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In another column will be found a short article giving an account of the work done in the different countries of Europe in the establishment of commercial museums for the encouragement and assistance of foreign trade. It appears that in several countries—notably Germany, France and Austria—a large amount has been spent on collections which are not so much museums in the sense in which the term is popularly applied, as centers where any properly accredited merchant or manufacturer may apply for information relating to a foreign country. This is the work which has been undertaken by the Philadelphia Commercial Museum, and it is a very serviceable and necessary one, if our export trade is to be maintained and extended. The gathering of such information as is needed can be done better, at much less expense and with more authority, by a well-managed co-operative institution than by divided effort. New York is behind Philadelphia in this respect; but it would be well to extend the work rather than to limit it to a single city or district.

The British Columbia Legislature has adopted an amendment to the Provincial Mining law which prohibits the location of placer mining claims by aliens. The law, as at first proposed, covered all mining claims, but was amended so as to apply to placer claims only. Of course, though the term "alien" covers all who are not citizens of Canada, it chiefly affects miners from the United States, since they constitute the very great majority of the foreigners coming to and operating in British Columbia. The immediate motive of the new law, it is understood, is the rush of prospectors to the new Atlin Lake District and the desire to reserve the promising placers there for British Columbia miners. A number of men from Oregon and Washington were arranging to start for the new district, who will now be shut out.

This looks very much like illiberal legislation, especially in view of the fact that British Columbia mines have been so far developed chiefly by capital and men from the United States. At the same time we are hardly in a position to protest against such action by Canada, while our own mining laws limit the location of claims to citizens of the United States.

The extraordinary speculation on copper stocks on the Boston market continues unabated; and it is only a reflection of the movement in stocks of almost all kinds in New York and elsewhere. The speculative spirit has broken loose and securities of all kinds have been forced up to a high point, with every prospect that they will go still higher. The new industrial stocks, such as Federal Steel, American Tin-plate and the rest, are getting their full share of the rise. As in all such movements, the stocks of little or no value show the greatest proportional advances, and almost any forms of security can be and are pushed up day by day to preposterous quotations. Even the better stocks are at points out of all proportion to their actual returns on the investment. Of course there can be only one end to such a movement. The speculation will continue as long as money is abundant at low rates, but as soon as higher interest is asked and the banks begin to be particular about collateral, a reaction will set in. When that will happen only a very acute observer can foresee, and the safest way for the ordinary man is to keep out altogether. The situation is in many respects a repetition of that which existed in 1881; but the upward movement may last longer than it did then, since we have a much larger balance to draw on abroad than we held 18 years ago, and there is more money available in the country. At the best it is a risky condition.

An event in the Western coal trade this week is the final agreement of the joint convention of miners and operators on a contract which is to cover the year beginning on April 1st. It is in the main the Chicago agreement adopted in the fall of 1897, with some modifications, and applies to the mines of Western Pennsylvania, Ohio, Indiana and Illinois. The main features are the establishment of a mining rate based on 66 cents a ton for screened coal, which is to apply everywhere except in Illinois, where the rates are for run-of-mine; and 40 cents a ton for run-of-mine is to be accepted as equivalent to 66 cents for screened coal. The uniform bar screen, with 1 1/4-inch opening, is to be used everywhere except in the block coal mines of Indiana, where a special screen is allowed. The differentials between pick and machine mining are unchanged. The eight-hour day for miners is recognized.

The convention is to meet again in January, 1900; and provision was wisely made for a board of conciliation, to consist of four operators, four miners and an arbitrator to be jointly chosen. This board is to have jurisdiction over all disputes arising under the agreement.

The weak point in the contract is that it does not include the West Virginia miners. It is clearer and better expressed than the Chicago agreement; but whether the 66-cent mining rate can be maintained

under the stress of competition with West Virginia coal mined under a 25-cent rate is an open question. One point is favor of its permanence is the general activity in business and the strong demand for coal, which may lead to the maintenance of better prices and give all the mines better opportunity than they have had under the bitter competition of the last two or three years.

In the death of General Michel Annenkoff, at the age of 61 years, on January 22d, Russia has lost one of her greatest engineers, who was not unworthy to rank with John B. Jervis, Benjamin H. Latrobe, Edgar Thomson and other famous engineers who made the American railroad. Brought up a soldier and receiving only a few years' technical training on the Russian general staff, when General Skobeloff conquered the independent Khanates of Tartary, General Annenkoff was assigned to the duty of building a railroad from the Caspian Sea into the newly acquired territory. Under his charge the Trans-Caspian line was built to Bokhara, Samarkand and Tashkend, under many difficulties and in a far shorter time than was at first considered possible. Later he was employed in the building of the Siberian Railroad, and helped much to interest the late Czar in the project. He had much to do with the location of the road, and it is said that he first urged the need of a terminus further south than Vladivostok, which is now realized in the Russian possession of Port Arthur and practical control of Manchuria. He also planned the extension of the Trans-Caspian line northward to a connection with the Siberian road, skirting the western frontier of China, which is now well advanced toward completion. He also located a branch through Merv into Afghanistan, the building of which was prevented by political considerations, and a branch into Persia, which is now under construction.

Though a builder of military roads, he was not unmindful of commercial results, and he made many plans for developing the resources of Russian Tartary, some of which have been at least partly carried out.

General Annenkoff was a great admirer of American methods. At his instance several young engineers of the staff were sent to study American railroad practice. On the Siberian line many American ideas have been adopted; and his influence, it is understood, helped to determine some of the large purchases of material for the road in the United States. The substitution of car ferries on Lake Baikal for 90 miles of costly and difficult construction; the bridge system adopted on the Central Division; the location of the Trans-Baikal Division from Sretensk over the Jablonnovoi Mountains and through the upper valley of the Amour; and the arrangements for keeping the road open in winter, were all in line with American methods and partly with the advice of American engineers.

Like all great engineers, General Annenkoff was ready and anxious to learn; and not the least of his good qualities was his quick perception of the value of the ideas presented to him, even when they conflicted with his own.

A NEW TUNNEL DECISION.

Another tunnel decision has just been rendered in the Federal Court at Denver which is of much interest to the numerous projects of that class which are now on foot in Colorado. The case was that of the Matoa Gold Mining Company versus the Chicago & Cripple Creek Gold Tunnel and Mining Company, and was tried before Judge Hallett, a jury determining the damages. The case for both sides was carefully presented by attorneys Lee, Judge Ady and Irwin for the plaintiff and Giles and Rockwell for the defendant. It was an action brought to recover the value of ores removed by the Tunnel Company from under the patented Gold Pass No. 1 lode claim of the plaintiff, at a point some 1,300 feet from the portal. The Tunnel Company located tunnel lode claims with discoveries at the point of cutting the lode in the tunnel on the patented ground. No mining, or at least none of consequence, had been done on this lode at the surface.

The Gold Pass No. 1 lode location antedated the tunnel site. However, the major portion of the trespass was under a tract patented as part of the Jubilee Lode claim, located subsequently to the tunnel site; but this tract was also included in the original and amended location of the Gold Pass No. 1, and finally, as compensation for an agreement not to adverse, deeded back to the Gold Pass No. 1. In part the court held that as the Jubilee tract was conceded to be Gold Pass No. 1 ground by the agreement and deed, the date of the location of the Gold Pass No. 1 would control, and not that of the Jubilee.

Mr. Francis T. Freeland, as witness for the plaintiff, estimated the ore removed at 950 tons. Certain settlement sheets showed that some lots were not pay. The jury brought in a verdict for \$29,889 for the plaintiff. The average net value of the pay ore was shown to be about \$40.20 a ton on the dump, so that 743 tons were included. No compensation for mining costs were conceded, as the trespass was deemed to be willful.

Notice of a motion for a new trial was given. A second damage suit is pending for ores removed later, and also an injunction suit to stop the operation of the tunnel through this ground.

It would seem that the prosecution of the various Cripple Creek tunnel schemes will meet with insuperable obstacles, unless right of way and haulage agreements are first had. If blind lodes cut in the tunnels cannot be located under patented ground, even if they appear to outcrop elsewhere, the principal incentive for such tunnel work is removed.

THE COMMERCIAL MOVEMENT OF GOLD.

The world's great production of gold in 1898—amounting to \$286,218,954, as shown in the "Engineering and Mining Journal" of January 7th—and the existence of some unusual commercial currents, make the study of the movement of the metal of interest at the present time.

The United States, for the first time in nearly 15 years, was a heavy taker of gold in 1898, reversing the drain which began in 1891-92 and continued, with some special intermissions, for nearly six years. Our very heavy exports of agricultural products and the light imports left a heavy trade balance in favor of the United States; while the liquidation of the years 1893-96, which largely reduced the amount of securities held abroad, not only reduced the amount which could be returned in payment of debts, but also the amount required to pay interest and other charges. A large part of this balance may be considered as still unliquidated, but part of it has been drawn upon, as is shown by the following table, which gives the imports and exports of gold in the United States for two years:

	1897.	1898.
Exports	34,276,401	158,036,252
Imports	\$34,020,592	\$16,194,954
Excess	Exp. \$255,809	Imp. \$141,841,298

As our own gold production in 1898 was \$64,300,000, the stock of gold in the country was increased during the year by approximately \$206,000,000, the largest yearly addition on record. A very considerable share of this remains in the form of bullion or foreign coin, or has passed into use in the arts, since the total gold coinage of the Mint for the year was \$77,986,918. This large amount, moreover, only exceeded that reported for 1897 by \$1,958,433. The only great reserves of gold in this country, the amounts of which are reported, are the holdings of the United States Treasury and of the New York banks associated in the Clearing House. These reserves compared as follows at the close of 1897 and 1898:

	1897.	1898.	Increase.
U. S. Treasury.....	\$161,029,305	\$245,714,633	\$84,685,328
N. Y. banks.....	104,403,700	168,965,700	64,562,000
Totals	\$265,433,005	\$414,680,333	\$149,247,328

Coin stored in local banks will add somewhat to the amount of increase shown in these depositories; but all allowances made for gains in these would leave from \$35,000,000 to \$40,000,000 of our gain in gold still unaccounted for. Part of this, of course, has been used in the arts; but a part must be included in private hoards and deposits, since there has been no appreciable increase in the quantity of gold in actual circulation. The Treasury has had so much gold that it has used some of it in settlements with the New York banks through the Clearing House; but the coin so paid over remains with the banks.

Although the United States had so strong an influence on the movement of gold in 1898, London still remains the center of that movement, and any statement would be incomplete without the record of British exports and imports for the year, which is given in the Board of Trade returns. The table is as follows, in sterling:

	—Imports from—		—Exports to—	
	1897.	1898.	1897.	1898.
United States	£68,056	£48,497	£1,208,466	£10,942,162
Canada	1,088	1,446	25,000	35,000
Mexico and South America	1,929,020	2,093,184	679,215	2,611,511
Euro'n Countries	1,904,516	10,769,670	14,630,241	15,151,027
British E. Indies	1,496,614	1,656,135	2,513,055	2,650,484
China	682,109	1,365,995	.....	.....
Japan	60,240	2,419,903	5,273,620	3,776,700
South Africa	13,621,336	16,768,997	100	.....
Other Africa	398,016	844,393	1,096,415	451,131
Australasia	10,604,052	7,566,247	.....	.....
Countries not specified	43,761	186,991	5,382,459	972,035
Totals	£30,808,858	£43,721,460	£30,808,571	£36,590,950

This table requires only a few words of explanation, the chief point being that the imports from Australasia show a decrease in a year of large production. The reason for this is that \$27,653,000 in Australian gold—about £5,500,000—was forwarded this year to the United States by way of San Francisco, instead of passing through London. Most of this was on London orders. If this is added to the shipments shown above, it shows a large increase in the Australian exports.

In 1897 the imports and exports of gold in Great Britain almost exactly balanced; but in 1898 there was excess of imports amounting to £7,131,410. The difference was largely in the imports from European countries, due to some curtailment of credits in France and Germany,

and in increased receipts from South Africa. These, with large receipts from China and Japan, more than balanced the shipments to the United States.

A brief study of the table also will show how large a part of the charges and the risk attendant upon the movement of the gold represented might have been saved by the plan of an International Monetary Clearing House, which was outlined and advanced in our columns years ago.

In 1897 we had to show a large increase in the gold holdings of the great banks of the European Continent. In 1898 this movement received a decided check, as is shown by the table below, which gives the statement for the close of each year in dollars:

Gold Reserves of European Banks.			
	1897.	1898.	Changes.
France	\$390,575,057	\$364,826,800	D. \$25,748,257
Germany	146,575,000	136,220,000	D. 10,355,000
Austria-Hungary ..	140,430,000	181,155,000	D. 40,725,000
Belgium	14,170,000	15,555,000	I. 1,385,000
Netherlands	13,145,000	21,575,000	I. 8,430,000
Italy	78,945,000	74,500,000	D. 4,445,000
Russia	578,790,000	489,690,000	D. 89,100,000
Totals	\$1,406,630,057	\$1,283,521,800	D. \$123,108,257

We have omitted the Bank of Spain from this list, because its so-called gold reserve is largely hypothecated with foreign banks, and probably appears in their reserves. There have been few changes in the monetary status to affect these reserves. The currency reform for which Austria-Hungary has so long been preparing has not yet gone into effect. Russia has put some gold into circulation, and the currency is now on a metallic basis, though the paper ruble is still the chief circulating medium. On the other hand, Spain is now entirely on a paper basis, with gold at a heavy premium, and no prospect of recovery in sight. Italy is in not much better condition.

The coinage returns of the different national mints for the year are not yet obtainable; but there is no reason to change the estimate heretofore made that about 25 per cent. of the gold output is required for conversion into coin—to keep up the current stock and to provide for increasing needs of business. Our own mint, as shown by the figures given above, largely exceeded this proportion; but much of its work was in the recoinage of foreign coin, and in working up imported bullion.

The year 1898 was one of very active trade throughout the world. With a few exceptions, all the countries of the world prospered. More money has been needed, and in the chief countries there has been a greater amount to spend for objects of ornament and luxuries. The use for gold in the arts increased, and will increase for some time to come. Though the production of gold in 1898 was the largest ever known, and though it promises to reach \$325,000,000, or possibly \$350,000,000, in the current year, there is no immediate danger of the over-supply of the yellow metal—nor of any cessation in the anxious search for it.

NEW PUBLICATIONS.

"Notes on the Occurrence of Bismuth Ores in New South Wales." Bulletin of the Geological Survey, "Mineral Resources" No. 4. By J. A. Watt. Sydney, N. S. W.: Wm. A. Gulick, Government Printer, 1898. Pamphlet; pages, 12.

In this report a list is given of the localities in New South Wales from which bismuth ores have been recorded. The list is a long one, and some of the samples run very high in metallic bismuth. The production of bismuth ore in the colony was, however, only 41 tons, valued at £490, in 1896, and 3.1 tons, valued at £800, in 1897. In former years the output has been larger. The bismuth ores in many cases carry silver and gold.

"Emploi des Explosifs dans les Mines de Houille de Belgique pendant l'annee 1897." By Victor Watteyne and Lucien Denoel. Brussels, Belgium; Polleunis & Ceuterick, 1898. Pamphlet; pages, 86.

The Belgian Bureau of Mines, acting under the authority of the Minister of Industry and Labor, has been investigating accidents in mines, with especial reference to those caused by the use of explosives. Of this inquiry the present report, which is an extract of the "Annales des Mines de Belgique," is an outcome. The statistical returns include also accidents due to explosions of fire damp. The quantity of low explosives (including black powder) used in Belgian collieries fell off from 762,463 kgs. in 1893 to 557,900 kgs. in 1897; of high explosives, 126,962 kgs. were used in 1893 and 230,803 kgs. in 1897; while the employment of the so-called safety explosives does not seem to have advanced very much, having been 98,352 kgs. in 1893 and 128,870 kgs. in 1897. In the latter year the collieries produced 21,492,000 metric tons of coal and used altogether 917,573 kgs. of explosives in mining it; that is, at the rate of 43 kgs. of explosive for every 1,000 tons of coal mined. It appears that in Belgian colliery practice the amount of explosives used, in proportion to the coal mined, has been steadily cut down during the last five years, the average per 1,000 tons having been 51 kgs. in 1893; 48 in 1894; 45 in 1895, and, as already stated, 43 in 1897. A large part of the present report is devoted to a consideration of safety explosives. It is a valuable report.

"The Metallurgy of Lead and the Desilverization of Base Bullion." By H. O. Hofman. Fifth Edition, Rewritten and Enlarged; 1899. New York and London; the Scientific Publishing Company. Pages, 559, with 441 illustrations; cloth, 8vo. Price, \$6.

The "Metallurgy of Lead," by Prof. H. O. Hofman, of which the fifth edition has just been published, has been entirely rewritten from the fourth edition and greatly enlarged, both in text and illustrations, so that it is practically a new book. The fourth edition had 414 pages, including the index, and 275 illustrations; the fifth edition has 559 pages and 441 illustrations. These figures do not, however, measure precisely the expansion, because some parts of the previous edition have been dropped entirely, while others have been condensed. The most noteworthy omission is that of the analytical methods employed in the laboratories of lead smelting works. Probably it was best to omit the description of these processes, which belongs properly to a treatise on assaying, although their inclusion in previous editions was certainly valuable, and it might have been well to preserve them if the size of the book could have been kept within bounds. However, this seemed impossible, and readers will generally concur in the author's judgment in sacrificing this for more important matter.

The fifth edition, like its forerunners, is divided into chapters on the properties of lead and its compounds; lead ores and their distribution; receiving, sampling and purchasing ores, fluxes and fuels; smelting in the reverberatory furnace, and ore-hearth; smelting in the blast furnace; general smelting operations; furnace products and their treatment; the Pattinson process of desilverization of base lead; the Parkes' process, and cupellation, German and English. The growth of the book has taken place more or less under each of these captions, and the fifth edition bears somewhat the same relation to the fourth that a man in his prime does to his boyhood, preserving the same general features, but improved in stature and strength, both physical and mental.

The division into chapters does not represent fully the scope of this treatise, and to understand this reference must be made to the subdivisions presented analytically in the table of contents. The chapter on the properties of lead and its compounds is sufficiently explained by its title. So also are the chapters on lead ores and their distribution, which are perhaps the least important in the book, but are inserted obviously to illustrate the kinds of ore that the lead smelter has to reduce at the present time, or has been called upon to reduce since lead smelting attained its highly scientific development, or during the last 20 years. The chapter on ore sampling, etc., is probably in itself the most practical treatise on this subject to which reference can be made in present metallurgical literature. Indeed, the literature of this subject is practically limited to papers in the transactions of the engineering societies and the files of technical periodicals, and these have been summarized in Prof. Hofman's treatise, while a large amount of original matter, all of it essentially practical, has been added thereto.

The chapters on smelting in reverberatory furnaces and the ore-hearth describe the Carinthian, English and Silesian methods of reverberatory smelting and the Scotch and American methods of reduction in the ore-hearth. These methods still find considerable application in England and on the Continent, and are used to a slight extent in the United States, but they are nevertheless of comparatively small importance and quite properly only a limited amount of space is devoted to them, the two chapters comprising only 65 pages, in which is included an account of the recovery of flue dust and fume by the Lewis & Bartlett bag process, practiced at Joplin, Mo., and an account of the F. L. Bartlett process for the treatment of complex zinc-lead sulphides, which is practiced at Canyon City, Colo.

The chapter on Smelting in the Blast Furnace has been greatly enlarged and now covers 160 pages, some of the more important smelting works of the United States being described in much greater detail than is to be found in any other treatise on any metal in any language. It goes exhaustively into the subject of ore roasting, discussing the theory of sulphide oxidation and the details of all the roasting furnaces, mechanical and manual, which are in use at the present time. This part of the book constitutes in itself a treatise on roasting processes, which would be complete if roasting in heaps, stalls and kilns had been described, but these methods are omitted since they are seldom practiced by lead smelters. The selection of a furnace site and general arrangement of plant, the design of blast furnaces and their accessory apparatus are taken up in great detail. A large amount of space is also devoted to the chemistry of the blast furnace process, the action of various fuels, fluxes and the important minerals which are met with in lead ores, the composition of lead slags, etc. The methods of calculating a charge are given in detail. I do not know any other treatise where this part of the metallurgist's duty, which is generally considered a mystery sealed to all but the initiated (although in reality it is a simple matter) is described so fully and so clearly. Nor do I know of any other treatise where the details of blowing in and blowing out and the irregularities in the operation of the furnace are described so minutely and comprehensively.

The chapter on furnace products takes up the subjects of matte roasting and smelting of roasted matte; wall accretions; hearth accretions; flue dust; and the treatment of these troublesome between products. The losses in smelting and the cost of smelting are also treated under this caption.

The concluding part of the book is devoted to the desilverization of base silver-lead, following much the same general plan as in the previous edition. Steam-pattinsonizing has received special attention, however, on account of the increasing prevalence of bismuth in the ores now treated and the consequent possibility that it may be combined in the future with the Parkes' process in order to produce a larger percentage of lead for corroding purposes than can now be obtained. The improvements in the Parkes' process by W. H. Howard, which have greatly changed the methods of practical working, are fully described. So also is the English method of cupellation, wherein the furnace has undergone radical changes in construction.

Prof. Hofman's treatise, since its first publication, has been the standard authority on the metallurgy of lead as practiced at the present

time, and has received the highest praise from metallurgists actively engaged in lead smelting. The new and enlarged edition is far more valuable than its immediate predecessor on account of the introduction of the large amount of new matter above mentioned and the bringing up to date of all accounts of practice in every part of the world, but especially in the United States. Particular reference should be made to the large number of new illustrations which have been inserted, many of these being working drawings of a kind not often seen in a treatise. Their appearance in Prof. Hofman's speaks highly of the esteem in which his work is held by the metallurgists who consented to furnish the drawings.

This book is the highest development of the technical treatise, such as was not dreamed of 20 years ago, wherein the descriptions of apparatus and processes are almost always illustrated by actual working drawings, showing dimensions. If the student wishes to investigate the history of the metallurgy of lead he should refer to the old general treatises. If he wished to study existing methods, with a view to the construction or operation of lead smelting works, he should refer to Prof. Hofman's. There is no other of the same kind treating of the metallurgy of this metal.

W. R. I.

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 on another page of the Journal.

"Kalkulos sobre las Kanerías de Agua." By A. E. Salazer. Santiago de Chile; Hume, 1898. Pages, 246; with diagrams and tables.

"Annual Report of the Chief of the Bureau of Steam Engineering, United States Navy, 1898." Washington, D. C.; Government Printing Office. Pages, 55; with 22 diagrams.

"Statistical Abstract for the Several Colonial and Other Possessions of the United Kingdom, in Each Year from 1883 to 1897." London, England; H. M. Stationery Office. Pages, 300.

"Annual Report of the Comptroller of the Currency to the Third Session of the Fifty-fifth Congress of the United States." In two volumes. Volume I. Washington, D. C., 1898; Government Printing Office. Pages, 823.

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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.

Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Phonolite Ores in the Black Hills.

Sir: A few weeks ago O. V. Pryor, of Cripple Creek, Colo., who had been in the Black Hills upon professional business, made the announcement that he had discovered large bodies of phonolite west of Deadwood; and since that time there has been little else talked of in mining circles of the Northern Hills. It is comparatively a new thing, although it has been known for a long time that this character of ore existed in some parts of the hills. Dr. Walter P. Jenney, who some time ago at the instance of interested parties made an expert examination of the Cripple Creek District, has also made an examination of the phonolite deposits of the Black Hills, and declares that this character of ore is found in a dozen or more places near Deadwood, and that great results may be expected when developments have progressed a little further. He has secured assays from several samples, with results varying from \$2 to \$112 per ton in gold. Furnace tests have also been made of several samples, and they have sweat beads of gold. Mining men who have operated in the Cripple Creek District have examined the Black Hills belt, and declare that they have never seen stronger veins nor better surface indications than here disclosed. This character of rock has been termed blue shale, trachyte and a species of granite, by the prospector, and has been shunned to a great extent because of its hardness. This is the first time that the attention of mining men has been called to the possibilities of mining in phonolite in the Black Hills, and many inquiries are being made from mining men all over the country in regard to the discovery. Should it prove to be so good as present indications point, it would warrant a person in presuming that it will not be long before the country will pass from the hands of the prospector into those of the capitalist.

W. J. McFarland.

Deadwood, S. D., Jan. 9, 1899.

The Darrington District, Washington.

Sir: Among the many mineral discoveries recently made in the State of Washington none are more notable than those near Darrington in what is known as the White Horse District, in Snohomish County. Although the country has not been thoroughly prospected, many veins have been discovered and located, all showing a good grade of ore; though in the different parts of the district the ores are of widely different character. In one section are several veins of galena from 14 to 30 in. wide, carrying from \$8 to \$15 per ton in gold and varying quantities of silver, some running as high as 300 oz. Gold Mountain, which appears to be the richest section of the district, has numerous veins of ore averaging, from surface assays, about \$20 per ton in gold, a small quantity of silver and 14 per cent. copper. These are true fissure veins, vertical, well defined and continuous; they can

be traced from water level in an easterly direction to the summit of the mountain, an elevation of about 3,000 ft., and down the opposite side. As many as seven claims have been located on a single lode with distinct outcrops on each claim. On one claim a vein more than 4 ft. wide, with average assays across its width of from \$20 to \$31 per ton in gold, from a trace to 5 oz. of silver and 14 per cent. copper, has been exposed for a distance of some 500 ft. by removing the loose surface soil. There are other lodes of greater width in its immediate vicinity. Wherever development work has been done in the district the ore bodies increase both in width and assay value with depth attained. The ores are not refractory, but are easy smelting varieties.

Only 45 miles from Puget Sound and 20 miles from navigable water on the Skagit River, with no mountains nor large hills intervening and a wagon road to the river; with a level plain of several square miles' extent and only 565 ft. above sea level, excellently adapted to the purpose of a site for a town, smelting plants, etc.; with abundance of timber and water for all purposes, and a climate which will admit of uninterrupted work throughout the entire year, the facilities for mining are excellent, and the district is well worth investigating.

E. J. Miles.

Darrington, Wash., Jan. 7, 1899.

Correspondence Schools.

Sir: I was tippie boss at a colliery in West Virginia a number of years. Had I possessed any knowledge of mining I am sure I could have been mine boss, for the position was offered me recently. If the United Correspondence School does what you say it can do for me, another offer will not be refused by me.

T. J. B.

Eckman, W. Va., Jan. 16, 1899.

Sir: The South presents many advantages for mining men in the future, yet, strange to say, our colleges, even the University of Virginia, have no mining courses, and we are forced to either study in the North or go without a mining education. The questions of means here prevents many young men from following that course, and we hail with gratification the United Correspondence Schools of Home Study, to which you have called our attention.

J. B. Cox.

Knoxville, Tenn., Jan. 15, 1899.

Sir: On reading in the "Engineering and Mining Journal" of January 7th your reference to the mining course of the United Correspondence School of Mines, I immediately enrolled. I have a fairly good knowledge of mining and wish to perfect myself in ore dressing and metallurgy. I have been anxiously awaiting just the course you mention, and I write to thank you for keeping your readers informed on all live topics.

H. D. Miles.

Tucson, Arizona, Jan. 18, 1899.

Sir: I note with pleasure that thorough and reliable courses in mining engineering are now being offered to the public. From my personal experience with the men engaged about our mines I am thoroughly convinced that all, or any number of men, who, with just such a training as they can obtain through a correspondence school, will be able to vastly improve their earning capacity and therefore attain a more satisfactory position in life.

I have myself seen what a course in electrical engineering with the United Correspondence School did for one of my men. From the results of this course and from an examination of the other courses of this school I would say that vast benefits are to be derived from a course in these schools and their work in improving the condition of workmen deserves the highest commendation.

Z. M.

Denver, Colo., Jan. 21, 1899.

Sir: I have read with great interest your note on correspondence schools in the "Engineering and Mining Journal," and if the school you recommend can provide me with what I want, I believe it will be a great benefit to me and many others. I have had a good deal of experience in running and handling machinery at mines and considered myself pretty well posted in a practical way, on engines, boilers, hoists and so on. Now they are introducing electrical motors in our section, and I find a good many points coming up which I do not understand. I want to keep up with the procession, and it looks to me as if electricity is going to be the power used at a great many mines in the West, so that a man must know something about electric motors, power transmission and all the rest of it, if he is to hold his place and not get to be a back number. I suppose from what you say that the correspondence school can help me in this matter as well as in mining and metallurgy. There are a good many others in the same box, and I believe a course in electricity would be just the thing to help us out. If we can get that—a good practical one, I mean—there is more than one here ready to join in. It seems to me, too, that if several of us come in together, we could help each other a good deal.

M. N. S.

Cripple Creek, Colo., Jan. 20, 1899.

INVESTIGATING FIRE-DAMP IN BELGIAN MINES.—A study of the phenomena connected with the generation of fire-damp and the causes which provoke its disengagement is declared by MM. L. Gerard and E. van den Broeck to be the aim of the new departure by the Belgian Geological Society, this study embracing a series of geological, physical, chemical, meteorological, and even biological and statistical problems, while it cannot but have a thoroughly scientific character; and the essential object of the new Fire-damp Committee is defined by them as consisting in (1) uniting savants, observers, societies interested in the subject and competent officials of the Government, whose advice shall aid in drawing up a detailed programme of the observations which it may be considered necessary to make; (2) determining the nature of the instruments to be used for these special purposes; (3) designating competent persons for periodically inspecting the observation stations, so as to make sure as to the regular working of the apparatus; and (4) collating and publishing the observations made, with a view to draw conclusions from them if possible.

THE STUART PROCESS FOR THE PRODUCTION OF OXYGEN.

By Romyn Hitchcock.

(Concluded from page 84.)

Applications of Oxygen.

I am not prepared to discuss at length the various applications of cheap and abundant oxygen to important industries. But little has been done, even experimentally, to develop the application of oxygen. When the gas is available on a large scale, chemists will surely find many valuable uses for it. It has been found that the use of oxygen in connection with bleaching powder or chlorine gas results in considerable economy. In the bleaching of wood pulp a saving of 30 to 40 per cent. of the bleach can be effected, while air has no such action. In the bleaching of grass for paper, actual trial showed that the introduction of 200 ft. of oxygen reduced the amount of bleaching powder required for a ton of grass from 2 cwt. to 1½ cwt. The action is not very clear. It is suggested that chlorine and oxygen act together in the nascent state, but that the nitrogen in the air carries them away before they have time to act.

Oxygen is used to a very limited extent in the purification of illuminating gas. It has been found that the introduction of 0.75 to 1 per cent. by volume of oxygen into gas before it enters the purifiers, not only materially assists the purification by lime or oxide, and greatly increases the life of the purifying agents, but it also increases the candle power of the gas.

It is said that the introduction of oxygen through a platinum tube extending to the bottom of a crucible containing melted glass in process of manufacture promotes the combination of the ingredients, expedites the fusion, hastens the clearing and makes the glass more workable. One hundred kilos. of glass require 600 litres of oxygen.

I will only casually refer to the use of oxygen in high temperature furnace work, which will undoubtedly become of importance, and to the manufacture of sulphuric anhydride by direct combination of sulphur and oxygen, or of SO₂ and oxygen. It is not impossible that we shall succeed in greatly increasing the output of blast furnaces by the use of oxygen instead of hot air at the tuyeres. But I wish to save the time before us by taking up a single application of oxygen, which has engaged my attention for some time past.

No problems are of greater industrial importance than those relating to the economical utilization of the energy of coal. The heat of coal is the original source of power which actuates the machinery of the industrial world. The steam boiler is the most efficient transformer of the energy of burning coal. If we assume the high average of an evaporation of 10 lbs. of water at 212° for a pound of carbon in coal, this represents a utilization of 66.6 per cent. of the total energy of the fuel. Twelve lbs. would represent 80 per cent., and 15 lbs. 100 per cent. About 65 per cent. is, therefore, a high average for practice.

When we consider the other uses of coal, we find that not even 10 per cent., perhaps not more than 5 per cent., of its energy is utilized.

It is not necessary to enlarge upon the greater efficiency of gaseous over solid fuel. Gas is destined to replace solid fuel, not only for domestic use in cities, but in every industry. In cities the coal carts will soon disappear, for fuel gas will be distributed to every dwelling house and manufactory. Even steam engines will be replaced by gas engines; for the more directly we utilize the energy of our fuel, the greater will be the economy. Large manufacturing establishments will also use gas, which they will generate themselves for furnaces and power.

Oxygen in Gas Making.

The great question before us in this connection is, What proportion of the energy of coal is it possible to obtain in the form of gas? There is another question, however, of not less importance in practice, viz.: What is the composition of the gas? Many well-devised gas processes have come to grief, because the projectors failed to recognize the truth, that not only must the energy of the coal be carried into the gas, but the gas must be of such composition that the energy can be efficiently utilized. It makes very much difference whether the total energy of a ton of coal is contained in 170,000 cu. ft. of gas, or in 50,000 or 60,000 ft.—whether we have a gas containing 60 per cent. of inert nitrogen and 40 per cent. of combustibles, or have the 40 per cent. of combustibles by themselves. The heat units in the total yield of gas are one element of the problem, showing the loss in gasification; but a far more important consideration, especially when the question of distribution is involved, is the available heat per cubic foot. The available heat of any gas depends upon the thermal units per foot and the calorific intensity or flame temperature. It is true that under certain conditions of working, high-flame temperature is not required, but I am speaking now of the qualities to be considered in a comparison of gaseous fuels. Natural gas carries more heat units per foot than any manufactured gas, but its practical efficiency under all conditions of use is not correspondingly high. Much depends upon how well the sensible heat of the products of combustion can be utilized.

As is well known, there are three different processes of gas making. First, we have the old process of distilling bituminous coal, in retorts. Then there is the well-known producer-gas process, in which either anthracite or bituminous coal is used. The coal is burned to CO, which, along with the nitrogen of the air used in combustion, constitutes the gas. If bituminous coal is used the volatile products pass over with the gas, but analyses of producer gases made from soft and hard coal under the same conditions show very little difference in composition. The volatile constituents of the coal are valuable for heating purposes, but in order to utilize them the gas must be burned while still hot from the producer. In most cases some steam is decomposed in the producers, but the amount must be restricted, because an excess causes a rapid reduction in temperature within the producer.

The water-gas process has made rapid progress in this country. A deep bed of coal is ignited and blown up with air until it is incandes-

cent throughout. The air is then shut off and steam is introduced. The steam is decomposed, yielding approximately equal volumes of H and CO. The accompanying table shows the average composition of the gases resulting from these different processes.

Average Composition of Different Gases.

	Distilled Coal.	Producer.		Water-gas.		Oxy-gas. Bituminous.
		Anthr.	Bitum.	Pure.	Enriched.	
CO ₂	0.3	2.5	2.5	...	0.14	2.68
CO	7.6	27.0	27.0	44.5	23.26	36.55
CH ₄	36.5	1.3	2.5	...	18.88	16.30
Hydrogen	4.3	...	0.4	...	12.82	2.05
N	48.1	12.0	12.0	50.9	37.20	40.60
O	0.4	0.3	0.3	...	...	...
N	2.8	57.0	56.2	2.08	2.64	1.62
B. T. U.	632	137	157	327	650	480
Cub. ft. from 1 ton of coal.....					40,000	60,000

The water-gas process is very interesting for its thermal reactions. It is obvious, that if we could generate a certain amount of heat by the combustion of carbon and retain all that heat in the mass of fuel within the generator, then, by shutting off the air and admitting steam it would be possible to transfer all that heat to the gas resulting from the dissociation of the steam. The combustion of the resulting gas would generate precisely the same amount of heat that was required to dissociate the steam. The water-gas process is therefore most admirable in theory. Unfortunately, the results in practice are far below the theoretical possibilities. There is an excessive waste of fuel during the blow-up, which cannot be avoided in an intermittent process. Glasgow has shown, that considerably more than 50 per cent. of the coal is burned during the blow-up, hence less than 50 per cent. is available in the water-gas. It is true, some of the sensible heat of the blow-up gases is utilized in gasifying oil to enrich the water-gas; but at the best the cost of water-gas is too great, relative to its thermal energy, to permit of its general introduction and distribution as a fuel gas for industrial operations on a large scale.

If it were possible to make a producer-gas without nitrogen, or to make a water-gas without wasting coal in the blow-up, it would be a great improvement on present methods. The new process of gas-making, which I wish to bring before you now, accomplishes both results. It is based upon the use of oxygen instead of air in gas-making. The resulting gas is a mixture of producer-gas, water-gas, and, if bituminous coal is used, distilled gas.

By the use of oxygen alone the intensity of the combustion would be so great that the introduction of steam would be necessary to moderate the temperature. In practice, the proportions of oxygen and steam must be regulated to maintain the most advantageous constant temperature. The use of oxygen in this way makes the process continuous, while the water-gas process is intermittent. There is no blow-up with oxygen, but all the carbon of the coal is burned and converted into gas, while in the water-gas process only half the coal is available for gas. Being a continuous process, it is possible to utilize the volatile constituents of bituminous coal in the generator in such manner as to convert them into fixed gas. In this way it is considered possible to produce from a ton of bituminous coal about 60,000 cu. ft. of gas, with a thermal value of about 500 B. T. U. per foot.

Theoretical Considerations.

Some calculations of the thermal reactions in the water-gas and oxy-gas processes lead to results of no little practical value. It is true, that in making these comparisons, the losses to be encountered in practice are not considered—nevertheless, the gas engineer can estimate these very closely. I have the details of the calculations at hand, but they are rather long, and I will only give you the results.

The conditions assumed for these calculations are as follows: (All temperatures in C. degrees and weights in grams.)

Initial temperatures, 20°	
Steam introduced at 165°	
Temperature of steam decomposition, 550°	
Temperature of escaping gases: For water-gas and oxy-gas, 800°; for blow-up gas, 850°; temperature of coal, after blasting, 1,000°.	
Water-Gas.—Reaction C + H ₂ O = CO + H ₂ (12 g. C and 18 g. H ₂ O.)	
Calories generated	41,355
Calories absorbed	71,719
Excess of absorption	30,384

This heat must be restored in blowing up. In this operation the coal is heated to 1,000°, and this involves a further loss of heat amounting to 5,880 calories, hence 36,264 calories must be supplied to maintain the temperature. The blow up gases are assumed to consist of CO₂, 9.7 vol. per cent.; CO 17.8 vol. per cent.; N, 72.5 vol. per cent.

On this basis it requires 12.7 grammes of carbon to make up the loss of heat in the generator. (In practice it has been shown that 16.8 grammes are required.)

The gas produced, composed of equal volumes of CO and H₂, carries 136,356 calories. The carbon consumed is 24.7 grammes, the calorific value of which is, 199,576 calories. The theoretically calculated efficiency of the water gas process is therefore 68.3 per cent.

Oxy-Gas.—Reaction C ₂ + H ₂ O + O = 2CO + H ₂ (24 g. C and 18 g. H ₂ O.)	
Calories generated	71,011
Calories absorbed	77,381
Excess of absorption	6,370

This heat must be made up by burning an additional quantity of carbon.

In practice some CO₂ is always produced, and we may arbitrarily assume that about 3 per cent. of the total carbon will be converted into this gas. The loss of heat can then be made up by burning 0.7 g. C to CO₂ and 0.3 g. to CO, making 1 gram, which yields 6,398 calories, slightly in excess of the requirements.

The gas produced will have the composition: H 32.43 vol. per cent.;

*Read by title before Section C of the American Association for the Advancement of Science, Boston meeting, 1898.

CO, 65.69; CO₂, 1.88, and the total yield of gas from 25 g. of carbon will carry 205,817 calories, showing an efficiency of 100 per cent.

To sum up we have:

Yield of gas from	Water-gas. litres.	Oxy-gas. litres.
24.7 g. C.	44.68	.....
25 g. C.	.....	68.91
Calories per litre.....	3,051	2,983
Total calories.....	136,356	205,817

The conclusion from this is that by the use of oxygen the water-gas process is perfected. A continuous thermal balance is maintained within the generator.

The great practical advantages of the application of oxygen in gas making are better shown by a comparison of the present water-gas process with the calculated output of oxy-gas. The water-gas process with anthracite coal yields about 40,000 cubic feet of gas, carrying 300 B. T. U. per foot. But one ton of bituminous coal converted into oxy-gas will yield 60,000 cubic feet, carrying about 500 B. T. U. The difference is

$$40,000 \times 300 = 12,000,000 \text{ B. T. U.}$$

$$60,000 \times 500 = 30,000,000 \text{ B. T. U.}$$

Difference, 18,000,000 B. T. U. per ton of coal.

Allusion has been made to the practical heating efficiency of gases, which is not indicated by their calorific power as usually expressed in thermal units. For illustration, I give here a calculation of the products of the combustion of 1,000 cubic feet each of natural gas carrying 1,000 B. T. U. per foot and of oxy-gas carrying approximately 500 B. T. U. Inspection of the figures will make it clear why natural gas with its 1,000 heat units cannot be a good gas for high temperature furnace work.

Natural gas 1,000 ft.			Oxy-gas 1,000 ft.		
	Feet.	Weight, Lbs.		Feet.	Weight, Lbs.
CO	5.9	0.363	1,596	365.5	26.97
H	21.8	0.115	7,139	406.0	2.13
CH ₄	926.0	39.700	932,950	162.0	6.94
C ₂ H ₄	3.1	0.230	4,922	20.5	1.52
Combustibles	955.9	40.414	946,598	954.0	37.54

Products of Combustion of 1,000 Cubic Feet of, Natural Gas.		
	Pounds.	Oxy-gas. Pounds.
CO ₂	110.5	66.26
H ₂ O	90.7	36.73
	201.2	102.99
O consumed.....	161.0	80.84
Air consumed.....	709.0	351.06
N equivalent.....	539.0	270.6

We need a formula for expressing the relative heating efficiency of gases. Calculated flame-temperatures are not satisfactory because they are not true. I would have more to say on this subject, but this communication is already too long.

ADVANCING EXPORT TRADE.

Means by which the export trade of the various countries can be advanced and increased are every day receiving more and more attention in almost every part of the world, says London "Engineering." One of these is the erection of commercial museums and the foundation of export societies; the origin of the former can generally be traced back to some important exhibition. The nature of the museums varies materially; in some countries they are purely commercial, in others they have more of the art-industrial stamp about them. This is, for instance, the case with the Imperial Royal Austrian Museum of Commerce in Vienna, or rather it was the case, for during the last few years it has been somewhat transformed. This museum owes its existence to the Vienna Exhibition of 1873, the Oriental Museum being the intermediate stage. The museum at Brussels dates from the Exhibition of 1880, when the rapidly developing Belgian industry found itself severely handicapped as regards outlets for its production. This museum publishes a journal or bulletin of a purely practical commercial nature, which is understood to be of great and universal practical value to its many readers, while the journal published by the Vienna Museum, although much better got up, is more academic and of less general use. The commercial museum of Budapest was founded after the Exhibition of 1867; this is an absolutely practical institution, which brings buyer and seller together, and is not above charging a commission (3 to 5 per cent.) on the transactions at which it assists. It gives all kind of information, and has a number of branches and sample collections abroad, whereby it is enabled to act independently of the Consuls. Germany does not much favor the idea of commercial museums—that at Frankfurt being the only important one—but goes in principally for export societies and dépôts. The largest export society in Germany is the one of Saxony, with headquarters at Dresden. It is a semi-official institution, which, however, does not receive any subsidy from the Government. It has a number of branches (over a hundred) in all parts of the world, and publishes catalogues, printed in many different languages, all over the globe. It has a large staff of travelers, and furnishes its members with a considerable amount of useful confidential information. Among its undertakings may be mentioned a branch at Sofia, which goes in for Bulgarian publications, and which has done much to advance the German trade in that country to the detriment of Austro-Hungarian trade. The export societies of Munich and Carlsruhe have ceased to exist, and the one at Stuttgart is not doing much good. In Berlin there are numerous institutions intended for the advancement of export in various ways. France has a permanent colonial exhibition, and a commercial museum at Lille, which latter is of much use to the industrial world in Northern France. Italy has permanent commercial sample exhibitions in Turin, Milan and Palermo; dépôts for Italian samples have been established at Liverpool, Brussels and Amsterdam. Portugal has a commercial museum at Lisbon,

and one at Orpoto. Holland has a commercial museum at Haarlem, but this is principally intended for the display of colonial produce. Turkey boasts an Ottoman commercial museum, which is about to or has just opened a sample dépôt for Turkish articles in Japan. The Swedish Export Society founded a commercial museum some ten years ago, and the Swedish, as well as the Danish, Export Society is doing a lot of good and steady work for the advancement of export trade.

ANNUAL MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

A circular from the Secretary says that, as already announced, the seventy-sixth (twenty-ninth annual) meeting of the Institute will be held in New York City, beginning Tuesday, February 21st, 1899. The hotel headquarters will be at the Murray Hill Hotel, Park Avenue and Fortieth Street. Theodore Dwight, Secretary of the Local Committee, should be addressed for rooms at the Murray Hill Hotel, or for information about other hotels. All communications regarding papers should be addressed to the Secretary. All other queries about the meeting to Mr. Theodore Dwight, 13 Burling Slip, New York.

The following programme is provisionally announced: February 21st—Tuesday morning, headquarters open at Murray Hill Hotel. Evening, 8 p. m., opening session at Hall of the American Society of Mechanical Engineers, 12 West Thirty-first Street. At this session a paper, illustrated with lantern views on "The Copper Queen Mine, Arizona," will be presented by Mr. James Douglas.

February 22d—Wednesday morning and afternoon, visit to and session at Columbia University. Evening, reception and dance at Sherry's.

February 23d—Thursday morning, session at American Society of Mechanical Engineers' Hall. Afternoon, free for optional excursions. Evening, session at the hall.

February 24th—Friday morning and afternoon, visit to mine and works of the New Jersey Zinc Company. Evening, free for theaters, etc.

February 25th—Saturday, optional excursions. Further particulars will be given in the local programme. No arrangement has been made for reduced railroad fare.

The list of nominations for officers of the Institute, received by the secretary, has been sent out. This list, which may be altered in accordance with Rule V., or a new list properly prepared, should be signed and mailed to the secretary. Unsigned ballots and ballots from members in arrears for 1898 will be rejected. The following officers are, under Rule IV., ineligible for immediate re-election to the same office: Vice-Presidents, D. W. Brunton, W. E. C. Eustis, James Douglas; managers, James Gayley, James F. Kemp, Benjamin Smith Lyman.

PATENTS IN AUSTRIA.—On January 1st a new patent law went into force in Austria, which is a radical departure from the old one. Heretofore every invention that claimed a patent was patented without any examination on the part of the authorities, and it was left to those whose interests were at stake to dispute the novelty of the invention in the courts. By the new law all inventions for which patents are asked are laid before the Patents Board, which consists of engineers and lawyers, and one of the five departments of the Board is instructed to examine whether the invention is indeed new. If this is found to be the case, the invention is announced in the "Journal for Patents," and a description of the new invention is exhibited during two months in the Patents Board's public rooms. Here every one can study the new invention, and dispute the inventor's right to a patent before he gets it. This difficulty in obtaining a patent is compensated for by a better protection of the invention when the patent has been granted. Tampering with a patent is regarded as a serious offense, for which fines from 500 to 2,000 florins are imposed, or imprisonment between three months and a year. Patents are to be void if the inventor allows three years to elapse without having put the invention into practical use.

JAPANESE SWORD STEEL.—An interesting paper on Japanese swords, by Mr. Gilbertson, appears in the last volume of the "Transactions" of the Japanese Society. The blades are from metal, made chiefly from the deposits of magnetic iron ore and ferruginous sand, and in the opinion of many experts no weapons are superior to those produced by the Japanese. The art of making the blades was at one time a secret, handed down from father to son and master to pupil. The mode of manufacture is as follows: A strip of steel is welded to a rod of iron which serves as a handle. A number of other strips of steel are then welded on the first until the mass measures 6 in. or 8 in. in length, 1 1/4 in. to 2 1/4 in. wide, by 1/4 in. to 3/4 in. thick. When raised to a suitable heat, this bar is doubled in half and then beaten out to the original dimensions. This process is repeated 15 times. Four such bars are made, welded together, then doubled over, again welded and forged as before 5 times. So thin are the original strips of steel, and so often are they doubled over, that it is estimated that a Japanese sword blade consists of 1,194,304 layers of metal. The bar is then beaten out from the 6 in. or 8 in. to the required length. Sometimes in the forging process the metal is hammered on the edge, and the instruments, instead of being all steel, are alternately a layer of steel and one of iron, a combination which produces beautiful markings, representing fine wood grain or wavy lines. When the blade is completed it is scraped with a knife, and the tang—that part inserted in the hilt—is shaped. The blade is then roughly ground, and if the smith is satisfied with it, he generally signs his name upon the tang. Now it is ornamented, and the process is interesting. The blade is thickly coated with a mixture of clay, fine river sand, and finely powdered charcoal. When this coating is nearly dry, a design is traced upon it, cutting through to the blade. The weapon, when the coating is properly set, is plunged into a specially prepared fire, and when sufficiently heated—only by long experience can a man judge this—it is dipped into water or oil. The operation of sharpening in the case of a very fine blade sometimes requires 50 days to finish, the surface being gone over as many as 20 times. Finally, the blade is most minutely examined by an expert.

THE WEST AUSTRALIAN MINING EXHIBITION.

The Commissioners of the West Australian International Mining and Industrial Exhibition, which opens at Coolgardie (the chief city of the gold fields) in March, 1899, have achieved the first stage of their labors. Our illustration, for which we are indebted to the "Town and Country Journal," will convey some idea of the magnitude of the undertaking. The Government granted in fee simple 15 acres of freehold land, but have also subsidised the undertaking by a grant of £5,000, to which the city corporation added £1,000. This, supplemented by voluntary donations varying from £1 to £100, has enabled the Commissioners to erect on this land the buildings shown in our illustration. The main structure is built of stone, and so devised that it may after the exhibition be utilized as a permanent school of mines and museum, and for that purpose left as a gift to the city of Coolgardie. Temporary buildings or annexes have been erected with jarrah wood and corrugated galvanized iron, extending round the land granted by the Government. These annexes really fence in that land, leaving an open space or quadrangle which will contain all open air exhibits, side shows and pleasure grounds. In order that all exhibitors may enjoy the greatly sought for privilege of an equal frontage to the main avenue, the annexes consist of a series of recesses or bays 15 ft. by 15 ft., with a facade of 15 ft. to the avenue of nations. This avenue, which begins and ends into a large hall on either side of the permanent building, is nearly half a mile in length.

As a preliminary step, and in order to assist in the classification of exhibits, an approximate estimate has been made, and the exhibition has been subdivided as under: 1, Mining Court; 2, School Exhibits; 3,

would not disgrace a much older city. The exhibition buildings were planned by Messrs. Summerhayes and Ford, architects, and erected by Mr. Connolly, contractor.

CYANIDING AT BINGHAM, UTAH.

By Our Special Correspondent.*

The cyanide plant of the Old Jordan & Galena Mining Company was in operation four months prior to January 1st, 1899. This is the fifth cyanide mill erected to work large bodies of Bingham Canyon low grade gold ores. The first plant was erected as a custom mill, but proved a failure and was moved to the Geyser-Marion Mine at Mercur. The second plant was built to work the ores of the Commercial Mine, but after a short run was closed down, owing to a serious cave-in in the mine. The milling is not supposed to have been a success. The third plant was constructed and operated by Col. H. G. Heffron. It was in this mill that the first successful results by cyaniding on Bingham ores were obtained. This plant was operated intelligently and carefully by its constructor. It was a metallurgical and financial success. The fourth plant built was the Highland Boy mill. This is by far the most elaborate and extensive mill yet built in Bingham Canyon. After a few months' operation the company decided to close it down, retaining, it is said, the auriferous quartzose ores for use in the big copper plant now being erected. The fifth plant is the Old Jordan & Galena Company's mill. Having been familiar with the successful work performed by Col. Heffron in his own mill, he was employed to take charge of the leaching part of this plant when it commenced operating.



EXPOSITION BUILDING AT COOLGARDIE, WESTERN AUSTRALIA.

Foreign Section; 4, Machinery (silent and in motion); 5, West Australian Court; 6, Departmental (Government) Exhibits; the fine arts, photography, etc., being located in the main buildings. The total area of space amounts to 235,900 ft., as under: Actual floor space, 42,375 ft.; wall space, 126,025 ft.; open air space, 67,500 ft. (in quadrangle). There are 187 bays in the annexes, of which 16 bays have been assigned to the Government department exhibits, 36 for British exhibits (industrial, etc.), 20 for United States, 20 for foreign courts, 40 for Australian courts, 40 for machinery, 15 for bars, offices, etc.

The application for any of these bays will be dealt with by the general purposes committee, who have allotment of space in their hands, when all the applications are at hand. Priority of application will have priority of choice, although really there is no difference in the locality, inasmuch as all bays face the main avenue. Powerful engines will supply the motive power, exhibitors having to find counter-shafts, pulleys, and belting. The whole of the exhibition will be lighted with electricity, and in order to save the usual rough handling of exhibits the Government has put in a railway siding, which will bring all exhibits direct from the ship's side at Albany or Fremantle to the space allotted in the annexes. It has been decided that for perishable exhibits arrangements shall be made to have them removed and sold as soon as possible, in which case the exhibitor who undertakes the removal will benefit by the sale of the exhibits, which will be conducted under the special supervision of the officers of the exhibition. Account sales and proceeds will be carefully kept and regularly remitted. The commissioners are gratified to hear that good progress is being made in popularizing the exhibition. From its inception, a diversity of opinion existed as to the advisability of holding an exhibition of this magnitude at Coolgardie. Many were of opinion that Perth, being the capital of the colony, was entitled to that honor. But, inasmuch as the basis of the movement was mining and mining machinery, the principal centre in the West Australian gold-fields took it up. The citizens subscribed liberally, and the City Council voted £1,000. The commission was appointed, and an efficient staff secured. The upshot is that Coolgardie to-day boasts of an international exhibition building which

The leaching tanks are 20 ft. square by 4 ft. deep, holding 50 tons of ore. The ore is an acid ore, requiring by laboratory tests about 2 oz. of caustic soda to a ton to neutralize. The same system Col. Heffron had used so successfully in his own plant was adopted. It was in general:

First, a wash water with 4 to 10 lbs. of caustic soda added. This wash water was not held on the ore, but was allowed to drain immediately through it.

Second, to fill tank with a 0.0005 per cent. potassium cyanide solution until the solution stood 6 in. over the ore. Allow this solution to drain through until it was 6 in. below the surface. This required about 30 minutes. Another similar solution was then run on until the ore was again covered 6 in., when it was again allowed to drain through until 6 in. below the surface. This operation was repeated 20 times; each time about six tons of solution were added. After the twentieth solution the ore was washed and sampled. If the tailings went high, about 80 cts. additional solutions were added, occasionally using a 0.001 per cent. solution.

The results of this method have been, in Col. Heffron's mill, running on ore assaying 0.225 oz. gold per ton, a saving of 87 per cent. with a loss of cyanide amounting to 1.2 lbs. per ton of ore treated. This same method in the Old Jordan mill, on the same grade of ore, showed an equally good or perhaps better saving, but a largely increased loss in cyanide, amounting to a little over 1½ lbs. per ton of ore treated. But the most astonishing result was an acid solution, which never got below 0.0001 per cent. acidity and reached as high as .0018 per cent. Even at the highest point of acidity the extraction was about as good as when an alkaline solution was being used, though at that point the precipitation on the zinc was very poor; sometimes none at all, when the solution was run on at the usual rate. Increasing the zinc surface—by decreasing the flow—would increase the precipitation, but never made it satisfactory.

*This interesting account of the recovery of gold from an acid solution at the Old Jordan Mill is from the notes of Manager A. F. Holden, under whose direction this success was achieved.

Believing that an acid solution of potassic cyanide was impossible for gold extraction, and bothered by the occasional poor precipitation, many attempts were made to neutralize the ore and solution. First, the caustic soda was increased from the determined point of 4 lbs. to the tank up to 30 lbs. to the tank; even at that rate the solution frequently came off acid. Caustic soda was also added to the solution after it had passed the ore and before it went to the zinc. Up to a certain point this addition of caustic soda would usually regenerate potassium cyanide. On the whole, the large use of caustic soda resulted in decreasing the acidity but fouled the solution and zinc to such a degree as to prohibit its extended use.

Lime was next tried in varying amounts. The amount at first used not only failed to keep down the acidity, but on every tank in which it was used the tailings jumped from 45c.—the average without lime—to \$1.50 per ton, and defied all attempts at reducing them. Lime was therefore discarded at once. Various experiments were next tried, which, after many trials, resulted in the following scheme:

First, a 0.0005 per cent. solution is added and held on the ore for 12 hours; 4 to 10 lbs. of caustic soda are added.

Second, eight more solutions, without the caustic soda, are run on, as above explained.

Third, the tenth solution is held 24 hours.

Fourth, the ore is washed.

By this method the consumption of cyanide has been reduced to about $\frac{1}{2}$ lb. per ton of ore treated. The acidity of the solution has been reduced somewhat. The stock solution occasionally, when considerable fresh solution has been added, will be alkaline; as a rule the acidity is from 0.0001 to 0.0004 per cent.

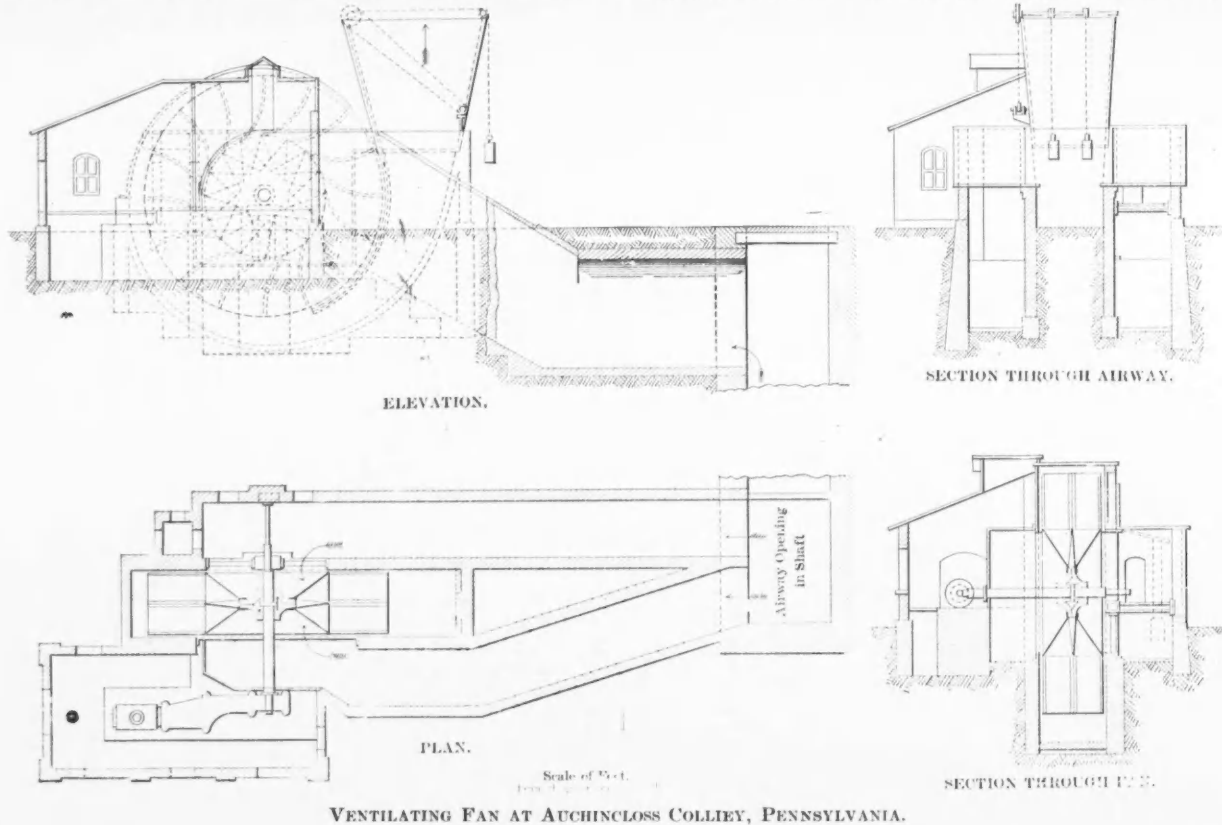
1. In operating with this acid solution the following facts are found:
2. The extraction of gold is practically the same when the solution is 0.000125 per cent. potassium cyanide as when it is .0005 per cent. potassium cyanide, which is the strongest solution used.
3. The precipitation is proportionately poor as the percentage of

VENTILATING FAN FOR AN ANTHRACITE COLLIERY.

In the early days of anthracite mining in Pennsylvania operators paid little attention to the scientific side of mine ventilation. In shallow workings with more than one opening natural drafts sometimes sufficed. Where the seams mined were not too fiery, furnaces were used to make an upcast current, and later jets of steam were sometimes employed for the same purpose. Deeper workings, however, and gassy seams necessitated fans. These at first were of small size and crude. Even as late as 1880, according to the Second Geological Survey of the State, empirical methods ruled in fan construction, and little was known of European practice. One prominent company used open fans altogether, apparently making no attempt to test the efficiency of inclosed fans. Little attention was paid to design and fans were often planned and built at the mine by some foreman or machinist. Mathematical theories were ignored; carefully conducted experiments were not tried, and the fans were often built by pure guesswork. They were usually open running, no attempt being made to secure high efficiency, and fire-proof construction was not considered, the vanes of the fans and the fanhouses being of wood.

The progress of mining, however, compelled changes. Deeper mining, gassy seams and miles of old workings to be kept ventilated necessitated powerful fans. In some collieries about Wilkes-Barre return airways frequently carry from 1 to 3 per cent. of the fire-damp, and any interruption of the air current means trouble. Fans must therefore be not only powerful, but must be free, as far as possible, from the chances of accident, and must be fireproof. The decreasing profits in mining anthracite have also compelled superintendents to regard steam economy and the efficiency of fans. While fan construction as a rule is behind the best European practice, yet the present practice in the anthracite fields is the result of costly experience and is probably by all odds the best in this country.

The fans used in the Wilkes-Barre regions are almost wholly of the



VENTILATING FAN AT AUCHINCLOSS COLLIERY, PENNSYLVANIA.

cyanide falls below 0.0005 per cent. With an acid solution exceeding 0.0005 per cent. acidity the precipitation is poor—practically none. With the very dilute acid solutions the precipitation, while not as good as with an alkaline solution, is yet fair. In figures this means an after zinc assay of 0.03 to 0.04 oz. gold per ton of solution, with weak acid solution, while with an alkaline solution the assays run from 0.01 to 0.02 oz. gold. The consumption of zinc with the acid solution has been about $\frac{1}{2}$ lb. to the ton of ore treated.

In all the work the ordinary silver nitrate test of cyanide has been used. Potassium iodide was tried as an indicator, but owing to the large amount of silver present in the solution proved entirely untrustworthy. No indicator is now used. The acidity tests are made with a standard caustic soda solution as an indicator.

We hope later to present a fuller statement of the results obtained in this remarkable plant.

LARGE GAS ENGINES.—A very large gas engine plant, probably the largest in existence, is about to be installed at the Lot's-road Pumping Station of the London County Council, says the London "Engineer." The plant, which is to be supplied by Messrs. Crossley Brothers, Limited, of Manchester, will consist of eight double-cylinder horizontal gas engines, four being rated at 260 indicated horse-power each, and four at 210 indicated horse-power each. There will further be four small engines of 5 indicated horse-power each, combined with air compressors and hydraulic pumps. The working agent is to be coal gas.

Guibal pattern, taking air from one side, and directly connected to an ordinary slide valve engine. One Capel fan has been tried, but was replaced by a Guibal, there being a strong preference for fans directly connected to the engine. The fans are of varying size up to 35 ft. diameter, and the usual periphery speed is about 5,000 ft. a minute. The most costly and most carefully designed mine fans yet installed in the Wilkes-Barre region, and probably in the United States, are those now in use at the Bliss and Auchincloss shafts of the Delaware, Lackawanna & Western Coal Company. They were designed, it is said, by an officer of the company and built by the Dickson Manufacturing Company, of Scranton. The accompanying plans and photographs show their construction. It will be noticed that they are not of the original Guibal pattern, but combine features of several modifications of the Guibal. An English colliery engineer might call them a combination of the Guibal and the Rammell. They take air from both sides and have tapering vanes between a plate casing. The fans are 35 ft. in diameter with vanes having a radial length of 9 ft. and a width at the base of 9 ft., tapering to 6 ft. at the periphery. This taper is shown by the large photograph though not indicated on the plans.

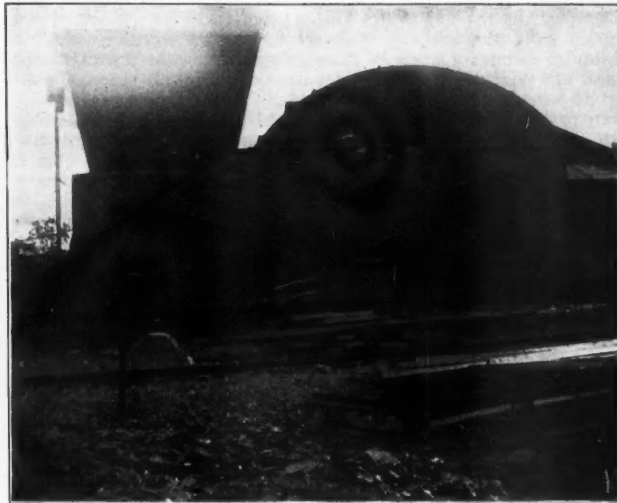
The construction is shown by the small photograph. On a forged steel axle is a central spider to which is bolted 16 channel bar arms. Fastened to these arms are steel plates forming a disc of the same diameter as the in-take openings of the fan or 17 ft. At the ends of the channel bar arms the vanes are fastened, supported at the back by a plate, which also helps to prevent eddies between the entering air cur-

rents. The vanes are so shaped as to make what may be called a forward curve, which at the periphery is perpendicular to the circumference of the fan. The sides of the vanes are fastened to an outer casing of steel plates, and this in turn is secured by long stay-bolts running to the central spider, as is faintly shown in the large photograph. The

tions and airway walls are concrete, while the engine house is of brick. The two airways to the fan are 9 ft. square. The passage under the fan at its lowest point is 6 ft. high. The top of the evasee chimney is 32 ft. from the ground and 20 ft. square in side. There is a sliding shutter with counterpoise in the chimney as shown in the plan. The



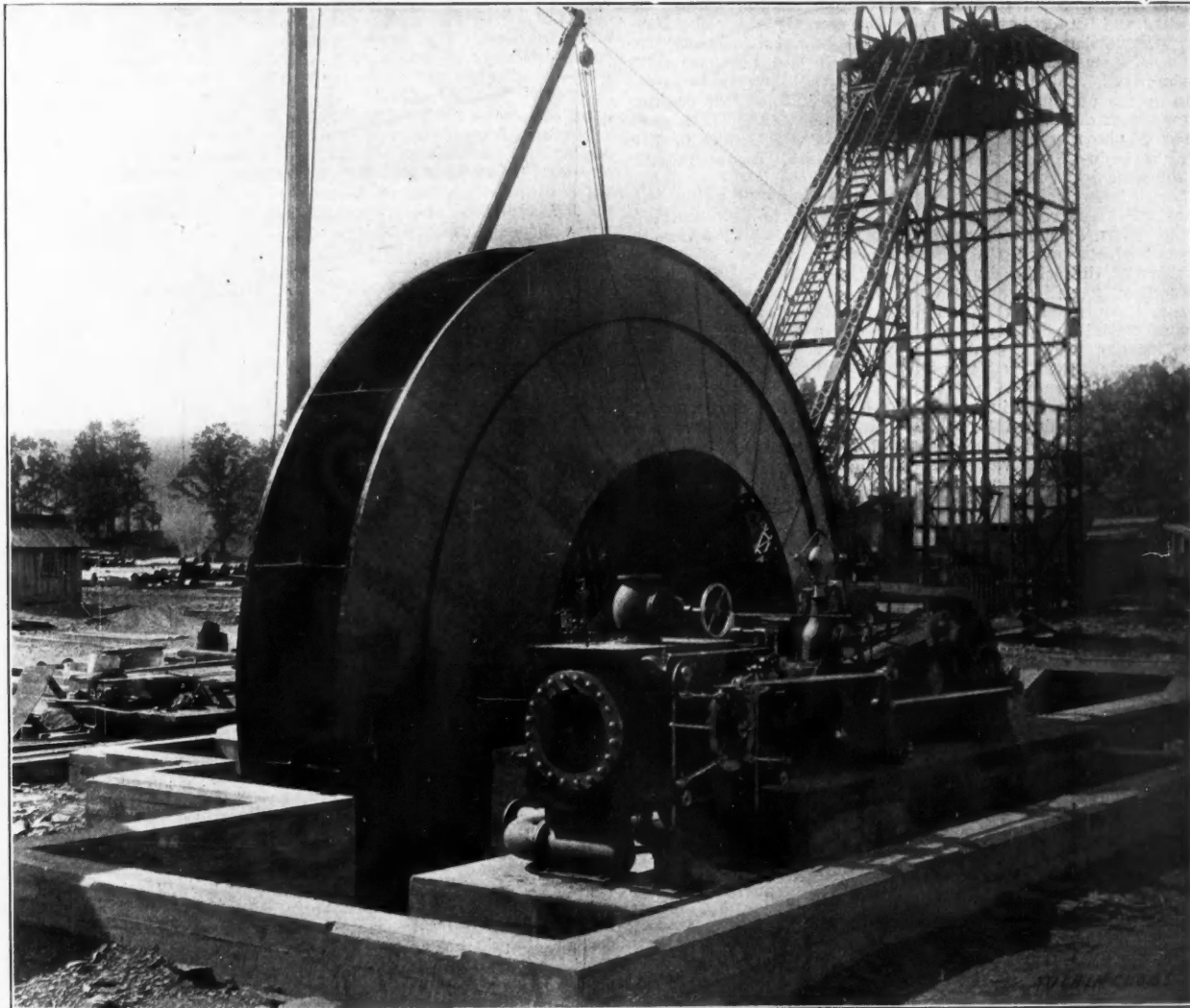
FAN IN COURSE OF ERECTION.



FAN HOUSE COMPLETED.

axle at one end rests on the pillow block of the engine; at the other end it rests on a pillow block supported on iron columns that rest on and are stayed to the concrete walls of the airway. The engine is a 26 by 48 in. Corliss, using steam at about 90 lbs. pressure. As shown

fans run smoothly and quietly with very little vibration. Standing outside the fanhouse one can hardly hear the rapid thudding that is such a familiar sound near many a colliery. The efficiency of the fans is also said to be good, though no figures are reported. A part of this



35 FOOT FAN AT AUCHINCLOSS SHAFT, PENNSYLVANIA.

in the plans the airway to the fan on the side next the engine is enclosed by steel plates to bring the engine as near the fan as possible, shortening the shaft and reducing the strains on it. The airways leading to the fans are large. The foundations to the engine and fan are massive and the fan house is of fireproof construction. The founda-

efficiency may be due to the double in-take and care taken to avoid loss by internal eddies, and to keep down losses from re-entry of air behind the vanes. As stated, the fans are probably the most expensive yet built in this country. While exact figures are not known yet it is the current report that they cost \$25,000 apiece.

THE GEOLOGY OF THE KLONDIKE REGION.*

By J. B. Tyrrell.

The Klondike region, as far as it is known to be rich in gold, has a total area of about 1,000 square miles. It is bordered on the west by the Yukon River, on the north by the Klondike River, which flows into the Yukon from the east, on the east by the great valley of Flat Creek, and on the south by the watershed between the Stewart and Indian Rivers. In past geological ages it was a rough and mountainous country, but the mountains have been eroded to gentle slopes, so that now the country is a series of vast swelling hills and deep intervening valleys, with a greatest relief of about 3,000 ft. and a greatest elevation above the sea of about 4,000 ft. The Dome is the highest point of a high ridge near the center of this area, and from about it valleys radiate in all directions toward lower country. The rocks underlying this whole region can very rarely be seen, but hills and valleys alike have a thick coating of decomposed rock, which forms an excellent soil for trees and shrubs. The creeks on which gold was mined last summer were Bonanza, with its tributary Eldorado, Hunker and Dominion, which have a total length of about 60 miles. Rich prospects were reported from many of the other creeks in the vicinity. The total number of claims worked on the above creeks was about 200.

The rocks underlying the known gold-bearing area are micaceous and sericitic schists and quartzites cut by many small and some large veins of quartz. In places the schists are also cut by extensive dykes of dark green basic rocks, and by lighter colored acid porphyries, but it is not probable that these latter have any influence on the value of the gold contents of the rock. On Bonanza and Eldorado creeks one band in the schist is highly graphitic. The schists are undoubtedly sedimentary rocks of early Paleozoic, probably of Cambrian, age, which have been highly metamorphosed, the quartz veins having probably formed in them during this metamorphism. They are not greatly disturbed, but appear to lie in wide and gentle folds. Near the Dome they are approximately horizontal, apparently on the summit of a diffuse anticline.

The Klondike schists are probably the southeast continuation of the Birch Creek and Forty-Mile schists, which have already been traced to some extent in Alaska. Farther south, in Canada, they have not been clearly followed, though it is not improbable that many of the schists, quartzites and limestones underlying the country along the Dalton Trail and westward to near White River are of approximately the same age. I saw specimens of coarse gold which had been brought from the Kasha River and its tributaries, where the country is probably underlain by mica schists not unlike those of the Klondike region. As yet very few traces of gold in these rocks have been found. The gold is concentrated in the recent sands and gravels on the banks of the rivers and in the beds of the smaller streams, as well as in stream-terraces and moraines on the sides of the valleys.

In the bottom of the valley of Bonanza Creek, as well as in the bottoms of most of the surrounding valleys is a deposit of well-rounded gravel from 6 to 20 ft. or more thick, lying on the bed-rock, which is often very much decomposed. Many of the pebbles are of white quartz, others are of the schist, but all are of local origin. The sand and gravel are usually well stratified, and often contain bones of the mammoth bison, bear, musk ox and other animals, and fragments of wood, as well as occasional peaty layers. The gravel is usually overlain by several feet of peat or sphagnum, on which may be a growth of small black spruce. Scattered through the gravel, but more especially within a short distance of bed-rock, are nuggets or particles of gold varying in size from a medium-sized potato to very minute flashes. The gold usually extends down 1 or 2 ft. into the bed-rock, and this bed-rock is raised and washed with the richer portions of the overlying gravel. On the sides of some valleys benches of well-rounded gravel, similar to that in the valley bottoms, are found extending 50 or 60 ft. up the hills. This gravel is stratified and clearly waterlain, and in a favorable locality may be rich in gold.

On Bonanza and Eldorado creeks, more especially on their western sides, some very rich claims have been located in a lateral moraine which extends along at a height of about 200 ft. above the bottom of the valley. The rich hill claims near the mouth of French Gulch are located on this moraine, which, however, has been here largely formed by a stream running between the glaciers and the sides of the valley. The gold is found at the bottom of a bed of coarse sand containing rock-flour, sand, pebbles and boulders, not well rounded, but rather of glacial shapes. The gravel is more or less distinctly stratified, and the pebbles almost always lie horizontally. The gold, often in large nuggets and including much quartz, is usually rough and but little water worn.

The conditions which would seem to have prevailed when the gold was deposited are simple and clear. The rock with its included gold had decayed to a considerable depth, and this decayed material had gradually crept toward the valley bottoms. When great ice-sheets covered much of the country to the south small local glaciers formed in the heads of the valleys and flowed down. These glaciers were, as a rule, thin, that in Bonanza and Eldorado creeks being only about 200 ft. thick, through much of its length. The glaciers cleared most of the decayed rock out of the lower parts of the valleys, while the torrential streams from their feet sorted and left the gold and well-rounded gravel as a typical glacial wash in the bottom and on the lower benches. Thus it is seen that the gold is derived from rock close at hand; that it weathered out of this rock during the progress of ages; and that small local glaciers, with the torrential streams flowing from them, assisted materially in concentrating it in the valley bottoms. In valleys that have not been occupied by glaciers it is hardly probable that the gold will be so richly concentrated, even if the underlying rock should be equally rich. The streams are all flowing over these beds of rounded gravel. I did not see an instance where one had cut down to bed-rock. The gradients of the main valleys are not

steep. Bonanza Creek from the Forks to Klondike River has an average slope of 40 ft. to the mile, while above the Forks the slope increases to 100 ft. to the mile. Eldorado Creek below the mouth of Chief Gulch has a fall of rather more than 100 ft. to the mile.

While the gravels in the valley bottoms vary in thickness from 6 to 20 ft. or more, the gravel and clay on the hillsides are sometimes more than 50 ft. thick.

As the surface is often covered with peat or vegetable matter, keeping out the summer warmth, much of the ground is frozen. A depth of over 100 ft. of frost has been reached in some places. The extent of the country penetrated by permanent frosts is not known, but probably many of the drier and more open benches are free from frost in summer. A little farther south, along the Dalton Trail, all the drier and more open country was free from frost in summer, as was shown by its being riddled with the holes of ground squirrels, who clearly could not live in permanently frozen soil.

Shaft sinking and drifting are done in winter by building fires on the frozen gravel. In summer, when fires would melt the sides of a shaft, red-hot stones are used. Where water is plentiful, as on the banks of the larger creeks, the material raised is washed in short sluices, and most of the gold is caught without the use of mercury. Hand rockers are used where water is scarce. Last summer many of the principal claims were worked by a system of open cuts or diggings. The surface peat or muck was removed, either by digging it up or by cutting a number of narrow channels through it and sweeping it off by turning on the water of the creek. The summer heat quickly thawed the surface of the gravel, and as fast as it was thawed it was scraped off and thrown into the sluices. A small amount of water might seep into the pits thus dug, but was easily removed by some kind of rough pump, the commonest being a continuous band with dippers, run by a rough water-wheel.

As the small and very rich claims are gradually washed out, there will remain a great quantity of gold to be recovered by grouping the claims and washing the gravel by cheaper methods. The decomposed rock covering the hillsides contains a certain varying amount of gold, and this can in many cases be washed and recovered by hydraulic processes. The frozen clay and gravel, when exposed in summer, thaws very quickly, leaving the material in a loose and friable condition. In this state it might be very quickly washed off the hillsides by any good stream of water which could be brought to bear upon it, especially if this stream could change its point of impact slightly from hour to hour. The lower portions of Hunker and Bonanza Creeks could probably be washed by water brought from the Klondike River, while the higher portions could probably be supplied with water from reservoirs at the heads of the creeks themselves, which could be used after the creek claims had all been washed.

Much of the country is well wooded with white and black spruce, poplar and birch, which cover the bottoms and the hillsides to heights of about 2,500 ft. above the Yukon River, or 3,500 ft. above the sea. On the lower portion of Bonanza Creek is a forest of fine tall white spruce, many of the trees being 18 in. or more in diameter. If the wood is properly cared for there is enough for all purposes for many years to come.

ELECTROLYTIC WORK AT NIAGARA.

In a long and interesting article of the electrical plants at Niagara Falls, the "Electrical World" gives an account of the manufacture of chlorate of potash as there carried on. The power is derived from a large turbine which is rated at 2,500 H. P. at 250 revolutions per minute, under the normal head of 210 ft. This is capable of driving two machines of the size used in connection with it, but at present is coupled to one only. This one machine is a General Electric, 14-pole, direct-current generator, capable of delivering 5,000 amperes at 175 volts. For the rectification of this enormous current, two commutators, one on either end of the armature, are provided, connected with two electrically independent bar windings laid in the same slots. The field is shunt-excited only. The two sets of brushes are connected up in multiple with each other. Proper division of current between the two is ingeniously effected by slightly varying the lead of one or the other set of brushes, a Weston central-zero ammeter connected to a Y-shunt being mounted on the machine, convenient to the brush-rocking wheels, so that this adjustment can be accurately maintained at all times. The generator is controlled on a panel of the switchboard in the gallery overlooking the station, its output being delivered to the plant of the National Electrolytic Company.

The 5,000 amperes are conveyed to the latter company's works with a drop of less than 10 volts over a line between terminals 800 ft. long, built of aluminum, but unlike that running to the Pittsburg reduction works, which is of aluminum rods about ¼-in. in diameter, twisted into great cables. This line is of strips 25 ft. in length and with a cross-section 6 in. by ½ in., four of these, with an aggregate cross-section of 12 sq. in., being on each side of the circuit. The line passes vertically up beside and is supported on the large penstock.

The eight ends of the two adjacent lengths of one polarity are interleaved and lapped upon each other and fastened together by aluminum rivets, as well as by heavy bolts, which also pass through flattened sections of two 1½-in. round iron rods, which are each bent into a stirrup shape. These two stirrups rest on the heads of two screw-cap fibre insulators, mounted on pins on an angle-steel framework attached to the penstock. The line was put up last summer and left with considerable slack, sufficient to allow for thermal contraction without stretching the lengths at the lowest probable temperature. Slight changes in length make, of course, quite a considerable bulging or sagging of these long bows, and their change of shape with the weather is quite noticeable. Before another warm spell comes around the middle of the lengths will be fitted with slate slabs to prevent the positive and negative sides from bulging sufficiently to come together and cause a short circuit.

The plant of the National Electrolytic Company uses 1,100 H. P. continuously, day, night and Sunday, in the electrolytic production of

*Abstract of paper read before the American Geological Society at the December meeting.

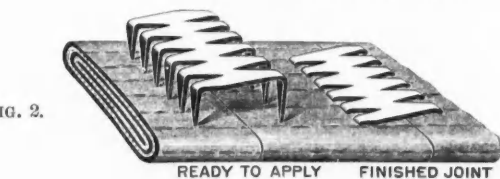
chlorate of potash. This plant is the only one of its kind in the country; in fact, the only one at present producing chlorate of potash in this country under any process, although there are other electrolytic plants for the same purpose in Switzerland and Sweden.

The importation of this material during the year 1897 was 6,200,000 lbs., and in 1898, 4,364,000 lbs. Its best known use is in medicine, but it is also used in the manufacture of matches and the dyeing of calico, in caps for toy pistols, in fireworks, where it gives a purple flame, and in that most violent of explosives, rack-a-rock. The raw material for all chlorate of potash by all methods is chloride of potassium, the source of this raw material for the whole world being in Stassfurt, Saxony. The electrolytic process uses no intermediate reagents, the oxygen necessary for the chlorate being derived directly from water. This direct method gives a product of great purity, a consideration of no small value in medical work. The process used by the National Electrolytic Company is the invention of Mr. W. T. Gibbs, of Buckingham, Quebec, and its operation so far has been successful. The company is about to double its present equipment. The technical details of the process are kept secret.

THE BRISTOL STEEL BELT LACING.

It is now nearly ten years since the Bristol Company, of Waterbury, Conn., began manufacturing the patent steel belt lacing which has become within that time familiarly known and very generally used at home and abroad. There are over 100 different sizes and lengths adapted to different styles and width of belting. The illustrations, Figs. 1, 2 and 3, show the three different types that are made, of which Fig. 1 represents that originally placed upon the market and designed particularly for leather belts.

The type illustrated in Fig. 2 was brought out later to meet the demand for a fastener for woven belts, such as are made of cotton and



THE BRISTOL STEEL BELT LACING.

rubber. In this style the distance between the rows of spurs is greater than in the original form shown in Fig. 1, and thus affords a better hold on the ends of a belt of a woven or fibrous nature. Both types of lacing shown in Figs. 1 and 2 have the patented feature that they are formed from blanks of a zigzag shape, said shape being such that the blanks may be successfully cut from a ribbon of steel without waste of material.

The latest design, shown in Fig. 3, which is now being introduced, combines the special features of both of the previously described types, the essential difference being that there are two rows of spurs on each side of the center instead of one. The patented features of this latest design are that the blanks used are of a zigzag form, and that they may be successfully cut from a ribbon of steel without waste of material, each blank as it is cut off simultaneously forming one side of the blank for the next lacing.

The advantages of this latest form of lacing are that it is equally applicable to leather, cotton or rubber belts, and that the double rows of spurs on each side of the joint insure great strength, especially when applied to old and partially worn belts. All the above types have been carefully designed to give maximum strength with minimum amount of material. All three types are easily applied without use of special tools, making smooth and elastic joints.

THE LYNCKER & SCHROPP GAS INDICATOR.

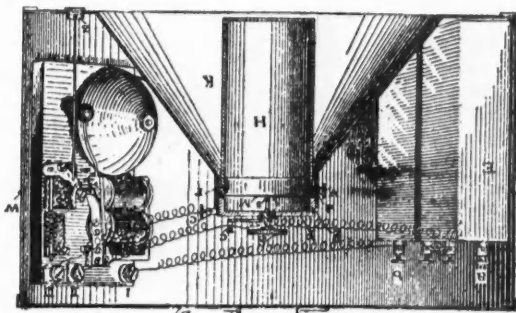
The accompanying illustration shows a device which—as described by the "Oesterreichische Zeitschrift für Berg und Huettenwesen"—is intended for use in collieries, ships' bunkers, gas works, etc., and is based upon the principle of the diffusion of gases, that when two gases are separated by a thin, porous partition—in this instance of unglazed baked earthenware—an interchange of the gases goes on by diffusion through the partition, the gas which is specifically lighter passing more rapidly than the denser and more sluggish gas. Consequently when this interchange occurs in an inclosed chamber an alteration of gas pressure ensues within the chamber, and can be employed to indicate the change that has taken place. The idea of utilizing this property of gases in order to reveal the presence of fire-damp in mines, etc., is not new. This apparatus, however, is intended to overcome defects which have been found in previous ones of the same type.

The indicator consists of a porous, unglazed, baked earthenware cylinder or diaphragm H closed at the bottom and attached to a metal ring r at the upper extremity, the said ring forming the neck and being provided with a screw thread of slow pitch. On a step-like projection in the neck rests a thin ring of india rubber, and upon the latter a fine strip of brass, a thin membrane (0.03 mm. thick) of silver foil M being laid between them and serving to close the mouth of the cylinder. Another strip of metal P (the head ring) is screwed into the neck until it makes contact with the brass strip aforesaid, and on being tightened up a little further produces a uniform tension of the silver membrane, thus closing the earthenware cell in a thoroughly gas-tight manner. Over the center of this head, or tension ring, passes a metal bridge p of suitable breadth, in the center of which is inserted a metal nut, with arm attachment, surrounded by insulating material and serving for the reception of the adjustable contact screw S. The stretched silver membrane M thus at the same time forms a gas-tight cover for the porous cell, and also an electrical conducting surface which communicates via the brass strip and tension ring, with the screw clamp c' mounted on the latter. The second electrical conduit starts from the platinum tip of the contact screw S and passes through the arm to the clamping screw e.

The earthenware cell, together with all these appurtenances, is soldered at the lower part of the metal ring r to the zinc hopper K, in which it hangs free, and the said hopper is placed in the bottom of the gas box W, which is made gas-tight by the lid D and an inserted strip of rubber. Within the gas box, and at one side of the earthenware cell, are placed a dry battery E and an electric bell, connected in circuit by the terminals a, b and I. II, III., or c, c'. A screw valve V, fitted with leather washers d, serves to equalize the air pressure.

The apparatus is intended to signal within the gas box itself, but it can be modified so as to give the indicating signal at any convenient station at a distance by removing the bell and battery to the desired position. In this case the gas box can be made smaller and the terminals of the conduits at the head of the cell can be connected by wires to terminals outside the box, the wires leading to the bell being then attached to the latter. Where a number of these apparatus are in use in various parts of a mine, etc., the signal station can be provided with an indicator plate to show which box the signal comes from.

The form described first can be used in mines to indicate the danger point to the miners at work—to warn the latter when the accumulation of fire-damp has reached the danger limit in that part of the workings.



FIRE-DAMP INDICATOR FOR COAL MINES.

It should also be used whenever blasting is about to take place.

On the other hand, the distance signalling apparatus is intended to afford the mine manager an indication of the state of the mine as regards danger from fire-damp in the various sections, and to render it impossible for a dangerous accumulation to form in any part of the mine without the knowledge of the management. If the boxes are hung at a distance of say one yard from the roof of the workings and are set to record the presence of 1 to 2 per cent. of fire-damp, the sounding of the signal will indicate that this percentage of gas has accumulated at the height mentioned, and that, above, the mixture will already be near or within the explosive limits.

The electric bell is constructed on a special system, by which all danger of explosion caused by the conducting wire is precluded. Under tests applied in the Chemico-Technical Laboratory at Munich the apparatus sounded the signal, with 1 per cent. of methane in 10 seconds; with 1 per cent. of illuminating gas in 8 seconds; with 0.6 per cent. of hydrogen in 6 seconds.

ELECTROPLATING ON WOOD.—If a simple method of coating wood electrically with metallic deposits of silver or copper could be devised there should be a considerable demand for such articles for ornamental parts of various articles of furniture, mouldings, picture frames, etc. Mr. C. F. Barnes describes, in the "Electrical World," a method which he believes will meet the requirements. The operation is briefly as follows: The wooden article is first saturated with copper sulphate by immersing it in a solution of that substance, then removed and thoroughly dried. It is then exposed to the action of hydrogen sulphide gas, which converts the sulphate of copper to the sulphide—which is a conductor of electricity, and also insoluble in aqueous solutions. Then the article is lightly wrapped with fine copper wire and suspended in a solution of common salt at the cathode, and a current of some density is passed. The copper sulphide is thereby speedily reduced to metallic copper by the reducing action of the cathode products. When the reduction is supposed to be completed, say in ten minutes, the article is transferred to an ordinary copper-plating bath, where a coating of copper of any desired thickness may be formed upon the surface. The copper surface may be polished or varnished, and is very adherent. For silver the process is modified by immersing the object, after preliminary coppering, in the silver-plating bath.

QUESTIONS AND ANSWERS.

(Queries addressed to this department should relate to matters within the special province of this periodical, such as mining, metallurgy, chemistry, geology, mineralogy, machinery, supplies, etc. As it is manifestly impossible to devote space to all the questions and notes constantly received, preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot here undertake to give professional advice on problems requiring special investigation and which should be obtained from a consulting expert. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers should send their names and addresses. Anonymous questions will not be answered.—Editor E. & M. J.)

Copper Solvents.—What are the cheapest solvents for oxide and carbonate of copper, excluding acids?—A. D. M.

Answer.—This is a question which requires some care in answering, and you had better take the advice of a competent expert, after he has made careful examination of your ores. To speak generally, cuprous oxide is soluble in a concentrated solution of magnesium chloride, in a solution of ferrous chloride, and in aqua ammonia. Cupric oxide is soluble in concentrated solutions of caustic soda and caustic potash; also in an aqueous solution of sulphurous anhydride. Carbonates of copper are generally soluble in aqua ammonia and solutions of ammonium salts.

Use of a Siphon.—I am sinking a shaft (now 6 ft. deep) a further 8 or 9 ft. Water fills the present hole in about six hours. I propose using a siphon of 2-in. rubber hose, 70 ft. of which, measured from the top of the shaft, will be required to bring the outlet lower than the bottom of the shaft when finished. Do you think it will work? What is the best way to start it, what fittings should there be, and what difficulties may I expect? I understand that air accumulates in the bend. How long will it flow before this stops it?—D. G. E.

Answer.—A siphon should work well for a hole 15 ft. deep. Better have the long end several feet lower than the bottom of the hole. Fill the hose with water by plugging the short end, moving the hose to one side and underrunning it to get all the air out; carry the long end down hill, remove plug from short end under water, and there you are. Water should flow till the hose leaks or sucks air at the bottom. Do not have too sharp a bend at top of shaft. The neatest arrangement would be an iron tee in the hose at collar of shaft, and a plug for each end of hose. Put a valve and a short vertical piece of pipe in one end of the tee. Fill siphon through pipe and shut valve before opening the short leg. You can regulate flow by reducer or valve in long end.

Beryllium.—What is this metal worth? What is it used for? Where is the ore or raw material in demand? What is its form and its color?—J. C. W.

Answer.—Beryllium, or glucinum, is one of the rarer elements that, in a metallic form, are quoted at a high price, because there is no demand for them except as curiosities for occasional use in the laboratory. Glucinum is quoted at \$5.95 per gram at makers' works in Germany. It is not reduced in this country on a commercial scale. It may be of use in electrical work. The chief ore of glucinum is the mineral beryl or glucinum silicate. The difficulty of extracting the metal is one reason for its high price. Beryl, nominally, contains about 14 per cent. of glucinum oxide, and is a rather common mineral, associated with granite rocks. Very large crystals have been found. It is generally green in color, but may be pale blue or even yellow. It can usually be distinguished by its greenish color, glassy lustre and hexagonal form. It is harder than apatite or green tourmaline, and can be told from topaz by its imperfect cleavage. Clear, flawless crystals are prized as gems, blue-green varieties as aquamarines, and the deeper green as emeralds.

Suction Dredges.—I notice in a recent article on the dredging of gold-bearing sands in New Zealand in the "Engineering and Mining Journal" the statement that suction or pump dredges have been tried and found unsatisfactory. Can you state the objections against such dredges, there or elsewhere?—W. B.

Answer.—Suction dredges do excellent work in many places, and for some classes of dredging they cannot be bettered. The objection to them in gold dredging is that they do not clean up the bed-rock unless it is smooth and free from cracks and also from bowlders, which, of course, is very seldom the case. Experience has shown that in most instances the best value in gold is found on or near the bed-rock, and it is important to save all that can be found there. In fact, unless the rock is very hard, it is a common practice to break up and take out a foot or so of this bed-rock with the overlying gravel. Moreover, the suction dredge will not remove the larger bowlders, and it is quite possible that coarse gold and occasionally nuggets may be left under them. These are the chief reasons why a scoop or bucket dredge has been found more efficient in saving gold from river bed deposits.

Kaolin.—Where is the nearest market for a Missouri kaolin, and who will buy it? What price is now being paid for kaolin? Does the clay

have to be perfectly free from iron; if not, what percentage is allowable? How does the supply of kaolin compare with the demand? K.

Answer.—1. Kaolin is sold in some quantities in St. Louis, but the chief market for your product would be in Illinois and at East Liverpool, Ohio. It is bought by the potteries chiefly; but some is sold also to paper makers. You will find an article containing a great deal of information on this point in the "Engineering and Mining Journal" of October 8th, 1898, page 426—"Clay Resources of Missouri."

2. The price varies according to quality and place. Kaolin brings from \$4 to \$6 a ton in St. Louis.

3. No clay is perfectly free from iron. The best kaolin contains from a trace up to 1 per cent. of iron oxide. Too high a proportion of iron injures the color. Over 1 per cent. of iron oxide would lower the price of the clay.

4. Good qualities of kaolin are always in demand, if they are found where transportation can be had at moderate rates. The value of the product is not high enough in proportion to the bulk to stand heavy freight charges.

Dividend-Paying Mines.—What proportion of the total number of dividend-paying mines is represented in the list printed in the "Engineering and Mining Journal" weekly; does the list include all of the prominent companies, or are there a great many companies—outside of private properties which are not capitalized—which are not enumerated? I note there is only one, for instance, as representative of Arizona, while the Copper Queen and other well-known producing and dividend-paying properties are left out. Is there any publication which will show the dividend-paying mines of this country, if not those also of other countries?—G. D. T.

Answer.—There are a large number of mining companies which do not make any returns of dividends paid. In many cases the stocks are closely held and the profits are quietly divided, no public announcement being made. The "Engineering and Mining Journal" is constantly trying to secure reports and to make its statements as full as possible; but they cannot be complete as long as many companies withhold information, for one reason or another. This reticent policy is to be regretted, and in the majority of cases the reason for it is an imaginary one entirely. If the total amount of profits on mining operations could be ascertained and stated, it would be very much greater than that shown by our reports.

There is no publication which gives the amount of dividends paid by American mining companies. "Skinner's Mining Manual" gives such statements for companies registered in the United Kingdom.

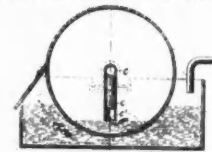
PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of the patents relating to mining and metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

Week Ending January 10th, 1899.

- 617,323. ROLLING-MILL FEED-TABLE. Francis I. Freeman, Pittsburg, Pa. Assignor to the Totten & Hogg Iron and Steel Foundry Company, same place. The combination with a rolling-mill feed-table, of an electromagnet arranged to attract and thus deflect one end of an article passing thereover, and means for energizing and de-energizing said magnet.
- 617,363. MACHINE FOR ROLLING METAL TUBES. Gustave Skogse, New York, N. Y. Assignor to the Phenix Tube Company, same place. A machine for making metal tubes which consists of means for lapping the margin of one metal strip around the edge of another metal strip, and means for rolling the compound blank thus formed into tubular form.
- 617,367. APPARATUS FOR DRYING SODIUM BICARBONATE. Ernest Solvay, Brussels, Belgium. Assignor to the Solvay Process Company, Syracuse, N. Y. The apparatus comprises a receptacle for the moist material, a filtering body with perforated walls partially

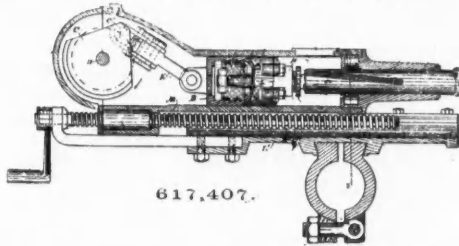


617,367.

submerged in the moist material and partially surrounded by air or other drying fluid, a pipe or conduit opening from the interior of the filtering-body for maintaining a partial vacuum within the filtering-body and retaining the material in position on the exterior face of the peripheral wall of said body, and a knife extending crosswise of the periphery of the filtering-body in proximity thereto for removing the greater portion of the dried and filtered material.

- 617,381. ELECTRIC TRANSFORMER. David H. Wilson, Chicago, Ill. The combination of an induction-coil of a coil of wire having a metallic magnetic circuit, a second coil of wire the core of which is part of magnetic circuit, the second coil being movably mounted in the magnetic circuit in such a manner as to be moved out of its normal position when the first coil is energized; a circuit-varying device connected with the movable coil so as to be operated thereby.
- 617,391. DRYING APPARATUS. Frederick Berner, Jr., Indianapolis, Ind. A rotary drier containing conveying devices whereby the material to be dried is caused to move longitudinally, and a series of plates the edges of which overlap each other and have spaces between them whereby the material being dried is prevented from falling into the center of the space within the cylinder where it would be drawn out by means of the blast and is at the same time distributed over more heating-surface.
- 617,407. ROCK DRILL. Alfred Rosenholz, San Francisco, Cal. The combination of an adjustably-supported casing and guides; a post or standard and mechanism by which the casing and guides are supported, and advanced; a hollow plunger guided and slidable in the

casing; a piston fitting and independently movable within the plunger; said casing being enlarged at one end and having a shaft journaled in this portion out of line with the axis of the plunger; a removable cap at the end of the enlarged portion of the casing

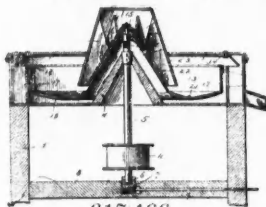


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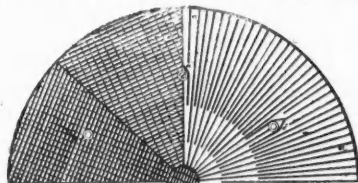
and adapted to expose the plunger-chamber in the line of its length, and permitting the ready removal of the operative parts; a drill-shank connected with the piston and means for rotating the same; a crank on the drive-shaft and a rod connecting the same with the plunger; and means for operating the shaft.

617.427. **CONCRETE.** Winifred M. Robinson, Shubenacadie, Canada. Assignor of one-half to Samuel M. Brookfield, Halifax, Canada. A concrete composed of small stones or gravel, sand or earthy material, iron oxidated or comminuted and flour of sulphur, mixed dry, and hardened by wetting with saturated solutions of silicate soda and salt.

617.466. **APPARATUS FOR SEPARATING PRECIOUS METALS FROM THEIR ORES.** James R. Macmaster, Pomeroy, Wash. The combination of a rotating separating-cylinder having a centrally-disposed cone, a depressed bottom, and an outer wall, a ring detach-



617.466.



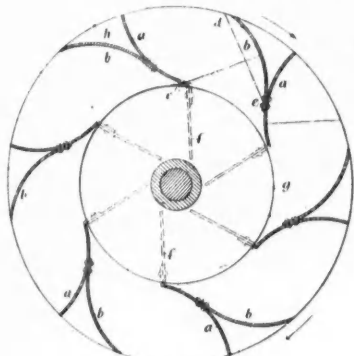
617.497.

bly connected with the upper end of the outer wall and provided with an inner flange, and a vertically arranged feeder appearing as a truncated cone mounted to revolve with the cylinder.

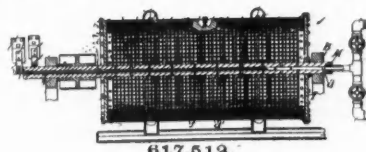
617.497. **CYANIDE FILTER TANK.** Philip Angall, Denver, Colo. A tank with a level bottom, having a central discharge, to which gutters converge, a level filter-floor above said gutters, having interstices to allow of the passage of liquids, and layers of permeable fibrous filtering material over said floor.

617.512. **APPARATUS FOR EXTRACTING PRECIOUS METALS FROM ORES.** Lewis E. Porter, Los Angeles, Cal. Assignor to the Porter Gold and Silver Extraction Company of California. The combination of a casing with discharge openings for filtered liquid; a lining of filtering material within the casing, having a space between it and the casing; means for introducing pulp into and removing it from the filter-lined chamber; a housing surrounding the cylinder and arranged to catch the filtered liquor discharged from the openings when the casing is revolved; and means for rotating the casing at a high rate of speed.

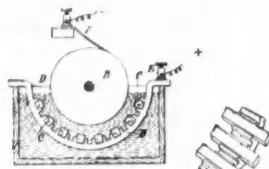
617.520. **CENTRIFUGAL FAN AND PUMP.** George M. Capell, Passenham, England. A centrifugal fan or pump provided with a series of compound wings each comprising a curved blade or wing extend-



617.520.



617.512.



617.526.

ing from the inlet to the periphery and having its concave face toward the direction of rotation, and a second blade or wing curved oppositely and extending from the first wing at a point between the inlet and the periphery, to the periphery, the passage between the adjacent wing being shortest adjacent to the inlet, increasing gradually therefrom toward the periphery and being slightly contracted at the periphery.

617.526. **APPARATUS FOR ELECTRO-DEPOSITION OF METALS.** Elisha Emerson, Buffalo, N. Y. The combination with a cylindrical cathode, of a series of horizontal anode-bars in proximity thereto, and curved supports therefor composed of lead with lugs or ribs forming receptacles for the anode-bars, whereby the latter are maintained out of contact with each other and in the same relative positions as they are dissolved.

617.530. **DIRECT CONVERSION OF ENERGY OF FUEL AND AN EXPANSION MEDIUM INTO POWER.** Augustus Howard, San Francisco, Cal., and Willard R. Green, Denver, Colo. Said Howard assignor to said Green. In the conversion of the energy of fuel and an expansion medium into power, the combination of means for compressing the expansion medium to the desired degree while retaining substantially atmospheric or initial temperature, or reducing the same, a device for at once introducing into the compressed expansion medium the fuel of combustion, with an independent igniter for igniting the fuel, whereby the expansion medium is caused to be expanded and to perform mechanical work.

617.546. **CONTROLLING ELECTRIC MOTORS AND TRAINS.** Elihu Thomson, Swampscott, Mass. Assignor to the General Electric Company of New York. The combination of a plurality of separately-actuated contacts for varying the motor speed, electromagnets for controlling the contacts, and means for controlling the magnets from a distance.

617.605. **EXCAVATOR.** William S. Russell, Toledo, Ohio. A car body or platform having a truck at one end and having at or near its other end a seat for the turn-table truck and having a similar seat between such end seat and truck, and the turn-table truck having wheels to run on the rails and fitted at its upper end to the intermediate and end seats of the car body or platform whereby it may be shifted to serve its dual functions.

617.618. **APPARATUS FOR SEPARATING DUST FROM BLAST-FURNACE GASES.** Benjamin H. Thwaite, London, England. Assignor of one-half to Frank Lacroix Gardner, same place. The combination with a downcomer and with a concentric surrounding casing, of a vessel having sloping sides and containing fluid in which the lower end of the said casing is submerged, a conductor of electricity suspended centrally in the downcomer and provided with numerous projecting points, and a generator of high-tension currents of electricity, the lower end of the downcomer lying above the fluid in said vessel to permit the gases and fumes to pass into the annular space between said downcomer and the surrounding casing.

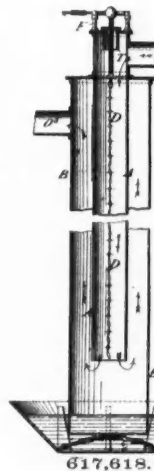
617.636. **PROCESS OF OBTAINING THORIUM OXIDES.** William Buddeus, Munich, Germany. Assignor to Ludwig Freussner and Philipp Itzig, Charlottenburg, and Gustav Oppenheimer, Berlin, Germany. The process consists in crushing raw materials containing the phosphates of thorium and cerium bases, together with ferrous titanate and zircon, into coarse granular form and then introducing them into molten alkali hydrate, whereby the phosphoric acid is separated and the ferrous titanate and zircon are unaffected.

617.646. **APPARATUS FOR MANUFACTURING GAS.** Frederick Egner, Norfolk, Va. The combination of a retort-furnace; a number of retorts set therein at an angle from the horizontal; each retort being divided into an upper and lower chamber by means of perforated removable tiles; means to heat the retort simultaneously and constantly externally, and at will internally; one end of the retorts provided with means whereby oil, steam and air may be injected into them, and the other end furnished with means whereby the gas produced may be conducted either to the hydraulic main or into the combustion-chamber of the retort furnace or elsewhere.

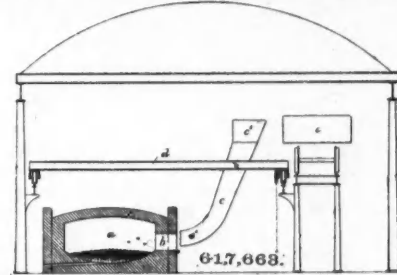
617.656. **APPARATUS FOR CLEANING AND COATING SHEET-METAL PLATES.** Charles C. Roberts, Ansonia, Conn. The combination of a pot for molten metal, a tinning-roll mounted to rotate in said pot and having a roughened surface to throw molten metal upward against the under side of a sheet of plate of metal carried over said roll, means for applying pressure to the upper side of said metal sheet or plate, rotary wipers between which the coated sheet is passed to wipe molten metal from said sheet, a pair of smooth-faced squeezing-rolls located between the tinning-roll and the wipers and means for reversing the tinning-rolls and wipers.

617.663. **MEANS FOR CHARGING OPEN-HEARTH FURNACES.** Henry Tomkins, Stockton-on-Tees, England. The combination with a movable support, of a chute carried by said support, adapted to be moved across the face of the furnaces to occupy various charging positions, the chute being provided with a hopper sufficiently flared to receive the charging material from a fixed source of supply when the movable support is shifted along its track.

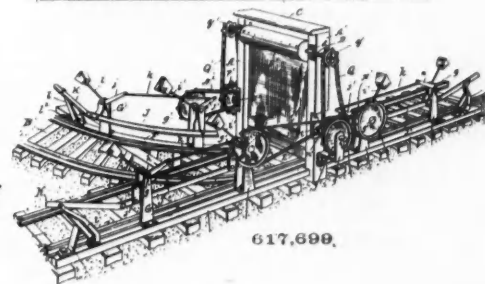
617.669. **MINE-GATE.** Newton K. Bowman, Lawrence, Ohio. The combination with a track, of a gate-frame arranged transversely thereof,



617.618.



617.663.



617.699.

a gravity-closing gate, a pair of swinging operating-bars mounted above one of the track-rails—one on each side of the gate, an inclined trip-lever connected to the outer end of said bar, and mechanism connecting between the gate and bars, whereby one of said trip-levers and its coating bar are positively swung inward by the wheel of a car approaching the gate, the other bar will also be swung inward and the gate opened.

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 3d, 1898.

- 26,394 of 1897. **COAL CUTTER.** W. E. Garforth, Normanton. Improvements in the gearing of under-cut coal cutters.
- 26,320 of 1897. **COAL WASHER.** G. W. Elliott, Sheffield. Means for separating the small coal from water in coal washers.
- 15,885 of 1898. **MAGNETIC SEPARATOR.** H. E. Languth, Aix la Chapelle, Germany. Improvement in the arrangement of electromagnets in magnetic separators.
- 21,282 of 1898. **ROCK DRILL VALVE.** G. S. Ullathorne and H. P. Vacher, London. Improvements in steam or air inlet valves in piston rock drills.

Week Ending December 10th, 1898.

- 16,735 of 1898. **REFINING SILVER BULLION.** Dr. W. Feit, Langelsheim am Harz, Germany. Improvements in the process of refining rich silver bullion by volatilizing the lead.
- 18,788 of 1898. **HARDENING STEEL.** C. W. Spensel and W. A. Lorenz, Hartford, Conn., U. S. A. Hardening steel by sheets of water forced laterally on the sheet.
- 21,678 of 1898. **COKE OVEN.** E. Festner, Gottesberg, Silesia, Germany. Improvements in the arrangements of heating flues in coke ovens.

PERSONAL.

Mr. L. S. Noble of Leadville, Col., has been examining mining properties about Battle Lake, Wyo.

Mr. Edwin D. Graves, of Hartford, has been elected president of the Connecticut Civil Engineers and Surveyors' Association.

Mr. Hartwig A. Cohen, mining engineer, of New York, has gone to Arizona to examine some copper properties in that territory.

Mr. W. Cywinski, chief engineer of the Manchurian branch of the Trans-Siberian railway, is in San Francisco, on his way to St. Petersburg.

Mr. Stephen Humphrey, formerly an assayer in Central City, Colo., who has been in Old Mexico for about 3 years, has been paying a visit to Central City.

Mr. A. H. Wood is to act as manager and Mr. H. L. Cory as cashier of the Brushy Mountain Coal Mines, at Petros, Tenn., the position of sales agent having been abolished.

Mr. Charles H. Cramp, president of the Cramp Ship and Engine Building Company, has been elected president of the Philadelphia Museums, to succeed the late William Pepper.

Mr. Geo. Cushing of the firm of Cushing & Walkup, owners of the Quien Sabe Mine at La Trinidad, Otaez, Durango, Mexico, was a visitor in New York last week. The Quien Sabe Mine is one of the large silver producers of the State of Durango.

Prof. J. B. Johnson of Washington University, St. Louis, has been elected dean of the Department of Engineering of Wisconsin University. He graduated from Ann Arbor University in 1878, and was immediately appointed to the United States lake survey, where he served until 1882, when he was appointed to the Mississippi River Commission. He has been connected with Washington University since 1884. He is a member of the Institution of Civil Engineers, the American Association for the Advancement of Science, the International Society for the Testing of Engineering Materials, the American Water Works Association and the St. Louis Academy of Science. Prof. Johnson has written several books, among which are "Topographical Surveying," "Theory and Practice of Surveying," "Modern Frame Structures," "Engineering Contracts and Specifications," "Materials of Construction" and "Index Notes on Current Engineering Literature."

OBITUARY.

Wilhelm Merck, senior member of the chemical firm of E. Merck, of Darmstadt, Germany, and father of George Merck, of Merck & Co., New York, died on January 11th, aged 66 years. He received a scientific education in London, Paris and Breslau. For many years he was president of the Darmstadt Chamber of Commerce, and a member of the local Municipal Council.

John Reynolds, president of the California Chemical Works and vice president of the San Francisco Sulphur Works, died at San Francisco on January 14, aged 73 years. Mr. Reynolds was born in Ireland and came to this country in 1848, drifted West to St. Louis and finally settled in San Francisco in 1862, where he established a silver and gold refinery. Later he experimented at Carson City, Nev., on bullion refining, and evolved a refining process.

Cummings Cherry, Sr., known as a geologist and author of geological treatises, died January 24 at his residence in Chicago, Ill., of old age. Prof. Cherry was born eighty-four years ago in Scotland, and came to the United States when he was 20 years old. He settled in California and began his geological researches, which he continued as a member of the faculty of one of its oldest educational institutions. Prof. Cherry moved to Pittsburg in 1860 and to Chicago about ten years later. He was a member of the California Pioneers' Association of Chicago and was a wealthy man.

James B. Weir, a pioneer in the petroleum export trade of this country, died at his residence in New York City on January 13th. He was born in Ireland 73 years ago. In 1863 Mr. Weir organized the Columbia Oil Company, which operated the Columbia Oil Farm, about 7 miles from Oil City, Pa. At the same time Mr. Weir started in business under the firm name of J. B. Weir & Company, in New York. This firm did a large export business in petroleum to Europe. In 1867 Mr. Weir secured renewals of the franchises for tram cars in London, Liverpool and Dublin that had been given to George Francis Train by Parliament in 1863, and furnished the money that developed the conces-

sions. In 1870 he retired from business, but 5 years ago became president of the Falling Rock Cannel Coal Company, of West Virginia.

SOCIETIES AND TECHNICAL SCHOOLS.

American Paper and Pulp Association.—The Twenty-second annual meeting of the association will be held in New York on February 15 and 16, at the Waldorf-Astoria. The annual dinner will be on February 16th.

Geographical Society of the Pacific.—At the last annual meeting of this society at San Francisco, the following directors and committees were elected: Directors, George Davidson, C. L. Taylor, John Dolbeer, E. J. Bowen, John P. Partridge, H. Durbrow and S. L. Nelson. Committee, R. C. Harrison, M. Sheldon, W. Hood, C. Goodall, J. F. Houghton, G. Nelbaum, G. C. Perkins, H. Lund, I. M. Scott, W. Alvord, E. J. Molera and H. J. Crocker.

American Chemical Society—New York Section.—At the meeting on January 20th about 40 members and guests were present. The papers read were: "The Cyanide Treatment of Clayey Tailings," by F. W. Traphagen and W. M. Cobleigh. "Analysis of Portland Cement," by Chas. T. Davies. Prof. Raoul Pictet then addressed the meeting in German, his remarks being on the subject of the purification of chloroform and the manufacture of chloroform Pictet. He illustrated his discourse with diagrams. Dr. Schweitzer subsequently gave a summary of his address in English.

Engineers' Society of Western Pennsylvania.—The 19th annual meeting of the Engineers' Society was held in Pittsburg January 17th, 1899. The following officers were elected: President, H. J. Lewis; vice-president, H. W. Fisher; directors, P. T. Berg, Prof. F. C. Phillips; secretary, R. A. Fessenden; treasurer, A. E. Frost. After the adjournment of the annual meeting a regular meeting was called, and the secretary was instructed to write to the Representative of this district stating that the pending H. R. bill 10,403 was indorsed by the Engineers' Society of Western Pennsylvania, and urging them to support it. After a discussion as to the stand the Society should take regarding the present agitation for the abatement of the smoke nuisance, the Society adjourned.

Columbia University.—The annual catalogue shows the total number of students for the year 1898-99 to be 3,707, divided as follows: College, 398; Law School, 353; Physicians and Surgeons, 706; Faculty of Applied Science, 470; Faculties of Philosophy, Political Science and Pure Science, 252; Barnard College, 257; Teachers' College, 1,250, and Auditors, 21. There are now 70 professors, 14 adjunct and associate professors, 15 clinical professors and lecturers, 3 demonstrators, 9 assistant demonstrators, 54 instructors, 31 tutors, 51 assistants, 3 curators, 25 lecturers and 12 emeritus officers, a total of 287. The comparative statement of students' expenses shows that by dint of economy an undergraduate may go through the college year of 32 weeks on \$387. The average cost is \$547, while a liberal allowance would be from \$800 up.

Engineers' Club of St. Louis.—At the meeting on January 18th 31 members and 10 visitors were present. Mr. Louis Ruckert was elected a member of the club. Mr. J. A. Ocker-son read the paper of the evening, entitled "The Southwest Pass of the Mississippi River." The paper described fully the methods of the last survey, and the physical characteristics of the pass, mentioning especially the character of the banks and the peculiar mud lumps which form at various points. Methods used in making soundings, both in the pass and in the gulf at its mouth, were fully explained. The slope of the river in the pass was stated, and the effect of the winds and tides on the slope discussed. The movement of the crest of the bar at the mouth of the pass was shown by the surveys of different periods. The advance is due mainly to sand rolling up the rear and down the front of the bar. Most of the silt brought down by the river is deposited before reaching the bar and goes to building up the banks. The plans of the board of engineers appointed to report on the improvement of the Southwest Pass were set forth, the nature of the jetties which they proposed and the necessity for the improvement. Drawings and photos were exhibited, showing the various points. The discussion following was participated in by Messrs. Flad, Connor, Freeman, Bouton, Colby, Herman, Russell and Turner.

INDUSTRIAL NOTES.

The Indiana Pipe Line and Refining Company will erect a new plant at Kankakee, Ill., to have a capacity of 3,000 bbls., and to cost \$40,000.

The Jas. Leffel Water Wheel Company, of Springfield, O., is to build a new foundry early

in the spring. It will be double the capacity of the old one.

The Omega Chemical Company, of New York City, has been incorporated. Capital, \$100,000. Directors: Michael Wineburgh, Higinio Espinosa and B. M. Moses.

The Rand Drill Company, of Tarrytown, N. Y., has secured control of the plant of the Weston Engine Company, of Painted Post, N. Y., that went into insolvency last winter.

The Armington & Sims Company, Providence, R. I., which purchased the plant of the old Armington & Sims Engine Company, has changed its name to the Eastern Engine Company.

Owing to the death of Wilhelm Merck, senior member of the firm of E. Merck, of Darmstadt, Germany, the business is now in the hands of Drs. Louis, E. A., W. and C. E. Merck.

The American Tool Works Company, of Cincinnati, recently shipped a carload of machinery to Japan for a Japanese arsenal, a carload of machinery to Italy, and several orders to Russia.

The Colorado, Texas & Mexico Railroad Company has placed an order with the Carnegie Steel Company for 30,000 tons of rails, to be used in extending the railroad. Col. Morris Locke, of El Paso, Tex., made the contract.

The Litholine Chemical Company has been organized in Jersey City, N. J., to manufacture chemical compounds, Capital, \$125,000. Incorporators: Kenneth K. McLaren, Lauriston W. Sherman, Harry W. Meen.

Mr. W. C. Mundt has succeeded the late Otto C. Mundt in the business conducted under the firm name of Chas. Mundt's Sons, manufacturers of perforated metals. The firm makes a specialty of all kinds of fine screens for mining purposes.

The newly organized Pressed Steel Car Company, of Pittsburg, Pa., has received an order from the Oregon Short Line Railroad, of Utah, for 300 steel freight cars, each of 100,000 lbs. capacity. The contract will amount to about \$300,000.

A. Middlebrook, manager of the Denver branch of the Jeanesville, Pa., Iron Works Company, has sold the Ixex Mining Company, of Leadville, a large compound condensing mine pump with 36-in. stroke. It will be the first 36-in. stroke mine pump at Leadville.

The Laidlaw-Dunn-Gordon Company, of Cincinnati, O., through its St. Louis branch, has just secured a contract for a compound Corliss air compressor, with a capacity of 1,500 cu. ft. of air per minute, from one of the leading lead companies in Southeast Missouri.

The Geo. V. Cresson Company, New York, recently received an order for a Buchanan magnetic separator with a capacity of 50 tons per day, to be used for the separation of iron from zinc ores; also an order from the Lehigh Cement Company, of Ormrod, Pa., for 36-in. Buchanan crushing rolls, weighing 30,000 lbs. The Lawrence Cement Company, of Siegfried, Pa., has awarded the contract for the power transmission machinery for its new cement mill.

The Baltimore & Ohio Railroad has awarded contracts for the construction of 51 new steel bridges along its lines west of the Ohio River. The Youngstown Bridge Company, of Youngstown, O., will erect 31, the Pencoyd Bridge Works 11, and the Edge Moor Bridge Company, of Wilmington, Del., 9. The total cost is \$300,000, and nearly 6,000 tons of steel will be needed.

The Koken Iron Works, of St. Louis, has secured the contract for the structural work of the new casting building being erected at Granite City, Ill., by the American Steel Foundry Company, of St. Louis, Mo. The central span of the new structure will be 80 ft., with wings 60 ft. in dimension, and its entire length will be 400 ft.

The Jeffrey Manufacturing Company, of Columbus, O., that has recently taken up the manufacture of standard elevator buckets and spiral conveyors, reports a very flattering trade on account of its ability to supply high-grade material at moderate prices. To any one requiring material in this line the Jeffrey Company will send its latest catalogue and prices upon application.

The Duquoin Iron Works, of Duquoin, Ill., that has been engaged in the manufacture of coal mining machinery and of the Blakely pump, will remove its plant to Birmingham, Ala. It is said that for the present the company will confine itself to the manufacture of gasoline and gas engines and veneering machinery, and will do business under the name of the Blakely Company.

The Cleveland Rolling Mill Company, having been absorbed by the American Steel and Wire

Company, new directors have been elected as follows: Wm. Chisholm, Wilson B. Chisholm, Arthur De Forest, Thos. H. Taylor, Wm. P. Palmer, Isaac L. Edward and Wm. Edenborn. Wm. Chisholm was elected president; Wm. P. Palmer, vice president, and Thos. P. Taylor, secretary of the company.

The organization of the Borax Consolidated, Limited, with \$7,000,000 capital and a debenture issue of \$5,000,000, to control the major part of the world's borax and boracic acid, is announced from London. The leading constituent companies are the Pacific Coast Borax & Redwoods Chemical Company; the Borax Company, of England; the Société Lyonnaise, of France, and the various South American companies, which supply raw material to European refiners. There will be seven companies in the combination.

Owing to increased business demands made upon Messrs. Baker & Co., platinum refiners, to secure additional space, they have found it necessary to remove their New York office from 121 to 120 Liberty street. They have on exhibition at the above address a number of specimens of crude platinum, among which is their large nugget, which is believed to be the largest nugget in any collection on the American continent. The collection is very interesting to metallurgists, chemists and all persons interested in the different uses of platinum.

The following changes have been made in the official staff of the Illinois Steel Company, of Chicago, Ill., as a result of its coming under the control of the Federal Steel Company: Mr. Eugene J. Buffington has been elected president, vice Mr. J. W. Gates, resigned; Mr. Wm. P. Palmer has resigned as second vice president; Mr. T. J. Hyman has been elected secretary, vice Mr. W. A. Green, resigned; Mr. A. M. Crane has resigned as general sales agent, and the sales department will, until further notice, be in charge of Mr. George Baker, assistant general sales agent; Mr. C. A. Honecker has resigned as cashier.

The Berlin Iron Bridge Company, of East Berlin, Conn., has shipped several carloads of bridge material to the Hawaiian Islands. The contract was obtained through its regular agency at Honolulu. Men will be sent from the United States to put up the bridge, which is for highway travel, and consists of one span of 200 ft., 40 ft. wide, across a river in one of the larger towns. The Berlin Iron Bridge Company, besides its agency at Honolulu, has one at Guadalajara, Mexico, and at Berlin, Germany, and has also a representative traveling through Russia obtaining information in reference to the possibilities of steel buildings for that country.

At a meeting of the American Steel and Wire Company directors in New York this week the following officers were elected: Chairman, J. W. Gates; president, John Lambert; first vice-president, William Edenhorn; second vice-president, I. L. Ellwood; third vice-president, S. H. Chisholm; fourth vice-president, P. W. Moen; treasurer, W. A. Green; assistant treasurer, F. L. Watson, Chicago; assistant treasurer, T. P. Adler, New York; secretary, C. S. Roberts; assistant secretary, O. Owen, Chicago; assistant secretary, F. E. Patterson, New York; executive committee—I. L. Ellwood, chairman; J. W. Gates, William Edenhorn; general counsel, Seward, Guthrie & Steele; general manager, William P. Palmer; assistant general manager, A. M. Crane; general sales agent, Charles T. Boynton; auditor, C. A. Honecker; assistant auditor, Charles A. Vogt.

TRADE CATALOGUES.

"Pencilings" is the title of a neat little pamphlet printed in color that is published by the Joseph Dixon Crucible Company of Jersey City, N. J. The pamphlet sets forth the merits of the Dixon American graphite pencils and their advantages for every variety of use to which lead pencils are put.

"Incrustation and Corrosion" is the title of a little pamphlet showing the merits claimed for the boiler scale resolvent manufactured by the Pittsburg Boiler Scale Resolvent Company, of Pittsburg, Pa. The pamphlet gives directions for using the resolvent, which is especially recommended for waters strongly acid or alkaline. Testimonials are given from mining companies that have had trouble from using such water.

The series of catalogues published by Fraser & Chalmers, of New York and Chicago, form a useful library for mining men generally. Catalogue No. 6 describes clearly the "cement" rock crusher, showing its construction, and giving detailed description of the way it should be erected and adjusted. This crusher is in use at the great Alaska-Treadwell mine. The catalogue gives testimonials from that and from other well-known mines.

Catalogue No. 54 gives a description of the Sederholm boilers, which the company recom-

mends for large units and high pressures. Its construction and advantages are set forth at length. The catalogue contains tables on the properties of saturated steam, weight of water per cubic foot at different temperatures, of value to steam users.

"Generators and Rotary Transformers for Electrolytic Work" is the title of Circular No. 55 (catalogue No. 200), issued by the Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa. Numerous outline drawings and half-tone cuts show the details of construction of the field and brush holders of an 850 k.w. 180-volt generator being given, and the switch-board shown. The rotary transformers illustrated are of different sizes, the largest being 175 k.w.

The Metz & Weiss gas and kerosene engine is described at length in a catalogue issued by the manufacturer, August Metz, of New York City. The engine is built in sizes from 1/2 to 15 H. P., and is especially adapted for use where a small and efficient prime mover, taking little floor space and using little fuel, is desired. The engines, it is claimed, are so constructed as to reduce liability to injury from unskilled labor, and are intended to be dust proof. In the kerosene engine ignition is effected by compression. Testimonials are given from various users, and numerous cuts show the engines at work.

The C. & C. Electric Company, that has its main offices in New York City, and its factory at Garwood, N. J., is issuing some very neat and attractive circulars describing the dynamos and motors it manufactures. Circular 126 describes the C. & C. bipolar type of dynamos and motors, which are built in both the straight and the curved field type. Bulletin 128 describes the C. & C. multipolar type. The circulars are clearly illustrated, and give briefly much information. Some C. & C. specialties, such as field regulators, automatic starting boxes and "reaction" field regulators, are also described. Bulletin 127 describes the C. & C. iron-clad dynamos and motors, which the company recommends for use about mines, as for electric hoists, coal cutters, etc.

"The Diamond Drill and its Work" is the title of the revised catalogue just issued by the American Diamond Rock Drill Company of New York City. As the diamond drill is a recognized part of the equipment of many of the important mines in this country, particularly the Lake Superior iron mines, this catalogue, which gives full particulars about the various types of drill manufactured by the company will doubtless have a wide circulation. The catalogue gives testimonials from all over the world, and many of the letters show the actual cost of sinking holes in different kinds of rock. The company claims to have given particular attention to its smaller drills for prospecting work. The lightest, which can be driven by hand power, is stated to be capable of taking out a 1-in. core to a depth of heaviest single piece but 25 lbs.

The latest addition to the meter literature issued by the General Electric Company of Schenectady, N. Y., is "Thomson's Recording Watt Meters," a handsomely printed and illustrated pamphlet in a rich cover, dealing with the different types of these Thomson meters, which the General Electric Company manufactures, their uses and their advantages. Each type is clearly described and so illustrated that its construction can readily be understood. Full instructions are given for the care, connection and reading of these meters, not less than 200,000 of which have been sold by the company. The pamphlet should be in the library of every electric light and power station.

Bulletins Nos. 4147 to 4154, recently issued, illustrate and describe various devices manufactured by the company with noticeable clearness and precision. Bulletin No. 4147 gives a full description, with numerous drawings and cuts, of the company's GE-58 railway motor for narrow-gauge roads; No. 4148 describes C R regulators for series incandescent systems; No. 4149 running light telltale boards; No. 4150 magnetic blow-out automatic circuit breakers for 500-volt direct current circuits, and No. 4151 railway switchboards, with cuts of switchboards used on some of the largest plants in this country. Bulletin 4152 describes direct driven multipolar generators for continuous current lighting, including both the company's iron-clad and smooth body types, while No. 4154 describes the monocyclic system of power transmission now frequently used when motors and lights are to be supplied by one system.

MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" 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 con-

cerning 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 and selling goods of any kind.

GENERAL MINING NEWS.

A dispatch from Knoxville, Tenn., states that the Virginia Coal, Iron and Railway Company has bought in the blast furnaces at Max Meadows, Pulaski, Roanoke, Virginia and Bristol, Tenn., also the Bristol & Elizabethton and the South Atlantic & Ohio railroads. Cash is paid for all the properties. The company becomes owner of 125,000 acres of coal lands, 60,000 acres of ore lands, 2 railroads and 9 furnaces. The railroads extend from Big Stone Gap, Va., to Elizabethton, Tenn., passing through Bristol, Tenn., and the rich coal and mineral and timber lands of the new company. Col. E. J. Sanford of Knoxville, president of the Knoxville & Ohio Railroad, C. M. McGhee of this city and Benj. Delaney of Bristol, Tenn., promoted the deal. New York financiers were interested in the enterprise, the outcome of which was an organization with \$7,500,000 stock subscribed and the same amount of bonds, which were issued and sold for cash. Moore & Schley, the New York bankers, underwrote the bonds.

Petroleum Pipe Runs and Shipments.—The figures compiled by the Oil City "Derrick" show that the runs of Pennsylvania oil averaged 85,206 bbls. during 1898 and of Lima oil 46,928 bbls., after allowing for oil not reported. The average daily production of Lima and Pennsylvania oil makes a total of 140,134 bbls. and the daily consumption, 158,192 bbls. In 1897 the average daily production was 159,078 bbls., while the demand averaged 157,043 bbls.

International Mining Congress.—At a special meeting in Milwaukee, Wis., on January 20th, of citizens interested in mining and the mining congress to be held there in August, a general finance committee was appointed, consisting of John S. George, F. T. Terry, C. J. Dixon, George R. Best, John H. Kopmeier, P. J. Somers, Howard F. Bosworth, W. J. Morgan, Henry Ferge, J. C. Koch, Henry Weber, J. O. Buckley, John F. Burnham, August Uihlein, S. J. Hoff, Louis Auer, W. H. Earles, T. L. Kennan, Gustav Pabst, H. C. Payne, J. P. Murphy, H. A. Luedke, E. R. Stillman, I. D. Adler, C. F. Pfister, V. J. Schoenecker, Jr., J. S. Church, F. J. Kipp, W. W. Allis, J. M. Perles and Adam Gettelman. J. C. Koch was elected treasurer of the committee.

The Western Coal Mining Agreement.—The long discussion of the joint convention of coal operators and miners at Pittsburg came to an end on the night of January 24th, when an agreement was adopted which extends for one year the Chicago agreement, which closed the great strike of 1897. There are some modifications, but the main points are the 66c. rate for screened coal, the uniform screen and the eight-hour day. After signing the contract, the convention adjourned to meet at Indianapolis, Ind., the fourth Tuesday in January, 1900. It was decided to appoint a committee of four operators and four miners, one from each State, to act as a board of conciliation. The change in the date of the expiration of the agreement is the only feature. The agreement is as follows:

"1. That an equal price for mining screened lump coal shall hereafter form a base scale in all the districts above named, excepting the State of Illinois, the block coal district of Indiana to pay 10c. per ton over that of Hocking Valley, Western Pennsylvania and Indiana bituminous district, and that the price of pick run-of-mine coal in Hocking Valley and Western Pennsylvania shall be determined by the actual percentage of screenings passing through such screen as is hereinafter provided, it being understood and agreed that screened or run-of-mine coal may be mined and paid for on the above basis at the option of the operators, according to market requirements, and the operators of Indiana bituminous shall also have like option of mining and paying for run-of-mine or screen coal.

"2. That the screen hereby adopted for the State of Ohio, Western Pennsylvania and the bituminous district of Indiana shall be uniform in size, 6 ft. wide by 12 ft. long, built of flat or akron-shaped bar of not less than 5/8-in. surface, with 1 1/4-in. between bars, free from obstructions, and that such screen shall rest upon a sufficient number of bearings to hold the bars in proper position.

"3. That the block coal district of Indiana may continue to use the diamond screen of present size and pattern with the privilege of run-of-mine coal, the mining price of which shall be determined by the actual screenings, and that the State of Illinois shall be absolutely upon a run-of-mine system, and shall be paid for on that basis.

"4. That an advance of 10c. per ton of 2,000 lbs. for pick-mined screened coal shall take effect in Western Pennsylvania, Hocking Valley and Indiana bituminous districts on April 1st,

1899, and that Grape Creek, Ill., and the bituminous district of Indiana shall pay 40c. per ton of run-of-mine coal from and after same date, based upon 66c. per ton screened coal in Ohio, Western Pennsylvania and the Indiana bituminous district, same to continue in force until the expiration of this contract.

"5. That on and after April 1st, 1899, the 8-hour work day, with 8 hours' pay, consisting of six days per week, shall be in effect in all of the districts represented, and that uniform wages for day labor shall be paid the different classes of labor in the fields named, and that internal differences in any of the States or districts, both as to prices or conditions, shall be referred to the States or districts affected for adjustment.

"6. That the same relative prices and conditions between machine and pick-mining that have existed in the different States shall be continued during the life of this contract.

"7. That present prices for pick and machine mining and all classes of day labor shall be maintained in the competitive States and districts until March 31st, 1900.

"8. That the United Mine Workers' organization, a party to this contract, do hereby further agree to afford all possible protection to the trade and to the other parties hereto against any unfair competition resulting from a failure to maintain scale rates.

"9. That this contract shall remain in full force and effect from April 1st, 1899, to March 31st, 1900."

ALASKA.

White Pass & Yukon Railroad.—The road is reported completed from Skaguay to the summit of White Pass. The company has employed a large force of men, but stampedes to the gold fields are frequent and interfere with the work.

CALIFORNIA.

California Debris Commission.—The Commission has received new applications to mine by the hydraulic process from S. S. Taylor, in the Silver Star Flume and Mining Company's mine, near Spanish Ranch, Plumas County, to deposit tailings in a worked out pit; from H. S. Byam, in the Bonanza claim, in Amador County, near Michigan Bar, to deposit tailings in Arkansas Creek, and from the Badger Hill & Cherokee Gravel Mining Company, in the Badger Hill Mine, at Cherokee, Nevada County, to deposit tailings in a worked out pit.

Gray & Bullard have obtained a permit to work their hydraulic mine, at Canada Hill, Nevada County.

AMADOR COUNTY.

(From Our Special Correspondent.)

Central Eureka.—The work of freeing this mine, at Sutter Creek, of water, has been completed down to the 900-ft. level, and the shaft and levels have been found to be in good condition. The development work will be continued under the management of Superintendent W. R. Thomas.

Douglas.—The shaft at this mine, in the Volcano District, is down 400 ft., and drifting is going on both north and south with favorable results. About 20 men are employed.

Onelda.—At this mine, 2 miles north of Jackson, sinking has been discontinued, and cross-cutting has commenced on the 1,700 level. The vein will probably be reached in the next 150 ft.

Potazuba.—At Sutter Creek \$26 ore has been encountered in the drift on the 210-ft. level of this mine. The 180 tons milled at the Balliol Mill yielded \$7,000, and \$500 sulphurets.

South Eureka.—On the 1,600-ft level of this mine, at Sutter Creek, a drift has been run 300 ft. to the south. The main ore body will probably be reached within the next 500 ft. The 20-stamp mill is running steadily.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Demarest.—Work at this mine, at Altaville, is progressing rapidly. A sump has been sunk at the 400-ft., and stoping from the 300-ft. and 400-ft. will commence immediately.

ELDORADO COUNTY.

(From Our Special Correspondent.)

Springfield.—This old mine, 3 miles south of Eldorado, comprises three claims, which contain two veins, called the Church Union and Consumers. The property was reopened some months ago by Harpending & Williams, who started a shaft some distance from the old workings, and have encountered some very good pay ore. The shaft will be sunk on the foot wall to a depth of 500 ft.

KERN COUNTY.

(From Our Special Correspondent.)

Hard Cash.—At this mine, near Randsburg, the mill is crushing about 25 tons per day, which is concentrated to about one ton, which averages over \$240 per ton. Arrangements are being made to double the milling capacity.

Red Dog Mill.—The following runs were recently made at this mill, at Johannesburg: Wedge, 50 tons, yielding \$40 per ton; Big Butte, 75 tons, \$75 per ton; Windy, 100 tons, \$60 per ton, and the Minnehaha, 15 tons, at \$25 per ton.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Doss.—This mine, 2 miles south of Hornitas, has been bonded by San Francisco parties, who are pumping out the shaft, and will put a large force of men on development work.

NEVADA COUNTY.

Pennsylvania Mining Company.—At the annual meeting, held in Grass Valley, on January 16th, the following directors were elected: John M. Thomas, Edward Fitzsimmons, F. Zeitler, D. E. Matteson and T. H. Wilhelm. T. H. Wilhelm was elected president, D. E. Matteson vice-president, F. J. Thomas secretary, and the Citizens' Bank treasurer. Bennett Ople was re-appointed superintendent. The material for the new 10-stamp mill is on the ground.

PLACER COUNTY.

Pioneer Mining Company.—The December statement is as follows: Rock crushed 430 tons; value in gold bars, \$4,531; payroll, \$3,343; total expenses, \$4,281; net earnings, \$250; average value rock, \$10.54. The small output was due to the fact that the mill was stopped to make electric connections with the new machinery.

(From Our Special Correspondent.)

Crandall.—This old mine, in the North Ravine, Ophir District, is about to be reopened by an Eastern syndicate, which will begin operations very soon.

Eureka Consolidated.—At this drift mine, 3 miles north of Sunny South, on the Forest Hill Divide, the channel long sought for has been found between 400 and 500 ft. under the surface, and a quarter of a mile in the mountain. On breaking through into the cement filling the channel, pieces of driftwood were found, which is considered good evidence of the presence of the channel. Experts are of the opinion that there are two channels in this property.

Pioneer-Lynn.—The ore in these mines, one mile from Damascus, continues to improve with depth. Since reaching the 1,000-ft. level, a winze has been sunk through the ore body to a depth of 170 ft. to test the value of the shoot, and drifts were run both north and south about 150 ft. A tunnel will now be run at the 1,500-ft. level to be known as Tunnel No. 5. The ore being stoped from the 500 and 1,000-ft. levels is milling from \$9 to \$17 per ton.

Three Star.—This mine, 7 miles west of Auburn, is being worked under the superintendency of E. J. Kendall. About 35 men are employed.

SHASTA COUNTY.

(From Our Special Correspondent.)

Connor.—This property, 4 miles west of Redding, is in good shape and a large amount of fair grade ore is on the dump awaiting the completion of the 5-stamp mill that will be put in as soon as the roads are in condition for hauling to the mine. The mine is now owned by Williams & McEvoy.

Golinsky, Weischmann & Clendening Copper Claims.—This copper property, near Kennett, 20 miles north of Redding, is reported to have been bonded to Eastern parties, represented by J. Parke Channing, for \$130,000, to be paid on or before Jan. 4th, 1900, work to commence at once and continue or contract is void. The property comprised 9 claims. All mill site locations and water rights are included in the deal.

Another group of seven copper claims, belonging to E. J. Goss, C. G. Ferguson and J. Fraser, has been bonded by the same parties for \$30,000.

Uncle Sam.—This mine, 7 miles west of Kennett, which was supposed to have been worked out by the Sierra Buttes Company, is reported to have been purchased by F. H. Deakin and associates, who will continue the development work under the management of Mr. Deakin. This property has been a large producer.

Milkmaid.—This property, near French Gulch, has been leased for a long term to Ellery, O'Shay & Welsh, who will continue to develop it. There is a mill and other machinery on the property.

Spring Creek Electric Power Company.—The plant belonging to this company is in order again, and power will be furnished to the National Mill and Machinery, power drills at the Mammoth Mine, and the hoist at the Texas Mine.

SIERRA COUNTY.

(From Our Special Correspondent.)

Phoenix.—This property, located about a mile from Sierra City, comprises 7 claims on the ledge, and 2 claims on a parallel ledge higher up. The latter will be worked by a cross-cut from the Phoenix tunnels. These mines were opened up in 1866, and many thousands of tons of ore were taken out and milled, the average returns being over \$7 per ton. The old tunnel was in 700ft., with drifts running east and west 300 ft. on the ledge. At the end of the tunnel a winze has been sunk on the ledge 165 ft. The ledge in this winze is about 7 ft. wide at the bottom, and averages 4 ft. Assays show over \$10 per ton free milling. The plant consists of a 20-stamp mill, 3 water wheels under 500 head pressure,

which furnish power to operate the mill and dynamos. The property has passed into the hands of Prof. N. S. Keith and associates, who will run another tunnel 1,600 ft. to tap the ledge 800 ft. below the present one. A 3-mile flume and ditch furnishing free water belongs to the company. The litigation which has caused this property to remain idle for several years comes to an end with the transfer of the mines.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Black Oak.—This mine, just west of Soulsbyville, is still operated by steam power, it being impossible to utilize the water from the ditch on account of the snow. Stoping is going on in the 800-ft. north.

Hudson & Calhoun.—This mine, at Saw Mill Flat, is being worked through the Fox Mine tunnel. This tunnel has been retimbered and put in good condition. The ore shoot, which was lost in sinking, has been cut and shows good ore.

Lucy.—Development work is still going on at this mine, one mile northeast of Summersville. A 25-ft. open cut has been made, and 10 tons of very rich ore has been taken from a vein which is from 4 to 10 in. wide.

Standard.—At this mine, near Columbia, a cross-cut tunnel has tapped a 6-ft. vein of very good free milling ore. After driving about 40 ft. on the vein, the result was satisfactory. Another tunnel, driven several hundred feet from above, is in about 60 ft. on the vein, which shows up well. Assays are being made from samples taken from all the openings.

Street.—This mine, ½ mile north of Tuttle town, has been started up with a force of 12 men under Superintendent F. Wooster. The shaft will be straightened, sinking resumed, and a new road to the property built. A 6-stamp mill is on the ground.

COLORADO.

Boulder County.

Village Bell Gold Mining Company.—This company, with \$1,000,000 capital in \$1 unassessable shares, has been incorporated under the laws of Colorado to work the Village Bell mine on Spencer Mountain, near Eldora. H. L. Paris is president, and C. F. Avery, treasurer. Walter Jenness is superintendent at the mine. The company has a New York office and is floating stock in the East.

Clear Creek County.

(From Our Special Correspondent.)

Consolidated Stanley Mining Company.—Air drills are sinking the 2-compartment shaft at Idaho Springs. The showing of ore continues from the level at 600 ft. The shaft will go down to 1,100 ft. before stoping. The ore body as opened is of great size.

Crockett Mining Company.—Sinking is under way at this mine at Idaho Springs and a depth of 600 ft has been gained. No effort has been made at cutting stations, and it is understood no effort will be made until the shaft is 700 ft. deep. The ore streak is showing in all parts of the shaft. An adit level driven for 700 ft. carries a nice streak of ore.

Gum Tree Gold Mining Company.—In drifting on the Belmont vein near Idaho Springs the management has opened about 2 ft. of pay ore. Timbers are being put in for stoping, as the ore was found at 600 ft. below the surface.

Smuggler.—B. C. Catren, Jr., the manager of this property at Georgetown says that a plant of machinery is to be added and shaft sinking will be undertaken. Immense silver bearing ore bodies have been cut in the adits.

El Paso County—Cripple Creek.

(From Our Special Correspondent.)

December Output.—The output of this district for December amounted to 33,122 tons, of the value of \$1,230,260. Of this, 8,938 tons, of the value of \$70 per ton, were sent to the smelters, and 24,184 tons, of the value of \$25 per ton, were treated by the chemical mills. The principal dividends paid by the public stock companies were as follows: Portland, \$60,000; Gold Coin, \$20,000; Victor, \$100,000; Matoa, \$25,000, as well as a number of others.

Isabella Gold Mining Company.—At the annual meeting of the stockholders the following directors were elected for the ensuing year: F. H. Morley, Geo. D. Kilborn, J. A. Hayes, W. S. Jackson and Nelson B. Williams. The reports of the officers are of considerable interest and will be given later. At a meeting of the directors the following officers were chosen: Nelson B. Williams, president; F. H. Morley, vice-president; Geo. D. Kilborn, managing director; J. F. Sanger, secretary, and W. T. Doubt, treasurer.

Marinette Mining Company.—At the annual meeting of the stockholders the following directors were elected: Geo. R. Arnold, president; J. R. Arnold, vice-president; E. S. Arnold, treasurer and manager; A. L. Arnold, secretary, and R. R. Arnold. The company owns the Abe Lincoln Mine, in Poverty Gulch, which is worked

under lease and bond by several Denver and Cripple Creek men. The mine has been pumped out and is shipping some very good ore.

Mary McKinney Mining Company.—This company is putting in a new hoisting plant, which consists of a 2-cylinder geared hoist, made by Webster, Camp & Lane, of Akron, O., and sold to the company by Hendrie & Bolthoff, of Denver. The cylinders are 13x15 in. New boilers have already been put in. The new hoister is at the Johnson shaft, 3 compartment. The lease on this ground expires about February 1st. A new ore house is being built and the company will soon take hold of the property itself. Good ore is being taken out of the Rouse shaft on the property, which lies some distance to the south of the main workings. This block of ground is worked under lease by Crandall and others, and has about a year to run.

Matoa Gold Mining Company.—A decision was rendered this week in the United States Court in Denver giving this company judgment against the Chicago & Cripple Creek Tunnel and Mining Company and others for about \$30,000. This judgment was for ore extracted from ground belonging to the Matoa Company. It is understood that the case is to be carried to a higher court.

Moon-Anchor Gold Mining Company.—From a circular issued by the directors it is learned that the Gold Hill property is to be absorbed by an English company. The new company is registered in London as the Moon-Anchor Gold Mines Company, Limited, and is to have an issued capital of 350,000 shares of the par value of £1 each, and a working capital of 50,000 shares of £1 each. The company becomes the owner of the Moon-Anchor Mine and some other property on Gold Hill, towards the purchase of which \$25,000 has been paid by the Moon-Anchor Company. Of the 350,000 shares of issued capital, 50,000 are to be issued to the Moon-Anchor Company, and will be held in that company's treasury. An option on the remainder of the capital of the new company is held by a reliable London financial concern, the option providing that the Moon-Anchor receive for its interest in the property the minimum sum of £180,000, about \$900,000, as well as other consideration.

Gilpin County.

Gold Coin Mines Company.—The company, in a circular to its shareholders, states it is proposed to execute a 3-years' mortgage for \$100,000, and issue certificates bearing 6% interest, to be sold on the basis of 50c. on \$1. Each stockholder can subscribe his proportionate amount, which will be a 25c. cash subscription on each share. President Bush states that after a careful examination of the property, Mr. Benj. B. Lawrence, of Denver, recommends that \$50,000 be provided for development purposes. It is proposed that the California Company, of London, extend the time of final payment of \$50,000 due by the Gold Coin Mines Company for 2 years, and that the latter company have the privilege of operating the California and Hidden Treasure properties during that time without other rental than the usual royalties upon the ore extracted. The company's financial statement for the first 10 months of 1898 show gross income of \$102,171; cost of production and treatment of ore, \$88,593; net profits, \$13,578; other expenses, \$17,335; net deficit, \$3,757.

(From Our Special Correspondent.)

Carr.—This property produced \$3,957 with a working force of only 10 men last month. The first-class ore ran \$269.50 per ton, the second-class \$105, and the concentrating ore \$8.50 per ton.

Clay County.—Eastern parties have taken a 2-year lease and bond and they will thoroughly develop the property. W. Ballantyne has been placed in charge.

Concrete.—A new 1-in. wire cable 1,800 ft. in length has been put on the big hoister. Daily shipments are from 40 to 50 tons. S. V. Newell is manager.

Elk Park Mining and Milling Company.—A force of 25 men is at work on the Annie H., showing lots of ore. A new plant of machinery is to be put up. In the mill a roaster or converting process is to be introduced. The treatment will be to subject the ore to a low degree of heat and take the sulphide off as sulphate, leaving the gold free. C. L. Hathaway is manager. Pittsburg parties are interested.

Gold Collar.—Sinking operations have been resumed, the shaft to be sunk 200 ft. deeper, or to 500 ft., this winter. Massachusetts capital is interested and the property has more than paid for development work. L. H. Stockbridge is manager.

Golden Scepter.—This property is situated in the Pine Creek District. A new 3 H. P. plant furnished by the Mine & Smelter Supply Company of Denver is now being installed. Omaha capital is interested, with V. M. Came as manager.

Golden Wedge.—Local parties have made a new discovery, the two first assays showing values of \$18.645 and \$19.205 per ton. The property

has always been a producer of high grade ore. Rapin, Vallero & Company are the lessees.

Hampton and Rainbow.—Hal Saye and E. J. Queen have given a 3 years' lease and bond on the two claims in the Russell Mining District to C. W. Pollard. A good grade of ore was formerly taken out of the Hampton.

Imperial Mining and Leasing Company.—This company has leased and bonded the Golden Cloud mine in Russell Gulch, owned by Potter & Hawley, of Central City. G. E. Strayer is manager.

Keystone Leavenworth Mining Company.—A certificate of full paid stock has been filed, showing capital stock to be \$10,000. E. F. Olden, W. O. Jenkins, C. Bliebel, J. Key and J. W. Westman, constituting a majority of the board of directors.

Kirk.—A deed has been recorded conveying to Florence Garroth, of Cook County, Ill., 400 ft. in the Kirk lode in Illinois Central district. Uranium ore was found recently in this claim.

Modoc.—Colorado Springs parties recently took a lease and bond on this mine on Quartz Hill, and they have commenced to ship a fair grade of concentrating ore. D. Sayres is manager.

Monroe Gold Mining Company.—This company, with a capital stock of \$250,000, has been organized to work the East Monroe. The incorporators are M. B. Murrell, H. S. Shaw and F. L. Brown, all of Denver. H. Armsfield is manager.

McMaster Mill.—This 10-stamp, rapid drop style mill will be moved from the Union District to Black Hawk, and will be a custom mill.

Rebeckah Mining Company.—This company has given a 3 years' lease from February 1st to I. D. W. Stevens on the Ivanhoe, Rebeckah and Rowena Lodes in Nevada district.

Susan Mary.—The lessees have begun to sink 200 ft. deep, and are now taking out a good grade of mill ore. W. Scholl is manager.

Tonawanda Leasing and Mining Company.—This company has filed articles of incorporation, with a capital stock of \$50,000, to operate in this county. The incorporators are B. B. Lawrence, Jacob Fillins and R. G. Simonds.

Lake County.

(From Our Special Correspondent.)

Daily Tonnage.—An increased production from the Ibex, Resurrection, Iron Silver, Combination, Penn Company and a few other properties has sent the daily output to 2,000 tons of all classes of ore.

A. Y. & Minnie.—Pumping in the Moyer shaft of the Iron-Silver has taken all the water here and the lessees are able to work the lower levels. The output this month will be 1,500 tons. The mill is handling about 50 to 75 tons per day, which is producing a concentrate carrying about 12 oz. silver and 25 per cent. lead. In addition, the lessees, Newton & Douglass, are shipping ore that has been opened which averages about 20 to 30 oz. silver to the ton.

Bi-metallic Smelter.—The new furnace is probably the largest now in operation in the West. It is 18 ft. long by 3 ft. wide, and has a capacity of 200 tons net ore in 24 hours. A new 30 k. w. dynamo has also been installed, furnishing current for 20 arc lights and 300 incandescent. A motor for slag hauling is to be put in soon.

Downtown Mines.—Two big Jeannesville pumps have arrived and will be put in at the 400-ft. workings of the Penrose. Repairs are also being made at the Bohn, and in a few days all the machinery will be hoisting about 7,000,000 gals. of water out of the Leadville Basin every 24 hours. It is now likely that the Coronado, Weldon and other downtown properties will soon be able to recover their pumps, as the water is lowering rapidly.

Gordon.—Judge Omers has decided this suit, involving a three-fourths interest in the Gordon, Bengal Tiger and Old Pounder claims, in favor of Constance H. Brown and against H. D. McAllister. The decision declares the deed held by McAllister to have been a mortgage for \$26,000. A foreclosure will be ordered to pay it. In the testimony it was brought out that the property was valued at \$200,000.

Ibex Mining Company.—Shipments are running over 300 tons per day. Work has just begun putting in place the largest new electric lighting plant in the West on this property. The new dynamo will generate electricity to supply 1,000 incandescent lights, and every portion of the property will be lighted by this plant.

Iron Silver Mining Company.—Manager Robinson is now shipping from the old workings and is handling from 150 to 175 tons per day. The Moyer ore carries 8 to 10 oz. silver and .12 to .15 oz. gold.

New Years.—Lessees are working at both the 1,400 and 1,600 ft. levels of the incline, and shipping about 10 tons of ore from the workings already opened. The stuff returns about \$20 per ton at the smelter.

Yankee Doodle.—This property, owned by New York parties, but which is being operated under lease by local people, will become a big shipper,

largely iron, from now on. Shipments will resume next week.

Ouray County.

(From Our Special Correspondent.)

Camp Bird Mines and Mills Company.—The mill has 50 stamps, and is connected with the mine by a cable tramway over two miles long. The total cost of the equipment is nearly \$200,000. The crude ore resembles thin yellow mud. About 1 carload of concentrates is shipped daily. A new tunnel is being driven to tap the vein at a depth of about 1,000 ft. An extension of the Telluride Power Transmission Company's line has been brought over the range from San Miguel County, and arrangements are being made to operate the mill and mine by electricity. Next season the company will erect an electric plant of its own.

Caroline Mining Company.—The company is developing several claims through the Revenue tunnel. The tunnel, 1 1/4 miles long, is laid with double tracks, for electric motors, and is lit by electricity. The company employs from 500 to 600 men in the mine and 90 in the mill. The stokes are in good lead-silver ore. The first class is shipped direct to the Pueblo Smelters, and the second class milled. The output is about 400 tons per 24 hours. The company's mill, with a capacity of 600 tons daily, is under the supervision of W. A. Garrett, and is operated entirely by electricity. The entire business is under the personal supervision of Mr. Hub Reed, one of the owners. Shipments average 6 cars daily of first class ore and concentrates.

San Juan County.

(From Our Special Correspondent.)

Metal Output in 1898.—The output of San Juan County Mines for 1898 has been placed at \$2,973,742, divided as follows: Gold, \$1,245,073; silver, \$1,122,170; lead, \$403,688; copper, \$202,801. Although this is an increase over the published product of 1897 of 33%, the gold valuation is low from not including the Sunnyside Mine product, which would make the total output over \$3,000,000 for the year, and San Juan County, the smallest in the State, a close competitor for third place. As the county occupies third place in the State in assessed valuation of mines the increasing production would indicate that deserved attention is being drawn to the principal county industry.

Robert Bonner.—The different levels are being worked to full capacity by owners and lessees, and regular shipments average 2 oz. gold and 40 oz. silver per ton.

Boston & Silverton Mining Company.—A contract for additional work on the 4,000-ft. cross-cut tunnel has been let.

Sampson Mill.—This mill is again in operation under a new management, after some changes in the concentrating department. Experimental work will be done until Spring, when a full force will be employed at both mine and mill.

Silver Lake.—The 8 Weissner electric drills recently imported from Germany are working satisfactorily and their operation will be carefully noted by mining men.

Silver Ledge.—Manager Warner has closed both mill and mine for the winter.

Sunnyside Mill.—The new mill at Eureka, equipped with rolls, crushers, Bartlett concentrating tables and other modern devices, is completed and ore from the mine is coming over the new tramway at the rate of 150 tons per day. The mill is under able management and the ore body at the mine is large enough to meet all demands.

FLORIDA.

Seminole Hard Rock Phosphate and Sand Company.—At the annual meeting in Jacksonville officers were elected as follows: J. L. David, president; A. O. McDowell, secretary; T. A. Phillips, treasurer. Favorable reports were made for the present and future outlook of the company.

IDAHO.

Blaine County.

Cresus.—At this mine, near Hailey, the air compressor to run machine drills is in place. About 18 men are employed, which force is soon to be increased to 30.

Owyhee County.

Cumberland Gold Mining and Milling Company.—J. E. Branscombe, of Spokane, has, it is said, sold to a Wisconsin syndicate a one-fourth interest in the Cumberland Mine, at Silver City, for \$50,000. A company with \$20,000 capital, under the above name, will work the property. The Cumberland is an old-time producer. A shaft has been sunk to the 200-ft. level. The pay streak, which is reported rich, is 9 to 15 in. wide.

Empire.—This mine, near the Cumberland, recently sold to Senator Pettigrew, of North Dakota, has been reopened to the 800-ft. level.

MICHIGAN.

Copper.

Adventure.—A new compressor and boilers aggregating 200 H. P., have been ordered. Drifting progresses at the second level.

Copper Range Mining and Development.—This company, known as the "South Range Railroad," has been organized in Boston. It is said that among the directors will be Wm. A. Paine, president; Fred A. Gilbert, of Boston; James H. Seager, of Houghton, and Cameron Currie, of Detroit. The company will control about 11,000 acres of land along the mineral range, and its railroad will be about 55 miles long.

(From Our Special Correspondent.)

Arnold Mining Company.—At this old mine, in Keweenaw County, extensive improvements will be made in the spring. Connection will be had with the lake at Eagle River, and another shaft started. During the past year the mine has built a road to the Copper Falls Mine, 3 miles away; has built a rock house, put in new machinery, and made other preparations for handling rock. No. 1 shaft has been at the eighth level some time, and considerable drifting is done. Arnold was first opened in 1864.

Carp Lake Mining Company.—This mine, which was worked from 1859 to 1862, and then suspended for 35 years, is being reorganized. A committee representing the old stockholders recently bid in the property, consisting of 1,600 acres.

Eagle Harbor.—This long abandoned mine, in Keweenaw County, is occupied by 25 men, who are sinking pits and exploring. A shaft is down 73 ft.

Hancock Copper Company.—An option on the property has been secured by John Cuddihy, of Calumet, and he is in Boston endeavoring to organize a company to operate the mine.

Isle Royale Consolidated Copper Company.—Work underground at the two new shafts is said to show good results. It is intended to carry the shafts down 1,500 to 2,000 ft., and the machinery has been installed. The Isle Royale was the first property operated by other than primeval miners on the Michigan main land, having started in 1852. The property has been idle, except for tributors, since 1870.

Winona.—Shaft No. 1 is down 100 ft., No. 2 190 ft., while work has started on No. 3.

MINNESOTA.

(From Our Special Correspondent.)

The two iron ore railways running into Duluth have secured more business for the winter than ever before. They are carrying something like 80,000,000 ft. of logs from points on their lines to Duluth, for saw mills there, each road handling about half. Of the logs hauled over the Duluth & Iron Range road, about 15,000,000 ft. are for a firm of which Secretary of War Alger is head. This firm alone will furnish the road some 45,000,000 ft. annually for a long term of years.

Contracts for the Duluth & Iron Range road's new dock are nearly closed, and the delivery of material is going on. The long idle shops of the Duluth Car Company are working on some of the iron spouts and bolts.

No work is at present going on on the line of the Duluth & Northern road in track improvement, but considerable will be begun in the spring. During last year there were put into the roadbed of this line 15,588 carloads of gravel and nearly 21,000 cars of earth. For years to come some such quantity will probably have to be put in annually. This is, it must be remembered, but a short line of road. Estimates for an improvement at the dock approaches at Duluth, replacing timber with steel, are now in the company's offices, which call for an expenditure of some \$300,000. The No. 2 dock of this company will probably not be extended to full length this winter.

Not less than 9,000,000 tons of ore for the year 1899 have been covered by lake shipping contracts, including that to be carried by ore companies owning their own vessels. The rate, 60c. a ton, is one at which vessels of 2,500 tons or less cannot make money unless well managed and dispatched.

Contracts have been let for the construction of 4 steel steamships for the lake iron ore trade at a cost of something like \$250,000 each. They will be out at various times during next season to October. This makes about 16 steel and wood ships for the ore trade that will be in use next season.

Of the iron ore carrying fleets, the three largest are connected with roads and mineral interests of this State; the Bessemer Steamship Company, of which John D. Rockefeller is the head, and which runs to the Duluth, Missabe & Northern docks in Duluth, tonnage 65,000, and the valuation is \$4,000,000; the American Steel Barge Company, vessels of the whaleback type, of 40,000 tons and \$3,000,000 value; the Minnesota Steamship Company, owned by the Minnesota Iron Company, of 36,000 tons and \$2,200,000 valuation. The fourth fleet in point of tonnage and value is also a Duluth concern, most of the vessels being owned by the Zenith Transit Company, and all being managed by A. B. Wolvin, of Duluth. It has a tonnage of 25,000 tons and a value of \$2,000,000, being more per ton than any of the others, or \$80. Most of these ships are

valued at about \$60 a ton. Every ship in this list is of steel, and most are steamers, every one of the Wolvin boats being such. Of other large fleets of the lakes, that of the Menominee Transportation Company is also owned by an ore company, with 15,500 tons and \$1,000,000 value. Its ships run from Escanaba.

Iron—Mesabi Range.

(From Our Special Correspondent.)

Eveleth Townsite.—Diamond drill explorations are being carried on heavily here to test the ore body supposed to underlie the town. Several holes have been made, and it is stated they have resulted satisfactorily.

Franklin Group.—Nothing is yet known of the result of negotiations for this property. The water has been ordered kept down, however, which is supposed by some to indicate a sale.

Lake Superior Group.—Hull Mine, which resumed not long ago, is now employing over 100 men and increasing this force gradually. There is said to be no difficulty now in getting men at the various mines. Sellers Mine is working steadily.

Penobscot Iron Company.—This mine, which has been working some 125 men, will double the force soon and make a heavy output for the year. The Penobscot is at Hibbing, has excellent ore, and the distinction of being the wettest mine in Minnesota.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—The week ending January 21st was the greatest in the history of the Joplin District both in regard to the amount and value of the ore produced. The ore from the Eagle mines at Belleville which fixes the price for top grade ore, was not on the market, the mines being shut down for a few days to make repairs and alterations, but several heavy sales were made at \$33.50 per ton for fancy grade zinc ore and a large part of the district output brought \$32.50 and \$33 per ton. Lead ore sold throughout the week at \$24 per 1,000 lbs, the price at which it closed the week previous. On account of the high prices which have prevailed for zinc ore during the past year, little attention has been paid to lead mining and the output is much lighter than for years past, but the turn in has also been light on account of the refusal of many of the large operators to accept the prices offered and a couple of million pounds could probably be picked up in a very limited time by any buyer who would pay \$25 per 1,000 lbs. As compared with last week's shipments, the sales of zinc ore show an increase of 1,266,940 lbs.; the lead sales were greater by 88,490 lbs. and the value was greater by \$29,272. The sales for the week just closed show an increase over the corresponding week of last year of 4,184,330 lbs. of zinc, but the lead sales were less by 84,020 lbs.; the value was greater, however, by \$98,850. During the corresponding three weeks of last year the zinc sales were less by 3,346,940 lbs.; but the lead sales were greater by 900,230 lbs.; the value of this year's output being greater by \$200,481. Following are the sales of lead and zinc ores from the various camps in the Joplin District for the week ending Jan. 21: Joplin, zinc, 1,818,260 lbs.; lead, 226,540 lbs.; value, \$34,984. Webb City, zinc, 762,500 lbs.; lead, 45,450 lbs.; value, \$12,910. Cartersville, zinc, 1,202,830 lbs.; lead, 148,050 lbs.; value, \$22,197. Oronogo, zinc, 976,470 lbs.; lead, 19,020 lbs.; value, \$15,053. Duenweg, zinc, 678,060 lbs.; lead, 167,160 lbs.; value, \$14,522. Central City, zinc, 552,660 lbs.; lead, no turn-in; value, \$8,289. Stotts City, zinc, 399,860 lbs.; lead, 39,620 lbs.; value, \$7,549. Hell's Neck, zinc, 129,890 lbs.; value, \$2,078. Galena Empire, zinc, 3,207,280 lbs.; lead, 206,230 lbs.; value, \$53,060. Aurora, zinc, 1,350,000 lbs.; lead, 60,000 lbs.; value, \$16,587. Belleville, zinc, 162,570 lbs.; lead, 4,220 lbs.; value, \$2,783. Carthage, zinc, 195,600 lbs.; value, \$3,276. Wentworth, zinc, 44,380 lbs.; value, \$735. Lehigh, zinc, 112,270 lbs.; value, \$1,852. Granby (Newton County), zinc, 216,000 lbs.; lead, 56,000 lbs.; value, \$4,368. Total district value for the week, \$200,243. Total of zinc, 11,808,590 lbs. Total of lead, 972,290 lbs. District total for three weeks, zinc, 32,374,760 lbs.; lead, 2,770,200 lbs.; value, \$526,161.

The turn-in from the Granby Company is the first ever made by it from its Newton County land for publication in any mining journal or newspaper. It has made an annual report to the State Mine Inspector as required by law, but has refused heretofore to furnish a weekly report for publication. The report is of interest, as the company owns a large body of land in Newton County which it operates on an entirely different system from that of any other corporation in the district.

Cass & Crane.—These parties are building a new concentrating plant on their lease of four lots on the Chatham ground. The plant will be ready to run by January 15th. They have two shafts, both in good ore, with 25 to 30 ft. faces of ore in each. They bought the lease from G. W. Wright.

Murray Land.—Ragsville, where shallow lead ore was struck in so many different shafts a few months ago, seems to have suffered from its name, and the name has been changed to Klondike. Whether the change of name had any effect on the camp or not, there has been an increased output of ore.

MONTANA.

Granite County.

Granite-Bi-Metallic Consolidated Mining Company.—In the mines at Phillipsburg, tunnels are being run from the Bi-Metallic to the Granite Mountain in order to handle the Granite Mountain water through the Bi-Metallic shaft. It is expected that in a month the miners will break into the 1,400 level of the Granite Mountain. Until that time nothing will be raised from the Granite Mountain.

Jefferson County.

Basin Gold and Copper Mining Company.—Arrangements are being made to float the stock of this company, operating the Hope Mine, on Eastern markets. Marcus L. Hewett, of Butte, has gone to New York for this purpose.

(From Our Special Correspondent.)

Maine.—Situated on Golconda Gulch, about 5 miles from the town of Jefferson. This is a gold property, and was located last summer by two prospectors, Vincin and Gorman. The ore streak averages 6 in. of \$50 rock. The shaft is now 50 ft. deep, and 22 tons of ore shipped to the East Helena smelter gave the above result.

Sciota.—The machinery is to be hauled away from this mine, with a view of closing it down for some time to come.

Lewis & Clarke County.

(From Our Special Correspondent.)

Uncle Sam.—This property, on Dry Gulch, adjoining the Winscott, has been purchased by Lindsay & Freeman, of Helena. Mr. Freeman is running the 5-stamp mill which was built on the property some years ago. Some of the ore is very rich. The ore is a telluride.

Winscott.—This Dry Gulch property, under bond to an English syndicate represented by Harry Bush, has 20 ft. of pyritic ore in the cross-cut at the bottom of the 100-ft shaft.

Madison County.

(From Our Special Correspondent.)

Little Kid.—This property, at the head of Meadow Creek, on the East Slope of the Tobacco Root Range, on which was placed a 5 ft. Bryan roller mill 3 years ago, will add a cyanide attachment in the spring. Tests made in Denver with cyanide some years ago gave an extraction of 96½%.

Madisonian.—This, one of the first discovered quartz mines in the county, about 3 miles from Richmond Flats, after lying idle for several years, is now being operated under bond by R. B. Turner & J. H. Conrad, who propose placing thereon a cyanide plant. Mr. Turner built the first cyanide mill in successful operation in the state.

New Gold Dredging Enterprise.—Helena and Chicago people are considering plans for 2 dredges to be placed at the extreme headwaters of the Missouri just below the confluence of the Gallatin, Madison and Jefferson rivers. One of the first experiments in dredging on a big scale in the United States was tried there in 1890, when a party of Denverites, headed by ex-Governor H. A. W. Tabor, built a dredge of the dipper type which was used with a Bennett Amalgamator. For two summers the work was carried on under constant mechanical difficulties and finally abandoned. It was demonstrated that gold existed in paying quantities. The field will support several outfits. A few miles above the Jefferson, some very rich bars were worked in the early days, but owing to the large amount of water the new channel of the river has never been worked.

Park County.

Diamondville.—In these coal mines owned by Marcus Daly, a fire started recently and has not been extinguished yet. A great deal of damage has been done and there are fears that the mines may be shut down permanently.

(From Our Special Correspondent.)

Bear Gulch Mining Company.—This company has increased its capital stock from \$100,000 to \$1,000,000. The mill will be run by a Pelton wheel.

Independence.—Mr. Cowles, the owner, has built a 5-stamp mill on this Big Boulder property.

Yellowstone Placer Mining Company.—A syndicate, headed by Dr. Robert Emmet, of Colorado, have acquired a mile of the Yellowstone River just outside of the National Park. They propose to build two dredges in the spring to work the gravel. Tests by sinking pits to bed-rock have shown a paying proposition.

Silver Bow County.

Silver King.—This mine in Butte, owned by J. A. Murray and Silas King, is worked under bond

by the Waller estate and M. H. Sanders. Ore is steadily hoisted from a 20 ft. ledge of high grade silver rock and about 50 tons daily are hauled to smelters.

NEVADA.

Lincoln County.

Nevada Salt and Borax Company.—The company has re-elected the old directors for 1899, with H. L. Coye as general manager and H. C. Van Dyke as secretary.

Sierra Nevada Mining Company.—At the annual meeting in San Francisco on January 18th, Charles Hirschfeld, Charles H. Fish, Herman Zadig, E. P. Barrett and A. Krause were elected directors. Charles Hirschfeld was re-elected president, Charles H. Fish vice-president; E. L. Parker secretary and Roger Prendergast superintendent.

NORTH CAROLINA.

Cabarrus County.

(From Our Special Correspondent.)

Fritz-Honeycut.—This gold mine, near Gold Hill, is worked by a double shift of men. A 60-stamp mill, with copper plates, is erected. The tailings are concentrated on buddles and concentrates treated by chlorination. The mine is located on what is known as the Icenhour vein. It has been producing gold for a year, and at present is about paying expenses. The falling off at present is said to be due to the fact that no reserve has been held and that the ore has been taken out only as required until now more sinking is necessary in order to supply ore, over 100 tons daily. This is a low grade slate vein, carrying iron pyrites, which shows some free gold and will average about \$4 per ton.

Mac Mackin.—This property, adjoining the Fritz-Honeycut on the northeast, is being developed in a systematic manner by Col. E. B. C. Hambley. A shaft down some 50 ft. shows a fine 3-ft. vein, which promises well. Ore has free milled as high as \$10 per ton.

Stanly County.

(From Our Special Correspondent.)

Parker Gold Mines.—This property, at New London, has developed some rich quartz. The placer part of the property continues to produce well in nugget gold.

Thompson.—This mine is operated by Dr. Whitley, of Albemarle. A 10-stamp mill is producing a small amount of gold.

United Gold Fields.—The Crawford Mine is now operated by this company. Several years ago a large amount of nugget gold was found on the property, together with large nuggets. It has always been supposed the source of the gold was on the Crawford land, but of late it has been traced on to the adjoining property, where large nuggets have been found, and the source is likely to be uncovered.

OHIO.

Harrison County.

Scio Oil Field.—The production of this new field shows a slight increase. There are 34 producing wells in the list, with an estimated production of 1,570 bbls. a day. At present there are between 90 and 100 wells drilling and rigs up in the Scio field. The month's record of operations will show that about 35 wells have been completed in the past 30 days. The additions made to the producing territory have been to the east, north, west and southwest of developments.

PENNSYLVANIA.

Anthracite Coal.

Delaware & Hudson.—The Gravity Railroad from Carbondale to Honesdale over Moosic Mountain has been changed to standard gauge. Connections with Erie have been made near Honesdale, and all coal shipped by the Delaware & Hudson can go to market without breaking bulk twice, as was necessary when shipments were made by canal from Honesdale.

Midvale.—This new colliery near Centralia has started work, giving employment to 500 persons. The breaker is one of the best equipped in the region. Thomas M. Righter of Mt. Carmel is superintendent.

Bituminous Coal.

Beaumont Coal Company.—This company with mines near West Brownsville, has purchased the Phillips coal tract of 1,100 acres adjoining its old workings in Washington County along the Monongahela River for \$16,000.

Slate.

(From Our Special Correspondent.)

Bangor Peerless Slate Company.—The stockholders have elected the following officers: George I. Speer, president; E. J. Johnson, vice-president; Thomas Ditchett, secretary; William Blake, superintendent.

Chestnut Ridge Railway Company.—This new company recently capitalized in the sum of \$1,000,000, is grading a railway 15 miles long from Kunkletown, Monroe County, to Lehigh Gap, Carbon County. The road will open up a new slate territory.

December Shipments.—December shipments over the Bangor & Portland Railway were 440 cars of roofing and 19 cars of school slate.

E. D. Peters & Co.—This firm at Slatington has dissolved, W. K. Peters retiring. E. D. Peters, the other member of the firm, has associated with himself his two sons. The firm will be known as E. D. Peters & Sons.

Grand Central Slate Company.—The winter months are being spent in removing a large piece of top and otherwise putting the quarry in good condition for a large output. A new 50 H. P. boiler will be put up to furnish power for the channeled. During the coming season the company expects to produce from 15,000 to 20,000 ft. of blackboards, and 1,000 to 1,200 squares of roofing, in addition to several thousand school slate per month. The blackboard department is running through the winter to fill orders.

Northampton Hard Vein Slate Company.—The annual meeting resulted in the election of the following officers: James Young, president; William Smith, vice-president; Chester Smith, secretary, treasurer and business manager; Theodore Whitesell.

Pennsylvania Hard Vein Slate Company.—The annual meeting of stockholders elected George W. Geiser, president; M. H. Schall, vice-president; Chester Snyder, secretary and treasurer; W. M. Smith, superintendent.

Parsons Bros.—This firm of Pen Argyl, has completed the removal of a piece of top and will begin making slate.

SOUTH DAKOTA.

Lawrence County.

(From Our Special Correspondent.)

Parties arrived this week from Denver to inspect the phonolite belt ore prospects. They were taken over the phonolite belts west of Deadwood and examined the formations and the surface indications. The first discovery of phonolite ore was made 6 weeks ago by A. U. Pryce, of Cripple Creek, but no sale of mining ground has been made.

New Railroad.—Surveyors of the Elkhorn Company have run a line from Deadwood to Galena through Two Bit and Strawberry camps. The company wants a guarantee of 150 tons of ore per day before expending the necessary \$200,000 for building the road. The Gilt Edge mine is now shipping 80 tons per day. It is almost certain that the lessees of the Dakota Maid, Two Bears, Galena Mining Company and other properties will be able to furnish the remaining amount of ore to make the guarantee good. At present 40 teams are required to haul by wagon the ore from these camps.

Wolfram Ore.—The district around Lead City has been excited the past week over the discovery of wolfram ore in the Harrison Mine, in the North Lead District, owned by the Kuester Brothers and associates. A representative from the Phoenixville, Pa., Iron Works visited Lead and bought 40 tons at \$200 a ton. There is a shoot of the ore in the Harrison Mine. Herman Reinhold, of Omaha, Neb., who was the first to announce the discovery of wolfram ore in the Black Hills over a year ago, has made several carload shipments since from a vein near Hill City. He said in Deadwood this week that the market for wolfram ore is easily glutted.

Baltimore & Deadwood.—In the 20-stamp mill this company is erecting at Gayville the machinery is in place. The stamps will, it is said, be dropping in 20 days.

Bear Gulch District.—This district is 25 miles from Deadwood. The Bear Gulch Mining Company has a shaft down 50 ft. The Beaver Creek Mining Company is working on a shaft, now down 115 ft. Another large company has sunk several shafts on the creek to bedrock for placer gold. Some gold has been taken out. The camp is about 4 miles wide and 7 miles long. It is reached from Spearfish, 12 miles distant.

Deadbroke Company.—The ore in this mine, owned by Godfrey & Nelson, averages \$10 a ton, but only about \$2 can now be saved on the plates. New machinery has been purchased to save the concentrates.

Deadwood & Delaware.—The third reverberatory furnace at the smelter is nearly finished. The plant is running very smoothly. A larger supply of water has been brought in from Split-tail Gulch.

Detroit & Deadwood Company.—Work is progressing in the shaft on the East Fork of Two Bit. Sinking has been resumed and about 12 ft. more will reach quartzite. It is the intention of the company to spend some time exploring the lower formation.

Esmeralda.—A shoot of refractory ore has been encountered in this mine, owned by E. Faust & Son, of Central City. The main ledge is cement and is worked by a Huntington mill. The refractory ore is hauled to the Deadwood & Delaware Smelter.

Garden City.—This camp is very lively. E. May, of Lead, is working steadily the Old Faust & May Mine. The Garden City Company is doing considerable work. The cyanide plant, run

by Curtis Alexander, is giving good satisfaction to him and the mine owners of the camp. The MacDonald Brothers, lessees of the Blunderbus, at the head of Blacktail, are taking out a good grade of ore for the cyanide plant. The South Dakota Company has leased its mine to the Edna Company.

Gilt Edge Company.—New officers elected for this company are: President, B. F. Hake; vice-president, John R. Wilson; general manager and treasurer, M. H. Day; secretary, C. H. Shepley; directors, B. F. Hake, John R. Wilson, M. H. Day, C. H. Shepley, M. L. Day, J. B. Henry and Thomas Sweeney.

Golden Crest.—A fair-sized shoot of ore has been struck in this mine at the head of the East Fork of Two Bit, and ore is being shipped. The company is composed of Chicago capitalists.

Ragged Top.—The lessees of the Ulster mine, owned by A. J. Smith, are taking out ore. The Little Bud is producing several cars a month. Very little day work is done in the camp, but nearly every claim is worked by leasers. The American Mining Company has begun erecting a large building for hoist house to sink the Dacy shaft to quartzite.

Sunset Company.—The new air compressor for this company's shaft, at Terry, has been put in. The shaft is now down 180 ft. in porphyry.

Pennington County.

(From Our Special Correspondent.)

Gilt Edge Chlorination Works.—The old chlorination plant, at Rapid City, has been repaired at a cost of \$12,000. J. E. Rothwell, of Denver, has charge of the plant, at which 80 tons of ore are treated daily from the Gilt Edge Mine. About 35 men are employed.

TEXAS.

El Paso County.

A St. Louis, Mo., company, of which A. A. Chouteau is manager, is planning to develop sulphur deposits in the northeastern part of what is known as the Delaware country. The company covers 30,000 acres of land and refining works, it is said, have been erected for handling the ore.

UTAH.

Iron County.

(From Our Special Correspondent.)

Independence Gold Mining Company.—Incorporation articles were filed with the Secretary of State on January 6th. Capitalization, \$30,000, in share of 10 cents each, with 99,980 shares devoted to treasury needs; stock assessable. Principal office is at Salt Lake City; annual meeting, third Monday in January. Officers and directors are: Leonard P. Marix, president; Charles R. Aley, vice-president; William S. Evans, secretary; treasurer; Robert J. Nugent, Amos Whittemore, all of Salt Lake City. Realty consists of Marix, Sigsbee and Fitzhugh Lee lode claims, all situate in the Stateline mining district.

Juab County.

(From Our Special Correspondent.)

Blue Bird Extension Mining.—Incorporation articles were filed with the Secretary of State on January 6th. Capitalization, \$40,000; shares par value, 10 cents, with 100,000 shares set apart for treasury needs; stock assessable, but no single levy to exceed 1c. per share nor can they be made oftener than once in 3 months. Principal office is at Salt Lake City; annual meeting first Monday in December. Officers and directors are: B. F. Woodward, president; W. H. Simmons, vice-president; H. E. Simmons, all of Diamond. Fred C. Dern, secretary-treasurer; C. E. Hudson, both of Salt Lake City. Realty consists of Last Dollar, Apex No. 2 and Blue Bird Extension lode claims, all situate in Tintic mining district.

Fremont Mining Company.—Incorporation articles were filed with the Secretary of State on December 28th. Capitalization, \$100,000 in 50c. shares, with 90,000 set aside for treasury purposes. Principal office is at Salt Lake City; annual meeting, first Monday in February. Officers and directors are: E. H. Airis, president; George Romney, vice-president; E. A. Smith, secretary-treasurer; D. S. Spencer, E. A. Hartenstein, F. Y. Taylor, all of Salt Lake City. Realty consists of Parallel No. 2 and Vice-Admiral No. 2 in Tintic mining district.

South Sunbeam Mining and Milling Company.—Articles of incorporation were filed with the Secretary of State on December 29th. Capitalization, \$75,000 in shares of 25 cents each. Principal office is at Salt Lake City, second Monday in January. Officers and directors are: Thomas G. Merrill, president; R. G. Wilson, vice-president; Frank H. Forrest, secretary; Theodore Meyer, treasurer; John A. Street, Solon Spiro; all of Salt Lake City. Realty consists of Gracie, Justice, Bimetallic lode claims, all patented, situate in Tintic mining district.

Summit County.

Ontario Mining Company.—At the annual meeting in San Francisco the following directors were elected for 1899: Lloyd Tevis, Joseph Clark, Fred Clark, E. H. Clark, Thomas Turner, J.

B. Haggin and F. G. Drum. Lloyd Tevis was re-elected president, Joseph Clark vice-president, J. B. Haggin treasurer, and R. C. Chambers superintendent. It is not definitely known when work will be resumed in the mine, but it probably will not be until there is an advance in the silver market. Since its organization the Ontario Mining Company has paid a total of \$13,557,500 in dividends, the last one having been paid in November, 1897, at the rate of 75c. per share.

FOREIGN MINING NEWS.

AUSTRALASIA.

New South Wales.

Broken Hill Proprietary Company.—This company's statement for the four weeks ending January 5th, shows 21,103 tons of ore worked. The refining report shows 2,473 tons lead, 72 tons hard (antimonial) lead, 291,093 oz. silver, 378 oz. gold, and matter containing 15 tons copper and 14,291 oz. silver. The total silver output was therefore 305,384 oz. The average return was 12.06% lead, 14.47 oz. silver and 0.02 oz. gold to the ton.

Queensland.

Mount Morgan Gold Mining Company.—This company reports for December a total of 17,452 tons of ore chlorinated, the output being 12,729 oz. gold. This gives an average result of 0.73 oz. to the ton.

CANADA.

British Columbia.

New Placer Mining Law.—The text of the 3rd section of the act recently passed by the British Columbia Assembly by which American miners are excluded from British Columbia placers is as follows:

"3. (1). Every person who is not less than 18 years of age, and is a British subject, shall be entitled to all the rights and privileges of a free miner under this act, and shall be considered a free miner under this act, upon taking out a free miner's certificate, as long as such certificate remains in force.

"(2). No joint stock company or corporation shall be entitled to take out a free miner's certificate unless the same has been incorporated, and not simply licensed or registered, under the laws of the province, and unless such company or corporation is authorized to take out a miner's license by the lieutenant-governor in council. The word 'person' in this section shall include only such companies or corporations as aforesaid.

"(3). A miner's license taken out by any person not authorized so to do by this section shall be null and void.

"(4). This section shall not affect free miner's licenses issued before the coming into force of this section, and in case any person or corporation not allowed under this section to take out a miner's license has, prior to the coming into force of this section, acquired any interest in any claim under the provisions of the 'Placer mining act,' such license may be renewed from time to time, but such renewed license shall not entitle the holder thereof to hold or acquire any interest in any claim under said 'Placer mining act,' except such interest so acquired prior to the coming into force of this section.

"(5). No free miner, after the coming into force of this section, shall hold any claim under said 'Placer mining act,' or any interest therein, as trustee or otherwise, for any person who is not a British subject, or for any corporation not authorized to take out a free miner's certificate as above provided."

Yukon District.

United States Consul McCook, at Dawson, reports under date of November 1st: "There has been a continuance of typhoid fever during the past month, the hospitals, accommodating about 200, being always full and many patients, unable to get in, having to remain in their cabins. Some scurvy cases are coming into the hospitals. Scurvy, as a rule, appears to come from the system being run down by typhoid. Many a strong young man, who carried with him the very best canned vegetables, meats, etc., has brought on scurvy from overwork and exposure. The stamped for claims is over, as the country is all staked. The only question now is relocation. A rush over the ice to the Stewart River District, some 75 miles from here, is expected shortly. Some good prospects have been found there on Thistle Creek and other smaller creeks. The owner of Discovery Claim, on Thistle Creek, has refused \$75,000 for his claim. All of Thistle Creek, 35 miles long, was staked in two weeks. In all new staking—that is, on territory not previously staked—every alternate block of 10 claims is held for the Crown, so that only 50% is really open for staking by miners. The prices of provisions still advance. The cost of living for a miner who has to buy his food supplies now averages \$6 per day. There is no reason for the prices asked, and the supply companies are making immense fortunes. Unless the cost of living becomes more

reasonable, the poor man who owns a claim can not afford to work it, unless it proves very rich."

Mining Royalties.—Sir Charles Tupper in a recent interview at Ottawa stated that he was informed by the Hon. Clifford Sifton, Minister of the Interior, that there was to be no reduction in the 10% royalty in the Yukon. The only change to be made is that the amount to be exempted on each claim was to be raised from \$2,500 to \$5,000.

COAL TRADE REVIEW.

New York.

Jan. 27.

Anthracite.

Though the warmer weather of the past week has lessened buying for immediate wants, particularly in the West, yet the trade is in far better shape than a year ago. The consumption so far this Winter has been heavier than in a number of years, and there is very little fault finding among producers compared with the chorus of complaints that has been heard at this season so many times in the past.

The talk of combinations continues; much of it is Wall Street rumor of the wildest kind. As a sample we note the story sent out from Philadelphia that a company with \$20,000,000 capital was to be formed to control the output. As the aggregate capital stock of the five principal roads mining and hauling coal amounts to over \$260,000,000, it is evident that \$20,000,000 is not quite enough to control the anthracite trade.

Another Wall Street story was that the individual operators were not going to build their projected road from Scranton, but would let the old roads handle their coal and take 65% of the selling price instead of 60%, as at present. How an increase of 5% would benefit the individual operators in case the roads furnish them less cars it is hard to see. The individual operators would doubtless be glad to have 40% of the selling price or less, if they could run full time the year round.

There is doubtless a foundation for some of this talk. It is hinted that Ontario & Western may be removed as a factor in the coal business something after the manner of New York, Susquehanna & Western.

Business in the East rules steady, buying is from hand to mouth, but stocks do not accumulate. Egg coal is very plenty, while chestnut remains very scarce. Prices are practically unchanged, and we quote for free burning white ash f. o. b. New York: Broken, \$3.25; egg, \$3.40; stove, \$3.60; nut, \$3.55; pea, \$2.60; buckwheat, \$2; rice, \$1.75.

Bituminous.

There is a good demand for soft coal from along the Atlantic seaboard—better, in fact, than can be supplied by present transportation facilities. A fair number of season contracts are believed to be closed, but producers seem to be a little shy of binding themselves for the season's business, since every one feels that the ocean freight market is in too indefinite a shape to permit any reliable forecast. Every one feels that rates will be higher than last year, but no one can be sure how much higher. Some speculators have been bidding on particular trade at close to last year's figures, but more conservative men have been figuring 25c. higher. This condition of uncertainty has kept down any general scramble for business such as has characterized recent years at contract time, and most of the business taken has been figured on with due consideration. A great deal of coal is believed to be uncontracted for, and producers do not seem to evince much alarm at this state of things, believing that there must be considerable spot business during the season that will return better figures. The main line roads have apparently agreed to disagree, and no agreement about freights from mines to tide is in sight. As a result the prospects are that coal at shipping ports will be even lower than it was last year.

Trade in the far East is active; the demand is strong, but less urgent, and consumers seem prepared to wait till ocean freights are more to their mind. Sound trade continues large. The edge of the demand has been taken off, but producers are still unable to forward the entire amount needed. New York Harbor trade is active, but no one is short of coal. All rail tonnage is heavy. There is a considerable demand for coal for export to points in the West Indies and South America.

Transportation from mines to tide is poor and several days slower than when at its best. All shippers feel the delay severely, and to offset this there is some transferring of coal at tide-water points. Car supply is limited by the main lines to the amount of coal they will allow to go forward, and is fully two-thirds of what is desired. The coastwise vessel market shows a scarcity of vessels, but the high freights that have prevailed have scared shippers. Rates are now easier, and may go lower, but are liable to fluctuate 25c. from day to day, according to the weather.

Fair weather will send rates down and fuel will send them up. We quote \$1.15 from Philadelphia to Sound ports and \$1.50 to Boston.

Prices at shipping ports are hardly as firm as they have been, and when transportation improves are likely to fall. We quote: Clearfield at Philadelphia, best grades, \$1.75; poor grades, \$1.30; George's Creek, at Baltimore, \$1.70; Pocahontas, at Norfolk, \$1.70; New River, at Newport News, \$1.70; best grades, at New York, \$2.25; poor grades, \$1.60.

Birmingham, Ala.

Jan. 23.

(From Our Special Correspondent.)

Contrary to anticipations the demand for coal in this district is just as active to-day as it has been during the last four or five weeks. Almost every pound of coal being mined is finding a place or demand for it. There is not a mine in the district running on half time. There are but few miners out of work, and if the coal diggers want work they can get it. The price being obtained for fuel is fair. At Pratt City the record established during the Fall is being sustained, while the Blue Creek Region, Blocton, Milldale and Brookwood, Horse Creek, Galloway, Cardiff, Brookside and Blossburg and the Walker County mines are enjoying very large outputs. The Walker County mines are making preparations for a heavy trade down the Mississippi River, between Greenville, Miss., and New Orleans. It is believed that during the coming Spring and Summer something like 150,000 tons of coal will be shipped down the river. The Southern Railway, which is interested in the barge line, has promised to enlarge the facilities. The Alabama Block Coal Company, which controls the trade in the Louisiana and lower Mississippi markets, held a meeting here last week and the coming season was fully discussed.

Pittsburg.

Jan. 26.

(From Our Special Correspondent.)

Coal.—Notwithstanding the disputes between the mine owners and the mine workers, the market was an active one; the consumption of coal continues to increase; the river miners are kept busy in supplying the local demand, which is heavy, more so than usual. The current quotations for the different sizes of thin vein coal f. o. b. at tipples are as follows: River coal, per bu., 1 1/4 in., 3 3/4c.; 3/4 in., 3 1/4c.; rim of mine, 3c.; nut, 3c.; slack, 1 1/4c. Railroad coal, per bu., 1 1/4 in., 85@90c.; 3/4 in., 75@80c.; run of mine, 65@70c.; nut, 50c.; slack, 30c. Price of thick vein coal is about 1/2c. less per bushel. The Beaumont Coal Company, with mines near West Brownsville, Pa., has purchased the Phillips coal tract of 1,100 acres, adjoining their old workings in Washington County, along the Monongahela River, for \$26,000. Nearly all the coal has been worked out of the Beaumont mines, and this purchase will insure continued working for many years.

Morris I. Painter, of Greensburg, Pa., has purchased a half interest in the Kilgore coal mine, near Pleasant Unity, for \$20,000.

A large block of coal land on the west side of the Ohio, near Morgantown, W. Va., has been under option for some time, and a deal was made between some New York capitalists and a local company which controlled it, for the purchase of the land. The deal has fallen through on account of the appearance of an agent for Senator S. B. Elkins and ex-Senator Davis, who is buying the land direct from the owners. Several thousand acres were bought by these men a year ago, and they are now after 15,000 acres. The land in question is the best in the county, and lies along the river.

It is a matter of gratification for the public as well as those directly interested that the miners and operators have so promptly and amicably reached an agreement as to the scale of prices to go into effect the 1st of April next for the ensuing year.

Connellsville Coke.—Trade made a better showing last week; the shipments were surprising. There are signs that nine ovens will be in blast within the next few days; in fact, the prospects are that every available oven will be available before the middle of March. At all points the consumption of coke is large. With the production of pig iron up where it is and stock daily decreasing, it could not be otherwise. In the Pittsburg market the agents claim that the price set for 1899—\$1.60 a ton—is well maintained. Consumption is phenomenal; all available furnaces in the district being in full blast. The shipments aggregated 9,140 cars last week, an increase of 450 cars. Shipments west of Pittsburg were larger than for any week since November, the increase in tons being 5,490. The McClure Coke Company has already begun firing 125 ovens at its Donnelly plant that has been idle for two years, and is shaping plans to fire the Mayfield plant in the same field. The demand for coke for weeks has been far in excess of production, and if the railroads can furnish sufficient cars the trade will increase. The shipments were as follows:

To Pittsburg, 3,137 cars; sent West, 4,655 cars; sent East, 1,348 cars. Total, 9,140 cars.

SLATE TRADE REVIEW.

New York. Jan. 27.

The list of prices per square for No. 1 slate standard brand f. o. b. at quarries is given below:

Prices of Roofing Slate.

Size, inches	Monson or Br'n ville.	Bangor.	Bangor Ribbon.	Alb'n. or Jackson Bangor.	Lehigh.	Peach Bottom.	Sea Gr'n.	Unfad'g Green.	Red.
28 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
26 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
24 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
22 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
20 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
18 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
16 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
14 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
12 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
10 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
8 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
6 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
4 x 14	6.10	3.35	2.90	3.10	3.50	4.85	2.50	3.50	...
28 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
26 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
24 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
22 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
20 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
18 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
16 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
14 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
12 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
10 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
8 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
6 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
4 x 12	6.60	3.35	2.90	3.10	3.50	5.00	2.50	3.50	...
28 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
26 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
24 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
22 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
20 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
18 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
16 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
14 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
12 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
10 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
8 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
6 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
4 x 10	7.10	3.75	3.25	3.35	3.80	5.00	2.40	4.00	10.50
28 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
26 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
24 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
22 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
20 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
18 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
16 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
14 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
12 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
10 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
8 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
6 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
4 x 8	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
28 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
26 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
24 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
22 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
20 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
18 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
16 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
14 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
12 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
10 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
8 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
6 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
4 x 6	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
28 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
26 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
24 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
22 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
20 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
18 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
16 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
14 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
12 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
10 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
8 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50
6 x 4	7.20	4.00	3.15	3.35	3.80	5.10	2.50	4.00	10.50

A square of slate is 100 sq. ft. as laid on the roof.

In Brownville and Monson delivery quotations can be had somewhat lower than above, which is also true of other brands. No. 1 Bangor are 50c. extra when full 3-16 in. thick, and Peach Bottom 25c. extra per square. Purple sizes run 24x12 and 14x7, and vary from \$3.75 to \$4 per square. Variegated and mottled, \$2.25@2.90 per square, according to size. Intermediate sea green, \$2@2.25 per square. Intermediate red, 14x7 and larger, \$6; 12x6, 12x7 and 12x8 in., \$5 per square, net.

Rumors of combinations in the slate industry are afloat, but little or no credence is given them by conservative dealers. The Peach Bottom pool, known as the American Slate Company, is said to be the same element which appeared under another name about two years ago. The capital subscribed, we understand, is about \$1,500, or ten times less than the authorized capitalization of the company. Some of the quarries in the district are rather timid about allotting their output to this concern. The report about an export trade from this district is not taken seriously, as the slate costs more to quarry than any other, and is sold at higher prices. The Peach Bottom slate is well adapted for special roofing work, and can, therefore, readily compete with most of the other high-priced slates. Furthermore, we are building up an export trade for red slate, notwithstanding its costliness, and so, we believe, the Peach Bottom product can look for a foreign outlet. We understand also that Mr. W. H. Hughes, for many years sales agent for Griffith & Nathaniel, has resigned. He has succeeded in combining eight of the sea green slate quarries at Poultney, Vt., has put some money in it, and will call it the Poultney Consolidated Slate Company. This concern will handle the entire output of these eight quarries. The office, which will be at Poultney, Vt., will be in charge of W. H. Lloyd. The Western end of the company's business will be worked up by Mr. Hughes.

The members of the Bangor Association are still in session. Our price-list, given below, shows a drop in many sizes of Pennsylvania slates, while in others there has been a small increase. The shipments of roofing slate from Slatinington, Pa., during the week ended Jan. 19 amounted to 4,794 squares, against 1,679 squares in the previous week. From Walnutport no roofing slate was shipped, but Danielsville moved 528 squares, against 1,115 squares in the week of Jan. 12. Export business keeps up well, notwith-

standing the high freight rates. Latest private advices from London state that the Penrhyn quarries in Wales have made a slight reduction in their prices of roofing slate. The exports from New York for the week ending Jan. 24 were as follows: London, 38 carloads roofing (\$10,115); Liverpool, 3 carloads roofing and 47 crates slabs (\$1,360); Manchester, 3 carloads (\$816); Bristol, 1 car-load (\$300); Bremen, Germany, 6 car-loads (\$1,200); Gothenburg Sweden, 90 cases (\$260); Copenhagen, Denmark, 295 cases (\$810); Christiania, Norway, 121 cases (\$359); Christiansund, 15 cases (\$46); Drontheim, 4 cases (\$13); Australia, 221 cases (\$556); British Africa, 18 cases (\$62); Cuba, 1 case (\$26); Sandwich Islands, 25 cases (\$77); St. John's, Newfoundland, 9 packages (\$80); total value, \$16,080, against \$30,381 in the previous week. In addition to the above there have been several other large shipments to the British market. Freight rates to London on spot are 14s. 6d., while contracts are still quoted at 13s. 9d. An offer was made a leading exporter of freight room to London at 13s. 6d. on a steamer which will sail early in February.

Exports from Baltimore this week were 355 short tons, valued at \$400, to Bristol, England. Now that efforts are being made by the Government to regulate our commercial relations with the new countries that are under our protection, it seems a most opportune time for the slate industry to advertise itself. Unless more progressiveness is shown in this regard we need not look for a steady increase in the yearly consumption of slate.

CHEMICALS AND MINERALS.

(For current prices of chemicals, minerals and rare elements, see also page 136.)

New York. Jan. 27.

Heavy Chemicals.—Deliveries are heavy, especially of soda ash and bleaching powder. Inquiries are still being received for caustic soda for delivery in 1900, but our makers are reluctant to quote so far ahead. Prices are practically unchanged. Export business is fair. A new tariff has been drawn up for Porto Rico, which includes the following import duties: Bleaching powder, 75c. per 100 kilos; chlorate of potash and soda, \$1.80; sodium hyposulphite, 75c.; sodium chloride, 50c.; potassium chloride, magnesium sulphate, alum and carb. magnesium, 45c.; and copper salts, 75c. per 100 kilos.

Quotations are: Caustic soda, domestic, high test, \$1.40@1.45 per 100 lbs. f. o. b. works; \$1.50@1.65 delivered. Foreign caustic soda, high test, \$1.60@1.70 delivered, according to test and quality. Powdered caustic soda, 2 3/4 @3c. Alkali, domestic, 55@60c. f. o. b. works; 65@70c. delivered; foreign, 70@75c. Bleaching powder, English prime brands, \$1.50@1.65 per 100 lbs.; other brands, \$1.40@1.50; Continental F. prime, \$1.45@1.50. Bicarb. soda, domestic ordinary, \$1.15@1.25 per 100 lbs. f. o. b. works. Natrona brand, \$1.65; "Arm and Hammer brand," \$3.25@3.50, less the usual discount; foreign, \$2.12 1/2 @2.25 per 100 lbs., according to brand and style of a package. Sal soda, domestic, 50c. per 100 lbs. f. o. b. works, less the usual discounts; English, 60@62 1/2 c. per 100 lbs. Concentrated sal soda, foreign (crystal carbonate), \$1.60@1.70 per 100 lbs.; domestic (mono-hydrate crystals), \$1.25@1.35 per 100 lbs.; "snowflake," \$1@1.12 1/2 f. o. b. Syracuse. Chlorate of potash, crystals, 8 1/2 @9c.; powdered, 9 1/2 @9 1/2 c. per lb.

Acids.—Demand is good, and deliveries on contract are large. In sulphuric acid makers say their stocks are smaller than usual for this time of the year, while in blue vitriol the export movement has kept up well, and prices are stiff. The Porto Rico tariff shows the following import duties: Sulphuric acid, nitric, boric, hydrochloric and aqua regia, 15c. per 100 kilos; liquid carbonic acid, \$5 per 100 kilos; oxalic, tartaric and carbolic, \$1; and acetic, \$6 per 100 kilos.

Quotations per 100 lbs. for New York and vicinity are as follows: Acetic acid, commercial, No. 8, \$1.30@1.40; muriatic acid, 18°, \$1.10 for drums, and \$1.15@1.75 for carboys; 20°, \$1.20@1.87 1/2; 22°, \$1.35@2.25, according to quantity and brand. Nitric acid, 36°, \$3.50@4.75; 38°, \$3.75@4.62 1/2; 40°, \$4@4.87 1/2; 42°, \$4.62 1/2 @5.25. Oxalic acid, \$6.25@6.50. Mixed acids, according to mixture. Sulphuric acid, 66°, \$1.10 for drums and \$1.15@1.75 for carboys. Chamber acid, 50°, in a jobbing way, \$11.50@12 per ton f. o. b. factory. Blue vitriol (copper sulphate), \$5@5.25 per 100 lbs. for best grades.

Tin Crystals.—Owing to the rising market for pig tin, manufacturers have advanced the price of crystals from 14@14 1/4 c. per lb. to 18@19c.

Borax.—The combination of domestic and foreign makers recently formed is discussed on another page of this issue. Prices, however, have not yet been changed by the Pacific Coast Borax Company, being 7c. per lb. for crystals, 7 1/2 c. for powdered, and 19c. for calcined in large lots. Boracic acid is quoted at 10 1/2 c. per lb. for pure crystals, and 11c. for powdered. An import duty of 75c. per 100 kilos has been made for borax and 15c. for boracic acid in the new tariff for Porto Rico.

Brimstone.—Business continues quiet, owing to the heavy supplies in the hands of the larger consumers. Shipments in December are reported at 7,150 tons, and it is estimated that the year 1898 will show an increase of fully 20,000 tons more than during the two previous years. The total imports of brimstone into Great Britain in 1898 were 19,332 tons, against 22,451 tons in 1897, a decrease of 3,119 tons, or 14.1%. The new Porto Rican tariff puts the import duty of sulphur at 15c. per 100 kilos. In New York best unmined seconds are quoted at \$21.50@22, and thirds \$1 less per long ton.

Nitrate of Soda.—No arrivals are reported, and spot nitrate of soda is quoted at \$1.57 1/2 @1.60, while futures have sold at \$1.55 per 100 lbs. We note 620 bags were exported to Martinique this week. The Porto Rican tariff places the import duty of nitrate of soda and potash at 3c. per 100 kilos.

Pyrites.—Demand continues good, and prices are unchanged. The imports of iron and copper pyrites into Great Britain during 1898, valued chiefly for their sulphur contents, were 655,063 long tons, against 628,091 tons in 1897, an increase of 26,972 tons, or 4.3% last year. The Porto Rican tariff puts the import duty of iron sulphate at 45c. per 100 kilos.

Spanish pyrites contain from 46% to 51% sulphur, the American from 42% to 44%, and Pille's Island, N. F., about 50%. Quotations are: American lump ores (basis 52%), \$3.25 per long ton f. o. b. mines, Mineral City, Va.; \$5 per long ton f. o. b. mines, Charlemont, Mass., and \$6.50 per long ton for Pille's Island, delivered in New York. Fines are \$3 per long ton, f. o. b. Mineral City, Va.; \$4.25 at Charlemont, Mass., and \$4.50 for Pille's Island, delivered in New York. Spanish pyrites, 11@13c. per unit, according to percentage, delivered ex-ship New York and other Atlantic coast ports.

Fertilizing Chemicals.—A better inquiry is reported for the leading ammoniates. Export trade has also been better. Of the imports at New York we note 1,000 bags sulphate of ammonia. This article is quoted at an advance. Reports are current that three of the largest fertilizer concerns in Baltimore (the Detrick Chemical and Fertilizer Company, the Maryland Fertilizing and Manufacturing Company and George W. Graffin & Son) are to become the property of Northern capitalists in the near future. Importations of sulphate of ammonia made at Porto Rico will hereafter be assessed at 3c. per 100 kilos, while for sulphate of potash the duty will be 75c. per 100 kilos.

Quotations are: Sulphate of ammonia, gas liquor, \$2.75@2.77 1/2 (basis of 25%) per 100 lbs.; bone, \$2.60@2.65. Dried blood, high grade Western, \$1.92 1/2 @1.95 per unit; New York, \$1.70@1.72 1/2 per unit. Azotine, \$1.70@1.75, basis New York. Concentrated phosphates (30% available phosphoric acid), 57 1/2 c. per unit. Acid phosphates, 13@15%, av. P₂O₅, 60@65c. per unit at sellers' works in bulk. Dissolved bone black, 17@18%, P₂O₅, \$16@16.50 per ton. Acidulated fish scrap, \$11@11.50; dried, \$19.50@20 f. o. b. fish factory. Ammonia superphosphates, high grades, \$25@26 per ton. Tankage, high grade, \$14.50@15 per ton f. o. b. Chicago; \$18.50@19 at New York. Concentrated tankage, \$1.45@1.50 per unit f. o. b. Chicago; low grade, \$1.3@1.35 per ton. Bone tankage, \$19.50@20.50; ground bone, \$24@24.50 delivered. Bone meal, \$1.40@1.50 f. o. b. Chicago.

Phosphates.—There continues to be an improved foreign demand, and among the charters taken we note a British steamer of 1,029 tons from Fernandina to Glasgow at 18s. 6d. (\$4.44); and one of 1,327 tons to Rotterdam at 18s. 3d. (\$4.38); one of 2,000 tons, from Tampa to Venice or Genoa, Italy, at 19s. (\$4.56), January-February sailing; one of 1,042 tons, from Pensacola to Venice, at 24s. (\$5.76), February sailing; one of 1,203 tons, from Coosaw to Cork, Ireland, at 16s. (\$3.84), Feb. 25 sailing. Of late the Italian market has been buying much Tennessee phosphates. The new tariff for Porto Rico puts the import duty of phosphates and superphosphate of lime at 3c. per 100 kilos. We note that

vessels, exporters in general have withdrawn from the market; at the same time the majority of producers refrain from offering their output except for early delivery. The production during November amounted to over 2,600,000 qtls., making a total for the 11 months of 1898 almost 26,300,000 qtls. The exports for this year will probably exceed 28,000,000 qtls. We quote, 95% December-February, 4s. 8d.; March-June, 4s. 8½d., and 96% January-March, 4s. 9½d., all sellers. The price of 4s. 8d., with 28s. 9d. all round freight, stands in 67½ per cwt. net cost and freight without purchasing commission.

Sales for the fortnight are reported at 165,000 qtls.

IRON MARKET REVIEW.

NEW YORK, Jan. 27, 1899

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending		From		From	
	Jan. 28, 1898	Jan. 27, 1899.	Jan., '98.	Jan., '99.	Tons.	Tons.
An'racite	28	18,825	30	23,400	75,300	90,260
Coke.....	146	202,950	150	215,700	811,800	831,990
Charcoal.	16	5,375	20	6,120	21,500	23,610
Totals..	190	227,150	200	245,220	908,600	945,860

Business in the iron trade continues exceedingly active, and from all quarters reports come of large orders and a demand which shows no signs of decreasing. The sales of pig iron have been large, Bessemer pig leading. Foundry iron, however, has been in very good demand. The prices are firm, with a general tendency to increase.

The railroads have decided on securing their share of better prices, it seems. The Southern lines have announced a general advance of 50c. a ton in rates on Alabama iron, to take effect February 6th. It is understood, however, that some rebate will be allowed on export shipments.

There have been some heavy purchases of steel billets in Pittsburg. The mills, especially in the East, are apparently getting a little anxious about their supplies and are making arrangements to have plenty of stock on hand.

In finished material business has been large. The car builders are taking some heavy lots of bar iron. Plates are in demand, and at least one very large order has been placed by the steel car makers. There is also a good demand from the ship builders. Structural material is going to the bridge builders and a number of orders for building are under discussion.

The great topic in the trade just now is combination. Pools and agreements of all sorts are proposed, and everything is to be owned and run by syndicates. The most important organization on foot just now is the union of a number of small steel plants in Pennsylvania and Ohio, under the American Tin Plate Company, which evidently intends to control its own supplies of steel.

The cast iron pipe combination, it is said, is arranging to buy up all the pipe foundries and to unite the business under a single management. Some progress has been made in the negotiations.

There is also talk of a combination of bridge-building companies to control the bridge—and possibly also the structural trade.

The iron ore men have had several conferences in Cleveland, but no final result has been announced. It is reported that a moderate advance—20c. a ton is named—will be made in iron ore prices at Lake ports.

Birmingham, Ala. Jan. 23.

(From Our Special Correspondent.)

There are indications of an advance in pig iron quotations in the near future. The demand for the product in this neighborhood is very active and a scarcity of certain grades is not at all improbable. The shipments out of this district are exceedingly heavy, and have been so now for more than two months. After a two days' session the Traffic Managers and General Freight Agents of railroads in this section have decided on raising the rates on pig iron out of here 50c. per ton over its present prices. In May, 1897, the rates on pig iron were reduced 50c. a ton. It was shown then that the furnacemen had to be assisted, and to sell iron in competition with long haulage it was necessary to have low rates. During the last twelve months the quotations on pig iron have gone up until the time has come, say the railroad men, that the furnaces will have to let in the railroads. The new schedule of rates will not go into effect until February 6th, and the export trade is not to be affected at all. However, New Orleans, Cincinnati, St. Louis and other points which have been buying in this district will have to pay the advance. Bar iron and scrap are also mentioned in the new schedule.

The following are the quotations given for the product: No. 1 foundry, \$8; No. 2 foundry, \$7.75@ \$8; No. 3 foundry, \$7.50@ \$7.75; gray forge, \$6.50@ \$6.75; No. 1 soft, \$8; No. 2 soft, \$7.75@ \$8.

The domestic trade as well as the export trade is keeping up. There seems to be much iron

needed all over the country, and, judging from the demand that is being received here, there is but little being ordered for stock. Speculation is not so very great.

Finished iron is finding a ready sale in this district. The rolling mills are working hard, and are turning out great quantities of their product. A good price is being obtained, too. The Birmingham Rolling Mills have a good set of orders on hand. While these mills are in the hands of the receiver no stock iron will be manufactured. All orders will be promptly filled, however, as every department is in blast. The sheet mill department was off for a while this month. Now, however, all departments are on. The mills at Gate City, near here, are working steadily and are doing well. Of course, there is a little iron going to the stock house there, but not much to amount to anything.

Foundries and machine shops in this district have their hands full also. The furnaces and other big iron industries having plenty of work to do seems to keep up the smaller industries in that line. There is plenty of repair work as well as new stuff being done at the machine shops and foundries.

Quite a number of rumors were afloat here last week in reference to the sale of a controlling interest in the American Pipe and Foundry Company by Mr. John W. Harrison to Mr. Samuel Spencer, of New York. No denial has been made of the story. It is stated that Mr. Harrison sold his own besides the stock of St. Louis parties. He is said to have received \$65 per share for the stock. The American Pipe and Foundry Company controls the pipe plants at Chattanooga, Tenn.; Bridgeport, Anniston and Bessemer, Ala. Mr. Harrison is a heavy stockholder in the American Company. He was one of the principal stockholders in the Howard-Harrison Iron Company, of St. Louis, which company built the big pipe plant at Bessemer, a few miles below this city.

The Addyston Pipe and Foundry Company is expected to begin work on their plant near Bessemer in the near future.

Work on the big steel plant and steel wire and rod mill at Ensley progresses rapidly. Both plants are making great appearances every week. There will be wheels in operation at both plants in June.

Buffalo, Jan. 25.

(Special Report of Rogers, Brown & Co.)

The heavy advance in the rate of freight from Birmingham has not affected this market, and probably will not have the same effect here as elsewhere, owing to very little Southern iron having been used in this district for some time past. Sales have been rather light, but at full prices. Many foundries complain at paying the stiff advance in pig iron when they cannot get an equal advance in castings. Local furnaces continue to be taxed to their utmost to keep regular customers supplied. With the market firm, we quote for cash, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$12.25; No. 2 strong foundry coke iron, Lake Superior ore, \$11.75; Ohio strong softener No. 1, \$11.75; Ohio strong softener No. 2, \$11.25; Jackson County silvery No. 1, \$14; Southern soft No. 1, \$12.25; Southern soft No. 2, \$12; Lake Superior charcoal, \$12@ \$12.50; coke malleable, \$11.75.

Cleveland, O. Jan. 25.

(From Our Special Correspondent.)

Iron Ore.—The present indications are that the agents of the various companies will come to an agreement relative to the quantities and prices of ores to be handled during the current year, in the near future. Conferences are being held by them every few days, and it is confidently expected that a definite understanding will have been reached within a week or ten days, and new prices will have been fixed for the ores. The transactions just now are confined to the small lots already on the Lake Erie docks. The sales made were on the basis fixed for 1898, as follows: Specular and magnetic ores, Bessemer quality, \$3.25@ \$3.65; specular and magnetic ores, non-Bessemer quality, \$2.50@ \$2.75; hematite ores, Bessemer quality, \$2.55@ \$3.25; hematite ores, non-Bessemer quality, \$2.10@ \$2.25.

The chartering of vessels for the transportation of ores during the coming season continues, and quite a number of vessels have already been engaged, at 50c. per ton from Escanaba, and 60c. from the head of Lake Superior. So far as known no charters have been secured for Marquette cargoes.

Pig Iron.—The market is strong in all its phases, and all stocks are being firmly held at the prices quoted. The demand is good and some fair sales of foundry iron have been reported during the past week. Bessemer metals have moved slowly, but the sluggish condition of the market for this variety was expected, as most of the trading along this line was done several weeks ago. Following are the quotations, f. o. b., Cleveland: Lake Superior charcoal, \$11.75; Bessemer, \$10.75@ \$11; No. 1 foundry, \$11@ \$11.25; No. 2, \$10.65@ \$10.90; No. 1 Ohio Scotch, \$11@ \$11.25; No. 2, \$10.65@ \$10.90; gray forge, \$10.15@ \$10.40.

Philadelphia, Jan. 27.

(From Our Special Correspondent.)

Pig Iron.—For the time being there is no news. The reason is both buyers and sellers are at their wits' ends. Each side is waiting for the other to do something foolish. Business is small. What little is selling is going at the highest price. Makers are perfectly contented with the situation, and consumers want to see farther ahead before they extend their control over future deliveries. No one looks for sudden developments. Quotations are as follows: No. 1 X foundry, \$12.25@ \$12.50; No. 2 X foundry, \$11.50@ \$12; No. 2 plain, \$11@ \$11.50; standard mill iron, \$10.75@ \$11; basic, \$10.75@ \$11; low phosphorus, \$16@ \$16.50.

Billets.—Sellers do not care to take orders at \$19, or for that matter at any other figure. Makers have as much business to do as they feel it is prudent to have under the peculiar situation.

Merchant Bars.—The continuous heavy demand for freight cars keeps the bar mill capacity pretty well engaged. The general demand keeps all puddling furnaces busy, and the prospects are that until the railroad requirements will be covered the bar mills will be kept busy. Ordinary bars, in small lots, 1.10c.; refined, 1.15@ 1.20c.; steel bars, 1.20c.

Sheets.—The amount of business of the past five days shows that buyers generally are making purchases. This is particularly noticeable at stores. Heavy sheets, which have been neglected for some time, are now being ordered. No. 10, 1.45c.; No. 26, 2.35c.; No. 28, 2.45c.

Pipes and Tubes.—The situation is strong and business is good. Some orders have already been placed for spring which are not usually placed until about March. Our people note the symptoms of combination.

Merchant Steel.—Advances have been announced on several kinds of merchant steel. Agents say there is a movement among some of their customers to buy in larger bulk if concessions can be had, to which as yet no encouragement is given.

Plates.—There is really no news, and as far as can be seen conditions are just the same as a week ago. It is for manufacturers to say when business will be done. Buyers have done all they can. Tank plates are 1.50c., flange 1.60c.

Structural Material.—Our next big run of business will be from bridge and ship builders. A great deal of iron is now due these interests, and most of it is ready for shipment. Managers are straining every facility to make time, so as to bid on new work now in the specification stages. Local demands will absorb about 850 tons, which is taken by a near-by mill. Angles, beams and channels may be fairly quoted 1.40c.

Steel Rails.—There is some demand for light sections, and prices are given at \$20@ \$22. Standard sections, \$19.

Old Rails.—Old rails are wanted, but buyers are hanging back at \$13.50@ \$14. Large transactions have taken place in old steel rails at an average price of \$11.50. There are a good many rail buyers anxious to close.

Scrap.—There is more inquiry for heavy steel scrap than can be filled, and prices are very firm at \$11.25@ \$11.50. Choice railway scrap is now held at \$13.50. Iron and steel axles are up 50c. In fact, the pressure for all kinds of scrap has put everything up a little.

Pittsburg, Jan. 26.

(From Our Special Correspondent.)

The iron and steel trade, both raw and finished, continues to lead all others; in fact, it has no rivals. As regards consumption as well as demand, such a January for trade is not to be found on previous records. While production is beyond question the largest ever known, many of the large plants are withdrawing quotations or naming prohibitive prices in order to check orders, which cannot be filled for some time to come. There is no doubt that consumers require to carry larger and longer contracts than formerly, but under the conditions now ruling producers along the entire line feel that they must keep within reasonably safe limits, which in most cases has already been reached. At the same time nobody need suffer for material, which is legitimately required, but anything savoring of speculation is turned down with scant ceremony. Statistically, the situation is stronger than almost any one had figured on, an increase to the supply of 32,000 tons a month with a decrease in stocks of 38,000 tons during the same period is a startling surprise, considering the season of the year. We are getting rid of 1,025,000 tons of pig iron per month, and it is reasonably safe to assume that 13,000,000 tons will be required to carry us through 1899. As regards prices, it is difficult to say how much further they will advance. The strongest concerns are opposed to any material change from the figures now ruling. Twenty-five or even 50c. more would not be objectionable, but to ask an advance now might start a premature movement, when above

all else stability is the thing most desired. The year has begun all right. Buyers are well enough covered to enable them to exercise patience, and while sellers are completing existing contracts they, too, will have time enough to get definite bearings in regard to future operations.

Finished Material.—The activity previously noted continues for all kinds, and prices are well maintained; the advance in raw material has produced an upward movement in prices; at the same time there is no falling off in the demand; plants are all busy and will remain so.

Wire Nails.—The firmness noted in our last has been fully maintained; the demand continues to increase, with sales \$1.50 a keg; the combination now controls the market, and refuse to sell beyond 30 days, which looks like higher prices.

Wire rods are in fair demand, with sales at mill, \$23.15.

Wrought Iron and Steel Pipe.—The activity previously noted continues; the plants have all the business they want at the present time; the year's output beats all records.

Sheet Bars.—The demand has fallen off somewhat, still a fair business is being transacted.

Scrap Material and Old Iron and Steel Rails.—The market is fair, with an advance in all grades and still advancing.

Latest.—There is little that is new or important to note; trade is moving along steadily, prices being fairly maintained for leading products. The plants in Pittsburg and vicinity are all running to their full capacity, with sufficient orders booked to keep them busy for some time. The settlement of the coal question will no doubt assist business, as the plants that use coal will know what fuel will cost.

COKE SMOELTRD LAKE AND NATIVE ORE.		BLOOMS, BILLETS, BAR ENDS	
Tons.	Cash.	Tons.	Cash.
7,500 B. M. A. V.	\$10.50	1,000 B. Ends, del. P.	\$11.50
5,000 B. M. A. M. P.	11.25	MUCK BAR.	
5,000 B. M. A. M. V.	10.50	600 Neutral.....P.	19.00
3,000 B. M. A. V.	10.50	SKELEP IRON	
3,000 B. A. M. V.	10.50	650 Sheared, P.	\$1.37 1/2 4 m.
2,500 B. P. M. P.	11.15	500 W. Gr'd, P.	1.25 4 m.
2,500 B. M. A. V.	10.50	400 N. Gr'd, P.	1.25 4 m.
2,000 M. In. J. to J., V.	10.00	SKELEP STEEL	
2,000 B. F. M. V.	10.50	500 Sheared, P.	\$1.25 4 m.
2,000 B. A. M. V.	10.50	500 W. Gr'd, P.	1.10 4 m.
1,500 M. In. J. to A., V.	10.10	500 N. Gr'd, P.	1.10 4 m.
1,000 M. In. F. M. V.	10.00	CHARCOAL.	
1,000 B. M. A. P.	11.15	200 Cold Blast, P.	\$21.50
1,000 M. In. J. to A., V.	9.95	125 Ex. W. Rm B'st, P.	21.50
500 No. 3 F'dry, P.	9.95	120 Cold Blast, P.	21.00
200 No. 2 F'dry, P.	10.75	100 Warm Blast, P.	16.50
10 No. 2 F'dry, P.	10.75	50 No. 2 F'dry, P.	15.00
100 No. 1 F'dry, P.	11.40	50 Cold Blast, P.	21.50
100 M. In. Prompt, P.	10.75	OLD IRON AND STEEL RAILS	
SHEET BARS.			
2,500 at Mill, P.	\$18.00	2,000 Iron Rails, gr. V.	\$14.25
1,800 at Mill, P.	18.00	1,500 Steel Rails, gr. P.	10.60
1,500 at Mill, P.	18.00	1,000 Iron Rails, gr. P.	14.40
BLOOMS, BILLETS, SLABS.			
2,500 Billets, P.	\$16.75	SCRAP MATERIAL.	
1,500 Billets, P.	16.85	1,000 No. 1 W. S., n't, V.	\$11.50
1,000 B. del. at mill, P.	17.50	800 H'y M. S. k, gr. P.	10.50
1,000 B. del. at mill, P.	17.50	600 Cast Scr'p, gr. P.	9.00
500 B. del. at mill, P.	17.25	500 Bush. Scr'p, net, P.	9.00
STEEL WIRE RODS.			
1,000 at Mak'rs Mill, P.	\$23.15	300 Wrt T's, net, V.	6.00
		300 O. Car W's, gr. P.	10.25
		200 Cast B'ns, net, V.	6.40
		200 Cast Scrap, gr. V.	9.00

New York. Jan. 27.

The local iron market, reflecting the activity in the stock market to some extent, is gaining strength, though as New York is not a producing center there is no such activity here as at some other points. Foreign business remains good. We note a shipment to Brazil of \$22,800 worth of locomotives and parts, orders from Japan for iron pipe and bars and shipments of \$67,480 worth of locomotive iron; shipments to Australia of \$15,300 worth of steel rails, \$13,000 worth of plates, numerous inquiries for railroad material and electrical equipment from China; shipments to Argentina of \$20,750 worth of steel rails, and \$11,000 worth of agricultural instruments; and the usual movement to England, the shipments to London alone including \$15,000 worth of iron pipe and \$21,750 worth of railroad material.

Pig Iron.—The market shows more inquiry, as buyers feel that the present speculative movement is liable to last some time and better prices for pig are not unlikely. We quote: Northern brands, tide-water delivery, No. 1 X foundry, \$11.75@12; No. 2 X foundry, \$11.25@11.75; No. 2 plain, \$11@11.25; gray forge, \$10.50@10.75; Southern brands, New York delivery: No. 1 foundry, \$11.50@11.75; No. 2 foundry, \$11.25@11.50; No. 1 soft, \$11.50@11.75; No. 2 soft, \$11.25@11.50; No. 3, \$10.75@11; basic, \$11@11.25.

Cast Iron Pipe.—Nothing definite is given out yet about the proposed consolidation of interests.

Bar Iron and Steel.—The local demand is stronger. The advance on refined iron holds, and common bar is firmer. We quote for large lots: Common, 1.10c.; refined, 1.20c. Soft steel bars, 1.20@1.25c.

Plates.—The market is firm in response to the demand at other points. Local consumption is in small orders. We quote: For sheared plates at tidewater, in large lots: Tank, 1/4-in. and

heavier, 1.45c.; 3-16 in., 1.45@1.55c.; Nos. 8, 9 and 10, 1.55@1.60c. Shell is quoted for 1.40@1.45c.; flange, 1.50@1.60c.; marine, 1.60c.; firebox, 1.70@1.75c.; Universals, 1.35c.; charcoal iron plates, 2.25c. for shell, 2.75c. for flange; iron rivets, 2.25c.; steel rivets, 1.75@1.85c.

Structural Material.—Nothing new in the way of contracts is reported this week. The muddle over the material for the towers of the new East River bridge is in a fair way to be cleared and new bids are likely to be called for before long. We quote for large lots at tidewater: Beams, 15-in., 1.40@1.50c.; angles, 1.30@1.35c.; tees, 1.45@1.50c.; channels, 1.40@1.50c.

Steel Rails.—The market is pretty firm and higher prices are anticipated. Foreign business is good, but local demand is not heavy. We quote: Standard sections, \$19@20 f. o. b. mills, with girder rails \$23. Lighter rails are quoted: 12-lb., \$25; 16-lb., \$23; 20-lb., \$23; 25-lb., \$21; 30-lb., \$21; 35-lb., \$21; up to standard, \$20, with the usual 10% advance for smaller orders; all f. o. b. mills. Track fastenings are quoted: Angle bars, 1.10c.; fish plates, 1.15c.; spikes, 1.50c.; bolts, 1.60@1.75c.

Nails.—Buying of wire nails is active, as the American Steel and Wire Company is in complete control of the market and has limited deliveries. Higher prices are therefore not unlikely. We quote for large lots on dock, \$1.65. Cut nails are quoted at \$1.35 for large lots.

Old Material.—The demand for scrap is good and prices are, if anything, firmer. Quotations are: Old steel rails, \$10.50; old iron rails, \$12.50; old car wheels, \$10; axles, \$15@16; wrought iron scrap, \$10; machinery, cast, \$9.50; borings, \$5; turnings, \$6; burnt iron, \$5.50, all New York deliveries.

Cartagena, Spain. Jan. 5.

(Special Report of Barrington & Holt.)
Iron and Manganiferous Ores.—The shipments for December have been 19 cargoes, 10 of these were drying ores, 7 manganiferous, and 2 Cehigin magnetic. There has been no falling off in the demand for iron or manganiferous ores during the month; on the contrary, exporters seem to be refusing to sell, and those that have not already disposed of their production for the coming year are now holding off expecting to obtain increased prices later on. The fact is owing to the heavy drop in exchange and without compensating rebate in the cost of production. The sterling f. o. b. value of mineral for the next six months or so is likely to be higher than it has been for a number of years. Considerable shipments are now taking place; the export of iron ore for the last week in December was 16,000 tons, and at the present time there is tonnage to lift 20,000 tons in port, and a dozen or so of steamers due within the next fortnight. Rates of freight are, however, unusually firm, being quite 2s. a ton higher than at the same period in previous years. The rates paid for United Kingdom ports vary from 9s. to 10s. 3d. Among the shipments have been Portman ore, No. 1 manganiferous, one cargo of Cehigin ore, and two cargoes of Subido ore; this latter one from Cartagena and one from La Calera. Among the various developments in the iron ore trade during the year have been the increase in the production of Cehigin ore, the restarting of all the Perin mines, which are now producing about 2,000 tons per month of specular micaceous ore of first class quality, and the inauguration of the Subida Iron Ore Company's mines in the Penas Blancas District. This latter company will have their cable in working order in January, when they expect to transport a considerably increased quantity of their mineral to the Calera.

We quote for iron ore as follows: Portman, ordinary 50%, 5s. 9d.@6s. 3d. per ton; special low phosphorus, 6s. 1d.@6s. 5d.; extra quality low phosphorus, 6s. 9d.; special ore, 7s. 3d.; specular ore, 9s. 3d. For manganiferous ores we quote: No. 1, containing 20% iron and 20% manganese, 14s. 6d. per ton; No. 1 B., containing 25% iron and 17% manganese, 11s. 6d.; No. 2, containing 30% iron and 15% manganese, 11s.; No. 3, containing 35% iron and 12% manganese, 9s. 4d. per ton.

METAL MARKET.

New York, Jan. 27, 1899.

Gold and Silver.

Gold and Silver Exports and Imports
At all United States ports, December and year.

	December.		Year.	
	1897.	1898.	1897.	1898.
GOLD.				
Exports	\$577,966	\$1,219,638	\$34,276,401	\$16,194,954
Imports	2,582,465	8,639,882	34,020,592	158,036,252
Excess I.	\$2,004,499	\$7,420,244	\$255,809	\$141,841,298
SILVER.				
Exports	5,848,530	5,827,098	58,661,292	53,797,104
Imports	2,766,786	3,108,421	33,082,302	29,029,724
Excess E.	\$3,081,744	\$2,718,677	\$25,578,990	\$24,767,380

This statement includes the exports and imports to all United States ports, the figures being Treasury Department.

Gold and Silver Exports and Imports, New York

For the week ending Jan. 26th, 1899, and for years from January 1st, 1899, 1898, 1897, 1896.

Period.	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$88,735	\$158,012	\$701,542	\$68,391	E. \$563,874
1899..	198,221	1,934,073	2,190,692	286,070	E. 168,770
1898..	2,530,335	1,823,760	4,908,395	2,032,573	E. 3,882,397
1897..	183,620	228,211	3,906,881	226,302	E. 3,678,988
1896..	9,183,473	6,112,143	3,241,744	135,835	E. 5,157,539

Exports of gold were to the West Indies, those of silver chiefly to London. The gold imported came from Europe chiefly; the silver from Central and South America.

The United States assay office in New York reports the total receipts of silver at 76,000 oz. for the week.

Financial Notes of the Week.

The great feature of the business situation at present is the wild speculation in stocks which is going on, under the combined influence of general prosperity, cheap and abundant money. On all the exchanges prices are being forced up to very high points, the advances covering worthless as well as valuable securities. Two years of good crops and large exports at high prices, with the reaction from several years of depression, have brought about a situation very like that which in 1881 followed the panic of 1873. Logically a collapse like that of 1883 should follow, and a reaction is sure to come. It is to be remembered, however, that in the earlier year Europe held a very large amount of our securities and was drawing on us much more heavily for interest and other charges than at present; while we did not have the heavy balance due us to draw upon, which now exists.

The silver market has developed dullness the latter part of this week upon completion of Continental orders. After sagging off to 27% d., it closes with a firmer tendency. London still continues a good buyer for future delivery at prices close to spot quotations.

Imports of specie at San Francisco by water for the year ending December 31st, were as follows:

	Gold.	Silver.	Total.
Coin	\$33,279,369	\$355,364	\$33,634,733
Bullion	2,649,043	1,452,367	4,101,410
Totals	\$35,928,412	\$1,807,731	\$37,736,143

These imports were from the following countries: Mexico, \$2,573,001; British Columbia, \$397,442; Australia, \$27,653,561; Japan, \$6,765,826; Hawaiian Islands, \$192,092; Central America, \$63,472; miscellaneous, \$90,749.

The statement of the United States Treasury on Thursday, January 26th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date of last week:

	Jan. 19.	Jan. 26.	Changes.
Gold	\$230,545,957	\$229,103,940	D. \$1,442,017
Silver	8,908,162	9,696,035	I. 787,873
Legal tenders	13,825,835	14,784,365	I. 958,530
Treas. notes, &c.	1,116,230	2,181,157	I. 64,927
Totals	\$254,396,184	\$256,765,497	I. \$1,369,313

Treasury deposits with national banks amounted to \$89,495,534, an increase of \$506,171 during the week.

Shipments of specie from San Francisco by water for the year ending December 31st, are reported as below:

	Gold.	Silver.	Totals.
Hongkong.....	\$77,376	\$6,470,908	\$6,548,284
Shanghai.....	.....	676,178	676,178
Japan.....	.....	3,000	3,000
India.....	.....	415,900	415,900
Tahiti.....	2,411	.....	2,411
Honolulu.....	720,000	87,500	807,500
Central America ..	27,425	103,957	131,382
Mexico.....	500	.....	500
Total foreign	\$827,712	\$7,757,443	\$8,585,155
New York.....	48,037,158	15,157	48,052,315
Totals	\$48,864,870	\$7,772,600	\$56,637,470
Totals, 1897.....	27,090,153	17,823,470	44,913,623

Exports of Mexican dollars, included above, were \$866,763 in December and \$4,899,148 for the year. This is a heavy decrease from 1897, when they amounted to \$11,971,876.

The statement of the New York Banks—including the 66 banks represented in the Clearing House—for the week ending January 21st gives the following totals, comparison being made with the corresponding weeks in 1897 and 1896:

	1897.	1898.	1899.
Loans and discounts.....	\$490,328,700	\$623,470,100	\$720,351,600
Deposits	543,479,600	714,472,800	849,074,100
Circulation	18,479,800	14,593,600	15,439,300
Reserve:			
Specie	79,134,100	110,647,600	187,073,100
Legal tenders.....	118,803,600	99,245,900	59,889,100
Total reserve	\$197,937,700	\$209,893,400	\$246,962,200
Legal requirement	140,869,500	178,618,200	212,268,525
Balance surplus	\$57,068,200	\$31,275,200	\$34,693,675

Changes for the week this year were increases of \$3,505,600 in loans and discounts, \$13,268,400 in deposits, \$8,888,500 in specie, \$859,200 in legal tenders, and \$6,430,600 in surplus reserve; a decrease of \$168,860 in circulation.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings at the corresponding dates last year:

Banks.	1898.		1899.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Asso.	\$10,647,690	.....	\$187,073,100	.....
England	102,818,680	.....	163,414,105	.....
France	385,939,976	\$211,782,239	354,169,200	\$239,506,500
Germany	151,932,640	77,390,990	137,725,000	70,945,000
Aust-Hun.	182,255,000	61,830,000	179,495,000	62,194,000
Spain	47,155,000	51,600,000	55,310,000	41,545,000
Belgium	14,020,000	7,010,000	15,565,000	7,765,000
Netherl'ds.	13,145,000	34,000,000	21,575,000	63,750,000
Italy	78,610,000	10,505,000	75,145,000	11,720,000
Russia	591,685,000	19,060,000	495,695,000	19,680,000

The returns for the Associated Banks of New York are of date January 21st, the Banks of England and France January 26th, and the others are of date January 19th, as reported by the "Commercial and Financial Chronicle" cable. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports gold only.

Shipments of silver from London to the East for the week ending January 12th, 1899, are reported by Messrs. Pixley & Abel's circular as follows:

	1898.	1899.	Changes.
India	£93,400	£137,000	I. £43,600
China	.....	34,380	I. 34,380
The Straits	.....	.....	.....
Totals	£93,400	£171,380	I. £77,980

Arrivals for the week this year were £173,000 in bar silver from New York, £23,000 from Chile and £9,000 from the West Indies; total, £205,000. Shipments were £102,000 in bar silver to Bombay, India.

Indian exchange continues strong. The demand for council bills in London largely exceeded the supply, and those issued realized an average price of 16.09d. per rupee.

Daily Prices of Metals in New York.

January.	Silver.		Copper.		Tin.	Lead.	Spel-ter.	
	Fine oz. Cts.	Lon. Price	Lake, lb.	Elec-tro stand. lb.				
21	4.84 3/4	59 3/4	27 3/4	15	14 1/2	66 10 0	23 4 25	5.40
24	4.84 3/4	59 3/4	27 3/4	15 3/4	14 1/2	66 10 0	24	4.25
24	4.84 3/4	59 3/4	27 3/4	16	15	66 10 0	24 1/2	5.50
25	4.84 3/4	59 3/4	27 3/4	16	15	67 0 0	24 3/4	5.50
26	4.84 3/4	59 3/4	27 3/4	15	15 1/4	67 12 6	24 1/2	5.55
27	4.84 3/4	59 3/4	27 3/4	16 1/4	15 1/4	67 0 0	24 1/4	4.37 1/2

Average Prices of Metals per lb., New York.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1899.	1898.	1899.	1898.	1899.	1898.	1899.	1898.
Jan	14.59	10.99	22.40	13.87	4.16	3.65	5.34	3.96
Feb	11.28	.....	14.08	.....	3.71	.....	4.04
March	11.95	.....	14.38	.....	3.72	.....	4.25
April	12.14	.....	14.60	.....	3.63	.....	4.26
May	12.09	.....	14.52	.....	3.64	.....	4.27
June	11.89	.....	15.22	.....	3.82	.....	4.77
July	11.63	.....	15.60	.....	3.95	.....	4.66
August	11.89	.....	16.23	.....	4.00	.....	4.58
Sept.	12.31	.....	16.03	.....	3.99	.....	4.67
October	12.41	.....	17.42	.....	3.78	.....	4.98
Nov	12.46	.....	18.20	.....	3.70	.....	5.29
Dec	12.93	.....	18.30	.....	3.76	.....	5.10
Year	12.03	.....	15.70	.....	3.78	.....	4.57

Average Prices of Silver per oz. Troy.

Month.	1898.		1897.		1896.	
	Lon'd'n Pence.	N. Y. Cents.	Lon'd'n Pence.	N. Y. Cents.	Lon'd'n Pence.	N. Y. Cents.
January	25.29	56.77	29.74	64.79	30.69	67.13
February	25.89	56.07	29.68	64.67	31.01	67.67
March	25.47	54.90	28.96	63.06	31.34	68.40
April	25.95	56.02	28.36	61.85	31.10	67.92
May	26.31	56.98	27.86	60.42	31.08	67.88
June	27.09	58.61	27.58	60.10	31.46	68.69
July	27.32	59.06	27.36	59.61	31.45	68.75
August	27.48	59.54	24.93	54.19	30.93	67.34
September	28.05	60.68	25.66	55.24	30.19	65.68
October	27.90	60.42	26.77	57.57	29.68	65.05
November	27.93	60.60	26.87	57.93	29.46	64.98
December	27.45	59.42	26.83	58.01	29.70	65.24
Year	26.76	58.26	27.55	59.79	30.67	67.06

The New York prices are per fine ounce; the London quotation is per standard ounce, 925 fine.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	\$.47	\$.48 1/2
Peruvian soles and Chilean pesos	4.24	4.3
Victoria sovereigns	4.84	4.87
Twenty francs	3.84	3.88
Twenty marks	4.73	4.78
Spanish 25 pesetas	4.78	4.84

Other Metals.

Copper.—The market continues on its upward course, and has this week again scored large advances. For early deliveries producers are now fully sold up, and very heavily sold for future months. Prompt copper is unobtainable. Manufacturers report an excellent business doing at the higher prices. Lake copper has been sold at 16c. and there are no more sellers at that price. Sales at 16 1/4c. and 16 1/2c. have been rumored, but we have been unable as yet to verify these reports. Electrolytic copper has sold at 15 1/2c. for cakes, wirebars and ingots; 15 1/4c. for cathodes, with casting copper nominal at 15@15 1/2c.

In London the market opened with an advance of £2 10s. above last week's closing figures. On Monday it was £66 10s., on Tuesday £66 15s., on Wednesday it advanced to £67 5s. and on Thursday to £67 15s. On that day, under very heavy sales by speculative holders, the market declined 15s., to £67, but closes somewhat firmer to-day at £67 2s. 6d. The volume of transactions was tremendous. There has been a good inquiry from abroad for refined kinds, and we quote: English tough, £70@£70 10s.; best selected, £71@£71 10s.; strong sheets, £77; India sheets, £75; yellow metal, 5 1/2d.

Imports of copper into Great Britain for the full year were as follows, in long tons:

	1897.	1898.
Ores	82,595	89,706
Matte and precipitates	88,591	75,001
Copper (fine)	61,078	68,915

These imports were approximately equal to 115,386 tons fine copper in 1898, and 113,613 tons in 1897. The United States contributed in 1898 of the total 1,146 tons ore, 9,626 tons matte and 39,211 tons fine copper.

Tin has fluctuated violently, opening in London at £108 10s., an advance of £5. It rose quickly to £111 12s. 6d., and as quickly declined again to £108, recovered to £110, but closes weaker at £107 10s. Transactions in London have been enormous. A large business was also done in New York Spot tin is not plentiful, and the closing prices are 24 1/2@25c.

Imports of tin into Great Britain for the full year 1898 were 20,339 long tons, against 26,786 tons in 1897; a decrease of 6,447 tons, or 24.1% of the total last year, 15,961 tons came from the Straits and 1,166 tons from Australia.

Lead.—The demand for this article has still further improved, and New York lead cannot now be had below 4 1/4@4.40c. Buyers have been inquiring for future deliveries, but these were not obtainable at present prices.

The foreign market, which declined early in the week, has again advanced to £13 7s. 6d. for Spanish, and is cabled as being very strong and liable to advance very shortly.

Imports of lead into Great Britain in 1898 were 194,479 long tons, against 167,441 in 1897. Of the total last year, Spain furnished 103,481 tons; Australasia, 42,230 tons; the United States, 31,079 tons; Germany, 8,045 tons; other countries, 9,644 tons.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: "The lead market is very nervous and unsettled, combined with a great deal of bull snap. Prices range from 4.05c. to 4.12 1/2c., closing very strong."

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, under date of Jan. 5, as follows: During December the average price of lead was 71.62 reales per quintal, equivalent to £11 16s. 10d. per long ton, f. o. b. here, on an average exchange of 33.95 pesetas to the £1, silver having averaged 14.81 reales per oz. The weekly prices of lead were as follows: Dec. 7, 73.50 reales per qtl., £12 1s. per long ton; 14th, 72.25 reales, or £11 16s. 1d. per ton; 21st, 71.50 reales, or £11 15s. 4d.; 28th, 69.25 reales, or £11 14s. 11d. The weekly prices of silver per ounce were: Dec. 7, 15 reales (average exchange 34.55 pesetas); 14th, 15 reales (34.25 pesetas); 21st, 15 reales (34 pesetas); 28th, 14.25 reales (33 pesetas). The exports of pig lead during December were 1,303,035 kilos to Marseilles, and 365,612 kilos to Newcastle; total, 1,668,647 kilos. Other exports were 3,400,000 kilos zinc blende to Antwerp, 200,000 kilos zinc blende and 1,804 kilos silver ingots to Marseilles.

Spelter.—There again appears to be a scarcity of spelter abroad, and prices there advanced to £26. It is evident that large quantities will have to be drawn from this side, and with the excellent consumption here, higher prices are to be looked for.

Here the market closes with St. Louis spelter selling at 5.35c., and New York at 5.70c.

Imports of zinc into Great Britain for the full year 1898 were 77,521 long tons, against 69,884 in 1897, an increase of 7,637 tons.

Antimony is also somewhat firmer and higher prices are asked. The ruling quotations are about 9c. for Hallett's U. S. Star, Japanese and "C" antimony, and 9 1/2c. for Cookson's. Spot stocks here are rather depleted.

Nickel continues on unchanged lines, and no alteration in prices can be reported. We quote for ton lots 33@36c. per lb., and for smaller orders 35 1/2@38c. London prices are 14@16d. per lb., according to size and order.

Platinum.—Demand is active and prices are somewhat higher. For large lots \$15.50 per ounce is now quoted in New York; for smaller orders, \$16@17. The London quotation is 62@64s. an ounce.

Quicksilver.—The New York quotation remains \$42 per flask. The London price is £8 per flask, with £7 19s. named from second hand.

Imports of quicksilver into Great Britain in 1898 were 4,092,247 lbs. (4,195,053 lbs. in 1897). Exports were 2,551,001 lbs. (2,307,611 lbs. in 1897); leaving a balance of 1,541,246 lbs. (1,887,442 lbs. in 1897), consumed or added to stocks.

The Minor Metals.—Quotations are given below for New York delivery:

	Per lb.	Per lb.
Aluminum	.....	.....
No. 1, 98% ingots, 30@40c.	Bismuth	\$1.40
No. 2, 90% ingots, 31@34c.	Phosphorus	48@50c.
Rolled sheets, 38c. up	Tungsten	70c.
Nickel alloy, 33@39c.	Ferro-tungsten, 60%	60c.

Variations in price depend chiefly on the size of the order.

Imports and Exports of Metals

Port.	Week, Jan. 25.		Year, 1899.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum	13	.....	20	10
Antimony ore	.....	170	.....	170
" regulus	.....	.....	.....	.....
Chrome ore	.....	.....	.....	.....
Copper, fine	1,500	64	4,626	621
" wire	.....	.....	100	.....
" matte	90	.....	120	225
" ash	.....	15	.....	5
" sulphate	50	.....	548	.....
Ferro-chrome	.....	.....	.....	.....
Ferro-mangan'se	.....	.....	.....	.....
Ferro-silicon	.....	.....	.....	.....
Iron ore	.....	1102	384	174
" pig bar, rod	.....	.....	215	.....
" pipe	216	.....	2,449	.....
" plates	81	.....	85	.....
" other	.....	.....	202	.....
Lead	1,150	386	3,675	5,567
" ore	.....	.....	.....	129
Manganese ore	.....	.....	.....	157
" Metals, old	28	1154	128	.....
" Composition	.....	.....	325	.....
Nickel	60	.....	215	.....
" Rail'd material	404	180	982	140
" Rails, old	.....	.....	1,701	.....
Spiegeleisen	.....	.....	.....	.....
Steel billets, etc.	1,218	1372	2,915	761
" rails	2,526	.....	8,363	.....
" hoops	100	.....	100	.....
" wire	502	.....	1,969	.....
" nails	102	.....	837	.....
" not spec'f'd.	469	187	1,040	127
Tin	.....	1,015	.....	2,180
" dross	.....	.....	.....	.....
" and black plates boxes	.....	112,834	.....	12,834
Zinc	.....	19	.....	9
" dross	.....	.....	32	.....
" dust or ashes	23	.....	94	.....
" ore	.....	.....	.....	.....
" oxide	97	113	330	28
" skimmings	35	.....	43	.....
*Baltimore.				
Aluminum	.....	.....	.....	.....
Antimony regulus	.....	.....	.....	.....
Brass scrap	.....	.....	.....	.....
Chrome ore	.....	.....	.....	.....
Copper, fine	729	.....	729	.....
" matte	.....	.....	.....	.....
" sulphate	91	.....	91	.....
Ferro-manganese	.....	1250	.....	469
Ferro silicon	.....	.....	.....	50
Iron pig, bar, etc.	12	.....	72	484
" ore	638	15,582	1,092	15,384
" pipe	.....	.....	.....	.....
" pyrites	.....	13,781	.....	6,584
" other	.....	.....	.....	.....
Lead	.....	.....	.....	.....
Machinery	.....	.....	115	.....
Manganese ore	.....	.....	.....	2,450
Spiegeleisen	.....	.....	19	34
Steel, billets, etc.	1,398	.....	2,604	48
" rails	.....	.....	51	100
" nails	.....	.....	2,000	.....
Tin	.....	.....	25	25
" dross	.....	.....	.....	.....
" and black plates, boxes	.....	.....	.....	.....
Zinc	.....	.....	18	.....
" dross	.....		

MINING STOCKS.

Complete quotations will be found on pages 133, 134 and 135 of mining stocks listed and dealt in at:

Baltimore.	New York.	Mexico.
Boston.	Philadelphia.	Paris.
Butte.	Pittsburg.	Rossland.
Cleveland.	St. Louis.	Shanghai.
Colo. Springs.	Salt Lake.	Toronto.
Denver.	San Francisco.	Valpara'iso
Spokane.	London.	

New York. Jan. 27.

The Street has been very much excited of late by the extraordinary trading in the industrial combination stocks. Prices have advanced greatly and the boom of speculation continues. Meantime the professional element is unloading on the public, and the time is not distant when a reaction will be felt.

In mining shares there is also a better feeling, but less interest than in other securities. Efforts are being made here to revive the mining stock market by the Prentice Investment Company of Denver, Colo., which has just established a branch office in New York. This firm represents a number of Colorado properties, is a member of the Denver Mining Exchange and recently took a seat on the New York Industrial Exchange.

It is rather unusual for the curb-stone brokers to handle mining securities, but of late we notice several of these companies have attracted public attention in this way. The Markeen Copper Company of Arizona, a comparatively new concern, has been called on the curb at \$5½@55% per share, while its par value is \$10. Another stock has been that of the British Columbia Copper Company, Limited, of British Columbia. It is said that H. L. Horton and some bankers of New York are buying up this stock, as they intend to put it on the Boston Exchange. We also understand that the Pike's Peak Tunnel Railway Company of Colorado has been brought to brokers' attention by unsupplied bids, but nothing of consequence has been done in the stock. This company's scheme has often been discussed unfavorably in our columns.

There have been further sales of Batopilas Mining Company stock at auction; 1,002 shares changed hands at 96c. per share, and \$2,400 in 6% bonds at 46. The last sale of the shares brought \$1 each.

Of the mining stocks dealt in on the exchanges the Colorado group were in best demand, and in many cases prices ruled higher than a week ago. In the Cripple Creek section Isabella is strong at the advanced price, owing to the report that the company has over \$200,000 in the treasury, and the returns from the mine show high valuations which promise early dividends. The stock went up to 80c., and closes firm.

Portland rose from \$1.40 to \$1.75, reacting to \$1.70, notwithstanding the criticisms of the Board of Directors in lately investing \$225,000 in 38 additional acres of ground on Battle Mountain, making nearly 200 acres which the company controls in this section. Work, which sold around 4c. per share last January, has reached 20c. this week. The cheaper Cripple Creek stocks are finding support with those who anticipate a good future for them. Of the other Colorado stocks efforts are making to float several enterprises that have as yet received little attention by the public. Of the older set the Leadville securities are receiving some attention. Iron Silver has been quoted up to 80c., though buyers offer from 70c. to 75c. Little Chief fluctuated between 10c. and 21c. Leadville Consolidated ranged between 9 and 13c. Breece moved up 10c. to 95c., at which it closes.

During the last two weeks transactions in pig iron have taken place on the floor of the Consolidated Exchange. This is a departure, which, while often discussed, has never been attempted. Iron has not been known as a speculative commodity in this country, though in Europe, Scotland in particular, the trading on 'Change in pig iron has been a very important factor in the market.

The rules governing transactions in pig iron on the Consolidated Exchange are as follows:

"Section 1.—The warrants shall be the issue of the American Pig Iron Storage Warrant Company (engraved and printed in green and black). Each warrant shall be for 100 tons of pig iron, and but one brand of iron and one grade of iron shall be covered by the same warrant.

"Section 2.—All bids and offers shall be for lots of 100 tons, and when not otherwise stated at the time of the transaction, shall be considered as made for the regular way, and all such transactions shall be cleared daily through the Clearing House under the same rules as govern railroad stocks, deliveries being made Mondays of each week. Bids and offers shall be made on a scale of 12½ cents.

"Section 3.—The accrued storage on warrants shall be deducted from the invoice at the time of the delivery of the warrant."

Boston. Jan. 26.

(From Our Special Correspondent.)

The market has been a very active, not to say a wild one, this week, and the copper stocks have been selling at prices which beat all previous records. At the same time there are some

signs of sanity to be found here and there in the general craze. There are not so many such signs as there might be, but even a few are encouraging.

The old time dividend paying stocks had their innings this week and have made a tremendous showing, as a few figures will tell: Calumet & Hecla reached \$750 on Wednesday, but beat that to-day by a sale at \$765, dropping later to \$750 again. Tamarack made a gain of \$15, but after one sale at \$260, settled back to \$242. Quincy climbed to \$190, and held that price pretty well, closing at \$189. Osceola brought \$99½, closing a fraction lower at \$99½. Atlantic sold for \$39 and Wolverine \$48½@49½. Boston & Montana went up to \$302½ on several sales, but dropped back to \$298 at the close.

The older speculative stocks were not quite so much in evidence, but did pretty well nevertheless. Butte & Boston sold at \$91, but dropped back to \$88. Centennial, after selling at \$36, closed at \$34½. Franklin brought \$25, and Old Dominion, \$37½. The newer speculatives were not much changed, Arcadian selling at \$71 and Isle Royal at \$49½.

Of the outside coppers Parrot, which has not been very active, brought \$40, and Utah Consolidated \$26½.

The new prospect holes seem to be a little less in favor, which is a good sign. One or two of them have been withdrawn—on account of trouble over land titles, I hear—and most of them are not quite so much in demand as last week. The prices were rather uncertain and, upon the whole, rather lower than last week. There is still quite a rush to take up new stock offered. Boston & Arizona books close to-morrow (January 27th); insiders claim a very large subscription.

The gold stocks have been very active and strong. Santa Ysabel sold at \$12½@13. North American Gold Dredging brought \$24@25. Merced was lower, at \$9, and Cochiti sold at \$11. Pioneer is down, selling at \$5½@6.

In the general market Dominion Coal about held its own, selling at \$34 for the common stock. Federal Steel is about \$55.

The Mahala Mining Company, operating the old Mahala Mine at Leadville, is now offering its stock for subscription here.

Since June last 18 new companies have been organized to mine copper in the Lake Superior region and brought out on the Boston market. Nearly all of these have capital stocks of \$2,500,000 each, in \$25 shares. The amounts paid in varied from \$3 to \$12.50 a share, so that they have taken a lot of money in the first organization. They are all selling above the amounts paid in, some of them very much above. Besides these there are the Bingham in Utah, the Montana & Arizona, the Boston & Carolina and others. Altogether it has taken from \$15,000,000 to \$16,000,000 to start these properties—and there are others coming, enough to take as much more.

Salt Lake City. Jan. 21.

(From Our Special Correspondent.)

This has been a memorable week for the trading in Utah mining shares. Sales on the exchange foot up 411,501 shares, for which \$141,850 were paid. Off board transactions were even larger. The strength of the market and the demand for these shares are unprecedented. To-day's business on call was an astonisher for a Saturday, the sales being 92,400 shares, for which the purchasers paid \$87,574. It has been a good speculators' week, with lively fluctuations and strong advances.

Daly West moved up \$1.50 in the bid above the close of last week, standing \$10.50 bid, \$12.50 asked. There seems to be no doubt that work will be resumed within 60 days, and that regular dividends will follow. Ontario is higher and stronger. Silver King's closing bid is \$5 above that of last Saturday. Valeo has again topped \$1.50 and the talent avers that it will continue to climb. Anchor is quiet and featureless.

Grand Central is firmer and higher. Mammoth has weakened somewhat since last Saturday. The inside tip of a January dividend will probably not prove true. Ajax is firm and higher, closing \$1.20 bid, \$1.40 asked. More particulars of the new regime will be made known next week. Swansea and South Swansea are strong and unchanged. Four Aces did a large business between 55c. and 66c. There were 10,000 shares sold to-day between 58½c. and 64c. Joe Bowers is again dumping, doing business this morning at 24@25c. I am assured, on what should be unquestioned authority, that the contest over title to half the ground will be settled in court and not compromised, as seemed probable a few days ago. Eagle & Blue Bell holds strong around \$2. Lower Mammoth has taken another spurt and has advanced over 33% since last Saturday.

Geysir Marion has assumed a firmer front, closing 91½ bid, 93½ asked. I am told the mines are opening larger quantities of ore than for many months. Northern Light is becoming a fountain of surprises—very pleasant ones. A week ago it closed around 76c.; this morning it sold at \$1, and it gives signs of further strong advances. Chloride Point is higher than last Saturday. Mercur is about stationary.

Utah has moved up to about \$1. Galena continues stationary. Dexter is a shade higher than

on last Saturday, but the most flattering reports from the mines fail to bring up the bid quotation to \$3.25. Dalton holds around 3½ for no assignable cause other than the prevailing buoyancy. Horn Silver continues uninteresting and unchanged. Thus far it has taken no part in the boom. Alice is strong at 75 bid, 90 asked. The report for 1898, including a forecast for the current year, will probably be given out in a week or 10 days.

San Francisco. Jan. 21.

(From Our Special Correspondent.)

Business continues quiet on a purely inside market. Prices generally have been higher and the market closes firm, but the dealings have not been very large, and the outside public is not conspicuous on the exchange. This is more marked when we see the very active speculation which is going on in railroad and industrial securities here, as well as in the East. The brokers promise more activity when the new pumping plant in the Comstock lode gets to work; but it looks as if it would take longer than that.

If we had some good California mines listed there would be a chance for business. But these companies will not come in until we have a change in methods.

Some quotations noted are: Consolidated California & Virginia, \$1.25@1.30; Sierra Nevada, 64@65c.; Confidence, 57c.; Mexican, 31@32c.; Occidental Consolidated, 29@30c.; Gould & Curry, 25@26c.; Hale & Norcross, 7@8c. For Standard Consolidated, \$1.95 was bid, with no sales.

The stockholders of the Hexter Gold Mining Company have authorized a reduction of the capital stock from \$3,000,000, divided into 30,000 shares of the par value of \$100 each, to \$300,000, divided into 300,000 shares of the par value of 10 cents.

The death of Colonel Edward E. Eyre, an old member and former president of the San Francisco Stock and Exchange Board, was announced by President Emmett P. Barrett Monday morning, and an adjournment was taken from 10.30 a. m. to 2.30 p. m., as a mark of respect. He retired from active business some years ago.

Paris. Jan. 15.

(From Our Special Correspondent.)

The business in mining stocks shows some improvement, in spite of the still disturbed and uneasy condition of politics. Now that the holidays have passed over, and full attention is given trade and finance again, the market is stronger and more active.

The metallurgical shares hold a strong position, though at first sight most of them seem to have advanced more than the actual gain in dividends warrants. It must be remembered, however, that the good business and high profits of the past year and a half have enabled most of them to pay up the debts and depreciation of several years of poor business. Nearly all these companies are now in a sound and strong position, and many have added to their equipment.

The Russian group continues to find favor, and there is no doubt that the iron and steel trade in that country is receiving a great development. Part of the gain is temporary, perhaps, being due to the present activity in railroad building; but there is room for enormous advance, since Russia has only begun to develop its manufacturing resources, and will certainly become a much greater consumer of steel than it has been in the past.

The zinc and lead stocks continue to be favored by the high prices of those metals. The talk of a convention among the zinc producers has been dropped, since all the companies are now fully occupied in meeting the demand. In lead also business is very good and prices high.

Le Nickel shares are at a high value, when one considers that the business is, after all, a small one, and increase in demand can be only moderate.

The copper shares have been active, and advances based on the prices of the metal and the prospect of a large demand all through the coming year continue. There is no doubt that the copper companies generally had a profitable year in 1898, and it looks as if they would have a still better one in 1899; so that the high quotations now ruling are largely justified by the situation.

We continue to hear rumors about combinations to control the production of copper. Those best informed here do not place much confidence in these reports. Certain operators here have been approached by offers from your side, but it seems that they came from parties whose ability to form a satisfactory American combination was doubtful; so the whole matter rests.

There are floating rumors that a syndicate, headed by Baron Oppenheim, has been formed in Brussels to control the platinum mines of Russia. The reported capital is 20,000,000 fr. It is quite possibly true, but I have not been able to secure definite information about the matter. It would not be a very large or difficult operation.

It appears that we are on the way to a better understanding with England, if our politicians will permit. This will clear the air abroad, but we still have our domestic troubles to settle. Let us hope that this year will see matters in better condition. Azote.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Adams Con., Alamo, Alice, and others with columns for location, par value, and dates from Jan. 21 to Jan. 27.

BOSTON MASS.

Table of stock quotations for Boston, Mass., listing companies like Adventure Cons., Aetna, and others with columns for location, par value, and dates from Jan. 20 to Jan. 26.

Official quotations Boston Stock Exchange. Total shares sold, 170,557. *Ex-dividend.

CLEVELAND, O.

Table of stock quotations for Cleveland, Ohio, listing companies like Aurora, Geoble, and others with columns for location, par value, and dates from Jan. 25 to Jan. 26.

BUTTE, MONT.

Table of stock quotations for Butte, Montana, listing companies like Alice & M., Am. S. & W. Co., and others with columns for location, par value, and dates from Jan. 15 to Jan. 27.

Special reports by the Hewitt-St.aley Company. Total sales 19,300 shares.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colorado, listing companies like Alamo, Ansonia, and others with columns for location, par value, and dates from Jan. 16 to Jan. 21.

Official quotations Colo. Springs Mining Stock Exchange. Sales: Listed stocks, 1,999,576; unlisted, 1,399,974; total 3,399,550 shares.

By Telegraph.

Table of stock quotations received by telegraph, listing companies like Alamo, Anchoria-Leland, and others with columns for location, par value, and dates from Jan. 21 to Jan. 26.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stock quotations, listing companies like American Coal, Am. S. & W. Co., and others with columns for location, par value, and dates from Jan. 20 to Jan. 26.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pennsylvania, listing companies like Cambria Iron, Charter Valley, and others with columns for location, par value, and dates from Jan. 20 to Jan. 26.

PITTSBURG, PA.

Table of stock quotations for Pittsburgh, Pennsylvania, listing companies like Allegheny, Carborundum, and others with columns for location, par value, and dates from Jan. 20 to Jan. 26.

BALTIMORE, MD.

Table of stock quotations for Baltimore, Maryland, listing companies like Atlantic Coal, Big Vein Coal, and others with columns for location, par value, and dates from Jan. 20 to Jan. 26.

ST. LOUIS, MO.

Table of stock quotations for St. Louis, Missouri, listing companies like Am. Gold, Am. Nettle, and others with columns for location, par value, and dates from Jan. 20 to Jan. 26.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing various mining companies and their share prices across multiple dates from Jan. 16 to Jan. 21.

Official Quotations Denver Stock Exchange. Sales: Mines, 1,000 shares; Prospects, 11,000 shares; grand total, 241,000 shares.

SALT LAKE CITY, UTAH.

Jan. 21

Table of stock quotations for Salt Lake City, Utah, listing various mining companies and their share prices.

*From Our Special Correspondent. †Utah companies. ‡Mines in Vanderbilt, Cal. §Mines in Tascara, Nev.

SPOKANE WASH.

Jan. 26.

Table of stock quotations for Spokane, Washington, listing various mining companies and their share prices.

†Telegraphic quotations of the British-Canadian Investment and Mining Syndicate. *Under Republic management.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, California, listing various mining companies and their share prices.

Official telegraphic quotations, San Francisco Stock Exchange

TORONTO, CAN.

Table of stock quotations for Toronto, Canada, listing various mining companies and their share prices.

* Official quotations of the Toronto Mining and Industrial Exchange. Total shares sold, 49,900.

ROSSLAND, BRITISH COLUMBIA.

Jan. 11.

Table of stock quotations for Rossland, British Columbia, listing various mining companies and their share prices.

* From Our Special Correspondent.

MEXICO.

Jan. 19.

Table of stock quotations for Mexico, listing various mining companies and their share prices.

NOTE.—In most of the older Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Many newer companies have a nominal par value, usually \$5 or \$10. Prices are in Mexican dollars.

VALPARAISO, CHILE.

Dec. 17.

Table of stock quotations for Valparaiso, Chile, listing various mining companies and their share prices.

* Special report of Jackson Bros. Values are in Chilean pesos or dollars.

SHANGHAI, CHINA.

Dec. 19.

Table of stock quotations for Shanghai, China, listing various mining companies and their share prices.

* Special report of J. P. Brett & Co. The prices quoted are in Shanghai taels.

STOCK QUOTATIONS.

Main table containing stock quotations for LONDON and PARIS. Includes columns for Name of Company, Country, Product, Capital Stock, Par value, Latest divs., Op'ning, and Closing prices. Lists various mining and industrial companies like Alaska-Mexican, Anaconda, and Acieries de Creusot.

Dividend pending.

DIVIDENDS.

Table of dividends for various companies. Columns include Name of Company, Current dividends (Date, Amt.), Paid since Jan 1, 1899, Total to date, Name of Company, Current dividends (Date, Amt.), Paid since Jan 1, 1899, and Total to date.

ASSESSMENTS.

Table of assessments for various companies. Columns include Name of Company, Location, No., Delinq., Sale, and Amt. Lists companies like Andes, Central Eureka, and Chic & Mercur.

* New assessment.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last).

G. Gold, S. Silver, L. Lead, C. Copper, B. Borax. * Non-assessable. + The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ... Capitalization reduced September, 1898. ... The old War Eagle Company paid \$240,000 in dividends to July, 1897, and levied \$32,500 in assessments.

CHEMICALS, MINERALS, RARE ELEMENTS, ETC.—CURRENT PRICES.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. This table is revised up to Dec. 1st. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Review of Chemicals and Minerals.

Table with multiple columns listing various chemicals and minerals such as Abrasives, Acids, Alkalis, and Rare Elements, with their respective units and prices.

MACHINERY FOR SALE.

FOR SALE.—A Number of Second-Hand Split Switches for 30-lb. Rail, (3 ft. gauge of track), including 4 ft. Frog, Ground Lever, Switch Points and Connecting Rods, New and Relaying STEEL RAILS BOUGHT AND SOLD.
ROBINSON & ORR,
No. 419 Wood Street, Pittsburgh, Pa.

For \$25,000

(See Pages 754, 769 and 19 of Engineering and Mining Journal, Dec. 24, 1898.)

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MEETINGS.

THE ANNUAL MEETING OF THE STOCK- holders of the Colorado Smelting Company for the election of Directors will be held at the Company's office at Pueblo, Colorado, on Monday, February 13th, 1899, at 12 o'clock noon.

NEW YORK, January 19th, 1899.

H. SUHR, Secretary.

DIVIDENDS.

BREECE MINING COMPANY, 24 BROAD STREET, NEW YORK.

NOTICE OF DIVIDEND NO. 4.
NEW YORK, FEBRUARY 1st, 1899.

At a meeting of the Board of Directors of Breece Mining Company, held this day, a dividend of FIVE (5) CENTS per share was declared payable March 1st, 1899, to stockholders of record February 15th, 1899. Transfer books will close February 14th, at three (3) o'clock, p. m., and remain closed until ten (10) o'clock, a. m., March 6th, 1899.

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