R. R. W. scrap, net	9.50
500 Billets, Dec., Jan., at mill		100 No. 1 R. R. W. scrap, net	9.00
		50 Coil springs, gross	13.50
		50 Leaf springs, gross	15.50

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Dec. 15.

Heavy Chemicals.—There has been no change in the heavy chemical market during the past week. It continues quiet and devoid of features of interest. So far as spot goods are concerned only a hand-to-mouth jobbing business is doing. Considerable has been done for delivery next year, but even that has stopped for the present. Usually, contracting for the following year commences in September; this year people did not begin to place their orders until November, and a lighter volume was done than at the same time in 1892.

Prices are without change of importance.

Quotations are nominally as follows: Caustic soda, 60%, 3.05@3.20c.; 70%, 2.80@3c.; 74%, 2.82½@3.05c.; 76%, 3@3.10c. Carbonated soda ash, 48%, 1.15@1.25c.; 58%, 1.10@1.20c. Alkali, 48%, \$1.10@1.20; 58%, \$1.05@1.15, according to package. Sal soda, English, 1@1.05c.; American, .90@92½c. Bleaching powder, 2.25@2.50c.

Acids.—We do not hear of anything new in this market. Business is quiet and there are no features of interest. Prices show no change of importance. We quote this week: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.75@1.87½; muriatic, 18°, 90c.@1.10; 20°, \$1@1.25; 22°, \$1.10@1.35; nitric, 40°, \$4; 42°, \$4.50@4.75; sulphuric, 75c.@81. Mixed acids, according to mixture, oxalic, \$6.30@6.50. Blue vitriol is quoted all the way from \$3.50 to \$3.75; glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

Brimstone.—There is no change whatever to report of this market which continues quiet. Prices are about as they were last week. We quote, best unmix second: On the spot, \$17.75@18; shipments, \$17.50@17.75. Thirds are 75c. less.

Fertilizing Chemicals.—There has been a slightly better feeling in the fertilizer market this week. The demand for dried blood has improved somewhat and several sales are reported, with the result that this article is firmer in price than last week. On the whole, prices have undergone no change of any importance since our last report. Our quotations this week are: Sulphate of ammonia, on the spot, gas liquor, \$3.35@3.50; bone, \$3.25@3.30. Dried blood, \$2.50@2.55 per unit for high grade, and \$2.30@2.40 for low grade. Azotone, \$2.50@2.60. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 60c. per unit at seller's works in bulk. Dissolved bone-black, 17% to 18%, P₂O₅, 90c. per unit. Acidulated fish scrap, \$15@16, and dried scrap, nominally, \$25 f. o. b. fish factory; wet scrap, \$15 f. o. b. fish factory. Tankage, high grade, \$25.50@26.50; low grade, \$22@22.50. Bone tankage, \$23@24; bone meal, \$24@25.50.

The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12; Philadelphia, \$1.14½; Charleston and Savannah, \$1.17 cwt., basis 48@50%, in 50-ton pots on foreign weights and analyses. Sulphate of potash, 90% 96%, basis, 90%; New York and Boston, \$2.07, Philadelphia, \$2.09½; Charleston and Savannah, \$2.127, sulphate of potash, 96-99%, basis 90%, is 4% higher.

Phosphates.—Quotations are as follows: Land rock, 60% bone phosphate of lime, \$5 f. o. b. vessel Charleston; 62%, \$5.25; river rock, 58%, \$6 all kiln-dried.

Muriate of Potash.—This market continues quiet. Arrivals this week amounted to 900 tons, all of which have gone into consumption. The prices fixed by the syndicate for 1893 are as follows: New York or Boston, \$1.78; Philadelphia, \$1.80½; Southern ports, \$1.83.

Kainit.—Quotations for shipments are as follows: New York, Philadelphia and Boston, \$9 for foreign invoice weight and test, and \$9.25 for actual weight; Charleston, Savannah and Wilmington, \$9.75 for invoice weight and test, and \$10 for actual weight.

Nitrate of Soda.—There is nothing new to report of this market. Quotations continue \$1.77½@1.80 for spot.

LIVERPOOL, Dec. 6.

(Special Correspondence of Joseph P. Brunner & Co.)

There is little change in the position of chemicals since our last report. Soda ash is still scarce for prompt delivery and nominal quotations for Leblanc makes, according to export market, range about as follows: Caustic ash, 48%, £3 15s.@£4 5s. per ton; 57-58%, £4 10s.@£5 per ton net cash. Carb. ash, 48%, £3 15s.@£4 5s. per ton; 58%, £4 10s.@£5 per ton net cash. Ammonia ash, 58%, is scarce and strong at £4 per ton net cash to £4 5s., less 2½% for casks, according to make; bags, 5s. per ton less. Soda crystals are offered at £3 per ton, less 5%, and not much doing. Caustic soda is in small compass for prompt delivery, and nearest range, according to market, is about as follows: 60%, £9@£9 10s.; 70%, £10@£10 10s.; 74%, £11@£11 10s. per ton; 76%, £12@£12 10s. net cash. For parcels under 10 tons, 6s. per ton extra is charged. For January delivery, quotations are about 20s. per ton under spot prices.

Bleaching powder is slow of sale and nominal value ranges from about £8 7s. 6d.@£8 15s. per ton net cash, for hardwood packages, according to holders' views. Chlorate of potash is inactive at about 7½@8d. for prompt delivery. For forward

positions, quotations are: January, or January-March, 7¼d.; January-June, 7½d.; January-December, 7¼d., less 5%.

Bicarb. soda is well maintained at £7 per ton, less 2½% per 1 cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia being still in small compass, is rather dearer at £13 17s. 6d.@£14 per ton for good grey; 24-25% in double bags f. o. b. here, less 2½%.

Nitrate of soda in limited request and £9 10s. per ton, less 2½% is nearest value for export quality in double bags f. o. b. here. Carb. ammonia.—Lump, 3¼d. per lb.; powdered, 3¼d. per lb., less 2½%.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 632, 633 and 634.]

NEW YORK, Friday Evening, Dec. 15.

The past week in the mining stock market has been characterized by the usual dullness and lack of interest. There was no feature whatever and no one stock was in much demand.

The Comstocks were in little request and without improvement as to prices. On the contrary, they have ruled weaker and lower. Consolidated California and Virginia declined from \$3.60 to \$3.20; the total sales were 335. Other sales were as follows: 100 shares of Gould & Curry at \$1.15; 100 shares of Hale & Norcross at 95c.; 100 shares of Yellow Jacket at \$1.20; 100 shares of Best & Belcher at \$2.25; 1,500 shares of Comstock tunnel at 8@9c.; 100 shares of Mexican at \$1.95; and 100 shares of Union Consolidated at \$1.10.

The only California stock to show any sales this week was Brunswick, of which 1,500 shares changed hands at 6@7c. The superintendent of the Brunswick Consolidated Gold Mining Company writes as follows from Grass Valley, under date of December 6th: The ground in the drift is hard and the ledge is small and not looking as well as it did. I think it is only a bar, and that we will soon get through it. In the stope we have a ledge from 12 to 16 in. of good-looking ore. The Brunswick mill started up on December 6th with five stamps. According to the Grass Valley "Tidings," this is merely a test crushing. Should the rock pay well more stamps will be added.

Of the Colorado stock there was a sale of 100 shares of Leadville Consolidated at 14c.

Phoenix of Arizona shows sales of 400 shares at 50@51c.

The Horn Silver Mining Company has made its usual Christmas present to its stockholders in the shape of the regular quarterly dividend of \$50,000, or 12½c. per share, payable December 23d. Few silver mining companies in the United States can boast of such an excellent record as that of the Horn Silver under the present management. At this time, especially, with so many unfavorable conditions to contend against, the good condition of the company's property and of its treasury speak highly for the manner in which the affairs of the company are managed.

NOTES OF THE WEEK.

The Boston & Montana Company reports for November an output of 3,250,000 lbs. of copper.

The Calumet & Hecla Company maintains its dividend rate, having just declared its fourth quarterly dividend of \$5 per share, making a total of \$20 per share for 1893.

In the Murray-Heinze suit regarding the Stella mine, in Montana, in the district court, at Butte, to which reference is made in our mining news columns, the jury on December 15th brought in a unanimous verdict in favor of Mr. Heinze.

BOSTON, Dec. 14.

(From our Special Correspondent.)

The boom in copper stocks was of short duration and prices have receded \$1@3 from the highest of last week, and the market has relapsed into extreme dullness, which will probably continue until after the opening of the new year.

Boston & Montana as usual took the lead in the decline and dropped from \$30½ last week to \$27. The transactions were very small and tend to show that there is no desire to sell the stock to any extent at present prices, while at the same time there is no disposition to load up until the conditions are more favorable.

Butte & Boston declined from \$10 to \$9¼ for large lots, and to \$9 for 10 shares.

Calumet & Hecla was steady at \$300, with later sales, ex-dividend of \$5, at \$296. The company has paid \$20 in dividends the past year and should carry hold at present prices or better the probabilities are that increased dividends may be looked for in the ensuing 12 months.

The rock in the Red Jacket shaft, of which eight carloads have been sent to the mill, is said to be exceedingly rich.

Tamarack was forced up last week to a point which it could not hold, and it dropped from \$165 to \$154 on small sales.

Quincy declined from \$125 to \$120, but recovered the loss and was in fair demand at \$125.

Oseola sold ex-dividend (\$1 per share) at \$30¼, losing the fraction only in the later dealings.

Atlantic declined from \$12 to \$11, with later sales at \$11½ on light transactions.

The purely speculative list was lower, with Centennial selling down from \$4½ to \$3½, later \$3¾, and Kearsage from \$8¾ to \$7¾. Wolverine sold at \$2¾; Tamarack, Jr., at \$19¼ for 10 shares; National at \$1; Allouez, 47½c., and Arnold at 60c.

There was hardly anything doing in the market to-day. Tamarack improved from \$154 to \$100 for 25 shares, and 3 shares sold at \$159.

Centennial sold at \$3¾ for 100 shares, and the balance of the list was neglected.

COLORADO SPRINGS, Dec. 11.

(From our Special Correspondent.)

The approaching completion of the Colorado Midland Terminal branch line between Divide and Midland is causing great satisfaction to the mine-owners of Cripple Creek, as it saves them \$50 a carload on ore shipments.

Sales for the past week amounted to 805,000 shares. Work stock leads with sales of 343,000 shares. Anaconda advanced to 33 with little offering.

The Summit company advanced from 15½ to 18. This property is improving and 60 tons a day of medium grade (\$17@35 a ton) are treated at the company's mill at Beaver Park. The company since December 1st has paid for its 30-stamp mill, hoisting machinery and shaft house.

Isabella stock is lower, but the mine shows up well; ore from the Buena Vista lode runs better and stronger with depth. In the Victor workings the vein has been followed up to the Smuggler's end lines and is rich at that point. Both belong to the Isabella company.

Work has been offered at 3½, with heavy sales. Calumet followed Work in its downward course. The decision in the district court was construed as not favorable to the company and no apparent signs are visible of an immediate resumption of work on the property.

At the Zenobia mine, on Bull Mountain, a new shaft house and ore bias of improved pattern have just been completed. Work will be carried on all winter. Lemhi, of Idaho, is lower. Consulting Engineer A. J. Bowie recommends building a ditch from the Lemhi River at a cost of \$250,000 for a full supply of water. With this water Mr. Bowie estimates he can wash annually 3,000,000 yds. of dirt which will average 15 cents per yard. This large sum of money, if raised, will have to be on a first mortgage on the property.

Mollie Gibson has sold lower than usual. This company owns 65 acres in the heart of the Aspen district, but not more than 5 acres have been opened. From the 2d, 3d, 4th and 5th levels phenomenal high-grade ore has been taken which has produced, including the December dividend of \$50,000, a total of \$3,930,000 in dividends since April, 1891. The resources of this portion of the mine are by no means exhausted. From about midway between the 5th and 6th levels to between the 7th and 8th the formation has been faulted, and the ground considerably broken, and the ore is in detached and disconnected bodies. Exploitation and study have solved the extent of the fault and its general characteristics. About midway between the 7th and 8th levels the formation returns to its regular order as above the 5th, and without reasonable question contains the same rich ore chute on its downward dip. To the south and west of the Gibson property and joining the same lie the claims of the Argentum-Juniata Mining Company, and north and east the Smuggler company. Both these properties are believed to have bodies of ore on the same contact, a portion of which the Gibson has explored. The Gibson has 2,500 ft. of the main contact within its own boundaries, of which only 500 ft. on the strike of the contact have been partially explored above the 7th level and not at all below, excepting that the shaft has been sunk to the 10th level.

SAN FRANCISCO, Dec. 8.

(From our Special Correspondent.)

Speculation in the mining market during the past week has not been so rife as during the month of November. There have been spasms of activity and on each occasion, when exceptional strength has developed there has been a setback that has weakened the market. At the same time the fluctuations in prices have been sufficiently wide to allow good profits to those who were lucky enough to call the turn.

While there has been no news of exceptional importance from the Comstock, much interesting work is being done there. Ore from the Yellow Jacket find has assayed as high as \$2,800, and as the vein has widened out there is no telling what developments may reveal.

In the Savage mine, too, a good showing is being made—for the ring; and the profits during the past few months must have been satisfactory to the clique. In Hale & Norcross also affairs are working smoothly on the robbery basis, and altogether while there is no Comstock news tending to satisfy investors, there is quite enough to once again prove that the entire system of mining and milling at Virginia City is a fraud. Meantime stocks are peddled out and the public gaze is fixed on a moribund market that is occasionally galvanized into life for a purpose.

Consolidated California & Virginia sold steady to-day at \$3.75, much the same as the ruling rate

a week ago. Ophir sold for \$1.75; Mexican for \$1.15; Sierra Nevada for \$1.45; and Union Consolidated for \$1.05.

Best & Belcher sold a week ago for \$2.50; and after varying fortunes during the week, sold to-day for \$2.35, with small sales. Chollar sold for 65c.; Gould & Curry for \$1.20; Hale & Norcross for 90c.; Potosi for 65c.—a decline of 30c. on the week's trading, and Savage for 70c.

Of the Gold Hill stocks Yellow Jacket has been the only one showing any signs of decided activity. The sales have been fairly large and to-day the stock sold for \$1.20. Belcher has sold fairly well at 90c.; Confidence at \$1.40; Crown Point at 80c.; Overman at 35c.; Seg. Belcher at 15c.; and Kentuck at 15c.

At the close the market displayed a weak tendency, most sales being made at a trifle off ruling rates.

San Francisco, Dec. 14 (By telegraph).—Opening quotations to-day are as follows: Best & Belcher, \$2.30; Bodie, 25c.; Bulwer, 50c.; Chollar, 45c.; Consolidated California & Virginia, \$3.55; Gould & Curry, \$1; Hale & Norcross, 70c.; Mexican, \$1.05; Mono, 10c.; Navajo, 10c.; Ophir, \$1.65; Savage, 55c.; Sierra Nevada, \$1.35; Union Consolidated, \$1; Yellow Jacket, 80c.

London. Dec. 5.

(From our Special Correspondent.)

During the last few days there has been quite a revival in mining investment and all classes of stock have received more attention than for two months past. Americans amongst the rest have worked up to a little more life than they have been accustomed to lately, though the business has been confined chiefly to the dividend-paying mines. Good investment stocks like Alaska-Treadwell, De Lamar, Poorman and Jay Hawk have all been dealt in and the increased inquiry has hardened the prices. The greater inquiry for Elkhorns has brought out sellers who proved rather weak and allowed the price to drop 6d. or so.

Harquattala stock has fluctuated pretty violently from day to day. Holders do not know exactly what position they are in and consequently they get into a panic and sell at a low price. The official news about the mine is very contradictory and the rumors put abroad by interested parties are also of a variegated nature. It will be remembered that until a fortnight ago, this new company was going excellently, and after only three or four months' existence a dividend was declared. However, a cable was received a fortnight ago from the chairman, who is visiting the mine, saying that the

mill and mine would have to be closed for three months, from December 1st, until a new shaft was sunk, a work necessitated by the unsafe state of the present shaft. This cable caused the stock to go down 40%. Since then, however, more reassuring news has been circulated, to the effect that the new shaft will be 200 ft. deep and that 50 ft. of this had been completed by the middle of November. In all probability it will be finished by the middle of January. The report issued when the company was floated said nothing about a faulty shaft, but that the property was well equipped in every way. In consequence of this difference in reports and opinions, the stock is in an uncertain state.

There has been quite a revival in New Montana stock, caused by the receipt of hopeful telegrams about a new discovery. December 2d a cable was received that the Castletown cross-cut, on No. 3 level, near No. 1 shaft, had encountered a fine body of ore, 54 ft. from the stope. The distance to the hanging wall is 14 ft. and the hanging wall is well defined. The ore in the drift has an average assay of \$50 a ton, half gold. This message has had quite an enlivening effect on the stock and plenty of buyers have come forward to secure shares at the present extremely low price. The consequence of this has been that the price has gone up from 1s. to 2s. a week ago to 4s. @ 5s. to-day. Whether this rise is justified and whether buyers at that price will ever get any dividend is very problematical, considering the great capital of the company. At any rate holders who have sold out to-day have made a nice little profit.

Springdale Gold.—The Denver company working a telluride of gold property in Boulder County, Colo., announces an interim dividend of 4% on the three months ending November 30th.

The engineer of the Holcomb Valley alluvial mine cables to the effect that the new pipe line will be ready for work December 6th. The Bucyrus plant is all in order and has treated 140 cu. yds. in 165 minutes, yielding \$75. This stock has been neglected during the last week or two, and we do not hear of any transactions or recent quotations. The Idaho company, as reported a few weeks ago, has been reconstructed under the name of the Idaho Exploring Company, and the intention was to sell the present property, the working of which was rendered hopeless by the fall in silver, and look out for a new property. The directors now state that they will be able to sell the mill, etc., for £8,000. This and the assessment on the new shares (each of a nominal value of 5s., with 4s. Sd. paid) will place £15,000 at the

disposal of the directors. It is proposed to acquire a Mexican gold property called La Republica, in the gold-bearing district of Sierra de Talpapa, in the State of Jalisco. This mine is reported to contain true fissure veins, of a width of from 7 to 10 ft., and it is stated that in several cases these veins can be traced for a distance of 6,000 ft. The outcroppings show for a distance of about six miles, ore that would yield \$10 a ton. All the ore taken from the mine is said to be free-milling. Mr. Bernard C. Flatt has reported favorably on the property. It is at present in the hands of natives who have been using primitive appliances, and who are ready to sell it for shares in a company that will put in modern machinery. The company is also negotiating for another Mexican property.

DIVIDENDS.

Bald Butte Mining Company paid a dividend of 2%, \$5,000, at the office of the company in Helena, Mont., December 4th.

Calumet & Hecla Mining Company's dividend of \$5 per share, \$500,000 payable December 23d at the office of the company in Boston, Mass. Transfer books close December 12th.

Horn Silver Mining Company, dividend No. — of 12½c. per share, \$50,000 payable December 23d at the office of the company, No. 56 Broadway, New York City. Transfer books close December 15th and reopen December 26th.

Maryland Coal Company dividend of 2½% on preferred stock payable January 1st at the office of the company in New York City.

National Lead Company, dividend of 1¾% on preferred stock, payable December 15th at the office of the company in New York City.

MEETINGS.

American Coal Company, at the office of the company in New York City, December 28th, at 10 a. m.

King Granite Company, at the office of the company in New York City, December 21st, at 12 o'clock noon.

Maryland Coal Company, at the office of the company in New York City, December 20th, at 1 p. m.

Rocky Fork Coal Mining Company, of Montana, at the office of the company in New York City, January 8th, at 12 o'clock noon.

CURRENT PRICES.

These quotations are for wholesale lots New York unless otherwise specified. Acid—Acetic, chem. pure, 17½@.19 Commercial, in bbls. and obys., 17½@.22 Carbonic, liquefied, 18½@.25 Chromic, chem. pure, 1.00 for batteries, .40 Hydrobromic, dilute, U. S. P., .25@.30 Hydrocyanic, U. S. P., .45@.60 Hydrofluoric, 20@.30 Alcohol—95%, 2.30@2.40 Absolute, 3.30 Ammoniated, 3.20 Alum—Lump, 1.75@1.85 Ground, cwt., 1.35@1.50 Powdered, 1.04@1.05 Lump, 1.00, Liverpool, .85 Aluminum Chloride—Pure, 1.25 Amalgamating solution, .60 Sulphate, cwt., 1.90@2.50 Ammonia—Sal., in bbl. lots, .07½@.08 Carbonate, 1/2 lb., English and German, .07½@.08 Muriate, white, in bbls., .08¼ Aqua Ammonia—(in crys.) 18° B., 0.03@.04 20° B., .04@.05 26° B., .04¼@.05 Antimony—Oxymur., 1.00@1.15 Regulus, 1.00@1.15 Argols—Red, powdered, 1.15 Arsenic—White, powdered, 0.03@.03¼ Red, 0.06@.07 Yellow, 0.08@.09 White, Plymouth, 1.20@1.25 Asbestos—Canadian, 1.50@2.00 Italian, 1.20@1.50 Ashes—Pot, 1st sorts, 1.75@5 Pearl, .05¼@.06¼ Asphaltum—Prime Cuban, .04@.05 Hard Cuban, 28.00@30.00 Trinidad, refined, 30.00@35.00 Egyptian and Syrian, .05@.07½ Californian, at mine, 12.00@28.00 at San Francisco, 15.00@29.00 Barium—Carbonate, pure, .45 Carbonate, commercial, .06@.10 Chlorate, crystal, .75 Chloride, commercial, .06@.10 Chloride, pure, .18 Iodide, oz., .40 Nitrate, 1.00@1.15 Sulph., Am. prime white, 17.50@19 Sulph., foreign, floated, 21@24 Sulph., off color, 11.50@15.00 Carb., lump, f. o. b. L'pool, 20 No. 1, Casks, Runcoorn, 44 10 No. 2, bags, Runcoorn, 43 15 Sauxite, ton, 10.00 Bichromate of Potash—Scotch, 11@12 American, 11@12 Bichromate of Soda—1 lb., 0.65@.70 Borax—Refined, 1 lb., in car lots, 0.60 San Francisco, 0.60@.06½ Concentrated, in car lots, 0.7½@.08 Refined, Liverpool, .42 Bromine—1 lb., 25@.35 Cadmium—Minion—1 lb., 32.00

Cadmium Iodide—1 lb., 55.50 Chalk—1 ton, 1.50@2.25 Precipitated, 1.00@1.08 China Clay—English, 1 ton, 13@18.00 Domestic, 9@11 Chlorine Water—1 lb., .10 Chrome Yellow—1 lb., .10@.25 Chrome Iron Ore—1 ton, San Francisco, 10.00 Chromalum—Pure, 1 lb., 35@.40 Commercial, 1 lb., .02¼ Cobalt—Oxide, 1 lb., 1.60@1.70 Copper—Sulph. English Wks. ton, 20@22 Vitriol (blue), ordinary, 1 lb., 0.3¼@.03¾ extra, .04¼ Nitrate, 1 lb., .40 Copperas—Comm'n., 100 lbs., 85@.95 Best, 100 lbs., 1.35@1.50 Liverpool, 1 ton, in casks, 22@24 10s. Corundum—Powdered, 1 lb., .04¼@.09 Flour, 1 lb., .03 Cryolite—Pow., 1 lb., bbl. lots, .07@.08 Emery—Grain, 1 lb. (5 kg.), .01¼@.05 Flour, 1 lb., .02¼@.04 Epsom Salt—1 lb., .01@.01¼ Feldspar—Ground, 1 ton, 86.00@100.00 Crude, 2.00@3.00 Fluorspar—Powderd, No. 1, 1 ton, 20@30 Lump, at mine, 16@25 French Chalk—Fuller's Earth—Lump, 1 ton, 16@20 Glauber's Salt—in bbls., 1 lb., 0.1@.01¼ Glass—Ground, 1 lb., .006@.10 Gold—Chloride, pure, crystals, 1 oz., 12.00 pure, 15 gr., c. v., 7 doz., 5.40 liquid, 15 gr., 5.50 a. v., 1 doz., 5.50 Chloride and sodium, 1 oz., 36.00 15 gr., c. v., 7 doz., 27.25 Oxide, 1 oz., 27.25 Gypsum—Calcined, 1 bbl., 1.25@1.50 Land Plaster Iodine—Resublimed, 1 oz., .30@.33 Iridium—Oxide 1 lb., 80 Iron—Nitrate, 40°, 1 lb., 0.1@.01¼ 47°, 1 lb., .02@.02¼ Kaolin—See China Clay. Kieserite—1 ton, 39@50 Lead—Red, American, 1 lb., 0.09¼@.07½ White, American, in oil, 1 lb., 0.06¼@.07½ White, English, 1 lb., in oil, 0.08¼@.08¾ Acetate, or sugar of, white, 0.06@.06¼ Granulated Nitrate, .09@.12 Lime Acetate—Am. Brown, .90@.95 Gray, 1.15@1.37½ Litharge—Powdered, 1 lb., .05¼@.07½ English flake, 1 lb., .06@.09¼ Magnesite—Crude, 1 ton of 1,015 kilos, 14.75 Calcined, 1 ton of 2,240 lbs., 32.00 Brick, 1 ton of 2,240 lbs., 47.50 Manganese—Ore, per unit, 23@.28 Oxide, ground, 1 lb., .02¼@.03¼ Mercuric Chloride—(Corrosive) Sublimated, 1 lb., .63@.64 Powdered, 1 lb., .63@.64 Marble Dust—1 bbl., 1.25@1.50 Metallic Paint—Brown, 1 ton, 20@25 Red, 20@25 Mica—in sheets according to size, 1st quality, 1 lb., 40@50

Mineral Wool—Ordinary slag, .01¼ Ordinary rock, .02¼ Ground, 1 lb., .80@.85 Naphthal—Black Nitre Cake—1 ton, 10.00 Ochre—Rochelle, 1 lb., .01¼@.01¾ Washed Nat Ox'rd, Lump, 0.6¼@.06¾ Washed Nat Ox'rd, Powder, 0.7@.07¼ Golden, 1 lb., .03@.05 Domestic, 1 ton, 12@20 Oils, Mineral—Cylinder, light filtered, 1 gal., 14@.16 Dark filtered, 1 gal., 10@.13 Extra cold test, 1 gal., 20@.24 Dark steam refined, 1 gal., 7¼@.19 Phosphorus—1 lb., 55@.55 Precip., red, 1 lb., 80@.85 white, 1 lb., 85@.90 Platine Chloride—Dry, 1 oz., \$7 Plumbago—Ceylon, 1 lb., .04@.06 American, 1 lb., .05@.07 Potassium—Cyanide, 1 lb., C. P., 52 67½, 1 lb., 0 mining, 28@.30 Bromide, domestic, 1 lb., 23@.32 Chlorate, English, 1 lb., 18@.18¼ Chlorate, powdered, English, 1 lb., 18¼@.19 Carbonate, 1 lb., by casks, 82¼@.06 Caustic, 1 lb., pure slick, 0.5¼@.06 Iodide, 1 lb., 22.58@23.80 Nitrate, refined, 1 lb., .06@.08 Bichromate, 1 lb., .10@.11¼ Yellow Prussiate, 1 lb., 21¼@.22¾ Red Prussiate, 1 lb., 39@.45 Pumice Stone—Select lumps, 103¼@.15 Original cks., 1 lb., .01¼@.02 Powdered, pure, 1 lb., .01¼@.01¾ Pyrites—Non-cupreous, p. units, 10@.11 Quartz—Ground, 1 ton, 36.00@10.00 Rotten Stone, Powdered, 1 lb., 0.3¼@.03¾ Lump, 1 lb., .06@.07 Original cks., 1 lb., .03¼@.04 Rubbing stone, 1 lb., .03¼@.04 Sal Ammoniac—Lump, in bbls., 1 lb., 80¼ Salt—Liverpool, ground, 1 sack, .700 Domestic, fine, 1 ton, 37@37.5 Common, fine, 1 ton, 34.50@35 Turk's Island, 1 bush, 28@.28 Salt Cake—1 ton, 10.00@15.00 Saltpeter—Crude, 1 lb., .03¼@.04 Soapstone—Ground, 1 ton, 36@38 Block and slab according to size. Sodium—Prussiate, 1 lb., 22@.24 Phosphate, 1 lb., .04@.05 Stannate, 1 lb., .06@.12 Tungstate, 1 lb., .30@.35 Hyposulphite, cwt., in casks, 1.70@1.80 Strontium—Nitrate, 1 lb., .63¼@.06 Sulphur—Roll, 1 lb., .01¼@.02¼ Flour, 1 lb., .01¼@.02 Syvinit, 27@35, S.O.P., per unit, 3.75 Talc—Ground French, 1 lb., .01¼@.01¼ American No. 1, 1 lb., .01¼@.01¼ American No. 2, .06 Terra Alba—French, 1 lb., .65@.80 English, 1 lb., .65@.80 American, No. 1, 1 lb., 60@.80 American, No. 2, 1 lb., 40@.50

Tin—Crystals, in kegs or bbls., 14@.15 feathered or flossed, 20 Muriate, single, .07@.12 Double or strong, 54° B., .10@.15 Oxymur., or nitro., .19 Vermilion—Imp. English, 1 lb., .80 Am. quicksilver, bulk, .57 @.59 Am. quicksilver, bags, .58 @.60 Chinese, .85 @.1.00 Trieste, .90 @.95 American, .11¼@.13 Zinc White—Am., Dry, 1 lb., 0.4¼@.05 Antwerp, Red Seal, 1 lb., .06¼@.07 Paris, Red Seal, 1 lb., .07¼@.08 Muriate solution, .06 Sulphate crystals, in bbls., 1 lb., 0.03@.03¼ THE RARER METALS. The prices given below are the prices at works in Germany, and are per gramme except where otherwise stated: Arsenic (metallic), per kilo, 20.25 Barium (ex amalgam), 2.12 (per electro.), 7.75 Bismuth (metallic), per kilo, 6.25 Cadmium (metallic), 2.75 Calcium (per electro.), 5.25 Cerium (pulv.), 2.25 (fusum in globulis), 5.50 Chromium (fus.), 40 (cryst.), 75 Cobalt (metallic), per kilo, 10.00 (pure), per kilo, 40.00 Didymium (pulv.), 5.50 Erbium-Yttrium (oxydat.), 100.00 Gallium (cryst.), 100.00 Germanium (fus.), 37.50 (pulv.), 35.00 Glucium (pulv.), 7.00 (cryst.), 10.75 Indium, 5.00 Iridium (fusum), 1.25 Lanthanum (pulv.), 6.00 (per electro.), 11.00 Lithium (in glob.), 5.00 (wire), 6.25 Magnesium (bars), 0.1¼ (wire), .02 (pulv.), 0.1¼ Manganese (fusum), 2.25 Molybdenum (pulv.), 12¼ Niobium (pulv.), 4.00 Osmium, 4.25 Palladium (wire), 1.06 (pulv.), 1.00 Potassium (metal), per kilo, 27.50 Rhenium, 1.63 Ruthenium, 2.50 Rubidium, 6.25 Selenium (cryst.), .50 (precipitates), .62¼ Sodium (per electro.), 6.86 Strontium (ex amalgam), 3.25 Tantalum, 4.75 Tellurium (fusum), .50 (precipitates), .23¼ Thallium, .03¾ Titanium, 1.13 Tungsten (pure), .05 Uranium, .00 Vanadium, .00

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, Dec. 9, Dec. 11, Dec. 12, Dec. 13, Dec. 14, Dec. 15, SALES. Lists various mining companies like Adams, Alice, Amador, etc.

Table with columns: NAME AND LOCATION OF COMPANY, Dec. 9, Dec. 11, Dec. 12, Dec. 13, Dec. 14, Dec. 15, SALES. Lists various mining companies like Alpha, Alta, American Flag, etc.

*Ex-dividend. †Deal in at New York Stock Ex. ‡Unlisted securities. §Assessment paid. ¶Assessment unpaid. D. Dividend shares sold, 885. Non-dividend shares sold, 3,700. Total shares sold, 4,585.

BOSTON MINING STOCK QUOTATIONS.

Table with columns: NAME OF COMPANY, Dec. 8, Dec. 9, Dec. 11, Dec. 12, Dec. 13, Dec. 14, SALES. Lists companies like Atlantic, Bate, Bonanza Development, etc.

Table with columns: NAME OF COMPANY, Dec. 8, Dec. 9, Dec. 11, Dec. 12, Dec. 13, Dec. 14, SALES. Lists companies like Alto, Arnold, Astec, etc.

Dividend shares sold, 3,371.

Non-dividend shares sold, 2,903.

Total shares sold, 6,274.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends. Lists companies like Adams, Alaska-Treadwell, etc.

Table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends. Lists companies like Alliance, Alpha, etc.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Par, Dividends (Total Paid, Date and amount of last), and Assessments (Total levied, Date and amount of last). Rows list various mining companies like Derbee B. Grav., Dexter, Dunkin, etc.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California has paid \$31,380,000 in dividends, and the Conr. Virginia \$2,890,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$180,000 before the reorganization in 1890. ‡‡ This company acquired the property of the Raymond & Kly Company which had paid \$3,075,000 in dividends. **** Previous to this company's acquiring Northern Belle, that mine paid \$2,400,000 in dividends against \$125,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns for stock names, dates (Dec. 9-15), and sales. Includes entries like Am. Coal, Balt. & Ohio, Buff., E. & P., Cambria Iron, etc.

Total shares sold, 69,939.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for stock names, dates (Dec. 9-15), and sales. Includes entries like Adams Express, Am. Cotton Oil, Am. Dist. Tel., etc.

Total shares sold, 312,970.

CALIFORNIA.

Table for California stocks, San Francisco section, listing names and closing quotations for Dec. 9-14.

COLORADO.

Table for Colorado stocks, Colorado Springs section, listing names and prices for Dec. 9.

Denver.

Table for Colorado stocks, Denver section, listing names and prices for Dec. 2.

COLORADO.

Table for Colorado stocks, Aspen section, listing names and prices for Dec. 2.

Table with columns for stock names, high/low prices, and sales. Includes entries like Mollie Gibson, Ophir, Puzzler, etc.

MARYLAND.

Table for Maryland stocks, Baltimore section, listing names and prices for Dec. 14.

MINNESOTA.

Table for Minnesota stocks, Duluth section, listing names and prices for Dec. 12.

UNLISTED STOCKS.

Table listing unlisted stocks from various states like Adams Iron Co., Agate Copper Mining Co., etc.

MONTANA.

Table for Montana stocks, Helena section, listing names and prices.

Helena.

Table for Montana stocks, Helena section, listing names and prices for Dec. 4.

PENNSYLVANIA.

Table for Pennsylvania stocks, Philadelphia section, listing names and prices for Dec. 14.

MISSOURI.

Table for Missouri stocks, St. Louis section, listing names and prices for Dec. 13.

London Quotations.

Table listing London quotations for various commodities like Alaska Treadwell, Alaska Ter., etc.

Paris.

Table listing Paris quotations for various commodities like Belmez, Spain, Golden River, etc.

New York Mining Stocks.

Table listing New York mining stocks with columns for company name, bid/asked prices, and dates.

ASSESSMENTS.

Table listing assessments for various companies with columns for company name, amount, and dates.

CLASSIFIED LIST OF ADVERTISERS.

Adders and Calculators
Smith, R. C.

Air Compressors and Rock Drills
American Diamond Rock Boring Co.
Billock, M. C., Mfg. Co.
Brislegh Rock Drill Co.
Clayton Air Compressor Works.
Hassensahl, W.
Ingersoll-Sergeant Rock Drill Co.
Morris County Machine & Iron Co.
Norwalk Iron Works Co.
Penn Diamond Drill & Mfg. Co.
Rand Drill Co. (See Diamond Drills)

Aluminum
Cowles Electric, S. & A., Co.

Amalgamators
Bucyrus Steam Shovel & Dredge Co
Denver Separator & Amalgamator.
Gat & Iron Works.

Architects and Builders
Berlin Iron Bridge Co.
Pencoyd Bridge & Const. Co.
Pittsburg Bridge Co.
Pittsburgh Bridge Co.
Scaife, Wm. B. & Son.

Arms and Ammunition
Hartley & Graham.

Assayers and Chemists' Supplies
Almsworth, Wm.
Baker & Adamson.
Baker & Co.
Berge, J. & H.
Bullock & Crenshaw
Henry Hill Chem. Co
Hoskins, Wm.
Overbrook Chem. Co.
Penn Sm. & Ref. Wks.
Penn Salt Mfg. Co.
Queen & Co.

Bankers and Brokers
Bandell, E. H.
Bleher & Sohne.
Billings, Robt. & Co.
Cochran, A. M.
Grant, E. H.
Handy & Harman.
Hyde, Geo. A.
Maites, E. C. & Co.

Belting
Groetzinger & Sons.
Harris & Johnson Mfg. Co.
Jeffery Mfg. Co.
New York Belting & Packing Co., Ltd.

Blasting Caps and Fuse
Lau, J. H., & Co.
Macbeth, James, & Co.
Metallic Cap Mfg. Co.

Blowers
Foss Mfg. Co.
Sartevant, S. F. Co

Boiler Compound
American Fluoride Co.

Boilers
Rahner & Wilcox Co.
Heine Safety Boiler Co.
Orr & Sembover, Inc.
Pollock, Wm. B. & Co.
Scaife, Wm. B. & Sons
(See Machinery.)

Star Boiler & Sheet Iron Works
Stiwell-Bierce & Smith-Valle Co.
Strating Co.

Brick Machinery
Kreuzer, K. M., & Co.

Bridges
Berlin Bridge Co.
Pencoyd Br. & Con. Co.

Buckets
Scaife, Wm. B. & Sons.
(See Machinery.)

Calculators
Smith, R. C.

Carbons
Bishop, Victor, & Co.

Car Wheels
Whitney, A. & Co.

Chain and Link Belting (See Belting.)

Chemicals
Penn. Salt Mfg. Co.
Roesner & Hasslachner
Chemical Co.
Solvay Process Co.
Vandenbergh Laboratory

Coal
Maryland Coal Co.
Hecker & Co.
Potts, F. A., & Co.
Sickney, Conyngham & Co.
Ward & Olyphant.

Coal Cutters
Ingersoll-Sergeant Drill Co
Jeffery Mfg. Co. (See Machinery.)

Concentrators, Crushers, Pulverizers, Separators, Etc.
Allis, K. P. & Co.
American Mining & Milling Machinery Co.
American Ore Separator, Co.
Beckett Foundry & Machine Co.
Blake, Theo. A.
Bradley Fertilizer Co.
Colorado Iron Works.
Copeland & Bacon
Denver Separator & Amalgamator.
Fraser & Chalmers.
True Vanner Concentrator
Gates Iron Works.
Hendrie & Bolthoff Mfg. Co.
Krom, S. R.
Mechanical Gold Extractor Co.
Pierce & Miller Engineering Co.
Seymour Concentrator Co.
Sturtevant Mill Co.
Walburn-Swenson Mfg. Co.
(See Machinery.)

Copper Dealers and Producers
Abbott, Wheelock & Co.
American Metal Co.
Atlantic Mining Co.
Balbach S. & Ref. Co.
Baltimore Cop. Wks.
Boston & Mont M Co
Canadian Copper Co.
Central Mining Co.
Copper Queen Mfg. Co.
Detroit Copper Mfg. Co.

James & Shakspeare.
Lewisohn Bros.
Orford Copper Co.
Osceola Con. Mfg. Co
Penn. Salt Co.
Phelps, Dodge & Co
Quebrada R. R., L. & C. Co.
Tamarack Mfg. Co.

Contractors and Miners' Supplies
Bucyrus Steam Shovel and Dredge Co
Pollock, Wm. B., & Co.
Pratt & Whitney Co. (See Machinery.)

Corrugated Iron
Berlin Iron Bridge Co | Scaife, W. B. & Sons.

Dermagintine
Groetzinger & Sons

Decks, Chairs, Etc
Andrews, A. H. & Co.

Diamonds
Bishop, Victor, & Co.

Diamond Drills
American Diamond Rock Boring Co.
Bishop, Victor, & Co.
Bullock Mfg. Co., M. C.
Hassensahl, W.
Penn. Diamond Drill & Mfg. Co.
Stearns Bros.
Sullivan Machinery Co.
(See Air Compressors and Rock Drills.)

Drawing Materials | Heller, Chas. S.
Alteneder, Theo. & Son. Queen & Co.

Dredges
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Dump Cars
Hunt Co., C. W.
Thacher Car & Con. Co.

Educational Institutions
Corcoran Scientific School.
Harvard Univ. (Lawrence Scientific School)
Michigan Mining School.
Pennsylvania Military College.
Woolde Seminary.

Electrical Machinery and Supplies
General Electric Co.
Jeffery Mfg. Co.
Okonite Co., Limited.
Thomson-Houston International Co.

Elevators, Conveyors and Hoisting
Brown Hoisting and Convey. Mach. Co.
California Wire Works
Cooper, Hewitt & Co.
Day, F. M., Iron Works.
Hunt, C. W., Co.
Jeffrey Manufacturing Co.
Orr & Sembover, Inc.
Scaife, Wm. B. & Sons.
Union Wire Rope Tramway Co.
Vulcan Iron Works.
(See Wire Rope Tramway and Machinery.)

Emery Wheels
New York Belting & Packing Co., Ltd.

Emery Mill Stones
Sturtevant Mill Co.

Employment Bureaus
Engineering Employment Bureau

Engineers, Chemists, Metallurgists
Adams, W. H. | Jones & Jones.
Anthony, Wm. At | Kennedy, Julian
Argau, Phil. | Kent, William
Asew & Russell | Kerr, Mark B.
Baker & Co. | Keyes, W. S.
Bandy, John E. | Kirby, E. B.
Blauve, Harrington | Lammers, T. L.
Boggs, W. R., Jr. | Langth, Werner.
Boss, Clarence M. | Lavagnolo, G.
Bos, M. P. | Ledoux & Co.
Brodie, Walter M. | Leggett, Thomas H.
Burford, J. H. | Loring, Frank C.
Burlingame, E. E. | MacTeague, J. J.
Butters, Charles. | Mariner & Hoskins.
Carnahan, J. W. | Maynard, George W.
Cary, & Moore. | McCormick & Duffield.
Case, Wm. H. | Moore, Gideon E.
Cazin, Franz. | Newberry, W. E.
Chandler, W. H. | Nicholson, Frank
Channing, J. Parke. | Olcott, Eben E.
Chanute, D. | Osgood, J. O.
Chatard, Thomas M. | Page, Wm. Byrd.
Clark, C. H. | Penrose & Barringer.
Clark, Ellis. | Peters, Edward J.
Clement, Victor M. | Phillips, W. B.
Collins, J. H. & Sons. | Poole, Robt., & Son Co.
Darlow, E. B. | Porter, J. A.
De la Bouglise, Geo. | Potter, William B.
Dewey, Frederic P. | Price, Thomas & Son.
Dickerman, Alton L. | Randolph, John C. F.
Diekinson, H. F. | Raymond, Rosser W.
Donald, J. P. | Raymond, R. M.
Drysdale, Dr. W. A. | Rickards, T. A.
Ed & Burnell. | Rickards & Banks.
Emmens, Stephen H. | Robinson, G. H.
Everette, Dr. W. S. | Rothwell, John E.
Farish, Wm. A. | Rothwell, Richard P.
Fearn, Percy L. | Saunders, W. L.
Fisk, W. W. | Schwaerz, Theodore K.
Freeland, Francis T. | Saapleigh, W. L.
Froehling, Dr. Henry. | Shaw, Thomas.
Furlong, W. H. | Skewes, Edward.
Genth, F. A., Jr. | Smith, F. E.
Gooding, F. W. | Smith, R. C.
Goude, James H. | Squire, Jos.
Hahn, O. H. | Stein, Wm. M.
Hall Bros. | Souther, E. G.
Hammond, John Hays | Taylor & Brunkn.
Hampton, W. Huntley | Taies, A.
Hardman, John E. | Vandenbergh Laboratory
Hastings, John B. | Van Slooten, Wm.
Hofman, Ottokar. | Wannemaker, J. F.
Hollbaugh, J. H. | Wardraper, D. Lee.
Hooker & Lawrence. | Wins, J. Laurus
Hunt & Robertson. | Wilson, J. Howard.
Inne, F. W. | Wyatt & Saarbach.
Jennings, E. P. | Young & Park.

Engineers' Instruments
Alteneder, F. & Son.
Brandis' Sons.
Bullock & Crenshaw
Everhardt, J. M.
Garley, W. & L. E.
Heller, Chas. S.
Queen & Co.

Engines
Buckeye Engine Co. | Orr & Sembover, Inc.
Bullock, M.C., Mfg. Co. | Union Iron Works.
Morris Co. Mach. & | Stiwell-Bierce &
Iron Works. | Smith-Valle Co.
(See Machinery.)

Excavators
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Fire-Brick and Clay
Chur, A. T.

Forges
Foss Mfg. Co.

Furnaces
Hoskins, Wm. | Moore, S. L., & Son Co.
Pollock, W. R. & Co.
(See Machinery.)

Furniture Office, Etc.
Andrews, A. H. & Co

Gas Works
Pollock, Wm. B. & C. | Wood, R. D. & C.

Gauges, Recording, Etc.
Bristol Mfg. Co. | Everhardt, J. M.

Grease, Graphite, Etc.
Dixon, Jos. Crucible Co.

Hose, Rubber
New York Belting & Packing Co., Ltd.

Hotels
The Cochran

Inspection and Tests
Hunt, The Robert W. Co.

Insulated Wires and Cables
Okonite Co., Ltd.

Insurance Companies
Hartford Steam Boiler Inspect'n and Ins. Co.
Mutual Life Insurance Co

Lamps, Miners'
Everhardt, J. M.

Locomotives
General Electric Co. | Porter, H. K., & Co.
Hunt, C. W. Co.
Thomson Houston International Co.

Lubricants
Dixon, Jos. Crucible Co.

Manganese Steel
Taylor Iron & Steel Co.

Mats, Rubber
New York Belting and Packing Co., Ltd.

Machinery.
Dealers in Mining, Milling, and Other Machinery
Allis, Edw. P. & Co.
American Mining & Milling Machinery Co.
Buckeye Engine Co.
Bullock, M. C., Mfg. Co.
Carbon Steel Co.
Colorado Iron Works.
Copeland & Bacon.
Day, F. M., Iron Works.
Exeter Machine Works Co.
Fraser & Chalmers
Griffith & Wedge Co
Hendrie & Bolthoff Mfg. Co.
Jeffrey Mfg. Co.
Mechanical Gold Extractor Co.
Mecklenburg Iron Works.
Moore, Samuel L., & Son.
Morris County Mach. & I. Co.
Oil Well Supply Co.
Orr & Sembover, Incorp.
Penn Diamond Drill & Mfg. Co.
Pierce & Miller Engineering Co.
Pollock, Wm. B., & Co.
Poole, Robt., Son & Co.
Scaife, W. B., & Sons.
Seymour Concentrator Co.
Sullivan Machinery Co.
Thomson-Houston International Co.
Trenton Iron Co.
Union Iron Works.
Vulcan Iron Works.
Walburn-Swenson Mfg. Co.
Webster, Camp & Lane Machine Co.

Metal Dealers
Abbott, Wheelock & Johnson, Matthey & Co.
Co. | Lewisohn Bros.
American Metal Co. | Mathison Sm'ling Co.
Am. Zinc-Lead Co. | Orford Copper Co.
Baker & Co. | Phelps, Dodge & Co.
Cawies Elect. S. & Picher Lead Co.
Columbian Co. | Pullman, J. W.
Eureka Co. | State Ore Sampling Co.
James & Shakspeare. | Victor Chemical Co.

Metallurgical Works and Ore Processors' Processes
American Zinc Lead Co.
Baker & Co.
Balbach Smelting & Refining Co.
Baltimore Copper Works.
Canadian Copper Co.
Cawies Elect. smelt. & Aluminum Co.
Kansas City S. & Ref. Co
Ledoux & Co.
Mechanical Gold Extractor Co.
Orford Copper Co.
Pennsylvania Salt Mfg. Co.
Ricketts & Banks.
Russell Process Co.
St. Louis Sampling & Testing Works
State Ore Sampling Co.
Walburn-Swenson Mfg. Co.

Mining and Land Companies
Atlantic Mfg. Co. | Mollie Gibson Con. Mfg.
Boston & Mont. Mfg. Co. | & M. Co.
Central Mfg. Co. | Osceola Con. Mfg. Co.
Copper Queen Mfg. Co. | Quebrada R. R. L. &
Detroit Copper Mfg. Co. | C. Co.
Eureka Co. | Tamarack Mfg. Co.

Nickel
Canadian Copper Co.

Nuts, Lock
Young Lock Nut Co.

Ore Cars
Star-Boller & Sheet Iron Works

Ore Testing Works
Hunt & Robertson. | Ricketts & Banks.
Ledoux & Co. | State Ore Sampling Co.
Snelson, W. H., Assaying & Engineering Co.

Packing and Pipe Coverings
Oranot, Randolph | New York Belting &
Jenkins Bros. | Packing Co., Ltd.
Kenoy, Robt. | Wyckoff & Son, A.

Patents
Atkins, J. L.

Perforated Metals
Harrington & King Perforating Co.
Mundt & Sons.

Periodicals
Arms and Explosives. | Financial Times.
El Minerio Mexicano. | Iron & Coal Trades
Electrical Plant & | Review.
Electrical Industry. | Mining Journal.
Electrical Engineering.

Phosphates
Trenholm, Paul C.

Phosphor-Bronze
Phosphor-bronze S. & Refining Co

Picks, Miners'
Collins & Co.

Pile Drivers
Bucyrus Steam Shovel and Dredge Co.

Pipes
Pollock, Wm. B. & Co. | Wyckoff & Sons, A

Platinum
Baker & Co.
Johnson Matthey & Co.

Powder
Eureka Powder Co
Atlantic Dynamite Co.,

Pumps
Blaise, Geo. F., Mfg. Co.
Cameron, A. S., Steam
Pump Works.
Groetzinger, A., & Sons
Jeannette Iron Works.
Lowies Steam Pump
Works.
McGowan, John H., &
Co.

Publications
Allison Gibson Co
Arms & Explosives.
Electric Plant & Machinery
Electrical Industry

Financial Times.
Iron & Coal Trades Rev
Mining Journal.
Open Co. Pub Co
Stechert Gustave.

Pyrites
Adams W. H.

Quarrying Machines
American Diamond Rock Boring Co.
Ingersoll-Sergeant Rock Drill Co
Rand Drill Co.
Sullivan Machinery Co.
Union Wire Rope Tramway Co.

Quicksilver
Sueka Co.

Railroad Supplies and Equipment
Hunt, C. W. Co. | Johnson & Orr.
Porter, H. K., & Co | Young Lock Nut Co.
(See Machinery.)

Refrigerating Machines
De la Vergne Ref. Machine Co.

Regulators, Dampers, Heat, Etc.
Eddy Valve Co. | Mason Regulator Co.
Lunkenheimer Co. |

Rock Drills. (See Air Compressor.)

Roofing
Berlin Iron Bridge Co | Phelps, Dodge & Co.
Pencoyd Bridge and | Pittsburgh Bridge Co.
Const. Co. | Scaife, Wm B., & Sons.

Rubber Goods
New York Belting & Packing Co., Ltd.

Screens
Exeter Machine Works Co.
Harrington & King Perforating Co.
Mundt & Sons.
Tyler W. S., Wire Works Co.
(See Machinery.)

Screen Plates
Harrington & King Perforating Co.

Separators
American Safety Boiler Works.

Shaft Sinking
Potsch-Soyka'smith Freezing Co.

Shoes and Dies
Chrome Steel Works. | Reliance Steel Co.
Crescent Steel Co.

Shovels (Steam)
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Smelting and Refining Works
Balbach S. & Ref. Co. | Penn Lead Co.
Baltimore Cop'r Wks. | Penna. Salt Mfg. Co.
Boston & Mont. Smelt. Co. | Penn Smelting and
Cawies Smelt. & Ref. Co. | Refining Works.
Kansas City S. & Ref. Co. | Phosphor-Bronze
Mathison Smelting Co. | Smelt. Co.
Orford Copper Co.

Steel Rails, Castings, Rolls, Drill Steel
Abbott, Wheelock & Co. | Moore, S. L., & Sons Co.
Baltimore Iron Co. | Reliance Steel Co.
Billings & Spencer Co. | Roberts, A. & P., & Co.
Carbon Steel Co. | Robinson & Orr.
Crescent Steel Cast. Co. | Whitney, A., & Sons.
Chrom's Steel Works. | (See Metal Dealers.
Crescent Steel Co. |
Exeter Machine Wks. | Co.

Tanks
Pollock, Wm. B. & Co.
Scaife, Wm. B. & Sons.
Star Boiler & Sheet Iron Works.
Williams Mfg. Co.

Telegraph Wires and Cables
Osullivan Co., The, Ltd.

Tools
Billings & Spencer Co.
Pratt & Whitney Co.

Tubes
Oil Well Supply Co. | Pollock, Wm. B., & Co.
Williams Bros.

Tubing-Rubber
New York Belting and Packing Co., Ltd.

Turbines
James Leffel & Co., The.
Poole, Robt. & Son Co.
Stiwell-Bierce & Smith-Valle Co.

Valves
Eddy Valve Co. | Mason Regulator Co
Jenkins Bros. | Sturtevant & Co., R. F.
Lunkenheimer Co.

Ventilators
Snoock, A. C., Mfg. Co.

Vulcanite Emery Wheels
New York Belting and Packing Co., Ltd.

Washers
Hilton Mfg. Co.

Well Drilling Machinery
American Diamond Rock Boring Co.
Oil Well Supply Co., Limited.
Penn Diamond Drill & Mfg. Co.
Sullivan Machinery Co.
Williams Bros.

Wire Cloth
Harrington & King Perforating Co.
Mundt & Sons.
Tyler, W. S., Wire Works.

Wire Rope and Wire
Abbott, Wheelock & Co.
California Wire Works.
Cooper, Hewitt & Co.
Hunt, C. W. Co.
Phelps, Dodge & Co
Roebbing, J. A., Sons & Co.
Ropeways Syndicate, Ltd.
Trenton Iron Co.
Washburn & Moen Mfg. Co

Wire Rope Tramway
Brown Const. & Convey. Machine Co.
California Wire Works.
Colorado Iron Works.
Cooper, Hewitt & Co.
Hunt, C. W. Co.
Roebbing, J. A., Sons & Co.
Trenton Iron Co.
Vulcan Iron Works

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

Positions Vacant.

1294 WANTED—A YOUNG MACHINERY molder as workman and instructor in a college foundry. Wages will include the chance for a good mechanical education and the cost of living. Send copy of references, and state age and experience in detail, to LAS CRUCES, ENGINEERING AND MINING JOURNAL.

1295 WANTED—A COMPETENT, EXPERIENCED man as superintendent of car wheel foundry about to be erected. Confidential, if desired. CAR WHEEL, ENGINEERING AND MINING JOURNAL.

1296 WANTED—AT A POINT IN NEW Jersey—a chief engineer of experience to take charge of a large power plant of compound and triple expansion engines; must be a practical mechanic, thoroughly familiar with the theory and practice of modern engineering. Full references must be given; salary required, and time when applicant could accept position must be stated. Address BARBETTE, ENGINEERING AND MINING JOURNAL.

1297 WANTED—AN EXPERIENCED mill man, with unquestionable references as to character and ability, willing to go to Mexico. Must have had at least five years' experience with refractory ores. Address with references and salary expected MILLMAN, ENGINEERING AND MINING JOURNAL.

1298 WANTED—TWO MACHINIST ENGI-neers with unquestionable references as to character and ability, willing to go to Mexico. Address giving references, experience and salary expected MACHINIST, ENGINEERING AND MINING JOURNAL.

1299 WANTED—A MINING ENGINEER of practical experience for a gold and silver mine in Central America. Address CENTRAL AMERICA, ENGINEERING AND MINING JOURNAL.

1300 WANTED—A COMPETENT CHEM-ist for general analytical work, particularly analyses of clays, limestones and cements and mineral waters. Also an instructor in mathematics, preferably with some knowledge of mining or geology. Address STATE SCHOOL, ENGINEERING AND MINING JOURNAL.

1301 WANTED—FIRST-CLASS draughtsman (letterer); good salary paid. Send samples of work with application to DRAUGHTSMAN, ENGINEERING AND MINING JOURNAL.

1302 WANTED—A SKILLED ASSAYER of silver, lead and gold, one who has some knowledge of bookkeeping, for a silver mine in Montana. State qualifications and salary expected. MONTANA, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

Advertisements for SITUATIONS WANTED will be charged only 10 cents a line.

MEMBER OF AMERICAN SOCIETY ME-chanical Engineers, who has had 20 years' practical experience as follows: Machinist, chief draughtsman, erector of engines and machinery, engineering, estimating, contracting, office work and superintendent of large engine works—is available for responsive position. Address SUPERINTENDENT, ENGINEERING AND MINING JOURNAL, 531 Rookery, Chicago, Ill. No. 15,617, Dec. 23.

TECHNICALLY EDUCATED YOUNG MAN desires position in the Southern goldfields. Address B. S., ENGINEERING AND MINING JOURNAL. No. 15,729, Dec. 23.

YOUNG MINING ENGINEER, SCHOOL OF Mines graduate, late U. S. Geological Survey, desires a position in his profession. Moderate salary to start. All references. Capable, sober and progressive. Address W., ENGINEERING AND MINING JOURNAL. No. 15,725, Dec. 23.

WANTED—A POSITION IN SOUTH Africa by a metallurgist and mining engineer (Columbia), three years' experience in smelting and leaching in the West. Good references. Address SOUTH AFRICA, ENGINEERING AND MINING JOURNAL. No. 15,609, Dec. 23.

TECHNICAL CHEMIST—FIRST-CLASS scientific education. Many years' practical experience as superintendent in best European and American works in the manufacture of acids (sulphuric, nitric hydrochloric), alkali by Leblanc and ammonia processes ammonia, fertilizers, alumina products, copper extraction, etc. Address A. Z., ENGINEERING AND MINING JOURNAL. No. 15,497 e.o.w., Dec. 23.

CHEMIST AND MINING ENGINEER, WITH several years' practical experience, desires position. Young man and willing to go anywhere. Can give best reference. Address F. C. J., ENGINEERING AND MINING JOURNAL. No. 15,741, Dec. 30.

AN ACTIVE AND ENERGETIC COAL mines and coke works manager will be open for an engagement at New Year. Thirty-one years' practical experience in coal mines; nine years superintendent of large and fiery mines in Pennsylvania. Has thorough knowledge of coking, coal prospecting, planning and all inside and outside details connected with the successful management of coal mines. Now employed as Mining Engineer by a large coal land corporation in one of the Southeastern States. Highest references from present and past employers. Address "LANARK," ENGINEERING AND MINING JOURNAL. No. 15,734, Dec. 30.

A GENTLEMAN WITH A LARGE EXPERI-ence in engineering and manufacturing, and highly skilled in designing, estimating and contracting, production and cost sheets, technical and general correspondence, management, etc., is free to consider a responsible engagement. Address G. W. SCOTT, Ravenswood, Ill. No. 15,746, Dec. 30.

WANTED—SITUATION AS SUPERIN-tendent or mine foreman, by mining engineer and surveyor. At present holding responsible position. Holds certificate of qualification as mine foreman for Pennsylvania. Address THOS. CROSS, P. O. Box 195, Plymouth, Luzerne County, Pa. No. 15,738, Dec. 30.

CHEMIST AND ASSAYER WITH WIDE EX-perience in all kinds of chemical analysis desires position. Is a member of American Institute of Mining Engineers, and member of Chicago Academy of Sciences. References from last employer. Address COLUMBUS, ENGINEERING AND MINING JOURNAL. No. 15,724, Jan. 6.

WANTED—A SITUATION AS FOREMAN of iron foundry. Best of references. Address ABILITY, ENGINEERING AND MINING JOURNAL. No. 15,745, Jan. 6.

YOUNG MAN OF 24, GRADUATE IN MIN-ing, with three years' experience in railroad and general engineering work, at present county surveyor, desires position as assistant mining engineer. Address GEO. B. GILL, Searcy, Ark. No. 15,748, Jan. 13.

A RENSSELAER GRADUATE, THREE years' experience, desires a position. Has had experience in preliminary, location, construction and maintenance of way; also on masonry dams. Address M. E. F., ENGINEERING AND MINING JOURNAL. No. 15,747, Jan. 7.

RESPONSIBLE POSITION WANTED BY A graduated chemist and engineer; superintendency or assistant superintendency in steel works or blast furnaces preferred; is a metallurgist and can burden furnace; is well up in modern engineering practice; thoroughly understands machinery and the economies of production; can design and build mills or furnace plants. Address "MODERN ENGINEERING," ENGINEERING AND MINING JOURNAL.

AN ACTIVE AND ENERGETIC MINE Superintendent, graduated Mining Engineer, with an extensive practice in Europe and the United States, will be open for an engagement shortly after New Year. Specialties: Mining, Milling and Chlorination of Gold Ores, and Mining and Concentration of Lead and Zinc Ores. Will accept a position as Superintendent or Manager of a mining company with good standing. Highest references. Address ENERGETIC, ENGINEERING AND MINING JOURNAL.

WHEN YOU NEED

An Engineer, Chemist or Draughtsman,
NOTIFY
The Engineering Employment Bureau,
512 THE BASTABLE, SYRACUSE, N. Y.
PROMPT. HONEST. EXPERIENCED.
We will have men write you.

Contracts Open.

SEALED PROPOSALS FOR LIGHTING THE City of Jackson, Miss., with Electricity. Mayor's office, Jackson, Miss. Notice is hereby given that sealed proposals will be received at the office of the City Clerk until January 2d, 1894, for lighting the streets, alleys, parks and public buildings of the City of Jackson with electricity, for a term of five years from March 1st, 1894, in accordance with the plans and specifications on file in said Clerk's office. Also proposals will be received from each bidder of the cost price at which the plant put up according to said specifications may be purchased by the city. The Board reserves the right to reject any and all bids. L. F. CHILES, Mayor.

WATER WORKS—Proposals will be received at the Mayor's office in Cadiz, Harrison county, O., until January 2d, A. D. 1894, for plans and specifications, complete, of the best and most modern system of water-works, with estimated cost of complete construction, to be constructed and erected in said village (population, 1,716), if approved and accepted by Council of said village, at a cost not exceeding \$35,000. The Council of said village hereby reserve the right to reject any and all proposals of plans and specifications, or any parts or parts of any plan and specification presented or proposed as aforesaid. JAMES MOORE, Mayor.

OFFICE OF STATE WAGON ROAD COMMIS-sioners, State of Idaho, Boise City.—Notice is hereby given that the State Wagon Road Commission of Idaho will, on the 25th day of December, 1893, at their office in the State Capitol, let to the lowest responsible bidder, contracts for the building and construction of that portion of the State wagon road and bridges which runs through the counties of Lemhi, Custer, Boise, Idaho, Shoshone, Kootenai, Latah and Nez Perce. Sealed bids will be received for the construction of the entire road in each county, or for sections thereof, as divided by the surveyors and Board of Commissioners. For particulars concerning the road to be constructed in Lemhi county apply to J. W. Birdseye, Salmon City; in Custer County, N. J. Sharp, Challis; in Boise County, J. H. Ireton, Marsh; in Idaho County, D. H. Telcher, Grangeville; in Shoshone county, G. W. Craddock, Wallace; in Kootenai County, J. R. Sanburn, Coeur d'Alene City; in Latah County, B. F. Cone, Moscow. All bids must be accompanied by bonds in double the amount bid, and signed by at least two sureties to be approved by the Commission. All bids must be filed with the Secretary of the Board of Commissioners, at Boise City, one day prior to the day named for said letting. The right to reject any and all bids is hereby reserved. State Wagon Road Commission of Idaho, by N. J. SHARP, President.

BRIDGE.—BUDAPEST, AUSTRO HUN-gary.—A bridge of a total length of 312 meters and another of 332 meters will be executed on the Danube at Budapest. An international competition for plans and projects is opened for these two bridges. Without regarding to which bridge it refers a prize of \$6,080 will be awarded to the best project, and a prize of \$4,050 to the second best project. If the best project solved the question of connecting the two banks at the Eskuter with one opening, so that it answers the stipulations contained in the conditions, this project will receive a special premium of \$2,130, besides the allotted first prize. The Hungarian minister of commerce reserves the right of buying any of the not rewarded projects for \$1,015. If one of the winners should be commissioned to execute the work upon the basis of his tender the prize allotted will not be paid. The projects provided with device and sealed letter containing the device are to be presented to the manager of the bureaux of the Hungarian royal ministry of commerce (Budapest, Lanczhid, ulezsa) latest the 31 January, 1894, toward receipt. The terms to which the surroundings of the bridges and the plans and longitudinal section of every bridge are subjoined can be obtained at every consulate general of Austria-Hungary.

TO BUILDERS OF PUMPING ENGINES.—Sealed proposals, addressed to the Boston Water Board, and indorsed "Proposal for Mystic Station Pumping Engine No. 4," will be received at the office of the Boston Water Board, City Hall, Boston, Mass., until the 23d day of December, 1893, and at that time will be publicly opened and read. The price proposed is to cover all the expenses incidental to the completion of the work in full conformity with the plans and specifications. The price proposed must be stated both in writing and in figures, and all proposals containing bids not called for in this advertisement will not be entertained. Each bid must be signed by the bidder, and accompanied by a properly certified check for one thousand dollars (\$1,000), payable to the city of Boston, said check to be returned to the bidder unless forfeited under the condition herein stipulated. The amount of the security required for the fulfillment of the contract will be the sum of two thousand dollars (\$2,000) in cash, and a bond for fifteen thousand dollars (\$15,000), with sureties to be satisfactory to the Boston Water Board, and to be residents of Massachusetts. Plans may be seen, and specifications and form of contract can be obtained, at the office of the City Engineer, City Hall, Boston. THOMAS F. DOHERTY, JOHN W. LEIGHTON, WILLIAM S. M'NARY, Boston Water Board. Office of Boston Water Board, City Hall.

WATER WORKS.—Proposals will be received at the Mayor's office in Cadiz, Harrison County, O., until January 2d, 1894, for plans and specifications, complete, of the best and most modern system of water-works, with estimated cost of complete construction, to be constructed and erected in said village (population 1,716), if approved and accepted by Council of said village, at a cost not exceeding \$35,000. The Council of said village hereby reserve the right to reject any and all proposals of plans and specifications, or any part or parts of any plan and specification presented or proposed as aforesaid. JAMES MOORE, Mayor.

GRADUATION.—Sonora & Sinaloa Irrigation Company, 58 William street, New York.—Proposals will be received at this office until December 20th, 1893, for the graduation of 20 miles, more or less, of the Yaqui Canal, on the south side of the Yaqui River, in Sonora, Mexico. Form of contract and specifications and full information concerning the nature of the work can be obtained at this office. Due notice will be given to bidders of time and place of opening proposals and awarding contract. E. S. NETTLETON, Chief Engineer.

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A dividend of five cents per share (\$50,000) has been declared, payable November 15th, 1893, to stockholders of record on November 8th. Transfer books close November 8th, and reopen November 16th, 1893.

PERCY HAGERMAN, Sec'y-Treas.

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DIVIDEND 185.

The regular monthly dividend, TEN (10) CENTS PER SHARE, has been declared for November, payable at the office of the company, San Francisco, or at the transfer agency, in New York, on the 26th inst.

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