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CONTENTS.

Table listing contents with page numbers. Includes sections like Annual Reviews, Mineral Specimens, Western Coal Rates, The Michigan Tax on Mining, Cripple Creek and the Witwatersrand, Smelting by Solar Heat, A Look Back and a Glimpse Forward, New Publications, Books Received, Correspondence, The Annual Meeting of the Geological Society of America, The Cyanide Plant of the Rose Gold Mining Company at Victor, California, Lake Superior Iron Mines in 1899, Gilpin County, Colorado, Mines in 1899, Leadville, Colorado, Mines in 1899, Cripple Creek, Colorado, Mines in 1899, Aluminum in 1899, The Mineral Production of Nova Scotia in 1899, Utah Mines in 1899, New Industrial Trust Stocks in 1899, * Economical Excavation, Questions and Answers, Minerals for Collectors, Patents Relating to Mining and Metallurgy, * Illustrated, Personal, Obituary, Societies and Technical Schools, Industrial Notes, Trade Catalogues, Machinery and Supplies, Mining News, United States: Arizona, California, Colorado, Idaho, Michigan, Minnesota, Missouri, Montana, Nevada, Oregon, Advertisers' Directory, Dividends, Meetings, Assessments, Stock Quotations, Foreign: Australasia, Canada, Markets: Coal, New York, Birmingham, Chicago, Pittsburg, San Francisco, Shanghai, Slate: New York, Metals: Iron: Pig Iron Production, Birmingham, Buffalo, Chicago, Cleveland, Philadelphia, Gold and Silver Prices, Statistics, Imports and Exports, Foreign Coins, Copper, Tin, Lead, Spelter, Antimony, Nickel, Platinum, Quicksilver, Minor Metals, Chemicals and Minerals: New York, Liverpool, Mining Stocks, Market Reviews: New York, Boston, San Francisco, London, Paris, Minerals, Chemicals, etc., Advt. Rates.

The Index to Volume LXVIII. of the "Engineering and Mining Journal" is sent out with this number, and subscribers should receive it with their papers. This index, with its total of over 9,000 entries and over 20,000 page references shows the extent and variety of the information which the "Journal" furnishes to its readers in each half-yearly volume.

We are obliged to give some additional space this week to reviews of mining progress in several important districts, which were held over from our statistical number last week for lack of space. There was so much done last year and so much progress to describe that it was impossible to condense it all, even into 40 solid pages. We believe that our subscribers will find these reviews most interesting reading, and no apology is needed for their presentation.

On another page will be found a column devoted to descriptions of mineral specimens sent to us, which we believe will be of interest to many of our readers. We intend to make this column a permanent feature of the "Engineering and Mining Journal," and shall be pleased to receive mineral specimens of all kinds for description and classification. Correspondence in relation to minerals, their occurrence, characteristics, variations and value, will be acceptable. We hope that many readers will thus aid us in making this column of the greatest possible interest and value to themselves and others.

Our anthracite operators who complain of high rates of freight on coal should have some experience of western lines. Thus on another page one of our correspondents refers to the rate charged on coal from some coal mines in Kansas to Joplin in Missouri. This is 60 cents a ton for a distance of 28 miles. The anthracite coal charges compare very favorably indeed with this rate of 2.14 cents a ton-mile; while we have noted instances within a year where bituminous coal has been hauled over 10 times the distance named for 60 cents a ton. It must be remembered also that this is not a local rate for small shipments, since the consumption of coal in and about Joplin is large.

The lower house of the Michigan Legislature has passed what is known as the Bryan bill, which provides for a specific tax on all iron and copper ores mined in the State. The bill is favored by Governor Pingree, and is very much the same as the one brought forward a year ago, but then defeated. Its avowed object is to shift the greater part of the burden of State taxation upon the owners of the mines in the Upper Peninsula. The bill now goes to the Senate.

We have so often expressed our opinion on similar projects of taxation, that it is hardly necessary to repeat it here. The mining companies should—and we believe do—pay their fair share of taxation on the value of their properties; but taxes like that proposed, levied on special industries, are essentially vicious in their nature, and in the end will prove injurious to the State.

One of our Denver contemporaries makes a curious mistake in comparing Cripple Creek gold production with that of the Witwatersrand, and claiming that the South African district will be surpassed by the Colorado camp next year. The writer has evidently taken an English statement of the Rand output, and mistaken pounds sterling for dollars, bringing down the total to about one-fifth of the real value. Cripple Creek did extremely well in 1899, as our reports show, and promises to do better still in 1900; but it is hardly yet able to equal the \$90,000,000 or so which the Witwatersrand would have reached last year if the war had not stopped work in the mines during the last quarter of the year. We want to do full justice to our enterprising Colorado friends, but such a mistake as this tends to make comparisons ridiculous rather than otherwise.

Colorado made last year a magnificent showing in gold production, and has taken a lead in the United States which she is not likely to lose for a long time to come.

The latest concern to appear in the Joplin Region—and in Boston—is one calling itself the "Independent Smelting Company," and we have not been able to ascertain the names of the officers, though it is said to be "controlled by producers." This company's project is a very simple one; it proposes to build a large plant near Joplin, in which fuel will be entirely dispensed with and zinc ores smelted by the heat of the sun. The plan is entirely clear, too, as one of its newspaper outgivings shows, as follows: "Assuming that the difference of the temperature on the sun and shadow is 15°, then 10 reflectors should raise the temperature 150°, focused to one point, less the loss. The giant reflectors of the company will comprise a reflecting surface of, say 5,000 square feet, all of which can, if desired, be converged to a point 1 foot

in diameter. The tremendous heat that can be developed in this way is obvious to the most casual observer."

Of course; and the inventor doubtless has everything ready, though men like John Ericsson, who made a life-long study of heat and force, found some serious difficulties in the way of the direct utilization of solar heat. We are told, moreover, that "the new smelter will use regular retorts, but at slight expense this system can be so changed, that all of the smelting can be effected in an air-tight chamber in order to save the zinc-fume which now is a source of loss of about one-fifth of the product." Just what this means is a little doubtful.

We are sure that, in spite of the "Independent Smelting Company," coal and natural gas will find use in the zinc region for some time yet. Very probably, however, the solar heat will be able to absorb all the money the projectors can get—if anyone is foolish enough to put anything into the project.

A LOOK BACK AND A GLANCE FORWARD.

1900—many of us have looked forward to the time when we should write that date on our letter heads, and have wondered what the year would bring for us. It is here, at last, the closing year of the century, and standing on its threshold we are tempted to look back over the years in which men began all dates with 18; to note what momentous changes took place, and having contemplated these, to glance forward, and speculate on what further changes the intellect of man will work by mastering nature's laws.

As we look back we can see that the chief accomplishment of the century has been a great cheapening of transportation, bringing all parts of the world into closer relations, and greatly reducing the costs of all necessities of life to the toiling millions of the great industrial nations. It was only in 1814 that George Stephenson had his first little teapot on wheels hauling coal cars, at the Killingworth Colliery in England. To-day giant locomotives weighing 100 tons or more haul loaded trains weighing over a thousand tons, at a cost that seems at first glance incredible. One needs to think a minute to realize the importance of the statement that railroads in this country have carried coal at a profit when charging but one quarter of a cent per ton-mile, for their services. It was only in 1807 that Robert Fulton's steamer "Clermont" astonished the natives along the Hudson River. To-day, we can see on our great lakes, huge steel cargo tanks, that can carry iron ore 900 miles, at 40 cents a ton, and make money at it, and which on their return trip have charged but one-forty-fifth of a cent for carrying a ton of coal one mile.

Such a reduction in transportation costs affects the whole fabric of civilization. It strengthens another product of the century—the factory system, by which certain industries become rooted in certain localities, developing highly skilled artisans, who are able to hold their supremacy over other workmen in industrial establishments less favorably situated. Thus such centers as Birmingham, Sheffield and Essen have arisen abroad, and Pittsburg, Chicago and a new Birmingham are growing in strength on this side of the Atlantic.

Man has increased the efficiency of his control over the forces of nature wonderfully. The great law of the conservation of energy formulated only fifty years ago has shown engineers the enormous losses that occur through what were then regarded as very efficient devices for utilizing the latent energy of fuel. The stationary compound steam engine of to-day fitted with Corliss valve-gear, utilizing the energy of the burning coal through steam generated in high-pressure water-tube boilers is a more efficient instrument than the engine that Watt and Trevethick were making at their Soho works in 1800. Still, its development in economy has been slow. The compound engine was brought out by MacNaught in 1845 and in the same year the Corliss valve was patented; since then the improvement has been in minor details. In spite of all the thought and skill brought to bear by inventors, the steam engine is still a wasteful device, and we now see its supremacy threatened by engines of another type, applying the energy of the fuel direct to the piston by explosions of gaseous products in the cylinder. The first really efficient gas engine was not brought out till Otto's patent in 1876, yet these internal combustion engines are coming into general use where a cheap and easily controlled motor is needed, and are showing especial fitness for locations where water is scarce and fuel expensive. Looking forward we can possibly see the steam engine becoming obsolete.

Electricity, a form of energy regarded merely as a curiosity in 1800, is now the busy servant of man. It was not until 1864, however, that the dynamo electric machine showed its possibilities when Pacinotti invented an armature with commutator and connected conductors giving a direct current. To-day we see the energy of the waterfall utilized to drive machinery in mines or reduction plants a hundred miles away. Sir Humphrey Davy's early experiments in electro-chemistry opened the way for many developments since, leading on the one hand to the

electric furnace producing carborundum, graphite and aluminum, and on the other to vast electrolytic refining plants turning out many tons of pure copper daily.

In the metallurgy of iron, a field of human endeavor which concerns our civilization more directly than any other, we see in looking back that the hot blast stove was not patented in England until 1845. The Bessemer process, which revolutionized the iron industry, making cheap transportation by land and sea possible and led to the enormous development of our iron ore fields, was not patented until 1855. The great rival of the Bessemer process, the open-hearth process of steel making, had its origin in the work of Siemens and Martin in the late 60's, but to-day open-hearth steel is produced in hundreds of works, is displacing Bessemer steel for many purposes, and from the comparative scarcity of low phosphorus iron ores may supersede Bessemer steel altogether.

Of minor inventions and devices that have been brought out during the century, none perhaps has been of greater importance to the mining industry than the invention of nitro-glycerine in 1864, and its safer form, dynamite, in 1866, by the Swiss chemist, Nobel. Hand in hand with the use of high explosives in mining has gone the development of the power drill, the first of which was patented abroad in 1852. The air compressor was first used in tunneling work in this country on the Hoosac tunnel in 1866, and machine drills were not used on a large scale in Europe until work began on the Saint Gothard tunnel in 1872. Progress in mining has also been accelerated by the development of pumping machinery. Trevethick developed the Cornish pump by 1815, so that for years it was without a rival as a means for raising water. Its fate was foreshadowed, however, when Henry R. Worthington brought out his direct-acting steam pump in 1849. To-day the Cornish pump for mine use is practically obsolete.

What high explosives, power drills and the direct-acting steam pump have done for mining is shown by the extraordinary results obtained at some of the Lake Superior copper mines, where rock containing less than one-half of one per cent. of native copper is mined at costs which permit a satisfactory profit. Again, at one of the Minnesota iron mines a very hard and tough ore occurring in lenses between walls of soft rock, which necessitate great care in mining, has been broken down and put on the surface at an expense of less than 50 cents a ton, a result that seems almost impossible to anyone studying the nature and occurrence of the ore for the first time. High explosives and improved machinery are also continually bringing new supplies of gold to the world; thus the Rand gold-fields in South Africa would still be lying unworked except for the progress made in mining methods within thirty years.

In the future everything is possible. Though battles are in progress to-day, war is becoming less and less a menace to men and the growth of the commercial spirit promises still greater developments in the industrial arts. For, in spite of all our progress, we are still, like Newton, standing on the edge of a great sea of truth. In what direction the researches of chemists and physicists and the inventions of engineers may lead us we cannot see, but there is much that we can safely predict. Man will increase his control over the forces of nature. The engines and machines of to-day will be regarded as mere curiosities before long, and other devices of greater efficiency will then be in use.

It seems reasonably certain that the coming century will see no such development of specialized industrial activity as the one now ending, nor will there be any one nation making such marvellous progress as our own country has made. Whatever may be done in Russia or the East, it is not to be expected that the record of the United States will be surpassed. Never again will a people of restless energy and a natural talent for mechanical devices be given the opportunity to develop at will a virgin country with wonderful natural resources. As no people will have such an opportunity, so no people can equal our achievements. No nation on earth to-day can show a population having such intelligent, progressive workmen, nor such bold and resourceful captains of industry, in none can the necessities of civilization be produced so cheaply, and consequently none has such possibilities before it. It is not too much to say that the coming century will see the United States the great workshop of the world, its fleets on every ocean and its products in use in the uttermost parts of the earth. The prospect is one to sober us and to make us regard ourselves more seriously. We have outlived the days of self-conceit and insolent assertion, and can take up our work and our responsibilities sedately.

NEW PUBLICATIONS.

"The New Gold-Fields at Cape Nome, Alaska." By Ivan Brostrom. San Francisco; Phillips & Smyth. Pamphlet; pages, 40; with map. Price, 50 cents.

It is very seldom that we meet with such a plain and truthful account—so far as one can judge from internal and collateral evidence—of a

new mining district. The author speaks from personal experience, and does not hesitate to give the rough side as well as the smooth. He says, with evident sincerity: "I have endeavored to describe things as they really are, not as they might be represented by those, whose business it is to boom up the country, regardless of truth, and for their own and others' benefit. If the information herein obtained will be of some value to those who contemplate going to the new fields, this publication will serve one of its objects; another is to make the reader think before he undertakes a trip of privations and hardships of the severest kind. And if I can prevent, to some extent, a repetition of the Klondike excitement, caused by exaggerated newspaper accounts, and which proved so disastrous to thousands of people, I will feel content that my writings have not been in vain."

So much has been said and written about Cape Nome that such an account as is given in this pamphlet will be of service to many, though it makes no pretensions to scientific value, and does not go into the geological conditions of the district at all. It is simply a plain, straightforward account of the district from the practical miner's point of view; and as such has much value.

"Alloys of Iron and Nickel." By Robert Abbott Hadfield. London, England; The Institution of Civil Engineers. Pages, 172; with diagrams and tables.

Mr. Hadfield's investigations on alloys of iron with manganese, silicon, aluminum and chromium are well known. More recently he has undertaken a further investigation into the alloys of iron and nickel, and has presented the results in the form of a paper read before the Institution of Civil Engineers in London. This paper, with a brief abstract of the discussion on it by members of the Institution, is published in the present volume. The author is known as a high authority on iron and steel and their alloys, and his investigations into the properties of iron-nickel alloys have been carried out with his usual thoroughness. The results are clearly and concisely set forth in this paper. He takes the steel-maker's view of the matter and gives practical working results, rather than the abstract and theoretical discussion of which we have had so much. We do not mean to say that the theoretical work has no value; but it is quite time that the practical side had such a presentation as it here receives. How to make and work nickel-steel; what can be done with it and what its properties are—these are the points which Mr. Hadfield has brought out. He does not claim to have written an exhaustive treatise on the subject; but he has brought together many facts, and added his own experience, thus giving us a valuable addition to the literature on the subject.

A brief, but interesting history of nickel and its use opens the paper; and there is added to it as an appendix a condensed account of the ores of nickel and their metallurgy. The tables and diagrams embody the results of a large number of tests and experiments made by the author and others, and present in compact form a great number of facts.

In studying the history of the uses of nickel, Mr. Hadfield concludes that, "as regards the metallurgy of nickel as applied to iron and steel, Marbeau, in France, applies the matter experimentally; Schneider, in France, perfects its application to a number of purposes, chiefly armor-plates; Riley brings the manufacture to a practical issue in England; American and Canadian enterprise follow in the perfecting of cheaper methods of producing nickel, and suddenly, so it appears to the world, a new product—nickel-steel—appears. But after all it is not so; it has taken about 125 years to arrive at the stage reached to-day. No one person, no one nationality can lay claim to its discovery, to its inception.

"From a chart on genealogical lines, how much would be seen to have sprung from the laboratory experiments by Cronstedt. But, if it were possible, far beyond the work of the Swede would be discovered the early workers of the old world in China and Japan, about whose work dates and facts are inaccessible. Apparently, to modern ideas, mention of nickel appears to have struggled into existence between the years 1600 and 1700, but the metal must have been well known, not merely centuries, but almost thousands of years earlier."

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.

"Annual Report of the Comptroller of the Currency, 1899." Volume I. Washington; Government Printing Office. Pages, 864.

"Transactions of the American Society of Mechanical Engineers." Volume XX, 1899. New York; published by the Society. Pages, 1,024.

"Annual Report of the Superintendent of the Onondaga Salt Springs." Charles Hiscock, Superintendent. Albany, N. Y.; State Printer. Pages, 20.

"Report of the Chief Labor Correspondent on the Strikes and Lock-outs of 1898." London, England; H. M. Stationery Office. Pages, 216; with statistical tables.

"Labor Chronology, 1898." By Horace G. Wadlin, Chief of the Bureau of Statistics of Labor of the State of Massachusetts. Boston; State Printers. Pages, 184.

"Report of the Governor of New Mexico, 1899." Miguel A. Otero, Governor. Washington; Government Printing Office. Pages, 376; with maps and illustrations.

"Western Australia. Statistical Register for 1898. Part IV. Interchange." Compiled in the Registrar-General's Office. Perth, W. A.; Government Printer. Pages, 182.

"The Preservation of Fishery Products for Food." Extracted from the United States Fish Commission Bulletin for 1898. Washington; Government Printing Office. Pages, 228; illustrated.

"Annual Report of the Mine Inspector for the Indian Territory, for the Fiscal Year ending June 30th, 1899." Luke W. Bryan, Inspector. Washington; Government Printing Office. Pages, 82; illustrated.

"Annual Report of the Mine Inspector of the Territory of New Mexico for the Fiscal Year ending June 30th, 1899." John W. Fleming, Inspector. Washington; Government Printing Office. Pages, 48; illustrated.

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 will only 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.

Iowa Iron Ores.

Sir: In your last issue you have a note on a newly developed iron mine near Waukon, Iowa, which unfortunately tends to perpetuate a mistake for which I am to some extent responsible and which I would be glad to correct. The analysis quoted there is an old one which has become somewhat mutilated in the process of newspaper quotation. It was the only analysis I had at hand at the time the reporter called on me and new analyses made since, from samples collected by myself, show that it was hardly a fair one. I quote below a complete analysis just made by our chemist and which I think fairly represents a large amount of the ore now being mined. Other analyses of which I have record place the sulphur even lower than in this case, while the phosphorus runs usually from 0.11 to 0.13 per cent. The ore is a limonite, open and porous and easily smelted. The stripping is thin and the cost of mining is bound to be low. The quantity of ore present is very large.

The analysis above referred to is as follows: Water and loss in ignition, 12.34; silica and soluble, 9.08; iron oxide Fe_2O_3 , 63.40; alumina Al_2O_3 , 6.08; manganese oxide MnO , 0.90; phosphorus pentoxide P_2O_5 , 0.41; phosphorus, 0.18; sulphur, 0.91; sulphur trioxide SO_3 , 0.40; undetermined, 1.48; total, 100.00. The total sulphur shown is 1.07 per cent.

H. Foster Bain,
Assistant Geologist of Iowa.

Des Moines, Iowa, Jan. 2, 1900.

Silver and Lead Losses in Lead Smelting.

Sir: In the purchase of silver and lead ores, it is the custom universally adopted to deduct for loss in smelting 5 per cent. from the silver and 10 per cent. from the lead contents, said contents being in each case determined by the fire assay. A question frequently asked is: "Do these arbitrary deductions represent the true loss in smelting?"

Hixon says: "The losses in lead smelting can be kept within the allowed limits of 5 per cent. Ag and 10 per cent. Pb, but to do this it is necessary that the furnaces shall not be run on too low a lead charge, say, not below 11 per cent., or the tonnage crowded too much by high blast." Dr. Iles in the "Engineering and Mining Journal," September 9th, 16th and 23rd, 1899, has given us a most valuable paper bearing on this interesting subject, making public the actual results obtained at the Globe Smelter for the month of March, 1893. The writer wishes to call attention to some of the statements made and conclusions drawn by Dr. Iles. The losses in silver for the month are stated to have been 39,444 oz., or 7.02 per cent.; at another place the figures given are 42,894.8 oz. or 7.59 per cent., while those for lead were 554,489 lbs., or 16.89 per cent. In the opening paragraph of the paper we find the following: "It is only fair to the writer to state that the actual silver losses during 1893 were subsequently shown to be not excessive, that these losses were imaginary and not real, owing to heavy furnace absorption of gold, silver and lead, and that these supposed losses were afterward recovered, particularly from two furnaces which were found to have sprung a leak in the crucibles. The records show a loss of 2.56 per cent. silver for the entire year 1893. The figure does not, however, show the actual silver loss, as the furnace absorptions, as stated, were afterward recovered."

Are we to infer from the above that the losses, mentioned in the very beginning of the paper, and referred to continually, were purely imaginary? If so, why has it been the apparent aim of the writer throughout his whole article, to account for a shortage which never existed? We are told that during this month (March) the net loss by bad smelting was \$22,294, and "as the Globe system of dust chambers and bag-house is so complete that losses of silver and lead and gold cannot occur through dust and fume, it was therefore safe to conclude that much of the \$22,300 was an actual loss and went over the dump." And again, "At this time (March) the present matte saving appliances were not in operation. The chief silver, lead and gold losses are, therefore, attributable to the matte which went over the dump with the slag." Again, "The bed-sheets for March show a credit of 1,084 tons of big pot shells, the value of the shells is stated on the sheets to be 7.8 oz. Ag and 1½ per cent. Pb. I think this is too low both in lead and silver and think 12 oz. Ag and 3 per cent. Pb will more nearly be the case. This, to my mind, very largely explains the apparently large loss in March though not entirely." Therefore it will be assumed that the losses first referred to were at least thought to be actual at that time, in order to enable us to discuss the conditions present and under which such losses could occur.

Extraction losses in lead smelting occur mainly in (1) Slags. (2) Flue dust from blast furnaces, and (3) Volatilization and dust from roasting. The above statement, however, presupposes an accurate sampling of the ores purchased, bullion sold and by-products on hand at time inventory is taken, and includes any mechanical dust loss in the sampling or handling of material. Losses in slags may occur under two conditions: (1) By values held in a homogeneous fusion, or, in other words, by lead and silver present in an oxidized state and not possible to separate by any form of settling arrangement. (2) By values held in sus-

"Lead and Copper Smelting," page 56.

pension, like matte, and in rare cases tiny shots of bullion. The slag losses in the former case are very easily determined by daily sample, and for the period under consideration we are told the exact value of the slag so determined. The second case is an entirely different one and the daily sample taken after the slag has been allowed to settle for a minute or two, may not represent the true contents. The daily sample must, however, show all the silver and lead present in the oxidized form and should show also the greater part of the matte originally present in a suspended form. The difference between the contents in slag as shown by daily sample and the real contents, would be a certain portion of matte settled to, or toward, the bottom, and therefore not included in the sample taken by the bar. That drawn to the sides, by the rapid cooling of the outer part or shell, is not lost because such shells are saved and resmelted. Here then is a possible leak where some of the values might have disappeared unnoticed. The value of the matte thus lost would be similar to that produced and saved at the same time, excepting in the presence of much zinc on the charge, producing what Dr. Iles terms "light-float zinc matte," which invariably is higher in zinc and lower in silver and therefore lower in value than the normal matte produced at same time.

The loss in flue dust consisting of dust and fume does not concern us here, inasmuch as all of this material was saved in the bag-house. The loss in roasting, sintering or fusing has in this instance also been determined and figures given. The only undetermined factor remaining, therefore, is the unknown loss in the slag above referred to.

Having traced the unknown loss of silver and lead to the only possible source, it is next in order to determine how much matte must have been thrown over the dump in order to account for the amount of silver and lead still missing.

Referring again to the figures on losses we will take that for silver as 39,444 oz., and for lead 554,489 lbs., of which 51,823 oz. Ag and 52,144 lbs. Pb were lost in roasting, leaving a net loss of 34,252.1 oz. Ag and 502,345 lbs. Pb to be accounted for in the smelting operations.

There were smelted during the month 12,934 tons of ore, producing approximately 12,934 tons of slag; the average value, as per daily sample of which, was 1.45 oz. Ag and 0.43 per cent. Pb, representing a total content of 18,754.3 oz. Ag and 111,232 lbs. Pb. These amounts taken from the net loss of 34,252.1 oz. Ag and 502,345 lbs. Pb, still leave as unaccounted for, 15,497.8 oz. Ag, and 391,113 lbs. Pb, or an amount of silver equivalent to the contents of 143 tons of matte of the average assay of that daily produced. The amount of lead still missing is so clearly impossible to account for either in 12.9 per cent. lead matte going over the dump or lead bullion underestimated in the crucible that one is forced to the conclusion that the case cited is not necessarily one of "bad smelting," but simply a striking example of an incorrect inventory taken at the beginning or end of the month, a quite usual occurrence, as Dr. Iles certainly knows, where monthly inventories are taken. The subsequent coming to light of this apparent shortage is sufficient confirmation of the above.

It is unfortunate that Dr. Iles has not given us his experience covering a longer period of time in order to eliminate such glaring errors as appear in the record for this particular month. Several statements are made by Dr. Iles which are contrary to the experience of the writer. No attempt will be made here at any extended discussion of any of these, but attention will be called to a few.

On the question of roasting we are told "It cost per ton to roast this ore \$3.417 on the fuse boxes and sinter boxes; on the Brown roasters it cost \$2.504 per ton. The cost of roasting was less than from 1887 to 1892 inclusive. The question may well be asked, Did it not cost too little? That is to say, if there was much zinc present it should be roasted better in order to convert the sulphide of zinc into an oxide." On the question of cost the writer is inclined to think the expense was high enough in view of a letter received by me lately from Manager Rush of the Tacoma Smelting Company, and from which I am at liberty to quote. Referring to the results obtained from the Godshall roasting furnace in operation at Tacoma, he writes: "A test run of 15 days gave the following results: Ore roasted per day, 60 tons to 1.85 per cent. sulphur. Cost of fuel 15c. per ton; fireman, 8c. and feeder, 7c., or a total of 30c. per ton. Since then the furnace has roasted 70 tons per day to 2.75 per cent. sulphur. The material roasted is Treadwell concentrates containing 40.5 per cent. sulphur. The fuel used is part fine bituminous coal and part slab wood." In the operation of the above furnace the raw ore is delivered to the mechanical feeders by means of conveyors and the roasted material is taken away in the same manner, so that at times at least the cost of the feeder could be deducted from the above total expense of 30c. per ton for labor and fuel.

As to the amount of sulphur to be left in roasted ore, the percentage in this particular case referred to by Dr. Iles, not being given, no comment is possible; excepting that in the experience of the writer it has always been found to be a very poor practice to endeavor to convert all of the zinc sulphide into oxide, for two very good reasons: (1) The fuel and time required, and therefore expense involved in roasting zinc-lead ores below 3.5 or 4 per cent sulphur. (2) The heavy loss in silver experienced in attempting it, owing to the presence of zinc, which when oxidized invariably carries with it, if excess of oxygen is present, a very considerable quantity of silver; a fact recognized long ago by Percy.

Dr. Iles says: "It is not known whether it is possible to have manganese in mattes, existing as a sulphide. I very much doubt it." With reference to the above statement I will submit the analysis of a matte produced by the Hall Mines, Limited, of Nelson, B. C. The figures were given to me by Mr. H. Harris, chemist to the company, and are as follows: Cu, 48.0; Fe, 19.0; Mn, 6.08; As, 2.09; Ag, 1.04; S, 23.70; total, 99.91. Knowing Mr. Harris to be a very careful as well as able chemist, I deem it safe to conclude that the above analysis proves that manganese may exist as a sulphide in a matte.

The statement is made that "there is an intimate relation existing between the grade of the bullion in silver and the amount of silver which will enter mattes." In the opinion of the writer the above statement should be modified somewhat. The silver present in the matte

depends very largely on the percentage of lead in the charge and the efficiency of the reduction in the blast furnace. Two other factors also play a very important part, but possibly indirectly by increasing the difficulty of obtaining a proper reduction. These are a high percentage of zinc, particularly in the form of sulphide, and the silver associated with or present as a sulphide in the charge. Gold in raw pyrites and fed in this manner into the blast furnace shows a similar tendency to enter unduly into the matte. Very high grade pyritic slimes or concentrates added to the charge first in the raw, then roasted state, will very quickly demonstrate the truth of the above. In the absence of the special conditions above enumerated, no criticism can be offered to the statement as made by Dr. Iles.

Reference is made to the difficulty in saving light floating zinc matte. This subject is of the very highest importance and when one has been obliged, as the writer has been while at Everett, to smelt for months at a time material producing slags containing from 8 to 10 per cent. zinc, frequently with high lime and low iron, and high silica and fully three-quarters of the charge made up of fine ore from mechanical roasters, the so-called dry ore containing from 7 to 9 per cent. of sulphur and from 8 to 10 per cent. zinc, no iron in the yard, nor in sight, nor any prospect of obtaining any in the near future, and bullion demanded by the office; then smelting becomes interesting. Difficult, however, as it is to save all the matte under such conditions, it can be accomplished, and is the least of several disadvantages attendant upon such conditions. The loss of silver so much emphasized by different metallurgists was not found at all serious by the writer when the percentage of lead on the charge was kept high. The very serious and apparently insurmountable difficulties were the irregular, and at times slow running of the furnace, and the exceedingly great difficulty in maintaining a proper reduction, while forcing the furnace to obtain tonnage.

The extractions were always very good in both silver and lead, although the slags would average close to 1.5 oz. in silver and from 1 to 1.5 per cent. Pb, but liable to jump up to 2 or even 3 per cent. on the slightest provocation whenever the zinc in the slag was unusually high. On the other hand, slags containing such an abnormal percentage of lead very frequently assayed less than 1 oz. Ag.

Below will be given some results obtained at Everett, representing extremes in zinc contents in slags. The results for January, 1898, and March, 1899, do not represent quite exact averages, inasmuch as the slag for several shifts was too valuable to be thrown away, consequently it was saved and resmelted. Assays for such slag are not included. On the other hand, the figures given do include all slag thrown over the dump. The remaining months do not show any such irregularities, and therefore the results given are exact averages.

When produced.	Assay of Slag.			Matte.		Oz. Ag. in Bullion.
	Ag. oz.	Pb. %.	ZnO. %.	Ag. oz.	Pb. %.	
July, 1896.....	0.75	0.50	6.32	66.4	8.22	306
October, 1896.....	1.53	1.15	9.60	109.4	12.9	324
May, 1897.....	1.30	0.61	7.54	76.5	11.0	282
November, 1897.....	1.49	1.38	11.73	111.0	16.2	285
January, 1898.....	1.72	1.25	13.1	110.0	19.6	300
March, 1899.....	1.34	1.37	12.1	116.7	26.7	269

Compared to the beautiful work now being done at the Globe smelter as shown by Dr. Iles in the "Engineering and Mining Journal" of December 9th, 1899, some of the above results seem crude, and the results of some months were even worse than any of the above. However, it must be remembered, that the Globe slags approximate most nearly in zinc contents to the cleanest above given; and when from this slag or the first three, in order to make the comparison just, there is deducted the percentage of silver and lead saved in the reverberatory settler, which has been brought to such a high state of perfection by Dr. Iles, Mr. Rhodes and others, the comparative difference is not so great as it might be, considering all the circumstances. At any rate the extraction gains obtained every year were conclusive proof that no "light float zinc matte," or any other kind, could to any appreciable extent, have been lost over the edge of the dump by failure to settle out of the slag.

In conclusion the writer sincerely hopes that Dr. Iles will write further on his experience of the effect of zinc in lead smelting.

L. D. Godshall.

Tacoma, Wash., Dec. 15, 1899.

ALUMINUM PLATES IN LITHOGRAPHY.—One of the difficulties experienced in lithography is when commercial printing is required on hard or rough paper, as, unlike stone, the aluminum plate cannot be so etched that the work stands perceptibly above the surface, giving a clear, sharp impression on printing. If hydrofluoric acid is used, the edges are left sharp, but brittle. This process, moreover, is an expensive one.

THE GOLDSCHMIDT-VAUTIN PROCESS.—This process of reducing some of the more refractory oxides by utilizing the heat rendered available by the oxidation of powdered aluminum was described in "The Mineral Industry," Volume VII. During the past year ferro-titanic acid and ferro-boron have been successfully made. The reduction of vanadic, niobic and tantallic acids has as yet failed. A by-product of value is the Al₂O₃, which is left in a form which can be substituted for corundum and emery in abrasive material. As the temperature depends upon the amount of aluminum fuel supplied, it is under easy control quantitatively and in point of position. Advantage has been taken of this in welding copper and steel. The rails on the Essen-Steele Railway have been welded by this method, and the Siemens-Martin welds at the imperial shipyards at Wilhelmshafen are said to have undergone all tests. This welding process can be utilized where neither the smithy nor the electric arc are obtainable, or where the latter two could not be readily applied. Broken gear teeth of cast steel have been replaced, for instance. For welding, the molten iron is produced from aluminum and iron oxide in a crucible. The contents of this are poured into a crude mould surrounding the parts to be welded, and these are pressed together. The whole apparatus is portable.

THE ANNUAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

Reported for the Engineering and Mining Journal by E. O. Hovey.

The twelfth annual meeting of the Geological Society of America was held at the Columbian University, Washington, D. C., December 27th-30th, 1899. As is usual when the meeting is held in Washington, the attendance was very large, partly on account of the number of members who are connected with the Geological Survey and the National Museum, and partly on account of the attractiveness of the city and its accessibility. The report of the Council showed that the society had had a prosperous year on the whole, though four eminent members have been lost by death. The members who died were Professors O. C. Marsh of Yale University, Oliver Marcy of Northwestern University, and Edward Orton of the Ohio State University, and Sir J. William Dawson of Montreal. Thirteen new names were added to the list last year, making the present number of active members 239. The treasurer's report gave another indication of the prosperous condition of the society, there being a balance of more than \$3,000 in his hands to the credit of the society. Eight new fellows were elected. They were Prof. I. P. Bishop of the New York State Normal School, at Buffalo, Dr. E. Bose of the Mexican Geological Survey, Dr. A. S. Eakle of Harvard University, Dr. A. F. Foerste of the High School at Dayton, Ohio, Prof. John F. Newsome of Stanford University, Prof. S. L. Penfield of Yale University, Prof. C. H. Richardson of Dartmouth College, and Prof. A. B. Willmot of McMaster University. The new officers for the ensuing year are: President, Dr. George M. Dawson, director of the Canadian Geological Survey; vice-presidents, Dr. C. D. Walcott and Prof. N. H. Winchell.

There were 57 papers on the programme submitted to the society, but some of them were not read on account of the absence of their authors. Of the rest, interesting and valuable though most of them were, mention will be made here only of those points which seem to be of particular interest to the readers of the "Engineering and Mining Journal." The retiring president, Prof. B. K. Emerson, gave an elaborate discussion of "The Tetrahedral Earth and the Zone of Inter-Continental Seas" as his formal presidential address. In this he showed by means of diagrams and maps the more or less exact coincidence of the distribution of the masses of land and water near the poles of a geometrical tetrahedron and the relations of the seas to such a solid, and traced these characteristics through the various geological ages. The other papers on the programme were distributed over the different branches of geologic science, from physiography to petrography.

Prof. I. C. Russell of Ann Arbor gave a description and discussion of the deposits of calcareous marl in Michigan. He said that there were many small lakes in the Drift of the Lower Peninsula, in a number of which calcareous marl had been recently found in large quantities. The beds vary in thickness from a few feet to more than 36 ft., the boring in this last case not penetrating the bed. They occur as terraces in the lakes, and increase in thickness from the shore outward. The marl is composed only in very small part of shells, and is mainly a chemical precipitate, which is still being deposited. The lakes which contain the marl are like great wells, since they have almost no inflowing streams, and during the summer some of them have no outlets. The theory is that the inflowing underground waters carry calcium bicarbonate in solution, which is precipitated from them as the carbonate when they reach the lakes, since the waters of the lakes are warmer and therefore less able to carry the lime in solution than the ground waters. Vegetation seems to be lacking from most of these marl lakes, and the action of algae is entirely ruled out in most cases. The marl is white, and the better grades contain from 80 to 95 per cent. of calcium carbonate. Experiments show that it makes a very excellent grade of Portland cement, the briquettes giving a tensile strength up to 1,000 lbs. and more to the square inch. Shales of the sub-carboniferous age have given the best results when mixed with the marl in making the cement. Glacial clays have been used to some extent, but the results have not been satisfactory. The supply of marl is practically inexhaustible, and Michigan can easily take a leading place in the Portland cement industry of the country. Five cement works have been established. They have cost from \$100,000 to \$150,000 each, and each is turning out from 500 to 1,000 barrels of cement a day.

"The Enrichment of Mineral Veins by Later Metallic Sulphides" was the title of a valuable paper by W. H. Weed of the Geological Survey, which was presented only in abstract. The author's observations show that many ore deposits in Montana indicate a later or secondary enrichment of the mineral veins by deposition of polybasite and pyragryrite in silver ores and of chalcocite, bornite and enargite in copper veins. In the silver veins this enrichment is a feature of the zone lying immediately below that of oxidation, and the formation of the richer silver minerals appears to be due to descending waters. The paper briefly describes the occurrence of such ores in the veins at Neihart, Montana, and then goes on to discuss the secondary enrichment of the pyritic copper ores at Butte and elsewhere in Montana and in other regions. The paper will be published in full in the society's "Bulletin" during the year.

"The Landslides of the Rico Mountains, Colorado." In this paper Dr. Whitman Cross first described the Rico Mountains, in Southwestern Colorado, which are due to the erosion of a local domatic uplift. The sedimentary formations affected are of all ages, from the Algonkian to the Cretaceous, inclusive, with the exception of the Silurian and Ordovician, which are lacking from the region. Many intrusive dikes, sheets and small laccoliths of diorite—or monzonite—porphyry occur in this complex, and a large monzonite stock penetrates all the sedimentary rocks. Intense and complicated faulting has taken place in the heart of the uplift, and there has been a large amount of mineralization, forming silver-bearing ore bodies of many types. Landslides, occurring in a recent geological epoch, and even down to the present time, are very prominent features of the local geology. The splitting

of young and old trees, the crushing in of mine tunnels, and the formation of benches and scars on the sides of the mountains by the landslides were shown in the numerous lantern slides which illustrated the paper.

G. O. Smith and W. C. Mendenhall, in a short paper, announced the discovery of a granite of Tertiary age in the northern Cascade Range in the State of Washington. It is one of the large granite masses of the Cascade Mountains, and its Tertiary or later age is proven by the tongues and dikes which run out from the main mass into the leaf-bearing Tertiary slates, the textural variations in the granite itself and the metamorphism of these sedimentary rocks.

Bailey Willis of the Geological Survey gave a brief synopsis of studies in the Santa Lucia Mountains in California, which he made during the past summer. The Coast Range has long been regarded as the advance guard of the mountain systems of Western North America, and the latest stage of land building in that part of the continent. The author, however, found gneisses, mica schists, quartz schists, marbles, etc., high up in the Santa Lucia Range, and the metamorphic rocks were all of Paleozoic age, or earlier. At the base of the Mesozoic beds of the region he found a basal conglomerate which shows that in Jurassic, or early Cretaceous time, there was a Coast Range here similar to that in existence at the present time. The succeeding strata indicate that this land mass continued to exist in Miocene time. The lower 2,000 ft. of the mountains show that there has been that much elevation in comparatively recent geologic time. The migrations of the coasts have involved great land masses, and the present time is one of retreat from former greater extension, rather than of advance.

A year ago certain great shallow hollows in the Medina sandstone in the western part of New York State were described to the society and accounted for on the supposition that they were gigantic wave marks, indicating waves at least 60 ft. in height for their production. The Medina has always been looked upon as a typical shallow water deposit, hence one of the members, H. L. Fairchild, of Rochester, examined into the question at some length last summer and determined that the hollows were the effect of sand-bars piled up along a flat coast or in very shallow water during a heavy wind, a process that may be observed in action at many places along the shores of the Great Lakes or the ocean to-day. The hollow behind the bar is curved in section like a wave mark.

W. M. Davis of Cambridge calls for a revision of the interpretation of the Tertiary strata in the Rocky Mountain Region. Many of the formations that have been described as lake deposits contain varying strata of sand and pebbles. This is held to indicate that in the origin of such deposits lakes played a subordinate part, and that in naming them the term "basin deposits" would be more in accordance with the facts than "lake deposits." From the discussion which followed this paper it was evident that the suggestion would not be adopted by the geologists working in the Rocky Mountain Region without further investigation.

N. H. Barton presented two papers on the Black Hills of South Dakota, in which he has been at work for the past two seasons. In one of these he brought out the fact that the White River (Oligocene Tertiary) lake deposits of Western South Dakota extend far up on the slopes of the hills to shore lines which are beautifully exhibited in a portion of the region. Heretofore these deposits have been supposed to be confined to the plains and the Bad Lands.

H. F. Reid of Baltimore has made a detailed and very careful series of experiments on the Forno glacier in the Alps for the past three years which prove that in the névé field of a glacier the movement of the ice particles is downward into the mass; at the névé line the movement is parallel to the surface of the glacier, while below this the movement is outward toward the surface at varying angles, which depend upon the portion of the glacier concerned. The forward movement of the ice is nothing at the lower end of the glacier and is greatest at a point about midway of the length of the ice stream. In the Forno glacier this maximum motion is about 35 meters per year.

"The Stratigraphy of the Pottsville Series in Kentucky" was the title of a paper by M. R. Campbell, in which the author discussed the areal distribution of the conglomerates of the Pottsville series along the western margin of the Appalachian coal-field in Kentucky and Tennessee. Three distinct horizons of conglomerates were described at some length which have heretofore been regarded as forming a single stratum. Attention was called to the unconformity at the base of the series, and the vertical expansion southward was illustrated by numerous sections measured along the margin of the field.

Another paper of interest to those working in the coal-bearing rocks was by David White, on the "Relative Ages of the Kanawha and Allegheny Series" as indicated by the fossil plants. The author stated that from an examination of the stratigraphic distribution of the fossil plants of the Kanawha series in Southern West Virginia, it appeared that only the upper half of the series contained the common and characteristic elements of the Allegheny series of Northwestern Pennsylvania. The lower half carries a flora which seems distinctly older than any of the floras which occur above the lowest coal of the Allegheny series. The plants of the lower Kanawha series are comparable to those of the Lower Coal Measures of the Old World, whereas the plants of the Allegheny series in Pennsylvania are referable to the Middle and Upper Coal Measures of the European basins.

An admirable paper on the "Newark Formation of the Pomperaug Valley in Connecticut" was read by William Herbert Hobbs.

The annual subscription dinner of the society was held Thursday evening at the Raleigh Hotel; 94 persons, among whom there was an unusually large number of ladies, participated in this, the chief social event of the meeting. Friday evening the Washington Academy of Sciences tendered the society a reception at the Columbian University, prefacing the social part of the evening with brief accounts of the Harriman Expedition to Alaska by four members of that party. The next meeting of the society will be held in connection with the meeting of the American Association for the Advancement of Science, in New York City, during the last week in June.

THE CYANIDE PLANT OF THE ROSE GOLD MINING COMPANY AT VICTOR, CALIFORNIA.

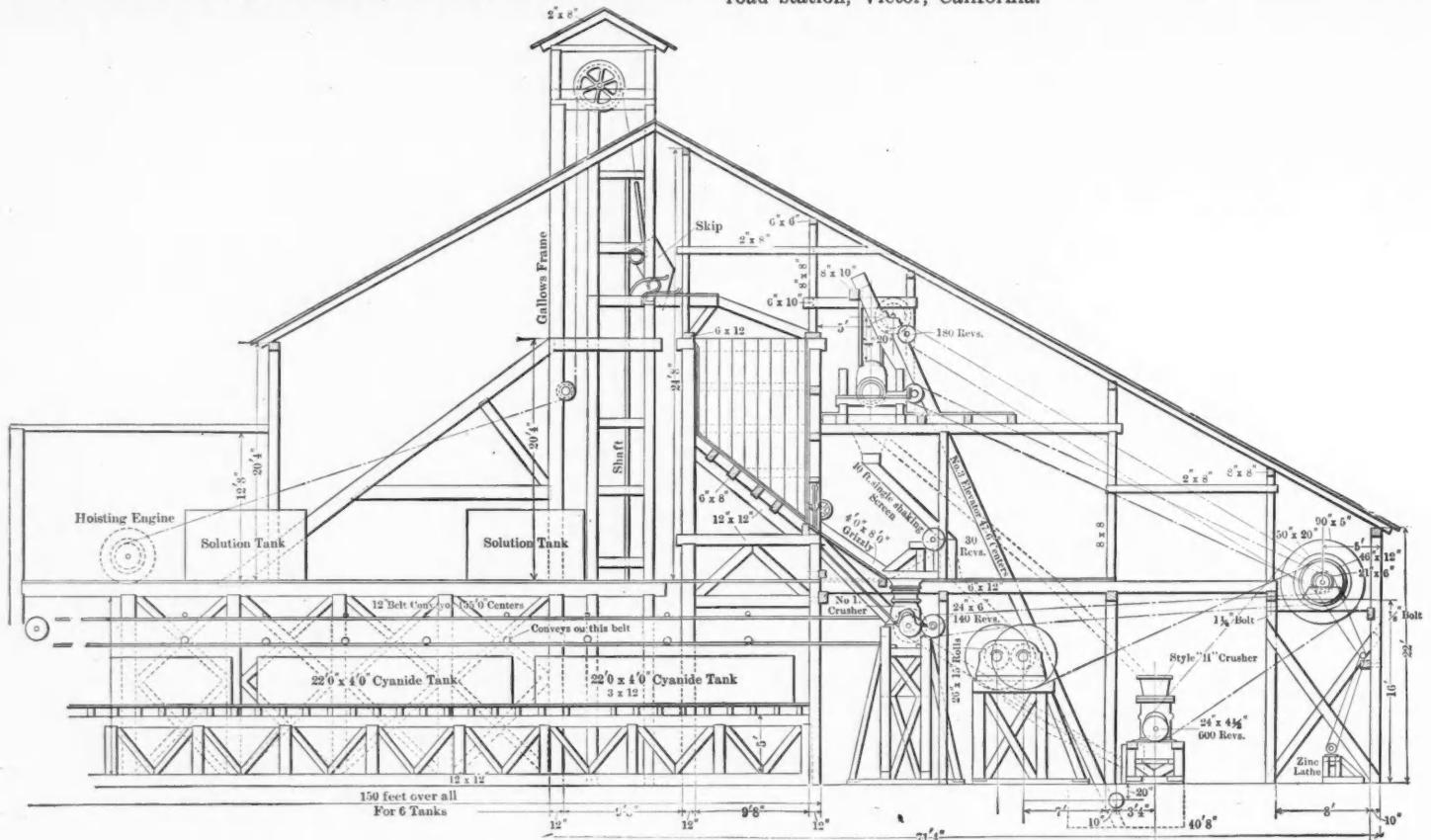
Written for the Engineering and Mining Journal by Charles T. Arkins.

The mill which this article describes is, perhaps, as nearly automatic as one can be constructed, and this renders it possible to treat with profit a grade of ore hitherto considered outside the pale of cyanide operations. The writer is chemist in charge of the operations.

The mill is located over the mine shaft, from which the ore is hoisted. The skip is automatically tripped, as shown in the plans, allowing the ore to fall into a storage bin having a capacity of 75 tons. From this it is fed over grizzly bars, 1½ in. apart, to a Gates No. 1 crusher, where it is reduced to 1½-in. material and conducted to a hopper common to the rolls, the No. 1 crusher and Style "H" crusher, whence it drops into a Gates No. 3 elevator and is elevated to a 32-in. by 8-ft. revolving screw having apertures ¾ in. in diameter; the rejections from the screen are conducted to a Gates Style H crusher, which reduces the material to

Between 60 and 80c. in gold is left in the tailings, so it will readily be seen that ore as low as \$5 per ton, or even less, can be treated with profit at this mill. The above figures are exclusive of superintendence, insurance and cost of maintaining and operating a chemical laboratory.

The ore is a difficult one to cyanide as it contains much clay and talc and quite a quantity of cupriferous mineral, mostly malachite and azurite. Much trouble is encountered with precipitation, but by the continual use of lead acetate on the zinc turnings, and strengthening the cyanide solution before it enters the boxes, satisfactory precipitation is generally maintained. The gold recovery ranges between 90 and 95 per cent. The mill was designed by and constructed under the direction of Mr. John Q. MacDonald of Cripple Creek, Colo., and is owned by the Rose Gold Mining and Milling Company of Saginaw, Michigan, a close corporation, composed of but four or five men. The mill operates only a product of the Rose Mine, which has an exceedingly large body of mill ore. The property is situated 45 miles from the nearest railroad station, Victor, California.



CYANIDE PLANT OF ROSE GOLD MINING COMPANY, VICTOR, CALIFORNIA.

¾ in. or less. It passes thence to the elevator, which returns it to the revolving screen, the undersize of which passes over a single shaking screen of 3 holes to the inch. The undersize of the shaking screen is finished product and is conducted to a small storage bin, from which it is automatically fed on a 12-in. belt conveyor and carried to the leaching vat receiving the charge. The oversize of the shaking screen passes to a set of Gates 26 by 15-in. rolls, and leaving the rolls it is conducted to the elevator, which returns it to the revolving screen.

The dumping of the finished product from the conveyor into the leaching vat is effected by means of two false rollers, one set at an angle of 60°, over which the belt passes, thereby raising the belt from a horizontal to an inclined position, and the other roller set at an angle of 50°, under which the belt passes after having discharged its burden. The belt may be set so as to discharge at any one of three points in a vat. When a tank is charged, horizontal rollers are substituted for the false rollers, which are then removed and are put in position over the vat next to receive a charge.

The force needed to operate this mill consists of an engineer, a crusher feeder and a laborer in the vat to distribute the material as it is discharged by the belt conveyor.

Following is the cost of treating 33 tons of ore per shift of 11 hours, together with cost of mining, the figures being those of actual work in the mill:

One engineer	\$3.33
One crusher feeder	3.00
One laborer in vat	2.50
One solution man	2.50
Oil	0.80
Fuel (wood)	3.00
Total	\$14.93
Cyanide of potassium, lime and zinc.....	21.38
Cost of treating 33 tons.....	\$36.31
Cost of treating 1 ton.....	1.09
Cost of discharging vats per ton.....	0.10
Total per ton	\$1.19
Total cost per ton for mining.....	1.25
Total cost mining and treatment per ton.....	\$2.44

The officers of the company are: Jno. J. Rupp, president; F. D. Ewen, vice-president; Geo. Grant, treasurer, and R. S. Grant, general manager.

ALUMINUM-MAGNESIUM ALLOYS.—P. Aulich (English patent 14,226 of 1899) has described a method of making these alloys by adding metallic aluminum to fused magnesium chloride. After fusion, sodium may be added to separate the magnesium. As an alternative the bottom of the crucible may be used as an anode, the cathode being the metallic aluminum.

THE IRON ORE MINE OF RAS EL MADEN, ALGERIA.—A recent number of "Stahl und Eisen" says that this mine, which has recently been opened, is situated about 5 miles inland from Honaine, a small fishing boat harbor on the coast of Algeria, between Oran and Nemours, near the mouth of the Tafua River. The ore is a limonite, containing from 50 to 52 per cent. of iron, and 5 to 8 per cent. of manganese, with 4 to 7 per cent. of insoluble silicious residue; it occurs in a large compact deposit between limestone and slate about 130 m. long and 50 m. broad. The depth is taken to be about 50 m., although borings down to 59 m. are still in ore. The working is carried on by open quarrying in a series of terraces, but preparations for deep working have been made by sinking a main hoisting shaft. The ore is conveyed from the mine to the beach by a Pohlrig wire ropeway, the first section of about 1½ miles having a rise against the load of 190 m.; from the summit to the sea the distance is about 3½ miles. The widest span between the supports on the line, which have a maximum height of 29 m., is 700 m. The carrying capacity is about 20 tons per hour. The loaded buckets are discharged on a pile at the cliff face, whence the ore is carried in buckets along plankways to open lighters carrying from 10 tons to 14 tons each, which, when filled, are taken out to the steamers lying in the roadstead and discharged in the same way. In spite of the very primitive character of the arrangements, as much as 2,000 tons can be shipped in 24 hours. The ore is sent to Westphalia and it is expected that 60,000 tons will be mined this year.

LAKE SUPERIOR IRON MINES IN 1899.

By Our Special Correspondent.

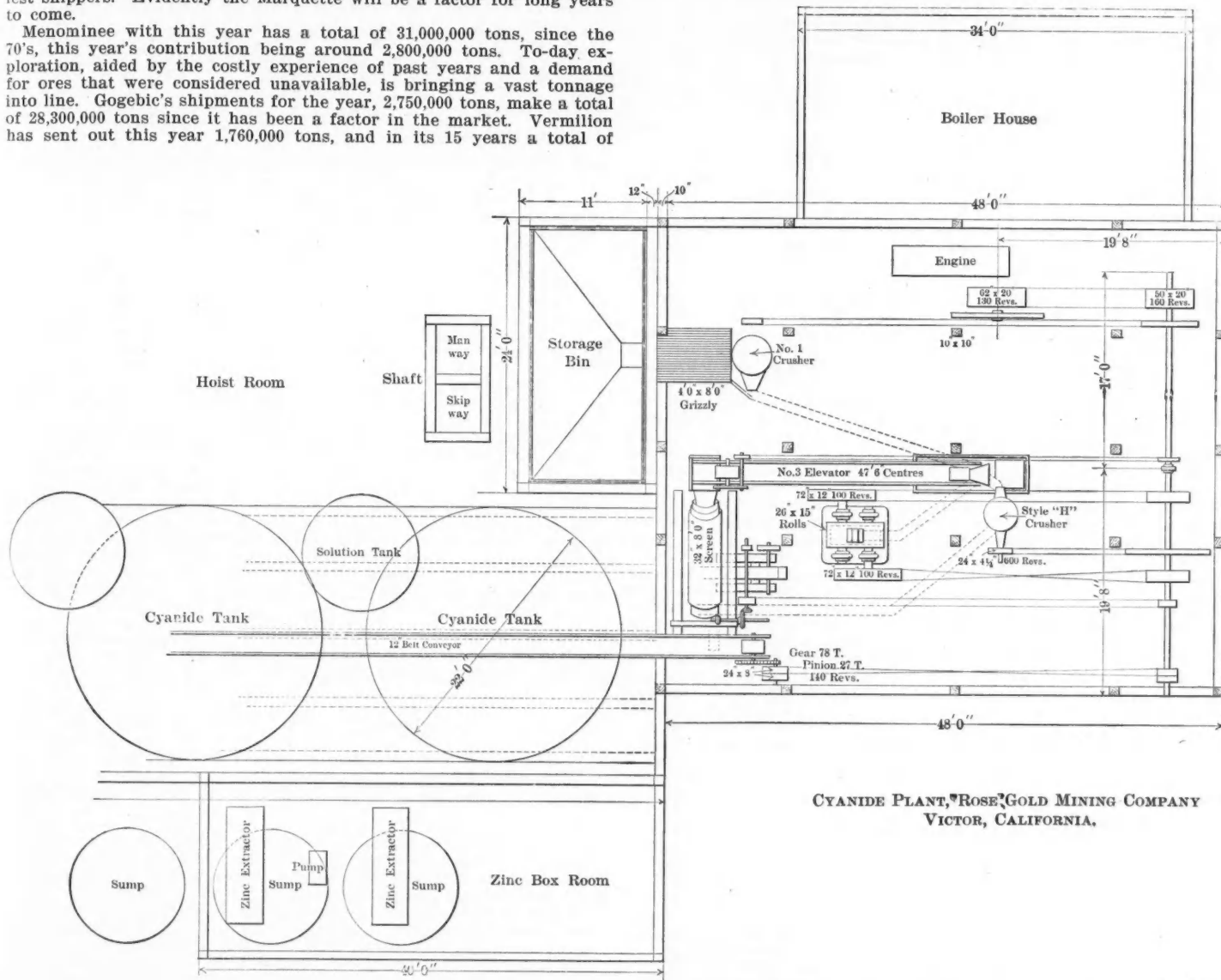
Total Lake Superior iron ore shipments the past year exceeded estimates in a way that surprised the trade, but the output was accomplished with such ease as to emphasize the statement made before that the mines in any given year could have furnished a far greater tonnage than could have been transported.

The year's total of over 17,900,000 gross tons shipped by lake is 4,000,000 tons above 1898, the highest preceding record, and is equivalent to some 10,000,000 tons of pig. The open pit of the Auburn Mine, Mesabi Range, is 125 ft. deep, 250 long by 500 ft. wide, and from it has come 1,400,000 tons of ore. That there were mined, moved by rail and shipped down the lakes a volume that would fill a hole twelve times as large, in this one season, seems incomprehensible. Yet since iron mining began on the Marquette Range in the early 40's Lake Superior mines have shipped 152,000,000 gross tons. The Marquette Range this year shipped almost 500,000 tons more than its record-breaking performance of 1898, and altogether 56,000,000 tons. This production has called for constant new development, but the oldest companies are still the heaviest shippers. Evidently the Marquette will be a factor for long years to come.

Menominee with this year has a total of 31,000,000 tons, since the 70's, this year's contribution being around 2,800,000 tons. To-day exploration, aided by the costly experience of past years and a demand for ores that were considered unavailable, is bringing a vast tonnage into line. Gogebic's shipments for the year, 2,750,000 tons, make a total of 28,300,000 tons since it has been a factor in the market. Vermilion has sent out this year 1,760,000 tons, and in its 15 years a total of

ing, every old dump pile a trifle better than the average, every abandoned shaft from which a little ore could be quickly taken, was in demand. Not in many years have stocks been so well cleaned out, and never has the outlook for winter all-rail business been so good. Naturally, wages rose, and successive advances were granted miners without any demand. The scale to-day is the highest that was ever known in Lake iron mining.

The demand started a search for new mines, for the old would not long endure at such a rate. The basic process of steel making and the demand for foundry iron has brought out high phosphorus ores. Other changes in demand caused a search for low-grade ores. On every range this search was active, and on most fairly successful. The Gogebic and the Vermilion have proved rather disappointing, but old mines have been extended and deposits have been shown to be more important than was supposed. On the Vermilion, for instance, there is to-day in sight probably three times the ore exposed a year ago, and the extension of the Ely ore bodies in the year is one of the marvels of the whole region. On the Menominee many new finds have been made, some of them apparently of value and importance, while many other properties, long known but almost forgotten of late years, have been reopened, and will be producers next year. On the Marquette systematic explora-



CYANIDE PLANT, ROSE GOLD MINING COMPANY VICTOR, CALIFORNIA.

13,500,000. Mesabi in its 7 years has averaged nearly 3,500,000, and this year shipped 6,800,000 tons. The early jealousy of this range when it was regarded as a menace to all the others, has partly gone, for the last comer has relieved the older ranges of a pressure undreamed of when the first ore was shipped in 1892. In 1896, the fourth year of its development, the Mesabi reached first place, and its lead has increased so fast that its production is now more than that of its two nearest competitors combined.

The year opened with little promise of what was to come, and so poor was the outlook for freights that some short-sighted vessel men sent their ships to the Atlantic Coast to carry coal for a concern that was to pay what seemed a fabulous offer. Lake season charters were made by the millions of tons at 60c. from Duluth to Lake Erie ports. Bessemer ore prices were advanced a few cents, and some good ore sold for Lake Erie delivery at about what lake freight on it was later to cost. Stock piles old enough to vote were scattered around at idle and abandoned shafts, wages were low, business was dull. The change came early. Manufactured iron advanced and it soon became evident that the supply was short. Values of ore rose and before the season was far along every stock pile on which young forest trees were grow-

ing of the iron formation by one company that controls some 40,000 acres, gives good indication and deep borings are now under way at favorable localities. Many thousand acres on both these two old ranges will be explored, and it is not to be supposed that all the work will be without return.

On Mesabi there has been a fever for exploration that has exceeded even the early 90's, though of course without such marvelous results, for the early work had shown up all easily found deposits. But this year diamond and churn-drill crews and test-pit men have been scattered for 60 miles along the range and at times as high as 50 drills have been at work day and night. These have located many million tons of ore. How much, it is idle to estimate, but the developments have certainly surprised leading mining men and confounded most of the prophets. On preceding maps of this range there were long gaps, such as from Biwabik westerly, from the Virginia group to Mountain Iron, and from there 15 miles to Hibbing, while nothing of high value was in evidence beyond Hibbing to where the ore-bearing horizon is buried west of the Mississippi. New maps will show ores almost the whole distance between Mountain Iron and Hibbing, across two townships and to some extent on a third. At Mountain Iron ore is now known outside

the great ore body and there is shown a reasonably connected series of deposits from Virginia to Mountain Iron. Ore had been known or suspected at many of the new developments, but its full extent has not been realized. The range needs a comprehensive survey, assisted by private funds that will leave no important question undecided. Some move of this kind is likely to be undertaken before long.

The various great steel making interests have begun to strengthen their position regarding raw material, realizing a necessity so apparent that it is a wonder they did not see it before. Consequently, added to a natural demand for ore properties resulting from an increased consumption there is a further demand from rival steel making concerns looking for ore reserves. The boom times of former days have been almost duplicated and the craze is growing. From mines it extended to options on mineral showings, from these to fee lands on the formations, then to low-priced leases, and now leases are being taken at as high as 40c. a ton for the hard bessemer hematites and to 25 and 30c. for a low-grade and medium soft ore of reasonable physical character. At the present time these latter are being optioned to some of the largest steel making companies at bonuses ranging from small sums to more than \$100,000 above the royalties on single tracts.

While the Oliver Mining Company, a Carnegie interest, was ahead of all competitors except the Federal Steel Company in this securing of raw material, it has shown no diminution of endeavor. It has in the year secured vast options for State land leases in Minnesota and private leases elsewhere. In a few days in December it secured some 15 or 20 State leases on the Mesabi, agreeing to a bonus on many of them, and agreeing to explore at once. It has a large number of drills at work. Its reserves of ore probably far exceed those of any other iron and steel concern in the world, and are varied enough to be available for all kinds of pig iron. It is mining on five ranges, has two of the chief properties on the Marquette, the cream of the Gogebic, the greater part of the Vermilion so far as developed, and a dozen of the best properties on the Mesabi. Besides these, its scattered options may yield many mines more. It is safe to say that an annual consumption of 5,000,000 tons would not exhaust its Lake Superior mines in a generation.

The most notable mining purchase of the year was that of the Chapin properties at Iron Mountain, Mich., by the National Steel Company, for a price generally regarded as excessive, but which time may have justified. This company has a very strong position through its agreement with the minority interest in the Oliver Iron Mining Company, under which it has a sixth of Oliver ore production for 20 years. It also owns the Winthrop, on the Marquette Range, and some other properties and options. Another newcomer and an aggressive force in the mining world has been the American Steel and Wire Company, whose first purchases of ore lands was the Saurtry property on the Mesabi. Within five months from the commencement of development the mine was said by the purchasers to have 60,000,000 tons of ore in sight. An adjoining property was secured and other Mesabi lands are under lease and option. The company entered the Menominee Range strongly, and on the Marquette has, besides the Negaunee, other properties under exploration. The Republic Iron and Steel Company has the Franklin mines on Mesabi and the Cambria and Lillie on the Marquette, and is understood to be negotiating for more Mesabi ores. Its ore position is not so independent as that of others. The American Steel Hoop Company has lately entered the lists of mine owners, with an interest in the properties of the Mahoning Ore and Steel Company showing many millions of tons on the Mesabi and some flattering hard ore indications on the Vermilion. It, too, has also other mining lands. Other furnace interests have more or less of their ore supplies under direct control and this movement is so evidently based on sound judgment that it will continue to spread. The Federal Steel Company has the vast ore interests of the Minnesota Iron Company on both Vermilion and Mesabi Ranges. In this combination is one mine, the Elba, with ore of superior quality, and that to-day is opened for 1,000,000 tons a year for 25 years ahead. But the Minnesota Company since its consolidation has been as active as any concern in securing new lands and has perhaps 150 mineral locations on the Menominee and Marquette Ranges besides new Mesabi purchases. The Federal Steel Company will mine 3,500,000 tons next year and yet hardly make an impression on its ore reserves.

The movement of mining and steel making interests toward a control of lake shipping similar to that already secured in mines and railroads is so recent that it needs no extended comment. The great Rockefeller fleet, which will consist of 58 steel snips in 1900, will carry nearly 4,500,000 tons of ore in the season, the Minnesota Iron Company's fleet will carry over 2,000,000 tons, and the American Steel and Wire Company is building a fleet that will have a season's capacity for 1,000,000 tons. In all mining concerns and allied interests have either under ownership or charter about 20,000,000 tons of room for 1900.

To meet what is expected of them the lake railways have made extensive contracts for new equipment and facilities, including docks, trackage, etc. These contracts amount to date to about \$2,000,000, and include rolling stock equivalent to about 2,000 new 25-ton cars. For the first time 50-ton steel cars will be generally used. Some of the roads are building double tracks and preparing for an enormous tonnage. It would not be at all surprising if the Mesabi Range alone is called on for 8,000,000 tons of ore, and the roads reaching it are preparing for such a movement. Old ranges will increase their output of the present year, except possibly in one instance. The Vermilion and the Menominee will increase about 15 per cent.; others less.

This year there has been a notable beginning of activity in exploring for ore on the Canadian side of Lake Superior, both in Michipicoten and West Algoma divisions. At Michipicoten the Lake Superior Power Company has opened a mine and is now building railroads and docks with capacity for 2,000,000 tons a year. The company is also exploring with great vigor. In West Algoma development has begun on the Atikokan and Mattawin ranges, northwest of Lake Superior, and exploration is actively under way all along the northern border of Minnesota, many excellent specimens coming from there, with stories of remarkable deposits.

GILPIN COUNTY, COLORADO, MINES IN 1899.

By Our Special Correspondent.

There is no mining camp in Colorado where the output is so reliable as in the "Little Kingdom of Gilpin," and its past record is one which other mining counties may well envy. At no time in its history has there been any boom, and while Gilpin County mining men are not advertisers, the fact remains that during its forty years' history it has been regarded as the reliable camp of the State.

At no time, however, have the indications been so bright for an ensuing year as at the close of 1899.

There have been numerous sales of mining property during the year. The largest were those of the Gunnell property, for \$784,000, to the Gunnell Gold Mining and Milling Company; the Topeka Group, for \$365,000, to E. G. H. and A. J. Richardson of Buffalo, N. Y.; the Cœur d'Alene, for \$25,000, to the Rapidan Mining and Milling Company, with many others of minor importance. All the larger properties are producing on the same even scale, month after month, and such properties as the Gunnell, Topeka, Hidden Treasure, California, and others, have been installing heavier working plants and doing much development work. Numerous smaller properties are being opened, as well as a number of new ones, and even to the outsider everything bears a look of prosperity.

The amount of new machinery brought in was larger than in any previous year, and of late new machinery is received every day with prospects of a good deal to come during the early months of 1900. The machinery is more powerful, enabling operators to go down maybe 1,000 or possibly 2,000 ft. New shaft houses are dotted about the older sections, many of large size in proportion to the new plants of machinery. Up to a year ago scarcely any of the mines in this county used air drills, while to-day there are at least a dozen, with several compressor plants now going in. Wages in the county remain the same, \$2.50 to \$2.75 per day. There need not be an idle man in the county, and from the outlook there will be a demand for good miners before spring.

The smelter strike last summer affected ore shipments, while for several months there has been a scarcity of cars for shipping ore to outside points, that the Colorado & Southern Railroad officials promise to remedy during the coming year. The production for 1899, as near as can be estimated, will be close to \$4,000,000, and shows an increase of a little over \$100,000. The figures would have shown a larger increase but for the big snows for the first quarter of last year and the fact that many of the big mines suspended regular shipments during the closing months, as, for instance, the Cook Mining Company, which is waiting until its new stamp mill is built; the Topeka for the installation of new machinery; also the California, Hidden Treasure, and such mines as the Gunnell, where development was carried on more than production. The ore shipments for the year show the usual increase, but quite a bit of the shipments was ore to concentrating mills in Clear Creek County, some of it low grade. However, the difference in values is more than made up by the large quantity of ore shipped regularly from Russell Gulch mines by wagons to Clear Creek for treatment, which does not show in the production. The shipments per month of smelting ore, concentrates and tailings to the Denver and Pueblo smelters and crude ore to outside points are as follows, the statement being furnished by the Black Hawk depot of the Colorado & Southern Railroad:

	1898. Tons.	1899. Tons.
January	4,832	4,868
February	4,752	3,654
March	5,600	4,824
April	5,472	6,808
May	4,096	6,364
June	4,608	5,110
July	4,464	4,940
August	5,742	7,080
September	5,368	6,030
October	5,400	5,475
November	4,788	5,347
December	4,554	Estimated 5,250
Totals.....	60,176	65,700

Work now going on at the big mines augurs well for a large production in 1900. The Topeka was transformed in October after a very productive year. The new buildings on the main shaft are to be 118 by 40 ft., with 30 by 50-ft. boiler room, equipped with one 150-H.-P. Webster Camp & Lane single-drum gear hoist, 3 100-H.-P. boilers and 2 4-drill Norwalk compressors, a dynamo for 125 lights, besides two 3-drill Rand compressors for West Topeka. The daily output is expected to be about 100 tons when running full. R. E. L. Townsend of Russell Gulch is manager. The Gunnell Gold Mining and Milling Company is working the Gunnell mines and 3 stamp mills, for which it paid \$784,000 in July. Development work has been heavy, while for the past 3 months the output has been about \$15,000 monthly, with prospects of more. Frank C. Young of Central City is manager.

The Cook Mining Company has maintained an average daily shipment of about 100 tons, but has curtailed its product during the erection of a big mill at Black Hawk, intending to transport its ores via the gravity tramway instead of hauling by team. The working force numbers 100 men and inside of 6 months will be doubled. C. K. Colvin, Central City, is manager.

The Gold Coin Mines Company, under the management of A. L. Collins, did a large amount of development during the year. Both the California and Hidden Treasure mines were reported looking well, when a fire destroyed the plant and buildings on the former in October. These are being replaced by one of the most complete plants in the State, shaft building to be 110 by 101 ft. A large shaft house has been built at the Hidden Treasure and a heavier hoisting plant installed. Both mines will soon produce steadily. The California is to be unwatered to its great depth of 2,230 ft., the water being now down to the 1,700-ft. level.

The Kansas-Burroughs Consolidated Mining Company has added to its property during the year, and now works one of the largest groups in the county. The daily production is about 125 tons, principally milling ore, and employment is given to about 175 men, with prospects of increasing this number at an early date. Pat McCann of Central City is manager.

The Banta-Hill Consolidated Mines Company has built two large shaft houses in its Hill and Gold mines, installed big plants of machinery and is carrying on operations in fine shape. Good ore is being opened up, and with such a large property, 234 acres, developed as it will be under the present management, the old-time production should be duplicated many fold.

The Saratoga is steadily shipping and the Fisk has been doing work calculated to make its output heavier in 1900. The Concrete has been opened up by sinking and the new hoister and new air compressor are installed. The Robert Emmet is shipping a good grade of ore and there are many more worthy of mention, such as the Perigo, Calumet, Ophir, Lotus and others. In the mills there has not been many changes during the year. The Fullerton mill of 33 slow stamps was overhauled by the Gunnell Gold Mining and Milling Company; the Avon, of 25 slow drop stamps, was also overhauled, and both are running. The Boston & Denver Mining and Milling Company is now erecting an 80 rapid-drop stamp mill on the site of the Bobtail Mill, to cost in the neighborhood of \$100,000, for which the Hendrie & Bolthoff Manufacturing and Supply Company of Denver has the contract. The new mill is expected to treat about 350 tons daily and will handle principally the output of the Cook Mine. One or two concentrators are talked of at Black Hawk, and there has been some mention made of a smelter, but it is not believed that the latter could compete with the big plants at Denver and elsewhere.

LEADVILLE, COLORADO, MINES IN 1899.

By Our Special Correspondent.

The statistics of the Leadville District for 1899 were given in our number for January 6th; they are supplemented below by some comments on the general conditions of mining during the year.

The first interference with mining came from the unprecedented severity of the winter of 1898-1899. Starting with unusual cold in November, it ended in April, after three months of almost continual storm. Snow on the ranges completely blocked traffic for many weeks on two railways and allowed only an intermittent and dangerous service on the third. The Ibox branch was abandoned after some of its rolling stock had gone over and was absolutely lost in snow banks until summer came. A fuel famine impended and only by heroic efforts were the principal pumping plants kept supplied and a great disaster to the district avoided.

The smelters curtailed operations to a minimum, as the ore supply was wholly shut off for a time, and they were also seriously short of coal, coke and other necessities. The railroads, while unprepared for a storm so prolonged and severe, made great efforts, and soon after the winter broke matters resumed a normal aspect. The mines had kept development work going and when the roads opened production began on a scale that forced the record up to over 2,000 tons daily by the middle of May.

Then came the second shock. An eight-hour law passed by the State Legislature was to become effective about June 10th. Mine operators and their employees came to an amicable agreement pending a decision as to the constitutionality of the law, but the smelters of the State, generally, felt the necessity of material modifications in wages, which their employees prepared to fight. Before June 1st this struggle began to affect ore production in Leadville. The smelters began to curtail purchases except in a few instances where contracts had to be fulfilled, or prudence dictated accepting at least part of the ore for fear the supply might be cut off indefinitely if once the mines were closed.

It was weeks before the Supreme Court decided the law unconstitutional, and weeks longer before the smelters resumed freely. But again the mines began to crowd production. The down-town mines were unwatered and began shipping, and early in October it was estimated that the total product reached 2,600 tons per day. Then traffic had grown so great that the roads found their rolling stock inadequate. Cars could not be had for ore. Motive power was lacking and side tracks along the roads were crowded with cars loaded with ore and coal. A coal shortage also threatened. The coal miners were chronically dissatisfied and the demand for coal was so great that only a meagre supply is even now obtainable, although it is hoped the situation will modify for the better henceforth.

Turning from the unpleasant features of the year to note what has been accomplished in the city itself, the down-town mines were finally unwatered about midsummer, though in January a cave-in at the Bon Air shaft imprisoned two pumpmen for 19 days and caused the Pumping Association heavy expense and loss of time. The Leadville Home Mining Company, organized among Leadville citizens, and capitalized at \$50,000, in shares of \$1, was the backbone of this work. It proved that "the way to resume is to resume."

First the Starr, then the Bon Air, and lastly the Penrose shafts became producers. The discoveries in the latter are of great size and richness. As the product went up from 50 tons a day to finally 300 and over, and when scores of visitors went into the Penrose and sampled silver chlorides along drifts and cross-cuts, the stock began to soar. There is now practically no trading in it; a few sales were made at \$15 a share, but nearly all is held at \$25 and upward.

The Midas, a new shaft just northeast of the Penrose, is shipping 75 tons daily while merely doing development work. The Bohn, Weldon, Coronado and Niles-Augusta are producing actively. On the Nubian shaft, southeast of the Weldon, rich ore has been found. The North-

ern, Sixth Street and Clipper shafts are working. A new shaft is under way on the P. O. S. of A. claim, southeast of the Bon Air.

Important combinations, intended to extend the down-town mining area, are the City Mining Company, the Clarendon Mining Company, the company to operate the Neusitz Placer, the California Gulch Mining Company, and others, while several big propositions in this same locality will soon be started.

Immediately east of these properties, on Carbonate Hill, is the section which produces most of the manganiferous ores, although a considerable tonnage comes from the Last Chip and some from Fryer and Yankee Hill mines. This product goes to Chicago almost entirely and aggregates 10,000 tons monthly. A great deal of attention was attracted by a special train of 40 cars carrying 1,200 tons of this ore, which Gen. Geo. W. Cook sent East, appropriately decorated, to call attention to Leadville's output of this ore.

In the Graham Park sulphide belt a most important event is the resumption of work on the Maid of Erin, Wolfstone and Adams properties, under the Adams Maid Wolfstone Company, managed by Mr. S. D. Nicholson. This company proposes to go to greater depths geologically than any yet reached, and its preparations in the way of machinery, surface improvements, etc., are on the largest scale yet witnessed.

The Mab and R. A. M. continue to maintain a very heavy tonnage. Passing to other sulphide producers, we find the A. Y. & Minnie, Rubie and Moyer producing heavily, the latter being now the principal if not the only direct operations of the Iron Silver Mining Company. The Mike & Starr is making a heavy tonnage from its enormous bodies of iron sulphides, a proof that its marketable character is improving.

In the Gold Belt, the Lillian, on the north slope of Iowa Gulch, the oldest and furthest south of the mines known as principally gold producers, has maintained its usual product under tribute workers. Passing to Breece, we note as heavy shippers the Penn shafts on the old Breece, the Ballard, Fanny Rawlings, St. Louis Tunnel, Little Vinnie, M. N. Fraction, and, to crown all, the various shafts of the Ibox Mines Company, which turn out daily from 300 to 500 tons of ore, principally gold-bearing iron and copper sulphides.

Passing to Little Ella Hill, we note the Reindeer as a small new producer, with a very large acreage favorably located. The Little Ella and New Years have been worked continuously. The New Monarch Mining Company has demonstrated the existence of large bodies of sulphides on and in the Cambrian quartzite. The Penfield and Fortune are also new shippers of 1899. The Dolly B. has kept up a heavy product, and its owners are extending work to the northeast, where a very large shaft is being sunk on the Board of Trade Group. The Resurrection, with its hundreds of acres, has under way a shaft house, engine house, machinery, etc., for a new shaft to be sunk northeast of the old workings, on the same bench of Big Evans Gulch as the Dolly B. surface improvements. The Diamond is still further to the northeast of the new Resurrection shaft.

This cursory and incomplete reference to some of the shippers will give the reader an idea of the extent of territory producing ore and the continued productivity of the old well-known mines and sections. It is now in order to refer to new work under way.

A number of such enterprises in and immediately around the city have already been mentioned in connection with the work of the Leadville Home Mining Company. To the south of Leadville, and not far from Iowa Gulch, the Revenue Mining and Leasing Company is sinking two large shafts, with ample resources, to explore the country for the old Iron Mine shoot on its western course. The Nil Desperandum and Crescentia shafts, with the same object in view, are also working. The Adams Maid Wolfstone Company, on the Maid of Erin, Wolfstone and Adams properties, already referred to, is working under a 10-year lease. Across Big Stray Horse Gulch is the new shaft on the Seneca Reservation, worked by the Tarshish Leasing and Mining Company.

Further up the gulch, on North Iron hill, the Mikado and Humboldt properties are receiving vigorous development. North of Adelaide the Superior Mining Company, under Manager A. J. Sullivan, is going after the westerly extension of the great gold ore shoot of the Penn mines. Between that and Big Evans, in the basin separating Breece and Yankee Hills, Mr. James J. Shinn has about completed preparations, by purchase outright of a large acreage, for sinking a deep shaft. East of him the White Prince and the Ocean shafts are new enterprises.

On West Breece are the new shafts of the Chippewa Mining Company, the Banker Mining Company, the President Mine, the Comstock Mining Company, and others, all strong companies, with much development mapped out. In the vicinity of Ibox, the Triumph and Modoc are working vigorously, and further to the northeast the Reindeer is doing very interesting work in the depression between Little Jonny and Little Ellen hills.

In Big Evans is a series of very important enterprises, including the New Resurrection shaft, the Diamond and Board of Trade shafts, all after the ore shoots to the north and east. Some very important work, with excellent prospect of success, is in progress in French Gulch, up the Arkansas from Birdseye. In more remote districts may be mentioned a large number of new combinations in the Twin Lakes, Lake Park, Clear Creek, Low Pass and Granite districts of Lake County.

It is safe to say that never has exploration about Leadville been so important, intelligent and enthusiastic as at present. Home capital has gone freely into the work, especially since the great success of the Leadville Home Mining Company. New York, Boston, Philadelphia and Chicago are heavily interested.

Necessarily only a few of the more important new workings have been mentioned, and the beginning of 1900 will see a great extension of them. The product of 1899 for Leadville is estimated in the neighborhood of \$10,000,000, a gain of 25 per cent. over 1898.

Branches to the heavy shippers from the Denver & Rio Grande and Colorado & Southern railways now extend practically over the entire district. The Ibox branch of the Rio Grande goes to West Breece as far

as the Penn mines, and also goes over Fryer Hill to Graham Park, thence west along Carbonate Hill. The South Park has also covered Fryer Hill to Graham Park and beyond.

In 1899 the Ballard Mine began to receive substantial returns from its bismuth ore, rich in gold. This ore has been shipped to London, Eng., for reduction. Zinc ores have become of much greater importance than ever before, shipments of this metal also going abroad, principally to the Vieille Montagne Company, Belgium.

CRIPPLE CREEK, COLORADO, MINES IN 1899.

By Our Special Correspondent.

In our number for January 6th we published the statistics of the Cripple Creek District for 1899; to these we now add some notes on mining progress during the year.

Mines.—A large amount of mining has gone on in the district, as the output shows. The Portland has kept up its splendid record, as has also the Gold Coin, in the same vicinity. The law suit between the Portland and the Strong is still pending. The Hull City placer of the Independence Town and Mining Company, since passing out of the hands of the lessees, has shipped considerable ore, but is still in litigation. A steel shaft house and gallows frame have been erected. Stratton's Independence began shipping in earnest about the middle of the year and is now putting out a large amount of ore and doing considerable development. The Victor, on Bull Hill, has proved rather disappointing, as no ore has been shipped for some time, though considerable development work is under way. The Isabella, on the same hill, has created considerable excitement, having shipped steadily a fair amount of ore and several times made good-sized shipments of very rich ore. The Acacia, on Bull Hill, has again found ore and its prospects are brighter than for some time. The Wild Horse of the Consolidated Mines Company has been a regular shipper. The north slope of Bull and Ironclad hills have developed several shippers, from which a large amount of ore has been taken. Among these are the Pinnacle, Damon, Jerry Johnson and others. Ore has been discovered in the Hoosier and quite a bonanza opened up. With the exception of the Lexington property, but little besides development work is being done on Gold Hill, neither the Anchoria-Leland, Half Moon or Moon-Anchor having shipped much lately. The Gold King is doing well and a little work is being done on the C. O. D. The Mary McKinney, at Anaconda, has mostly passed out of the hands of lessees and a first class mine has been developed. The Doctor has been opened up again after some years of idleness and is shipping some ore, though it is now in litigation with the Jack Pot over apex rights. The Jack Pot has kept up its good record and is still worked by lessees. The Moose is doing a little work. On the John A. Logan, on Bull Hill, one of Stratton's properties, a shaft 1,200 ft. deep has been sunk and considerable drifting done. Considerable prospecting is under way on Copper and Rhyolite Mountains, but no ore is being shipped.

Tunnels.—Not very much attention has been paid to tunnelling this year. Some work has been done on the Standard Tunnel, but water has bothered considerably. Some work has also been done on the Ophelia Tunnel. The Columbine-Victor Tunnel has been completed through Squaw Mountain and connected with the Gold Coin shaft. Haulage in this tunnel will soon be by electricity. Work was abandoned on the Red Mountain Tunnel about the middle of the year.

Mining Transfers.—Stratton's Independence has passed into an English company, though Mr. Stratton is still one of the directors. The Venture Corporation of London obtained a working option on the Moon-Anchor Mine early in the year, but it has now reverted to its original owners. The Mary Cashen Mining Company has purchased a part of the Mt. Rosa territory. The Elkton has bought the Thompson Mine, thus materially strengthening the Elkton Company. The Gold Knob property, in the town of Goldfield, has passed from the control of the Moffatt people to a syndicate composed mostly of Colorado Springs men. The Pharmacist has been reorganized and is now known as the Pharmacist Consolidated. The Pappoose Company has bought the Squaw Mountain Tunnel, thus putting an end to costly litigation. The Old Orphan Bell property has been absorbed by two new companies, the Orphan and the Arrow. The Alert Company has acquired the Little Joe and Kalamazoo claims on Bull Hill. The Woods Investment Company has got the control of the Jack Pot Company and has bought the Grassey town site from Bennett and Myers and put it into the Cameron Mines, Land and Town Company. On this 160-acre piece of land the town site of Cameron has been laid out. A great number of new mining companies have been organized and the stock placed on the market. Most of these companies have at least some property in a good locality and some have all good property. The average value of almost all the mining stocks has been away above the average of last year and the transactions in mining stocks were far ahead of any other year in the history of the district.

Railroads.—No new railroads have been built, though considerable grading has been done for the extension of the Cripple Creek District Electric Railroad. This road has been acquired by a syndicate of local capitalists, of whom Irving Howbert is the president and F. M. Woods vice-president. Among the stockholders are quite a number of the principal mine owners of the district. This same company is to build a road direct from Colorado Springs in connection with the electric road. A contract for part of the grading has already been let and it is expected that the road will be completed some time during the coming year. The Midland Terminal Railroad and the Florence & Cripple Creek have been absorbed by a new company called the Denver & Southwestern. The Colorado Trading and Transfer Company, the La Bella power plant and a part of the Metallic Extraction Company's works have also been included in the deal. The Golden Circle branch of the Florence & Cripple Creek Railroad has been completed around Bull Hill.

Mills.—One new mill has been built during the year, the Economic Gold Extraction Company having completed the works in Arequa Gulch. The company is controlled by the Woods Investment Company and is primarily for treating the ore of the mines of this syndicate. The mill is a chlorination plant of 300 tons capacity and it can be doubled very easily when required. The mill is equipped with rubber belt conveyors and everything is automatic.

Electricity.—The use of electricity in mining has been a feature in the camp during this year. The Colorado Electric Company has about 60 hoists, from 5 to 30 H.-P. each, aggregating about 1,500 H.-P. A number more would be put in at once if they could be obtained. The Taylor and Brunton sampler has a 75-H.-P. motor, the Rio Grande 35 H.-P. and the Cripple Creek sampler 35 H.-P. The Economic Mill is partially run by power from this company, having a 325-H.-P. motor. Current for a 140-H.-P. motor is supplied by the Arequa Mill. The Lillie has a 100-H.-P. motor for running a compressor, and the Tornado 75. The Moon-Anchor has a 100-H.-P. motor for running a pump. Besides these a number of mines and mills are supplied with light. The whole system has been improved and everything is in good order. The La Bella plant at Goldfield is completed and is now supplying power to the electric road, to one hoist, and is doing considerable lighting. A large compressor is also running at this plant which supplies air for a number of drills in the surrounding mines. The Woods Investment Company controls a company which is putting in a large electric plant to be run by water power, for furnishing power to run the mines, etc., controlled by this syndicate, though it is also a custom plant.

Taken as a whole the Cripple Creek District has made considerable advancement in the past year and the outlook for the next one is very good.

ALUMINUM IN 1899.

The production of aluminum in 1899 continued to be in the hands of a single company in the United States, and the quantity turned out did not greatly exceed that of the preceding year, when the total was 5,200,000 lbs. Arrangements are being made for an extension of works and a further increase of production, which will be manifest in 1900. It is to be regretted that the increase was not made during 1899, when the high price of copper and the great demand for electrical work presented an opportunity to extend the use of this metal, which may not occur again for a long time.

As it is, there were several instances of the extended use of aluminum, especially for conductors in the transmission of electric power, in which the low specific gravity of the metal gives it advantages over lowest specific gravity of the metal gives it certain advantages over copper, notwithstanding its lower conductivity. In other directions there has been a gradual extension of the use of the metal for various purposes.

The foreign production is increasing, and the establishment of new works in Great Britain has proceeded successfully. The French manufacturers have also enlarged their works, and the Neuhausen Company, in Switzerland, continues to report a large output.

Prices of aluminum have remained without material change through the greater part of the year, a slight reduction in quotations having been made toward its close. The selling prices in the United States for No. 1 ingots (99 per cent. pure) range from 33c. to 37c. per lb., and No. 2 (90 per cent.), from 31c. to 34c., while rolled sheets held at 42c. and upward per lb., according to quantity purchased.

THE MINERAL PRODUCTION OF NOVA SCOTIA IN 1899.

Through the courtesy of Mr. E. Gilpin, Jr., Commissioner of Mines, we are enabled to publish advance figures of the mineral production of Nova Scotia.

In the fiscal year ending September 30th, 1899, the output of the gold mines aggregated 27,772 oz., as against 31,104 oz. in the previous year. This decrease does not indicate that the year 1900 will show a falling off in the production of the precious metal, for, with the steady operation of the old mines and increased development work at the new properties, there is a probability that the coming year will show a material improvement in the gold output.

In iron ore the production in 1899 was 16,169 tons, showing a decrease of 14,881 tons as compared with 1898. Manganese ore on the other hand exhibited an increase of 25 tons, being 100 tons in 1899, against 75 tons in the previous year. This manganese ore is consumed in the chemical industries, and is high grade ore.

The output of coal was larger than in 1898, owing to the extended operations at the mines of the Dominion Coal Company in Cape Breton. In 1899 there were raised 2,642,333 tons, as against 2,281,454 tons in 1898, showing an increase of 360,879 tons. A large part of this coal was shipped to the New England Gas and Coke Company's works near Boston, Mass.

The increase in the production of coke was 13,484 tons, there being made in 1899 a total of 55,484 tons, as against 42,000 tons in the previous year. This coke came largely from the by-product plant of the Dominion Coal Company at Halifax.

Gypsum also shows an increase, the output in 1899 being 140,000 tons, against 131,000 tons in 1898. A large part of this found its way to the United States.

Limestone showed a total production of 32,000 tons, against 24,000 tons in 1898. Grindstones and similar quarry products were produced to the amount of 12,989 tons, as against 38,000 tons in 1898.

ACTIVITY IN A GERMAN COAL-FIELD.—During the fortnight between November 16th and 30th, comprising only 12 working days, no less than 200,392 railway wagons loaded with coal or coke, corresponding with a daily mean of 16,699 wagons, were sent off from the Dortmund coal-field in Germany.

UTAH MINES IN 1899.

By Our Special Correspondent.

The statistics of the Utah mines for 1899 were published in our issue of January 6th; we supplement them here with some notes on mining conditions in the State during the year.

Park City mines, both in tonnage and in value of shipments, make the best comparative showing. In 1899 there were 61,050 short tons produced, compared to 37,505 tons in 1898. In the review of 1898 note was made that Silver King incidentally contributed \$100,000 to the State's gold yield, though distinctively a lead-silver producer; last year this precious by-product amounted to \$150,000. Developments since mid-summer have doubled the known reserves, and beyond question it still stands the first mine in the State. Daly West is again on the shipping roster and takes second place in tonnage. Ontario has fine ore bodies blocked out; was a generous producer and will so continue. Anchor has its new concentrating mill in commission, capable of handling 100 tons daily, and so arranged that the capacity can be easily increased to 150 or 200 tons. The minor properties made a larger shipping record than in 1898. The signs are that Park City mines will show an equal increase in 1900; the element of uncertainty is in marketing the ores, not in mining them, for already the camp has experienced the lack of local smelting capacity.

Bingham has been the scene of a boom in mining properties unprecedented in Utah. The copper uncoverings in the Highland Boy, or Utah Consolidated, caused prices to leap skyward, and numerous tracts changed hands at inflated prices. Boston being the copper center, most of the wares were taken there, and early in the year the purchase of the control of the Highland Boy by Standard Oil interests whetted the appetite for tracts of unproven worth. The day of reckoning came like a lightning flash, sooner than expected. As frequently happens, a meritorious proposition—United States Mining—is the medium of equalization, a sort of differential adjuster between acreage flotations and mines. The United States property embraces a half dozen distinct mines, each of special merit, and the story of its brief career, as floated by the United States Oil folk, is full of interest. Probably it is about to pass to Standard Oil interests, which generally is looked on with regret. That United States shares were pushed far too high is no more true than that its collapse burst the Bingham flotation bubble, and the district must now stand on its merits. The medicine is hard to take, though it was necessary to check the disease. Including the sale of the control of the Highland Boy, since December, 1898, over \$11,000,000 were spent in acquiring Bingham realty.

Highland Boy's ore output far more than made amends for the lack of customary shipments from the mines. Had the company's smelter been in shape, 500 tons daily could have been mined from the time the smelter went into commission in May. The plant, in fact, is a grave disappointment and not a metallurgic success. Tetro, Silver Shield and a few other new producers, have helped out the camp's tonnage. Bingham Copper and Gold has considerable reserves blocked out which should contribute to the 1900 yield. The copper porphyry exploration propositions, embracing vast tonnages of $1\frac{1}{2}$ to 3 per cent. copper rock, of which much is promised, are dormant, though systematic development continues in Boston Consolidated territory. It is likely that Standard Oil will be a controlling factor in Bingham's future and it remains to be seen whether this is for good or ill.

Tintic has held its own in production and a little better. The output would have been much larger were it not for the stopping of Centennial-Eureka shipments for several months owing to the sale to the Bostonians and some law suits which prevented mining. Two of the historic notables, Bullion-Beck and Eureka Hill, are to-day short of reserves; but so far as concerns the whole camp this is made good by handsome ore exposures in adjoining territory, in Gemini and Centennial-Eureka. The former may be counted on to produce more in 1900 than Bullion-Beck and Gemini did in 1899. As for Centennial-Eureka, the stories told of its treasures seem like fairy tales. The company has contracted with the American Smelting and Refining Company to supply 75,000 tons of ore, averaging \$40 per ton, with the privilege of making the total 100,000 tons. It is said the treatment charges under this contract are the most favorable ever made in this field. The values are in gold, silver, lead and copper, and it is considered the most desirable dry-ore mine in Utah. Improvements on a well-systematized plan are hastening to completion. Grand Central is by no means worked out, but ore was mined faster than development and the inevitable result is a breathing period to catch up. The suit with Mammoth is one of the sensational happenings of the year and it is difficult to say when the trial will occur. Opinion as to the outcome is evenly divided, though the final inning probably will be either a compromise or purchase of the control of one by the other. Godiva and the properties owned by Jesse Knight, in which the public is not directly interested, show signs of maintaining their production. In fact, Godiva Hill is now one of the most attractive portions of Tintic. Though meteoric in its performances, no property averages more evenly than Mammoth. It has a fine record for 1899 and from reports of physical condition this should continue. The Silver City and Diamond portions of the district have made rapid progress, particularly in surface betterments, and larger ore shipments are promised.

Of all Utah's camps, Mercur is the most discouraging. In 1898 the apparent success of the Daisy Mill revived hope that the West Dip section would furnish at least a half dozen profit-paying mines ere this, but to-day the only work of consequence on foot is a death struggle to make Daisy meet current expenses. There seems slight chance of the mine ever doing better. Other parts of the region look no more hopeful. The disheartening truth is that, outside of Mercur and De La Mar's mines, with a part of Geyser-Marion and Sacramento, the bulk of the ore is too low grade to afford a profit by cyaniding. It is more than 7 years since prospecting for extensions of the Mercur ledge actively began; for 5 years the Mercur gold-fields attracted men and capital from far and near, and 1900 opens on two excellent mines—one wretched-

ly butchered—two doubtful fragments and the rest brilliant mirages. Other mines may yet be discovered, but it appears just now the least attractive section of Utah in which to spend time and money in exploration. This criticism does not apply to the Ophir section. Ophir itself will be one of the most reliable producers in 1900.

Alta and Stockton show an awakening. The Deep Creek Region has made slight progress the past 12 months. It will not move before there is a railroad headed that way. Horn Silver has kept on the even tenor of its way, with a pleasant increment of copper in a large part of its ore. Gold Mountain, Piute County, is scoring some important developments. It is said the exploration accomplished in Annie Laurie in past 90 days assures the transfer to P. L. Kimberly of Sharon, Pa., et al., for \$340,000. Work on other tracts gives the best encouragement.

The copper fever which raged last winter and reached the turning point in mid-summer, led many to believe that several new copper-bearing sections had been discovered in Utah. With the exception of Bingham—and copper at Bingham is an old story—not a discovery of any moment has been made. Near Vernal, Uinta County, in the north-east part of the State, the Uinta Copper Summit Company in 1899 shipped copper ore which realized \$40,000. The Copper Mountain, Box Elder County, in the northwest, near the Nevada boundary, has opened substantial ore bodies. In Washington County, in the southwest part of the State, the St. George has shipped 118,900 lbs. of blister copper and several cars of 30 per cent. ore. Each is an old property revived that to-day affords hope of profits; not a new copper discovery in any of the new fields has thus far shown more substance than newspaper puff.

In the closing weeks of 1899 a new industry for Utah appears probable in Iron County, where there are vast deposits of coal and iron. There is a likelihood that the Rio Grande Western will build through this field and on to the Pacific. Anticipating this, the Letters of Chicago, the Carnegie Steel Company, the Colorado Fuel and Iron Company, and others, including several Utah interests, have taken options on coal and iron lands. Several large tracts have been bought up already and considerable payments made on others. A new process of coke burning will, it is claimed, make a superior fuel from Iron County coal for smelting iron ores, and the coals and ores are said to be remarkably free from sulphur. This is the nearest coal and iron field to the Pacific.

NEW INDUSTRIAL TRUST STOCKS IN 1899.

This has been a banner year for consolidations, and there are few large industrial enterprises allied to the mineral industry that have not entered into some agreement bearing on the regulation of trade. The biggest combinations in 1899 were in the iron and steel industries. Most of these trusts have acquired large interests in coal and iron ore lands, thus aiding them in meeting any competition that may arise in the manufactured products. In this category appears the American Steel and Wire Company, incorporated in January, with a capitalization of \$90,000,000, of which \$50,000,000 is in common stock and \$40,000,000 in 7 per cent. cumulative preferred stock; par value of each, \$100. This company is closely allied to the Federal Steel Company, which was organized in 1898. The American Steel and Wire Company also controls some iron ore lands in Minnesota. The stock of this company is listed on the New York Stock Exchange. In January it sold at \$38@54 for the common shares and \$108@123 for the preferred. In April the common brought \$61@71.50, while the preferred dropped to \$102.50@92.50, notwithstanding the $1\frac{3}{4}$ per cent. dividend on these shares. In July, when another $1\frac{3}{4}$ per cent. dividend was paid on the preferred stock, these shares fell to \$97@94, and the common to \$59@53. In October the third quarterly dividend of $1\frac{3}{4}$ per cent. was paid on the preferred stock, which sold at \$96@93, and the common at \$54@47. In November the common shares sold down to \$46, and the preferred changed hands at \$97@93. In December the common opened at \$49@49 and the preferred at \$95@95, and prices dropped in the panic week to \$32 for common and \$84 for preferred.

The Republic Iron and Steel Company—a consolidation of a number of bar and forge iron plants in the Central and Southwestern States, west and south of Pittsburg—was incorporated in May, with a capital stock of \$55,000,000, divided into \$30,000,000 common shares, and \$25,000,000 preferred bearing 7 per cent. cumulative dividends annually. These shares are listed on the New York Stock Exchange. In August the common shares brought \$29@22 and the preferred \$79@70. In September the common sold up to \$33, while the preferred was held at \$79@70. In October, although a dividend of $1\frac{3}{4}$ per cent. was paid on the preferred stock, these shares went down to \$69, and the common to \$23, and in November further recessions were noted. In December the stocks sold at \$16 for common and \$60 for preferred.

The National Steel Company, which controls a number of tin plate, bar, sheet bar and steel billet mills in Ohio and Pennsylvania, was formed in February, with a capital stock of \$59,000,000, of which \$32,000,000 is common and \$27,000,000 preferred, carrying 7 per cent. cumulative dividends annually. The highest price paid for the common shares was \$63, in April, and the lowest \$39, in December. On the preferred shares quarterly dividends of $1\frac{3}{4}$ per cent. each were paid since June. This stock sold highest at \$99, in August, and lowest at \$85, in May, while in December sales were made at \$91@92.

The National Tube Company, the combination of leading wrought-iron pipe manufacturers, was organized in June, with an \$80,000,000 capitalization, of which \$40,000,000 was common stock and \$40,000,000 preferred, bearing 7 per cent. cumulative dividends annually. This stock is traded in only on the curb. In November the common shares were quoted at \$46@47 and the preferred at \$95@96, ex-dividend of $1\frac{3}{4}$ per cent. declared in October.

The Sloss-Sheffield Steel and Iron Company is a consolidation principally of the Sloss and the Sheffield properties in Alabama. It was incorporated in August with an authorized capital of \$20,000,000, of

which \$10,000,000 is common stock and \$10,000,000 preferred, carrying 7 per cent. cumulative dividends. These shares were dealt in on the outside market. In September, when business began, "subscriptions" were booked at \$125@119½; the preferred stock sold "when issued" at \$78, and preferred at \$31¼@35. In November sales were made at \$40@35½ for the common and \$75 for the preferred, and December opened at \$37@35, and \$73½ bid, respectively.

The International Steam Pump Company, incorporated in March, controls the larger part of the steam pump manufacturing industry in this country. Its capitalization is \$27,500,000, of which \$15,000,000 is in common and \$12,500,000 in 6 per cent. cumulative preferred stock. In March curb quotations were \$100@101 for subscriptions, \$75½@76½ for the preferred shares, and \$33@34 for the common. In April the common stock rose to \$34½@35½, but the preferred declined to \$74@72. In August, when the 1½ per cent. quarterly dividends on the preferred stock were commenced, these shares were quoted at \$73@74, and the common at \$23@24. In November the preferred sold ex-dividend at \$68@71, while the common dropped to \$20@18. In December curbstone prices were \$15@17 for the common and \$64@66 for the preferred shares.

The Virginia Iron, Coal and Coke Company, with property principally in Virginia, was organized in February, with an authorized capital, common stock, of \$10,000,000, of which \$8,425,000 is outstanding, and

In the third week in December the flurry in Wall Street caused extremely heavy declines in the market values of industrial stocks, but most of them recovered part of the loss before the close of the month. At one time the fall in industrials was estimated to represent over \$100,000,000 in nominal values. The year closed with a better feeling in industrial shares.

ECONOMICAL EXCAVATION.

Ground was broken late in December for the 120,000-H.-P. power house of the New York Gas and Electric Light, Heat and Power Company, at 38th Street and the East River, in New York City. The building will occupy the entire block bounded by 38th Street, First Avenue, 39th Street and the river, and the excavation for the foundations will go to a depth of 19 ft. below the curb level. The situation of the lot, with the river at one of its sides, is especially favorable for rapidly disposing of the earth and rock which is excavated, and the contractors, Messrs. Ryan & Parker, have taken advantage of this in a new and very successful way, which the photographs here reproduced will illustrate. An open trench, about 7 ft. deep was dug, running east and west through the center of the lot, extending from the river nearly to

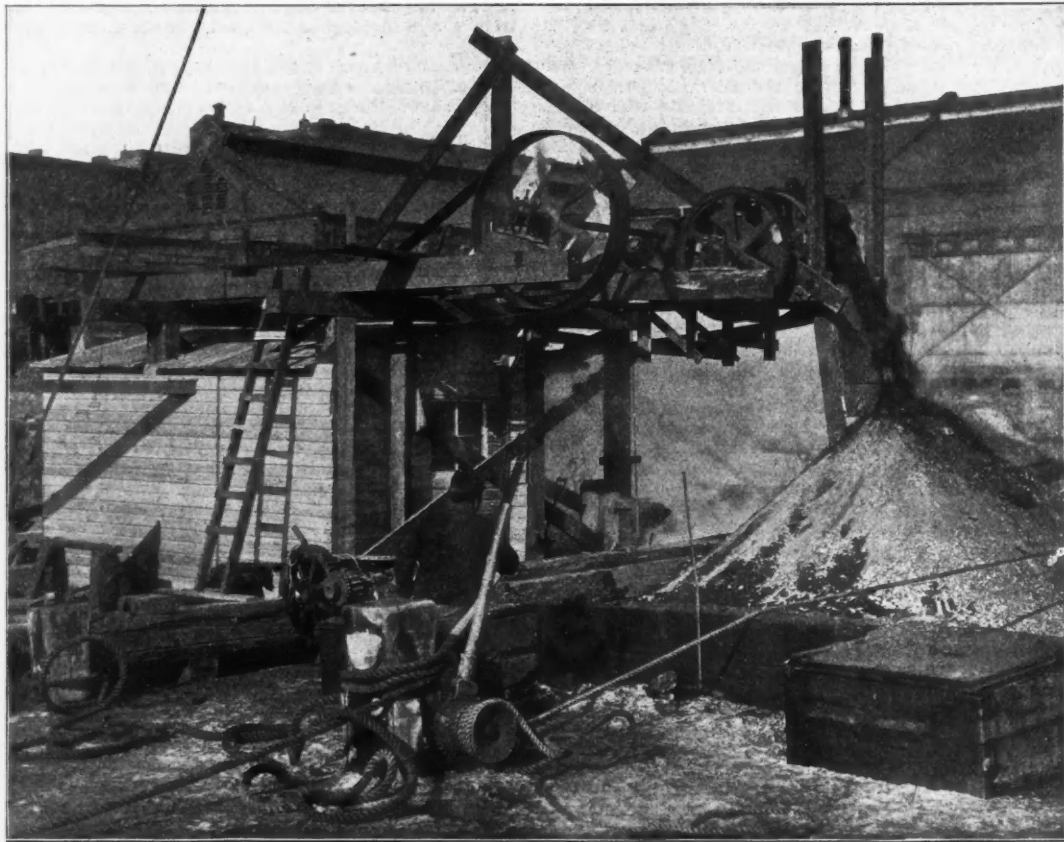


FIG. 1.—DISCHARGE END, ROBINS CONVEYOR PLANT.

\$10,000,000 in first mortgage bonds, of which \$8,425,000 is outstanding. The common shares are dealt in on the curb, being quoted at \$27@27½ in November and \$30@31 in December.

The Union Steel and Chain Company is capitalized at \$60,000,000 and controls six Bessemer converters and open-hearth steel furnaces, 4 ore mines, 4 coking and steam coal mines, 30 rolling mills, 19 chain and iron works, and 15 blast furnaces. The stock is dealt in on the curb, where, in November, it brought \$28@29 for the common and \$68@69 for the preferred, and in December quotations were \$20@25 for the common and \$60@65 for the preferred.

The National Salt Company, controlling a considerable part of the salt production of the country, was incorporated in March, with a total capitalization of \$12,000,000, of which \$5,000,000 is 7 per cent. non-cumulative preferred stock and \$7,000,000 common. Quarterly dividends of 1¼ per cent. on the preferred stock began in July. In that month the preferred shares were sold at \$77@80 and the common at \$40@50, and at the opening of December quotations were \$78@79½ and \$44½@47, respectively.

The General Chemical Company, incorporated in February by parties prominently connected with the old acid combination. The capital stock is \$12,500,000 in common, and \$12,500,000 in 6 per cent. cumulative preferred. A dividend of 2 per cent. was paid on the preferred shares in July, and another of 1½ per cent. in October. The shares are called on the curb, where the common was quoted \$57¼@59 and for the preferred \$97@100.

In the case of all these combinations they are actual consolidations, having purchased for cash, or for stock in the new companies, the properties going to make up the combinations. In this respect these new combinations differ entirely from the trusts and agreements of previous years.

First Avenue. In this a belt conveyor was installed by the Robins Conveying Belt Company of New York.

Across this trench three bridges were laid, with a hole about 3 ft. square in the center of each, with chutes leading from these holes to the conveyor. The wheel scrapers pass over these bridges in an endless succession. The loads are dumped into the holes and the belt carries the material away, running level for the greater part of its length, but taking a vertical curve of about 100 ft. radius as it approaches the river, until a height of 29 ft. is attained. At this point it delivers the material into a large barge which, when filled, is towed out to sea and dumped.

The conveyor is driven from its head end by a small horizontal engine, very little power being required. It has a capacity under steady feeding of 300 cu. yds. per hour. The contractor has as yet only half of the lot under excavation, and has gotten out thus far about 1,200 yds. of rock, earth and old brick a day. He has at present 2 two-horse plows and 12 two-horse wheel-scrappers at work, and expects to double this force shortly.

The conveyor is subjected to the roughest kind of usage, rocks weighing over 100 lbs. being constantly dumped upon it, but the contractor says that it has thus far run without a hitch and has never been the cause of a stoppage in the work.

In view of the large number of excavations now projected or under way, it is believed that this method of carrying away the earth and rock will be of interest to engineers on account of both the rapidity and the low cost per yard at which the material can be handled. In cases where the material has to be carried away by cars or wagons, delivery would be made to a large stationary hopper under which the cars would pass and receive their load. A similar method could be readily applied in surface stripping and in many kinds of work connected with mining operations.

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. Nor can we undertake to give advice about mining companies or mining stocks. 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. Preference will, of course, always be given to questions submitted by subscribers.—Editor E. & M. J.)

Duty on Cyanide of Potassium.—What is the import duty on cyanide of potassium in the United States.—D. S. H.

Answer.—Under our present tariff law the duty on cyanide of potassium imported into the United States is 25 per cent. ad valorem.

Phosphate Rock.—I noticed in your issue of December 30th a statement that "Tennessee high grade rock goes 73 to 80 per cent. phosphoric acid." Is not this a mistake?—O. F. H.

Answer.—Many of our readers noticed the statement in question. You will see on reading our statement again that we referred H. P. C. to our market columns, where the price of phosphate rock is given as determined by its percentage of bone phosphate. Of course a rock



FIG. 2.—ROBINS CONVEYOR PLANT.

containing 83 per cent. of phosphoric acid would be a decided curiosity as it would contain over 170 per cent. of bone phosphate. The mistake crept in unnoticed, owing to the pressure of work at the time in collecting, tabulating and editing the great mass of statistical information that we presented in our annual number.

Thorium.—Has the metal thorium any commercial value? Is there any market for the metal or ore?—S. E. M.

Answer.—For metallic thorium there is no market. Thorium oxide is used for making mantles for incandescent lights of the Welsbach pattern. There is a sale for monazite, the usual ore of thorium; but at present the supply comes chiefly from Brazil, where the monazite sand can be obtained of better quality and more cheaply than in the United States.

Aluminum Sulphate.—What is sulphate of aluminum (single sulphate) used for? Is all manufactured in the United States that is used in the world, or is it also manufactured in Europe? and in what quantities in 1898?—C. A. D.

Answer.—Aluminum sulphate is used in paper making; in dyeing and calico printing; in filtering and purifying water. There are some minor uses, but those named are the important ones. Large quantities of aluminum sulphate are made in England, Germany, France and Italy. The quantity made in the United States in 1898 was 56,663 short tons. See "The Mineral Industry," Volumes III. and VII.

Gold-bearing Antimony Ores.—I have a deposit of antimony ore carrying from 40 to 60 per cent. of antimony, from 1.5 to 3 oz. of gold and 2 to 8 oz. of silver per ton. Could you tell me where such ores can be treated for both antimony and the precious metals, or if there is a process available for such treatment? I venture to ask because I am told that the ore is valuable only for its antimony contents.—Arizona.

Answer.—We cannot give you the details of any process for treating such ores as you mention. In Australia—in the district around Chesterfield, N. S. W.—there are ores of this kind, and many experiments in their treatment have been made, without success, under charge of Messrs. Newbury, Vautin and others. Some Australian ores were shipped to Germany and treated there, an allowance for the gold and silver being made, though much less than its full value. The process used by the German smelters is, however, kept carefully secret; and they are the only smelters of antimony ores who will make any return of the precious metals.

Bone Black.—Will you kindly inform me through your column of questions and answers: 1. What bone black is? 2. What is its use? 3. Is there any substitute for it? 4. What is its market value?—F. W. S.

Answer.—Bone-black, or animal charcoal, is made by calcining bones. Its chief—almost its only—use is in sugar refining. The syrup is filtered through bone-black, which not only clarifies it, but takes out the color. When the filter becomes clogged and the bone-black is no longer of use—which is not until after it has been used and partially recarbonized two or three times—it is sold as a fertilizer, its value consisting in the phosphoric acid which it contains. No substitute for it has ever been found by the refiners. There are other substances which have been tried, that will clear the syrup, but none which will decolorize it. It is difficult to get any regular price for bone-black. The business is a close one, and indeed some refineries make their own supplies. The material in small lots brings 3 to 4 cents per pound.

Mining in South America.—Is there much mining in South America? Do you know of any mining paper in that country? Is there a good chance for a mining man, a mill-man or a metallurgist to make money there?—F. G. R.

Answer.—In South America mining is carried on extensively in Chile, Peru, Bolivia and the Guianas; to a lesser extent in Argentina, Brazil, Colombia and Venezuela. The mining interests of South America on the whole are large. The products include gold, silver, copper, tin, lead, nitrate of soda; very little coal or iron ore, though both are known to exist.

The mining papers published in South America are few, and are chiefly the transactions of societies. We may mention "El Economista," Lima, Peru; "Boletín de la Sociedad Nacional de Minera," Santiago, Chile; "Revista Minera y Salitrera," Iquique, Chile; "La Ingenieria," Buenos Ayres, Argentine Republic.

A mining engineer or metallurgist going to South America must, if he wants to succeed, understand and speak the Spanish language. He will have to learn the ways and customs of the people and to accommodate himself to them as far as possible. For a properly equipped man there is a chance to succeed. We believe, however, as we have often said, that there is no country in the world where there are so many and so good opportunities as in the United States. A man who fails here can hardly hope to do better elsewhere.

Treating Lead Ores.—I would like some information on the following points: How low grade of lead carbonate ore can be profitably worked? What is the method of concentration used for such ores? Would 5 to 12 per cent. lead ores carrying 2 to 10 oz. silver per ton be profitable? What is the method of smelting and style of jacket or furnace used for ores that carry both copper and lead, and can they be smelted so as to save nearly all values? These are carbonate and oxide ores. Where can I find full information on the above subjects? We have ores that carry 10 to 50 per cent. lead, 2 to 20 per cent. copper and 3 to 20 oz. silver, and other ores that carry only lead and silver. I would like also reference to some experienced and competent person whom I can consult on the subject.—F. H.

Answer.—The grade of ore that can be worked at a profit depends entirely upon circumstances, such as location, water supply, cost of fuel and other necessary supplies for operating a mill. Under normal conditions you should be able to do very well with a 10 per cent. ore, carrying say 5 oz. of silver, provided you can save a good proportion of the silver. By concentrating about five into one you could get a good result, the concentrates carrying about 50 per cent. lead and 25 oz. silver. The ordinary water-jacket furnace can be used to smelt ores such as you mention. The product would be matte which could be shipped or further treated at your own works, as might seem desirable.

For authorities, the best that we can refer you to is Prof. Hofman's "Metallurgy of Lead" (price \$6). This will give you all the information you can obtain from books.

We cannot undertake to recommend any special expert. You will find in the advertising columns of the "Engineering and Mining Journal" the cards of a number of mining engineers and metallurgists from whom you can select your adviser.

Copper and Aluminum Welding.—I would like to ask if any of the following processes are carried on upon a commercial scale, by other means than electricity: 1. Welding of copper. 2. Welding of copper to steel or iron. 3. Welding of copper and brass. 4. Welding of brass to iron and steel. 5. Welding of aluminum. Would the perfection of processes for the purposes named be important and have a commercial value?—W.

Answer.—1 and 3. Welding or brazing copper and brass is carried on, as is well known. Improvements and better methods would probably be welcome. 2 and 4. As to welding copper or brass to steel or iron, manufacturers seem to differ. Thus one high authority in the trade writes: "As far as we know, there is no practical process for welding the materials you refer to. We think, undoubtedly, a new method would be of value to the manufacturers." Another, however, writes: "It is not as easy to weld brass and iron together as it is to weld two pieces of brass or two pieces of iron. We, however, have no particular difficulty in doing it, and inclose two pieces of the different metals herewith, which you will notice we have brazed together quite successfully."

5. As to welding aluminum, there is no difference of opinion. One authority says: "We do not know of any other method of welding aluminum than by the electric furnace. As to whether another method would have a practical value, we are inclined to answer in the affirmative." Another manufacturer writes: "We know of no process for welding aluminum excepting the electric welding process. A practical method by which aluminum could be easily welded would, we think, be of considerable value, especially if it could be used to take the place of solder in making joints in wire used in electric transmission lines, and for joining small pieces of the metal together. There are a number of aluminum solders on the market, but none of them are entirely satisfactory. Thus, an alloy containing about 85 per cent. of aluminum would be quite extensively used for making patterns if a solder could be furnished with the metal by which the small patterns could be fastened to a gate of the same metal."

MINERALS FOR COLLECTORS.

(We shall be pleased to receive specimens of ores and minerals from any of our readers, and to describe and classify them, as far as possible, in this column. We shall also be pleased to receive descriptions of minerals and correspondence relating to them. Photographs of unusual specimens, crystals, nuggets and the like, will be acceptable, and will be reproduced whenever possible. Specimens should be of moderate size and should be sent prepaid; we cannot undertake to return them, except in special cases. We cannot undertake to make analyses of minerals, but will turn them over to a competent assayer, should our correspondents instruct us to do; and send the necessary money.—Editor E. & M. J.)

No. 1.—Clay.—The sample is apparently a pretty poor sort of clay. It contains iron, and hence is unsuited for the manufacture of porcelain, or for other purposes for which kaolin is used. It also contains more or less sand, and probably is good for nothing but making a very ordinary quality of brick.

No. 2.—Barytes.—The specimen shows the characteristic cleavage faces, and also the orthorhombic crystallization of barium sulphate, and is easily determined by its weight, the specific gravity of the mineral being 4.5. It is insoluble in acid. It is a common mineral of ore deposits, particularly lead and silver ores.

No. 3.—Lead Ore.—This specimen is a lead carbonate, which may contain also zinc and silver. It shows irregular masses of calcite scattered through it, the calcite being determined by its characteristic rhombohedral cleavage, its hardness and its effervescing with acids. The lead is mostly in the mineral cerussite, determined by its weight, its specific gravity being 6.5, its brilliant luster and grayish color, and behavior before the blow-pipe. It also effervesces when touched with nitric acid.

No. 4.—Fluorspar.—The mineral, judging from its rosy color, its crystalline form, octahedral cleavage, and particularly from its softness, which is but 4, or less than feldspar, is evidently fluorspar. It is a mineral of frequent occurrence in veins, especially those carrying lead ores. The mineral also sometimes occurs in large deposits in limestones, and is worked on a commercial scale as a fluxing material for iron foundries and blast furnaces, there being such mines in Kentucky.

No. 5.—Graphite.—The mineral is, as you think, graphite, as its greyish black color, softness and soapy feel show. It is distinguished from molybdenite, a mineral which much resembles it, by giving a gray mark on paper, and showing no reaction for sulphur before the blow-pipe. The specimen you send is amorphous graphite, showing no crystalline structure, and containing a large amount of impurity, apparently decomposed quartz. Such mineral is probably valuable only as a refractory material for the manufacture of crucibles.

No. 6.—Specular Hematite.—The specimen is the sesquioxide of iron, or hematite, as is shown by the characteristic bright red streak obtained by rubbing on a hard surface. It is what is called specular ore in the Lake Superior country, having a metallic luster, and shiny crystals, which are somewhat foliated or micaceous. Such ore when pure contains 70 per cent. metallic iron, but the Lake Superior specular as shipped runs from 60 to 66 per cent.

No. 7.—Gabbro.—The specimen is a tough dark green rock, with large crystals of a pyroxene mineral, probably diallage, and hence the rock may be termed a gabbro. The exact determination, however, of many of the basic rocks requires a microscopical examination of thin sections, which we are not prepared to give, and our determinations, consequently, are based only on the examination of the hand specimen sent. The specimen does not appear to contain any copper ore.

No. 8.—Pyrites.—This is a fine specimen of iron disulphide or iron pyrites, shown by its crystallization—the crystals, though, in this specimen small, being determined as pyrito-hedrons. It is distinguished from the copper-iron sulphide, chalcopyrite, by greater hardness, and paler color. A rock of similar appearance is imported in large quantities from Spain, and used as a source of sulphuric acid. If pure, iron pyrites contain over 53 per cent. of sulphur; but the mineral as imported probably does not run over 52 per cent., while the American pyrites from the mines about Mineral City, Virginia, carry from 42 to 44 per cent. sulphur.

No. 9.—Mica.—This specimen is plainly mica, as it easily falls into characteristic thin elastic laminae. The commercial value of a mica vein depends on the size of the plates that can be obtained, and their freedom from impurities. The clear, colorless or slightly colored variety known as muscovite is most in demand. The specimens sent, however, are almost black in color, and evidently do not occur in large sheets. Even if large sheets could be obtained, the deposit would not be of much value, as the mica is evidently one of the iron-magnesia-aluminum silicates, classified as biotite. Its percentage of iron makes it useless as an insulating material in electrical work.

No. 10.—Malachite.—The specimen you send is a medium-grained sandstone. The cementing material of the grains is largely the basic green carbonate of copper, malachite, determined by its effervescing when touched with acid. Other green minerals frequently taken for copper carbonate do not effervesce with acid. We cannot undertake to determine the composition of any ore, and must refer you for such determination to any of the assayers and chemists whose addresses you will find in our advertising columns. Judging from the looks of the specimen it does not contain over 3 per cent. copper.

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 December 19th, 1899.

- 639,209. **MANUFACTURE OF LEAD OXIDE.** William E. S. Bunn and Enslley J. Case, Peoria, Ill. The improvement consists in, first, reducing metallic lead by attrition and agitation in water; second, conducting the comminuted lead, mixed with water, into a separate vessel and therein subjecting the same to a rolling and tumbling motion in the presence of compressed air; third, settling the non-oxidized metallic lead and floating off the lead oxide, and then subjecting it, mixed with water, to a further rolling and tumbling motion and to the action of carbon dioxide under pressure.
- 639,257. **APPARATUS FOR VOLATILIZING AND BURNING OIL.** Harry Luckenbach, Seattle, Wash., assignor to William McPhee, Snohomish county, Wash. The combination with a steam-generator, and a heat accumulator and distributor, of a device for injecting the commingled vaporized oil and gases upon said accumulator.
- 639,267. **MINING MACHINE.** William T. Moss, Walsall, Pa. The combination of a pair of horizontal supports, vertical standards, a transverse supporting member carried by each end pair of said standards, a gang-drill press adjustably mounted upon one of said transverse supports, a drill-rod guide and means for effecting an angular adjustment of press and guide.
- 639,270. **DEVICE FOR MANIPULATING INGOTS, BILLETS, ETC.** Joseph J. McNeill, Cleveland, Ohio. A tool comprising two work-holding jaws arranged opposite each other, one of the jaws adjustable toward and from the companion jaw and counterbalanced.
- 639,281. **VALVE-GEAR FOR PUMPING ENGINES.** Harmanus L. Perrine, Milwaukee, Wis. The combination of a main and an auxiliary slide-valve and a steam-actuated piston.
- 639,282. **DUPLEX PUMPING ENGINE.** Harmanus L. Perrine, Milwaukee, Wis. In combination with separate steam cylinders and their pistons, a casting between and joining said cylinders with ported faces, and having an intermediate third ported face, the ports whereof communicate with said cylinders, a steam chest on said third ported face, a main slide-valve controlling said intermediate ported face, a reversing piston on said chest, an auxiliary slide-valve actuated by the said main slide-valve rod and yoke, a working beam connected to the main slide-valve and with the reversing piston for operating the same.
- 639,299. **APPARATUS FOR MANUFACTURING STEEL OR OTHER METAL TUBES.** Thomas B. Sharp and Frederick Billing, Birmingham, England. In combination, a cylinder adapted to contain the billet to be operated upon, a ram extending into the rear end

- thereof, a die seated in a rabbet in the forward end of said cylinder.
- 639,306. INSTRUMENT FOR RECORDING VARIATIONS IN TENSION OF GASES. Alfred Steinbart, Carlstadt, N. J. The combination with means for shifting paper, of a tracer, a rod carrying the tracer, a magnet for holding the tracer on the paper, the tracer and magnet being mounted to move together.
- 639,317. PNEUMATIC PYROMETER. Edward A. Uehling, Newark, and Alfred Steinbart, Carlstadt, N. J. In a pneumatic pyrometer, the combination with an upright vessel for containing water, of an upwardly-extending arm on the same, a pot held by said arm and a pipe system having apertures at its ends, which pipe system is connected with the upper part of said upright vessel and part of which system passes through said pot and a glass gage-tube containing a water column and in communication with said pipe system.
- 639,336. CARBURETER. Warren J. Anson, Toledo, Ohio. A carbureting apparatus comprising a tank for the hydrocarbon, an air-supply pipe having its outlet near the bottom of said tank, a spraying device for said outlet and valve mechanism.
- 639,340. PLASTER. William H. Beardsley, Pittsburg, Pa. A herein-described composition of water, sand, cinders, cement, glue, stucco, lime, hair, whiting, molasses, talc and acid.
- 639,360. JOURNAL-BOX FOR PULVERIZING MACHINES. John C. Clark, Atlanta, Ga. The combination in a grinding mill of a shaft-collar, having a closed end with an opening, and box provided with trunnions and with lubricating chambers inclosing said shaft and bearings.
- 639,368. PROCESS OF PRODUCING PHOSPHORIC IRON OR STEEL. Samuel P. Etter, East Lake, Ala. The process consists of smelting a mixture of iron ore, coke and bauxite, and second, injecting from time to time into the furnace, upon the top of the charge, powdered bauxite in such quantities that the aggregate amount of alumina used will be not greater than 3 per cent. by weight of the iron contained in the ore for the purpose of neutralizing the effects of phosphorus.
- 639,406. DISINTEGRATOR. Eugen Kreiss, Hamburg, Germany. A revoluble drum containing a large number of small balls; in combination with beaters revoluble at a greater speed than the drum of the balls as they drop from such higher to a lower level, for the purpose set forth.
- 639,418. RAILWAY ORE-PULVERIZER. Houston Mann, Plute, Cal. An ore-crushing apparatus, consisting of a single circular trough, formed of short segmental segments, abutting and forming tight joints at their meeting ends, said sections having upwardly-diverging sides and flanges at the top, rails secured upon said flanges and a crushing apparatus consisting of a motor with wheels traveling upon said rails, a car drawn by said motor, having a roller with spiked surface, loosely connected with the front by links, a second crushing roller following and similarly connected with the rear of the car and a plurality of weighted drags following the second roller.
- 639,433. ORE-SEPARATOR. Frederick A. Pratt, Butte, Mont., assignor of two-thirds to Clement Barzzen and Arthur H. Wethey, same place. A machine comprising a funnel-shaped screen and a rotating bucket or distributor centrally disposed within said screen.
- 639,437. NOZZLE FOR FEEDING FINE FUEL TO FURNACES. Charles A. Robinson, Hempstead, N. Y., assignor to the Ideal Fuel Feeder Company, same place. The combination with the hollow main body, of a series of independent, vertically-adjustable deflectors, extending transversely of the main body, each adapted to be moved into the path of the current of air and fuel.
- 639,481. CARBURETER. Heinrich Wolpert, Charlottenburg, Germany. The combination with a receptacle forming a drying-chamber for holding a chemical medium for drying air, of another vessel surrounding said drying-chamber and forming a carbureting-chamber.
- 639,495. COMPOSITION OF MATTER. George W. Bailey, New York, N. Y. A composition consisting of any copal gum, linseed oil, caustic soda, chloride of manganese, spirits of turpentine, carbonate of lead and powdered flint, for forming a water-proof paint.
- 639,520. APPARATUS FOR HOLDING CABLES, WIRE ROPES, ETC. James Carpenter, Portsmouth, England. A device comprising jaws having a hinge or pivotal connection, one provided with a recess accommodating an automatically-operating wedge.
- 639,537. MANUFACTURE OF PLANISHED IRON AND STEEL. Wallace C. Dickey, Pittsburg, Pa. The improvement consists in coating the sheets with a mixture of finely-communited aluminum and oxide of lead.
- 639,539. AUTOMATIC-OPERATING AIR-COMPRESSOR. George E. Drum, Philadelphia, Pa., assignor of one-half to Robert P. Smith, same place. The combination with a belt and pulley-driven air-pump, a belt-shifter, a weight to shift the belt to the loose pulley, a piston acting to lift the weight, a two-way valve controlling the admission and exhaust of the pump-pressure to and from the piston and a diaphragm connection controlling the valve, the diaphragm being exposed to the pump-pressure.
- 639,540. MEANS FOR MIXING AND AERATING SANDS OR TAILINGS WHILE UNDER TREATMENT BY SOLVENTS. William Duncan, Day Dawn Ridge, Charters Towers, Queensland. A semi-circular vat, a horizontal rotatable shaft journaled therein, arms helically arranged on said shaft, said arms depending into close proximity to the bottom, a plurality of outlets arranged at varying levels and uniting in a common pipe leading to the sump, a cock in said pipe and an independent pipe leading from said discharge pipe to a filter and having a cock and a discharge sluice for draining said vat.
- 639,558. ROCK AND ORE BREAKER. Elmer E. Hanna and Thomas W. Capen, Chicago, Ill., assignors to the Gates Iron Works, same place. The combination of a gyratory shaft, a spider portion in which the upper end of the shaft is journaled, a tapered bushing split longitudinally in the spider portion and provided with longitudinal and lateral lines on its outer surface.
- 639,570. APPARATUS FOR LEVELING COAL IN COKE OVENS. Gustav Hilgenstock, Dahlhausen, Germany, assignor to the United Coke and Gas Company, Philadelphia, Pa. The combination with a carrier-rod adapted to be thrust into the oven, of shovels supported upon said rod and adapted to be moved along the same, and means for giving said shovels a reciprocating movement in the oven and along the rod.
- 639,579. PROCESS OF RECOVERING ZINC FROM REFRACTORY ZINC-BEARING ORES. John Jones, East Melbourne, Victoria. The process consists in placing in the anode-compartment of a cell having a suitable diaphragm, a mixture of sulphate of zinc and sulphate of ammonium, placing in the cathode-compartment an acid solution containing sulphate of zinc, passing an electric current through both solutions, whereby zinc and ammonium are set free at the cathode, and continuously adding to the cathode solution sufficient acid solution containing zinc sulphate to neutralize the ammonium liberated in said solution and to maintain in the solution a low degree of acidity.
- 639,600. ALUMINUM ALLOY. William A. McAdams, New York, N. Y. An alloy composed of aluminum, zinc and copper, combined in the proportion of three parts by weight of aluminum to every one part by weight of zinc, and three parts by weight of zinc to every one part by weight of copper.
- 639,622. COMPRESSED-AIR WATER ELEVATOR. William H. Shaffner,

- Louisiana, Mo. A tank or chamber adap the water-level of a well or the like, pr valve in its bottom opening inward by entering water, an air-escape valve at tween the inwardly-opening water-inlet a water-discharge pipe, and an air-supply p, air under pressure, the water-inlet valve being pressure acting on the water in the tank or cham.
- 639,629. MINE-GATE. William H. Tschantz, Orrville, Ohio. '1. tion of oppositely-disposed gates mounted upon vertical su. yided with crank levers coupled together, oscillating clutch-gearing and connecting wire.
- 639,674. FIRE-EXTINGUISHING COMPOUND. Guy Edwards, New York, N. Y. A compound in the form of a dry powder containing carbonate of lime, sand and bicarbonate of soda.

Week Ending December 26th, 1899.

- 639,710. SCREENING AND ASSORTING APPARATUS FOR COAL, ETC. William S. Cherry, Streator, Ill. The combination of a hopper having a catch-retained counter-balanced bottom, of two screens one of which is provided with bars arranged below the hopper-bottom and receiving the material; an adjustable chute at the end of the forward screen.
- 639,757. ROTARY HEARTH AND WELDING FURNACE. Malcolm McDowell, Chicago, Ill., assignor, by mesne assignments, to the Fort Dearborn Iron Company, same place. In a rotary furnace supported rings constructed with interiorly extending skewbacks, lining for the rings and means for drawing off the slag or cinder, and means for temporarily closing the outer end of the drum.
- 639,766. APPARATUS FOR EXTRACTING PRECIOUS METALS FROM ORES. Lewis E. Porter, Los Angeles, Cal. The combination of a rotatable barrel provided with an amalgamated lining; a porous lining of non-conducting material; a lining of filtering material arranged inside the non-conducting lining; anode and cathode plates with connection.
- 639,811. ELECTRO-DEPOSITING ANODE. Harry L. Haas, New York, N. Y., assignor to the Zucker & Levett & Loeb Company, same place. An anode for electroplating, provided with a suspending-hook having flat contact-faces.
- 639,855. SEPARATOR. Robert W. Jessup, San Francisco, Cal., assignor of one-half to Fairfax H. Wheelan, same place. In a separator a cut-off device arranged to intercept the stream of screenings, and turn it back again into the material.
- 639,873. ART OF REFINING METALS. Benjamin Talbot, Pencoyd, Pa. The mode of making basic open-hearth steel, consisting in conveying successive charges of molten iron from a blast-furnace into a storage furnace of large capacity, in providing the molten metal with a slag covering not derived from the metal itself and capable of removing silicon from the molten metal, and withdrawing at intervals portions of the desilicized iron from the storage-furnace and conveying the same to a basic open-hearth furnace.
- 639,920. ORE-CONCENTRATOR. Herbert H. Cramer, Aspen, Colo. A concentrator comprising a table, means for imparting a differential rotary movement to said table.
- 639,969, 639,970. HEATING AND ANNEALING FURNACE. William Griffith and John M. Anderson, Pittsburg, Pa. The combination with an annealing or heating furnace having a combustion-chamber and a bridge-wall, of flues in the sides and top.
- 640,023. COMPRESSED-AIR PUMP. Paul B. Perkins, Los Angeles, Cal. A submerged valve-casing gate, threaded valve-rod and the hand-wheel.
- 640,026. PROCESS OF AND APPARATUS FOR MAKING COPPERAS. Alexander S. Ramage, Cleveland, Ohio. The process of making commercial copperas from liquor containing sulphate of iron and free sulphuric acid consists in neutralizing the free acid by the addition of a form of magnesia which will make magnesium sulphate with the free acid, but will not decompose the sulphate of iron, and evaporating the resulting liquid.
- 640,037. APPARATUS FOR MAKING ACIDS. Jean V. Skoglund, Bayonne, N. J., assignor to himself, and Albert Winter, New York, N. Y. An apparatus consisting of a tower or chamber with an opening for the admission of the acid-vapors, such tower being made of mason-work coated on the inside with an acid-resisting material and silicate of potash or soda, and treated with an acid to remove from the silica any alkaline material.
- 640,058. CALCINING-FURNACE. Arthur H. Weather, Butte, Mont. A furnace structure comprising a series of superposed horizontal hearths and roof-arches therefor, the same being separated by slots at the sides, two opposite rows of vertical posts arranged along the side walls of the hearths, longitudinal beams upon which the arches rest at the sides, means connecting the said beams with the posts and supporting them upon and spacing them from the latter, rakes arranged on the hearths, and projecting through the side slots, carriages for carrying the ends of the rakes, rails for said carriages, and supports for the rails.
- 640,093. ROTARY PUMP. Alfred W. Case and Lawrence W. Case, Highland Park, Conn. A rotary pump consisting of a shell, a shaft passing through the center of the shell, and angularly arranged blades radiating from the shaft.
- 640,109. BRIQUET-PRESS. John T. Davis, San Francisco, Cal., assignor to John Treadwell, same place. In a briquet-press, a rotary wheel having a rim provided with a continuous groove, a series of molds opening from said groove, and oppositely-acting plungers movable transversely in said rim.
- 640,117. ORE-CONCENTRATOR. Henry Earle, Canyon, Colo. A concentrator, comprising a chute or casing closed on all its sides, the said chute or casing being V shape in cross-section and diminishing in depth from its upper to its lower end.
- 640,160. EXPLOSIVE COMPOUND. Charles F. Hengst, London, England. The process of preparing an explosive from esparto grass, sulphuric acid, nitric acid, potassium bicarbonate and a small quantity of charcoal and potassium nitrate.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week Ending November 25th, 1899.

- 16,622 of 1898. ANTIMONY EXTRACTION. J. Ranald, London. Extracting metallic bismuth and antimony from their sulphides by treating with hot ferric chloride and precipitating with iron.
- 22,622 of 1898. ELECTROLYTIC APPARATUS. Q. Marino, Brussels, Belgium. An electro-metallurgical bath in which glycerine is used instead of water as an electrolyte.
- 26,260 of 1898. NICKEL ALLOY. J. Patrick, Frankfurt-am-Maine, Germany. The manufacture of nickel-magnesium alloys direct, without having to add magnesium in the metallic form.
- 17,851 of 1899. CONCENTRATOR. I. A. Cammett and F. E. Shepard, Denver, Colo., U. S. A. An improved rifled surface for end-stroke concentrating tables.
- 18,993 of 1899. AIR DRILLS. A. P. Schmucker and L. D. Sweet, Denver, Colo., U. S. A. Detailed improvements in the mechanism of air drills.

PERSONAL.

Mr. A. W. Hawks, civil and mining engineer of Tacoma, Wash., is stopping in New York City.

Mr. Chas. Butters is reported to be in San Salvador, C. A., where he has large mining interests.

Mr. J. W. Finch, of the University of Chicago, is geologist of the Woods Investment Company at Victor, Colo.

Mr. J. B. Corbus, superintendent of the Alaska-Treadwell Mine, Douglas Island, Alaska, has been in San Francisco.

Mr. Ellsworth Daggett of Salt Lake is at the Hotel Vendome in New York City, where he will remain for several weeks.

Mr. F. H. Harvey, of Galt, Cal., recently completed an examination of the Lamphear Mine, near Mokelumne Hill, Cal.

Mr. Henry Jeavons resigned on January 1st his position as assistant manager of the Otis Steel Company, Cleveland.

Mr. W. F. Patrick, mining engineer of Denver, Colo., left Denver January 9th to examine mining property in Mexico.

Mr. A. H. Waddell, formerly of the Union Iron Works, San Francisco, Cal., now has charge of a gold dredger at Adams Flat, N. Z.

Dr. A. G. Leonard has charge of the geological work at the State University of Missouri this year in the absence of Professor Marbut.

Mr. Walter Douglas, son of President James Douglas, succeeds Mr. Ben. Williams as superintendent of the Copper Queen mines, at Bisbee, Ariz.

Mr. W. H. Hile, mining engineer of Philadelphia, has been examining mines in Trinity County, Cal., in the interests of Eastern capitalists.

Mr. J. F. Coleman, bonding owner of the Mammoth Copper mines, Kennett, Cal., has been in San Francisco, on his return from Halifax, Nova Scotia.

Mr. T. C. James, formerly superintendent of the Uncle Sam Mine of Shasta County, Cal., is on his way to San Salvador to superintend a large cyanide plant.

Mr. Emile R. Abadie, mining engineer, late general manager of the Grand Central Mine, of Minas Prietas, Mexico, who recently returned from a trip to Europe, is in California.

Mr. F. C. Slink has become vice-president and general manager, Mr. Seyfert managing director, and Mr. George B. Harris treasurer of the Reading Iron Company, of Reading, Pa.

Mr. Geo. W. Dean, formerly chemist at the mill of the Republic Consolidated Gold Mining Company, at Republic, Wash., is assayer at Geo. D. Potter's ore sampling mill, at Wallace, Idaho.

Dr. J. W. Gregory, of the Natural History Museum, South Kensington, London, has been appointed to the chair of geology in the University of Melbourne, vacant by the death of Sir J. McCoy.

Mr. Edwin A. Buttolph will succeed Mr. J. R. Finlay as superintendent of the gold mines of the South American Development Company at Zaruma, Ecuador. Mr. Buttolph sails from New York on January 17th.

Mr. S. H. Johnson, Jr., representing the English firm of S. H. Johnson & Company, Limited, of Stratford, is at Republic, Wash., testing the ores of the Republic and other mines by the cyanogen-bromine process.

Mr. Wm. L. Saunders of the Ingersoll-Sergeant Drill Company of New York City, returns Saturday from Europe, where he has been for some months. He has, we are happy to say, entirely recovered his good health.

Mr. E. J. Godfrey of Godfrey & Tabor, owners of the Red Boy Mine at Sumpter, Ore., has returned from a trip to England, where, it is said, he completed arrangements for turning the mine over to an English company.

Mr. H. W. Fox, chemist of Capt. De Lamar's mines, at Mercur, Utah, is at Republic, Wash., superintending the erection of a 5-ton experimental cyanide plant and conducting tests on ores from the Republic Mine, for Mr. D. C. Jackling.

Dr. G. Frederick Wright, Professor of Geology at Oberlin College, has been given a leave of absence for a year and three months. He will make careful geologic studies in the Sandwich Islands, Japan, Russia, Egypt, Italy, and other countries.

Mr. S. F. Parrish, who for years was at the head of the Chrysolite Company at Leadville, Colo., but of late years has been conducting the

work of the Yak Company, has gone to British Columbia to take charge of one of the War Eagle mines near Rossland.

Mr. Geo. W. Bright of Columbus, O., president of the Boomer Coal and Coke Company and vice-president of the Sunday Creek Coal Company, spent last week at the different plants of his companies. Mr. J. J. Adams of Carrington, O., general store manager, was with him.

Mr. Ben. Williams, formerly superintendent of the Copper Queen mines at Bisbee, Ariz., is to look after his property at Calaveras, Cal. A sum of \$1,000 was subscribed at Bisbee for the purchase of two loving cups to be presented to Mr. Williams and his brother, Mr. Louis Williams.

Mr. D. M. Chapman, vice-president and assistant treasurer of the Virginia Iron, Coal and Coke Company, and the Virginia & Southwestern Railroad Company, resigned on January 1st. He returns to New York to engage with the banking house of Moore and Schley, in which he is interested.

Prof. C. Wade Stickney, metallurgist and mining engineer, has resigned his position as superintendent of the mill and smelter of the Granite Mountain Gold Mining Company, at White Pine, Colo., and removed to Hailey, Id. His address for some time will be Prescott, Ariz., whither he has gone on mining business.

President James M. Crafts of the Massachusetts Institute of Technology, has sent to the corporation a letter resigning the presidency of the institute with the close of the present academic year. In his letter President Crafts said that his reason for taking the step was his desire to return to purely scientific occupations.

Mr. Leon M. Hall, an electrical engineer of Oakland, Cal., has been appointed consulting engineer by the various mining companies composing the Comstock Pumping Association, to make arrangements for the removal of the steam plants from the different mines and the substitution of electrical power machinery therefor.

Mr. R. R. Bulmore, who has been the efficient general manager of the Quicksilver Mining Company at New Almaden, Cal., resigned on January 1st and retires from active mining work, taking with him the esteem of his associates. Mr. C. C. Derby, who has been superintendent for 8 years past, will be the new general manager.

Mr. A. F. Holden, managing director of the United States Mining Company and president of the Centennial-Eureka Mining Company, sailed from New Orleans January 2d, for Costa Rica. Edward Small, metallurgist for the United States Mining Company, is understood to have preceded Mr. Holden, and since his arrival has been engaged analyzing ores from a property in which Mr. Holden and his associates are interested.

Mr. C. C. Sharp of Corning, O., general superintendent of the Sunday Creek Coal Company; Mr. E. B. Pedlow of New Straitsville, O., general superintendent of the Columbus & Hocking Coal and Iron Company, and Mr. Thos. O'Neill of Columbus, O., the principal stockholder of the Raven Coal and Coke Company, spent New Year's Day at the new plant they are opening on Blake's Branch in Fayette County, W. Va., near Connelton.

Mr. D. W. Ropes, of the Buffalo Forge Company, of Buffalo, N. Y., has sailed for Europe to superintend the erection of the apparatus which the company sold to the Deutsches Niles Werkzeug Fabrik and the German Garvin Company. These equipments consist of heating and ventilating machinery and large forge tools. They will be constructed at the plants these works are building at Berlin, Germany. Mr. Ropes will also visit the principal cities in Continental Europe and the British Isles.

OBITUARY.

William Summerville, of Dawson, N. W. T., who had charge of some copper claims near White Horse Rapids, B. C., belonging to the British American Corporation, was frozen to death near White Horse about December 25th.

Capt. Jacob Jay Vandergrift, who died at his home in Pittsburg, Pa., December 26th, aged 73 years, started his career as cabin boy on an Ohio River steamboat, and later became captain and then owner of several vessels. He embarked in oil and gas operations and became prominent as an oil producer. With Joshua Rhodes and others he established the Pennsylvania Tube Works, at Pittsburg. At his death he was vice-president and a heavy stockholder of the Apollo Iron and Steel Company, and a director of the National Tube Company. The town of Vandergrift, Westmoreland County, in which the Apollo Steel Works are located, was named after him. He is survived by several daughters, two sons and a brother.

S. Dana Greene, general manager of the lighting department of the General Electric Company, and his wife were drowned January 8th while skating on the Mohawk River near Schenectady, N. Y. He was a son of S. D. Greene, who commanded the "Monitor." Mr. Greene entered the Naval Academy at Annapolis in June, 1879, and was graduated No. 1 in his class in June, 1883. On July 1, 1885, he received his commission as Ensign. He resigned from the service in 1888, and became associated with Thomas A. Edison in various companies, which were merged in the General Electric Company. Prior to assuming this position, he was chief engineer for the Sprague Electric Railway and Motor Company. In 1891 Mr. Greene joined the Naval Militia, and when the war with Spain broke out was Chief of Staff of the First Battalion. After the war he was appointed Lieutenant-Commander and Chief of Staff to Capt. Jacob W. Miller, commanding officer of the New York Naval Militia.

SOCIETIES AND TECHNICAL SCHOOLS.

American Society of Civil Engineers.—The 47th annual meeting will be held in New York City January 17th and 18th. On January 17th Mr. W. B. Parsons will give an illustrated lecture describing a survey he recently made in China covering a journey of 1,100 miles. There will be a reception at the house of the society in the evening. On January 18th there will be an excursion by steamer to the power stations of the Third Avenue Railway Company and the Metropolitan Street Railway Company. In the evening there will be a discussion of an illustrated paper presented by G. B. Francis, on the "South Terminal Station at Boston."

Engineers' Club of Philadelphia.—At the meeting on December 16th, 74 members and visitors were present. Mr. Chas. J. Dougherty presented the paper of the evening on "Annealing Armor Plates in the Construction of War-ships," in which he described the electrical process of annealing Harveyized steel plates in places where they are to be afterward drilled for bolts or other fastenings. By this method an electric current of low pressure and large volume is passed through the plate between two large copper terminals placed against it on opposite sides of the part to be annealed. The electric generator and transformer for furnishing the current and the apparatus used in applying it to the steel plate were fully described, with the aid of illustrations projected by the electric lantern.

At the conclusion of the paper a general discussion upon its subject was participated in by Messrs. W. C. L. Eglin, Francis Schumann, William Easby, Carl Hering, Edgar Marburg, John C. Trautwine, Jr., Edwin F. Miller and others.

American Chemical Society, New York Section.—At the meeting on January 5th Dr. Geo. F. Barker, of the University of Pennsylvania and a past president of the society, gave an interesting address on the more recent developments growing out of Roentgen ray investigations, describing and exhibiting a sample of radium. This substance emits rays which cause an impression of feeble phosphorescence to the eye, but which are not light. In other words, they are rays which cannot be reflected nor repeated. Nor can they be prevented from acting on a photographic sensitive plate by three thicknesses of black paper added to as many thicknesses of orange yellow paper; and images were shown on a plate which had been made through all this thickness of light-impervious wrappings.

Mr. Allen Hazen exhibited lantern slides "Illustrating Filters for Purifying Public Water Supplies," many of them taken in different foreign cities, but the largest number showing the process of construction and the finished work of the immense covered filterbeds at Albany, which are capable of delivering about 9,000,000 gals. a day.

J. A. Matthews read a paper on "Laboratory Method for Continuous and Uniform Generation of Acetylene and Its Purification" and "Upon the Carbide of Gold;" C. W. Volney discussed "The Reactions of Alkalies with the Cellulose Nitrates."

Dr. McMurtrie, the recently elected president of the society at large, expressed his appreciation of the honor conferred by his election, and the hope that he would receive the hearty cooperation of all the sections of the society.

INDUSTRIAL NOTES

The Batavia, O., brick and tile works, which have been in operation under a receiver, have been ordered sold by the court. The works have been appraised at \$25,000 and will be sold February 1st.

The Babcock & Wilcox Company has secured the contract for the Detroit and Syracuse boiler plants of the Solvay Process Company. The boilers will be an addition to the present power

plants of the Solvay Company. It is said that the entire order includes about 6,000 h. p.

A. Heimann & Brother, of Massillon, O., manufacturers of stone quarry rolls, rolling mill castings, and mining machinery, report that their business in 1899 shows an increase of 30% over 1898. The firm was established 6 years ago, and sells its product throughout the Central and far West.

The Lackawanna Iron and Steel Company, of Scranton, Pa., has increased its capital stock from \$3,750,000 to \$25,000,000. Plans are now being drawn for a large plant at Buffalo. It is not the intention to issue the entire additional stock, but only so much of it as the new plant shall require.

A decision has been rendered in United States Circuit Court, Cleveland, O., in the suit brought by the Brown Hoisting & Conveying Machine Company against the King Bridge Company for alleged infringement of patents on ore hoisting and conveying machinery. The court held in favor of the King Bridge Company.

The Colorado Fuel and Iron Company is carrying out improvements at Pueblo, Colo. New shops are being built, including machine, boiler, blacksmith and roll turning shops and also a new blast furnace, 95 by 20 ft., is being built. Following this work improvements will be made in the converter department, with possibly the addition of an open-hearth plant.

The Norton Emery Wheel Company of Worcester, Mass., has finished 2 additions to its large plant at Barber's Crossing. To the brick and iron building erected early in the present year an addition 65 by 45 ft. four stories high has been made. A smaller addition has been made to another building. The company's product is sent to all parts of the world.

The Pressed Steel Car Company of Pittsburg, Pa., recently received an order for 50 steel ore cars to cost \$60,000, which are to be delivered on Ontario during the early part of the coming year. The order is from the Consolidated Lake Michigan Company, which is completing the Algoma Central Railroad, a line from Sault Ste. Marie, to the company's iron mines in Northern Ontario.

The recent test of the Miller coal conveyor for coaling vessels at sea, undertaken by the battleship "Massachusetts" and collier "Marcellus" outside Sandy Hook, is pronounced satisfactory. At the final trial, in spite of a fairly heavy sea running, 160 bags of coal, each weighing 420 lbs., were transferred 400 ft. from the collier to the battleship in 80 minutes. The Miller conveyor is made by the Lidgerwood Manufacturing Company, of New York City.

The Pennsylvania Steel Company has ordered from the Fuel Economizer Company, New York City and Matteawan, N. Y., upward of 3,000 H.P. of economizers, for use in connection with the new boiler plant which has recently been ordered for its Steelton plant. The boilers will be fired by blast furnace gas. A 500 H.P. plant of this type was installed at the Steelton works some time ago, equipped by the Fuel Economizer Company and the Babcock & Wilcox Company.

The Summerville Fernoline Works, of Summerville, S. C., reports that it has recently been compelled to purchase the McClellanville Fernoline Works, of McClellanville, S. C., in order to fill promptly the orders for fernoline wood preservative and wood turpentine, which were coming in faster than its facilities could take care of them. The company is shipping 65 bbls. of wood preservative to the American Car and Foundry Company, to be used on cars now being built by that concern, besides other large orders.

We are informed by the secretary of the Acheson Graphite Company, P. McR. Bennie, that at a meeting of the Board of Directors held January 9th, at Niagara Falls, a dividend of 3½% for the last 6 months of 1899 was authorized from the net earnings of the company, payable February 1, 1900. The Board of Directors also authorized the construction of additional buildings, the purchase of machinery and apparatus, and a contract for an additional 1,000-H. P. from the Niagara Falls Power Company. This extension is necessary to take care of the increased requirements of the company.

The American Steel and Wire Company increased its employees' wages 7½% from January 1st. This affects the tonnage workers, workers paid by the hour and day laborers, in all about 30,000 men. The company will also pay into a fund 2½% of its entire annual pay roll for the relief and benefit of its workmen. It will appoint a committee hereafter to look after this fund and its proper distribution. The pay of the men employed will average between \$2.25 and \$2.50 per day, ranging from \$1.40 paid day laborers to \$10 per day for rollers in rod mills. The advance was unsolicited.

The new Empire Building, Pittsburg, Pa., will contain 2 Scaife water filters, having a combined capacity of 3,500 gals. per hour, so de-

signed that either filter can be shut off from the main supply pipe while being cleansed. Wm. B. Scaife & Sons, of the same city, manufacture these filters, which are stated to contain no chemicals or coagulents of any description. Contracts for the large extensions to the plant of the Carbon Steel Company of Pittsburg, Pa., were awarded to Wm. B. Scaife & Sons. The specifications consist of a great amount of plate girder work and steel frame construction.

The E. P. Allis Company of Milwaukee, Wis., reports that the past year has been the largest in its history and the firm has been unable to keep up with the orders that piled in on it. A new shop 60 by 250 ft. has been erected and another large building will be erected in the spring. The firm at present employs 2,400 men at Milwaukee and 350 at Buffalo. The plant at Milwaukee covers about 28 acres. The monthly payroll is \$90,000, and the value of the yearly output of machinery from \$4,000,000 to \$5,000,000. The firm has branch offices in Chicago, Minneapolis, Denver, San Francisco, Butte, New York, Pittsburgh, City of Mexico, Chile, Australia, South Africa, China, Japan, Russia, Germany, France and England.

The M. C. Bullock Manufacturing Company, of Chicago, Ill., states that 1899 saw a marked increase in all lines of its business, the month of December being especially busy. The firm has closed an order for a hoisting plant for the Loretto Iron Company, of Wauceca, Minn., and another for the Spruce Mining Company, of Eveleth, Minn., and has shipped a compressor plant to old Mexico and another to the Black Hills, a diamond drill to a mining camp near Kootenay, B. C., and 3 loads of engines and machinery to Australia. The firm have 5 hoisting plants and several Williams and Corliss engines going through its works. The exhibit at the Paris Exposition will consist chiefly of diamond drills.

The Seaboard Iron Company has been organized with a capital stock of \$250,000, and has taken over the furnace and other property of the Secaucus Iron Company at Secaucus, N. J., between the tracks of the Delaware, Lackawanna & Western and the Erie railroads. The company will be able to handle the ore direct to the furnaces. The capacity of the furnace now constructed is 100 tons of pig iron daily, but this will be greatly increased. It was formerly owned by the A. Pardee estate, but it has not been in operation since his death 3 years ago. All of the \$250,000 stock has been issued. The company may also construct an open-hearth furnace and manufacture cast-iron pipe and later on stel tubes and steel pipe.

The 55th annual report of the New York Life Insurance Company presents some interesting figures. The progress of the company's business during 1899 is shown by the statement that the increase in benefits to policy-holders was \$687,111; increase in income, \$6,939,346; increase in assets, \$20,505,537; increase in new insurances paid for, \$50,215,711, and increase in paid for insurances in force, \$117,850,865. The total assets of the company on January 1st, 1900, were \$236,450,348. The assets, according to a statement, increased \$110,503,058 in the last 8 years, and the number of policies in force 254,973. A new by-law adopted by the company last July eliminates all stocks from the list of assets. The company has already disposed of several million dollars' worth of its stock holdings and has reduced the amount now held to six items representing less than \$5,900,000, while the amount of bonds owned by the company represents \$145,000,000. The company also shows in full the liability for dividends where payment thereof is postponed beyond one year. The total amount of funds held for this account amounts to nearly \$29,000,000. The company will continue the issue of an insurance and investment accumulation policy that is non-forfeitable and incontestable from date of issue. This policy contains no restrictions on the insured.

The Colorado Iron Works of Denver, Colo., built the following complete smelting furnaces during 1899. The list does not include jackets, repairs, etc. Great National Mexican Smelting Company, Monterey, Mexico, 2 lead furnaces 44 in. by 144 in., ordered June 15th; Great National Mexican Smelting Co., Aguascalientes, Mexico, 1 copper furnace 44 in. by 150 in., ordered June 22d; Germania Smelting Works, Salt Lake City, Utah, 1 silver-lead furnace 45 in. by 140 in., ordered July 8th; Val Verde Copper Company, Limited, Prescott, Ariz., 1 copper furnace 42 in. by 120 in., ordered July 31st; Great National Mexican Smelting Company, Monterey, Mexico, 2 lead furnaces 44 in. by 144 in., ordered August 26th; A. Y. Cochrane, Tomichi, Gunnison County, Colo., 1 silver-lead furnace 36 in. by 120 in., ordered August 29th; Omaha & Grant, Denver, 1 silver-lead furnace 36 in. by 133 in., ordered September 18th; United Globe Mines, Globe, Ariz., 1 copper furnace 42 in. by 144 in., ordered September 21st; Vulcan Copper Mining & Smelting Company, Sodaville, Nev., 1 copper furnace 42 in. by 80 in., ordered September 22d; Montana Ore Purchasing Company, Butte, Mont., 2 copper furnaces 40 in. by 120 in., ordered

September 27th; Copper King of Arizona, Cochise, Ariz., 1 36 in. circular copper furnace, ordered November 1st; Whipsaw Copper Mining Company, Whipsaw, Ariz., one 42 in. circular copper-matting furnace, ordered December 7th.

TRADE CATALOGUES.

"Machinery Advertising" is a little monthly publication that is got out by the Machinery Advertising Company of Cleveland, O. It proposes to cover the advertising field of trade journals, giving hints and suggestions useful to both builders and purchasers of machinery.

Mining men and others interested in crushers and crushing rolls will find information of value in an attractive illustrated catalogue of 12 pages published by the Arthur Fritsch Foundry and Machine Company of St. Louis, Mo. The firm manufactures sectional jaw crushers in 3 sizes, 10 in. by 7 in., 15 in. by 9 in., and 20 in. by 10 in.; high grade crushing rolls in 4 sizes, 26 in. by 14 in., 30 in. by 10 in., 36 in. by 12 in., and 36 in. by 14 in.; "Economy" rolls of simpler pattern in 6 sizes, and also geared rolls in 4 sizes. The company states that it also manufactures jigs and complete concentrating plants for lead, zinc and copper works.

The Graselli Chemical Company, with headquarters and works at Cleveland, O., and branch offices at Olean, N. Y., New York City, Beaver Falls, Pa., St. Louis and St. Paul, has issued printed matter calling attention to the acids and ammonia it manufactures. The firm states that it is prepared to furnish chemically pure sulphuric acid in carboys and in 1 and 9-lb. sealed bottles; chemically pure nitric acid in carboys and 1 and 7-lb. bottles; chemically pure hydrochloric acid in carboys, and 1 and 6-lb. bottles, and chemically pure aqua ammonia in carboys and 1 and 4-lb. bottles. The company is finding an increasing sale for its products among assayers and metallurgists and particularly at the laboratories of mines and blast furnaces.

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 concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line. All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying and selling goods of any kind.

GENERAL MINING NEWS.

ARIZONA.

Yavapai County.

United Verde Copper Company.—Senator-elect W. A. Clark, of Montana, and other directors obtained a decision in favor of their plan of reorganization from Justice Gildersleeve in the Supreme Court of New York on January 4th. Gildersleeve denied the motion to continue the temporary injunction asked for by George A. Treadwell, a minority stockholder, and vacated the preliminary injunction granted restraining the sale of the property of the corporation. On January 9th the mine, with the works at Jerome and the railroad owned by the company, was sold at public auction by R. V. Harnett & Company for \$500,000, the purchaser being James A. MacDonald, who is said to have represented the reorganization committee of the company.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

Amador Queen.—Development work at this mine south from Jackson is being pushed under the management of J. E. Dye, and a sump is being sunk below the 1,200 ft. level.

Bunker Hill.—At this mine the new gallowes frame is up and preparations are under way to clean out and repair the old shaft. This property, known as the South Mayflower, is north of Amador City.

Kennedy.—The new vertical shaft at this mine 1 mile from Jackson, begun a year ago last November, is down 900 ft. Power drills are used and the sinking will be more rapid. A new station at a vertical depth of 2,300 ft. has been cut in the North shaft which is between 2,700 and 2,800 ft. in depth on the incline.

Mutual.—The shaft at this mine, located between Sutter Creek and Amador City, is down 260 ft., and the buildings to cover the hoist and engines are completed. The large plant contracted for will enable the management to sink to 3,000 ft. Fair grade rock is taken out.

Oneida.—The old shaft, down 1,350 ft., including the sump, is being unwatered. A steam pump with a capacity of 100 gals. per minute

has lowered the water to the 600 ft. Some good ore has been found in the old drifts. An upraise from the 1,700 ft. level in the new workings, to the old shaft, is being made for ventilation.

Zenith Mining and Development Company.—On the property of this company situated 1½ miles northwest from Plymouth, a shaft has been sunk 100 ft. and a drift run 150 ft. The mine is equipped with a steam hoist, a 10-stamp mill and concentrators.

Mariposa County.

(From Our Special Correspondent.)

Mariposa.—This mine in Mariposa, which is a part of the Mariposa Estate, is being equipped with new machinery. The hoisting engine is in place and the large galloways frame completed. Buildings have been erected at the mouth of the shaft. The water is being pumped to the tunnel level, where it runs off, and sinking goes on rapidly with three 8-hour shifts.

Nevada County.

(From Our Special Correspondent.)

South Yuba Water Company.—Connection has been made between the reservoir of this company and the hoisting and pumping plant of the Brunswick Consolidated Mining Company, giving the company a new water supply for hoisting and pumping purposes. The Union Hill Mine is also ready to connect the water power with its hoisting and pumping gear as soon as the machinery arrives and is installed.

Riverside County.

Death Valley.—The Gold Hill Mine, in the Panamint Mountains, known as the Death Valley property, has been placed with New York parties at a reported price of \$207,000. A 40-stamp mill may be erected.

San Bernardino County.

(From Our Special Correspondent.)

Columbia Borax & Chemical Company.—It is reported that this company has recently purchased a group of borax claims in the vicinity of Daggett, and that men have been put at work. Also, that a factory is in course of erection for the purpose of manufacturing boracic acid.

Shasta County.

(From Our Special Correspondent.)

American.—This mine, located on Kline's Gulch, 3½ miles northwest from French Gulch, has started up again under the superintendency of Richard Collins.

Minnesota.—This property on the east bank of Spring Creek, 1 mile below the Iron Mountain Railway bridge, has been leased to D. McCarthy, who has a large force of men at work in the mine. There is a 10-stamp mill on the property.

North California Investment Company.—This company, which is working the Black Diamond Mines on the head of Stillwater Creek, has purchased from J. E. Isaacs 10 claims near the Black Diamond and south of the Pit River. This company has a large number of men running a tunnel through the mountain.

Uncle Sam.—This mine, located 7 miles west from Kennett, formerly owned and operated by the Sierra Buttes Company, has been sold to a New York syndicate headed by Warner Miller and W. E. Spiers. It is said that the property will be developed by a system of tunnels and drifts. Geo. F. Milliken of New York will be superintendent.

Siskiyou County.

(From Our Special Correspondent.)

Jillson & Roberts.—This firm has had another cleanup from its claim near Hornbrook. The estimated production during the past 20 months with 50 men on the payroll is \$300,000.

Tuolumne County.

(From Our Special Correspondent.)

Densmore.—The shaft at this mine, 2 miles from Parrott's Ferry, is down 200 ft., and a fine ledge of ore has been exposed. The 4-stamp mill is kept steadily at work. In the spring it will probably be increased.

Golden Gate.—Eighty men are employed at this mine, 1 mile southwest of Sonora. Drifting and stoping is going on and the 20-stamp mill is running day and night.

Grizzly.—This mine on the East Lode, 1 mile southeast from Carters, is producing rich ore, enough of which is stoped out at the 500 and 600 ft. levels to keep the 20-stamp mill crushing steadily.

Street.—A strike is reported at this mine, ½ mile north from Tuttle town, near Jackson Flat, in drifting from the shaft. The ore is rich in free gold and sulphurets.

COLORADO.

Clear Creek County.

(From Our Special Correspondent.)

Banner District.—Dr. Franklin R. Carpenter of Deadwood, S. Dak., recently examined the Stephens group of claims just west of Idaho Springs. The group comprises 37 patented and 30 unpat-

ented lode claims and 5 placers and mill sites. Dr. Carpenter was looking over the field for a pyritic smelter. It is claimed he will take the Stephens property for the men who backed him at Deadwood, and drive a tunnel to open these and other veins at Freeland camp.

Garden Mining Company.—Trouble has started between this company and owners of claims in the same vicinity on claims that the Garden has cross-cut into the adjoining veins. The case has reached the district court.

New Dunderberg Company.—The judgment secured against this company by R. O. Old for trespass has been paid, the \$30,000 being paid to Old this month.

Seaton Mining and Milling Company.—This company is to begin working its ore bodies cut by the Newhouse Tunnel at Idaho Springs, about 1,800 ft. down in the dip. The Seaton shaft is down 600 ft. and in ore. It is intended to connect the shaft and tunnel and work all of the ore through the tunnel. The Seaton Company has headquarters in Cincinnati.

Gilpin County.

(From Our Special Correspondent.)

Mining Deeds.—W. Roderick to B. E. Hallenbeck, ½ interest Smuggler lode; Elizabeth F. Barker to Gold Coin Mines Company, the Gardiner Extension lode; J. B. Karcher to J. C. Jackson, a placer claim in Bay State district; C. G. Scott to J. W. Hohnan, the Prize Baby lode; C. W. Deems and C. Hesselbime to J. McKay, the Free American lode; Swan Johnson et al. to W. C. Schneider, the Montana lode.

Carr.—This property produced 1,250 tons of ore, valued at \$31,250, for 1899, the average of both milling and smelting ores being \$25 per ton, a very good average for this county. This was taken out with no more than 10 men at any time during the year. The property is owned by 7 Central City parties, of whom J. Gredler is manager.

East Notaway.—This property is worked under lease by W. Mitchell, and good grade ore is still taken out. The last shipment of smelting ore gave returns of 16.4 oz. for one lot, and 11.02 oz. gold for another. Machinery will soon be installed. G. W. Mabee, Central City, is agent.

Kansas-Burroughs Consolidated Mining Company.—In 1899 the group of mines at Central City produced 40,000 tons of oil, a daily average of 110 tons. This year will see a heavier output, as the company is breaking ore in new ground. About 170 men are employed.

Lake County—Leadville.

(From Our Special Correspondent.)

Mining Conditions.—But little snow has fallen so far and much work is going on in sections which were closed down tight last year at this season. The daily output is 2,800 tons of all classes of ore, which could be increased if cars to haul the ore were furnished by the railroads. Of this 1,250 tons is handled daily by the local smelting plants and 1,550 tons goes to out-of-town plants.

A Y & Minnie.—Lessees Newton & Douglass report a find of stuff which runs from 1½ to 3 oz. gold. It is the first discovery of gold ore in this property which has produced many millions in silver.

Big Four Mining Company.—The company is advertising to lease its ground on Brece Hill. About 1,000 tons of silicious and sulphide ores were shipped last year.

Home Mining Company.—A call for a stockholders' meeting on February 19th is issued to consider whether the capital stock shall be increased \$1,000,000 from \$50,000. The company is shipping from its 3 shaft—Penrose, Starr and Bon Air—300 tons per day. A new hoisting plant is going in on the Penrose and by February 1st that property alone will ship 350 tons per day.

M. N. Fraction.—Over 1,200 tons of rich gold ore was shipped in December, while the ore body grows stronger. It is intended to sink another shaft. Mr. Will Vivian has charge.

New Elkhorn Mining Company.—An early resumption of work is probable. C. B. Rogers, representative of the London owners, recently had a conference with the directors and intimates that after certain arrangements are completed the mine will likely resume work. Considerable work has already been done, while the mine is equipped with a fine plant of machinery.

Northern Mining Company.—Shipments have increased to 80 tons per day of a good grade iron ore.

Nubian Mining Company.—The ore cut by the Midland shaft is opening up nicely. A new shaft is started a short distance southwest of the Midland No. 1.

St. Louis Tunnel.—Lessees are shipping 30 tons a day of carbonate ore which runs fairly well in gold and silver. The owner of the tunnel is opening up a sulphide body in the lower workings.

Pitkin County.

Mining Progress in 1899.—According to Denver papers the output of the county in 1899 was

185,000 tons of ore, valued at \$2,775,000. At Independence, 18 miles east of Aspen, the Hunter Pass Company improved its concentrating plant. Its output is estimated at \$100,000 in gold and silver. The plant is closed for the winter. The Smuggler at Aspen, under Manager C. L. Hallett, had its 2 mills running, handling all told about 200 tons of ore daily. The shipments of smelting ore showed an increase in the last months of the year. The Mollie Gibson and Argentum-Juniata mines, under one management, had the joint concentrating mill running well up to its capacity of 200 tons daily. The Percy Consolidated Mines, 1 mile south of Aspen, on West Aspen Mountain, worked through the Newman Tunnel, came to the front as the heaviest shipper of smelting ore in the district, sending out daily 50 to 60 tons of high grade lead-silver ore. The Aspen Mine is worked by the company and by leasers. At Ashcroft a local company headed by H. E. Woodward, of Aspen, has leased the Montezuma group, and miners are at work. The same men have leased the Little Annie group on Richmond Hill, 6 miles south of Aspen, and are working it in connection with the Famous Concentrator. The litigation over the pollution of the waters of Roaring Fork by the concentrating mills will come before the District Court in April.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Bob Lee Gold Mining Company.—At the annual meeting of the stockholders the following directors were elected: E. D. Marr, president; P. W. Middah, vice-president, and J. W. Avery, secretary and treasurer. The company owns several claims on Tenderfoot Hill, not far from the Hoosier. It is understood that R. P. Russel of the Hull City Placer has a lease on part of the property.

Enterprise Mining and Leasing Company.—Considerable good ore has been found on the Morning Star claim, which has created considerable stir. The company owns 3 claims on Raven Hill not far from the Doctor and Jack Pot.

Pinnacle Gold Mining Company.—The suit between this company and the lessees, Messrs. Whipp and Glenn, has been decided in favor of the lessees, Judge Harris denying the injunction asked for by the company. The lease has still a number of months to run, which will give the lessees time to take out a large amount of ore.

Portland Gold Mining Company.—This company followed the lead of the Gold Coin and declared an extra dividend of 1c. per share, making \$30,000, in addition to the regular one of 2c. per share, or \$60,000. The company has now paid over \$2,500,000 in dividends since its organization. Some talk has been heard lately to the effect that the company was to increase its rate of dividend, but it is now understood that such is not the case. The company is shipping a large amount of ore, doing a lot of development work and increasing the treasury reserve. The annual meeting of the stockholders will be held in a few weeks.

Stratton's Independence Mines, Ltd.—The new ore houses have been completed, greatly facilitating the handling of ore. It is understood that the daily output of the mine is about 125 tons.

IDAHO.

Mineral Output in 1899.—Statements and estimates of the value of the 1899 output vary widely. One estimate in a Colorado paper is as follows: Gold, \$2,500,000; silver, \$6,103,028; lead, \$4,960,410; copper, \$60,000—total, \$13,623,438. The gold production in 1898 was \$2,050,000. The production of silver and lead was seriously interfered with by the disturbances in the Coeur d'Alenes. The total of all metals is practically the same as last year. The new camps, like Buffalo Hump and Thunder Mountain, have not yet begun to produce, but a number of new districts are expected to run this year's production of gold up considerably.

Owyhee County.

Pauper.—A strike of 10-in. ore running several hundred dollars a ton in silver is reported in the drift from the bottom of the 500-ft. incline in this claim, on War Eagle Mountain near Silver City. The vein carrying the streak is 2 ft. wide between granite walls.

Shoshone County.

16 to 1.—The tramway at this claim, near Wallace, is completed and the mill is in operation. The mill had a capacity of 175 tons of ore in 24 hours, and its capacity has been increased but slightly.

Helena & Frisco.—Stockholders of this mine at Gem have decided to consolidate the mine with the Gem, Galena and Black Bear, adjoining, and to work the whole under the name of the Frisco Consolidated, Limited, incorporated under the laws of New Jersey, with a capital of \$2,500,000. Holders of the old Helena & Frisco stock will receive 11 shares in the new company for 10 in the old. The consolidation, it is stated, will result in the operation of all the properties at reduced cost. The consolidation was brought about by E. O. Holter of New York City, David Hyam of New York City, and Barton Sewall of Chicago, representing the Eastern stockholders.

Skookum.—Judge Beatty in the United States Court has decided the case of Hanley vs. Sweeney over a 1/3 and 1/4 interest in this claim at Wardner, in favor of Mr. Sweeney. The claim is in the territory of the Empire State-Idaho Company, of which Mr. Sweeney is manager, the Last Chance ore body dipping into it. The ownership of the interest in question, which involved interests of the Chemung Mining Company, have been before the State courts some years, the decisions being against Hanley.

MICHIGAN.
Copper.

Arcadian.—It is stated that the mine is not opened enough to enable the ore to be selected so as to get the best results at the mill. Five shafts are working, and 1,000 tons of rock are hoisted daily. Two stamps are running in the mill. The new Nordberg hoist, capable of hoisting from a depth of 6,500 ft., is in commission at No. 2 shaft. It is similar to the hoist at No. 6 shaft, Osceola.

Isle Royale Copper Company.—Superintendent W. E. Parnell has closed a contract with the Wisconsin Bridge and Iron Works, of Milwaukee, for the construction of the new stamp mill, about 2 miles east of Houghton. The mill building is to cost \$40,000, and to be finished by September. It will contain 3 Nordberg heads.

Tamarack.—The Wisconsin Bridge and Iron Works, of Milwaukee, will build the rock and shaft house at No. 5 shaft.

Winona.—Three shafts are working on double shafts.

Iron—Marquette Range.

Michigamme.—The water in this mine, at Michigamme, has been lowered 200 ft. W. J. Fraser is in charge of work.

Pioneer Iron Company.—This company has entered on the lands of the Breitung estate, near Negaunee, and begun exploration under the lease given by Charles Harvey in 1857. The lands are 646 acres in sections 5, 6, 7 and 8, T. 48, R. 26, and in section 31, T. 48, R. 26.

Pittsburg & Lake Angelina.—The output of these mines at Ishpeming in 1899 was 464,987 tons.

Regent.—This group of mines at Negaunee shipped 343,257 tons of ore during the past season. The lease was transferred to the Oliver Mining Company early in the year by Corrigan, McKinney & Company.

Iron—Menominee Range.

Iron Ore Shipments.—Shipments from Escanaba of mines along the Menominee River in 1899 were as follows: Aragon, 332,798 tons; Bristol, 80,915; Chapin, 705,172; Commonwealth, 94,728; Columbia, 125,074; Crystal Falls, 147,346; Cundy, 89,338; Dunn, 7,458; Dober, 10,980; Florence, 74,235; Great Western, 43,316; Hemlock, 107,477; Loretto, 64,824; Lincoln, 43,622; Lamont, 67,652; Mansfield, 75,597; Millie, 15,194; Penn Iron Mining Company, 229,651; Pewabic, 529,968; River-ton, 2,262; Sheridan, 29,155; Cuff, 20,210; Hill Top, 3,496; Keel Ridge, 2,007; Quinnesec, 11,050; total, 2,913,525 tons.

MINNESOTA.

(From Our Special Correspondent.)

Oliver Iron Mining Company.—The company has opened a general office in the Exchange Building, Duluth, where T. F. Cole, its general superintendent, and J. C. Gilchrist, assistant superintendent, will be located. Mr. Cole has had his headquarters at Ironwood, Mich., and Mr. Gilchrist has been manager of the company's mine at Mountain Iron, Minn., and in direct charge of its Mesabi properties. The general office of Dr. N. P. Hulst, general manager, will remain at Milwaukee. Their duties will cover ground from the east end of the Menominee Range to the west end of the Mesabi. The Pittsburg Steamship Company, also a Carnegie concern, which is to have six 8,000-ton steel ships on the lakes this year, will have its headquarters in Duluth, with the mining company, and Mr. T. F. Cole will be managing director. The ships will be enrolled at Duluth.

With the addition of some 5 miles, soon to be under contract, the Duluth & Iron Range road will have under way or completed a double track line the entire distance from the Mesabi to the docks.

While the weather has been warm and comfortable, there has been so little snow that frost has gone deep into the ground and stripping at several open cut mines has stopped. The men let out have been eagerly taken by other mines and by railways and lumber companies.

Iron—Mesabi Range.

(From Our Special Correspondent.)

Biwabik Bessemer Company.—This company has stopped stripping and no men are busy. The mine is in shape to increase its 1899 output of 550,000 tons. Drake, Stratton & Company have the stripping. Davis & Davis are erecting a trestle over the tracks of 2 railways to a swamp where stripping will be dumped.

Cincinnati.—This long abandoned mine is under negotiation for lease to the Oliver Iron Min-

ing Company. The Cincinnati Iron Company, which had the original lease, long ago surrendered the mine and passed out of existence, a victim of overcapitalization.

Corrigan, McKinney & Company.—This firm has leased all the J. J. Hill lands on the west Mesabi, originally the Wright & Davis lands. Included is the Hill Mine, in sections 7 and 8, T. 57 R. 21, 4 miles west of Hibbing, known to contain at least 6,000,000 tons of good Bessemer ore. It is to be opened at once and mined by steam shovel. In addition there are some 5,000 acres in the deal, which are to be explored with indications of iron. All ore mined carries with it an obligation that it shall be shipped to the lake over the Eastern Minnesota, the J. J. Hill road.

Malta Iron Company.—This mine, known last year as the East Sparta, has incorporated with \$50,000 capital, and work is going on steadily. It will make a large output this year over the Duluth & Iron Range road.

Sparta Iron Company.—This company has let to Gulbranson Brothers a contract for tripping 800,000 cu. yd. of dirt, and about 150 men are at work. The force will be enlarged later.

MISSOURI.

Jasper County.

(From an Occasional Correspondent.)

United Zinc Companies.—The annual meeting was held in Jersey City on January 6th. The following board of directors was elected: W. L. Lowell of Newton, Mass., Col. Levi R. Greene of Boston, Franklin Playter of Joplin, Frederick R. Tibbitts of Boston, Jas. L. Clark of Chicago, Chas. R. Peabody of Boston, Frederick R. Turner of Boston, and Jas. B. Dill of Jersey City. At a meeting of the directors held later officers were elected as follows: President, Wm. L. Lowell of Newton, Mass.; vice-president, Col. Levi R. Greene of Boston; general manager, Franklin Playter of Joplin; secretary and attorney, Jas. L. Clark of Chicago, and treasurer, Geo. M. Foster.

Joplin Ore Market.—The first week of the year opened with both zinc and lead ore showing an advance. Top grade zinc ore sold for \$36.50 per ton, 70 tons being disposed of at this price, while 165 tons sold at \$36 per ton, an advance of 50c. over last week. Lead sold throughout the week at \$28 per 1,000 lbs., an advance of \$1 per 1,000 over last week. It was reported that \$28 per ton was offered and refused for some 63 per cent. zinc ore at Neck City.

During the corresponding week last year top grade zinc ore sold at \$29.50 per ton and lead at \$22.75 per 1,000 lbs.; the lead sales were less by 98,610 lbs., the zinc sales greater by 1,403,600 lbs. and the value less by \$1,281. As compared with the previous week, the zinc sales were less by 334,160 lbs., the lead sales greater by 365,420 lbs., and the value greater by \$5,662. Following is the turnin by camps.

	Zinc, lbs.	Lead, lbs.	Value
Joplin.....	1,376,150	356,400	\$34,063
Cartersville.....	750,640	219,325	19,000
Oronogo.....	537,830	10,240	11,071
Webb City.....	648,400	41,630	12,155
Belleville.....	498,580	.....	8,690
Central City.....	373,290	18,590	6,775
Cave Springs.....	93,420	1,820	1,639
South Jackson.....	43,340	18,730	1,171
Duenweg.....	118,300	50,820	3,316
Stotts City.....	159,430	.....	2,710
Granby.....	382,000	10,000	5,200
Alba.....	43,660	.....	764
Carthage.....	94,000	.....	1,739
Lehigh.....	74,400	.....	1,392
Aurora.....	616,500	47,090	9,125
Galena Empire.....	1,774,990	238,140	37,503
District total....	7,620,920	1,012,720	\$156,218

One of the most important mining deals of the week was the transfer of the Idaho lease and fee of 80 acres at Tuckahoe to the Colorado-Joplin Mining Company, composed of Colorado, New York and St. Louis men. The company has a capital of \$1,250,000, all of which is subscribed. J. B. McKinnie of Colorado Springs is president of the company and the work of development will be pushed. The old Tuckahoe mines have produced an immense amount of high grade zinc ore with hand jig plants only, but the ground has not been efficiently worked for years, as the water was very strong and difficult to handle with the poor machinery used. The sale of the Beacon lease east of Joplin was announced last week for \$30,000. Frye Brothers were the owners and the Plymouth Rock Mining Company were the purchasers.

Some of the wealthiest mine operators in the district met recently and perfected the temporary organization of the Kansas City, Joplin & Little Rock Railroad Company. The western terminus of the road will be the coal fields of Eastern Kansas and the towns to be tapped by the new system will be Joplin, Duenweg, Stotts City and Aurora, Mo. A large portion of the right of way has already been secured and capital has been guaranteed to make the road a certainty. The projectors purpose to build a road to deliver coal at a price that will make possible the establishment of smelters and other manufacturing enterprises. The present rate for hauling coal 23 miles is 60c. per

ton and it is believed that the new road will be able to deliver coal in Joplin at 10c. per ton.

New Corporations.—The Butler Mining and Milling Company has been incorporated in St. Louis with a capital of \$50,000 to develop a 160-acre tract at Saginaw, owned by Col. Ed. Butler, the well-known politician. The incorporators are Edward Ellen, James J. Edward, Jr., John R. Butler, Peter G. Linchey and John J. Parle, all of St. Louis. The Drumlummon Mining Company has been organized at Galena, Kan., with a capital of \$25,000. The Defiance Mining Company is a new Joplin corporation with a capital stock of \$5,000. The Merrimac Lead and Zinc Company of Nashua, N. H., has been authorized to do business in Galena, Kan. The officers are F. H. Ayer, Nashua, president; H. E. Rall, Galena, vice-president; Bradford Allen, Nashua, treasurer; Ed. A. Terrill, Galena, secretary; John P. Goggin, Nashua, assistant secretary.

MONTANA.

Deer Lodge County.

(From Our Special Correspondent.)

Mammoth.—This mine and mill near Coloma have now passed into the hands of S. E. Larabee of Deer Lodge. The property was sold by sheriff sale under mortgage foreclosure for \$15,600 over a year ago and the time for redemption by the stockholders having now elapsed, a deed has now been given.

Welch Granite Quarry.—J. Welch of Butte has completed a spur of the Logan branch of the Northern Pacific Railroad to his granite ledge at a cost of \$3,000. Sixty men are quarrying and cutting, the output being paving blocks and building trimmings. The whole output goes to Butte.

Granite County.

(From Our Special Correspondent.)

Drummond Coal Mines.—Elliott & Jones have leased a portion of their coal land to a company which is now sinking a 200-ft. shaft to cut the seam. Much prospecting by drilling will also be done.

Garnet Mining District.—The new custom mill of the Montana & Denver Reduction Company started on December 30th, and was found to run smoothly in all departments. At present it will treat about 30 tons daily. The treatment consists of amalgamation on plates, concentration of tailings by Wilfleys with subsequent treatment of tailings by the dioxide-cyanide method. The ores come from the mines in and around Garnet and Coloma and are purchased by the company at 90% of the assay value with a deduction of \$5 per ton for treatment.

Over 30 leasers are now working in this district, 19 having begun since the custom mill started. With the present demand for gold and silver ores ranging from \$15 to \$50 in value, a great incentive is given to mine owners. As the cost of mining, sacking, shipping and smelting has been as high as \$25 per ton, only a few of the owners were able to develop their mines as much of the ore was lower in value.

Nancy Hanks.—This mine, owned by S. Ritchie, has been closed down for 2 weeks. It is understood that the vein has been lost by a fault. The mine will be leased to 2 miners of the district.

Jefferson County.

(From Our Special Correspondent.)

Bell.—This mine, owned by C. W. Fleming, and located at the head of Middle Fork of Warm Springs Creek, 7 miles from Alhambra, is under active development by two adit tunnels, both of which are in ore. Tunnel No. 1 is in 370 ft., and will probably catch the discovery oreshoot in the next 100 ft. Tunnel No. 2 is now in 250 ft., and has a 6-in. streak of \$50 ore on the hanging wall. Both are being driven by double shifts.

Comet.—This old property, which in the days of the old Wickes Smelter was one of its chief ore suppliers, but has been idle for a long time, is being placed on the New York market. It is the property of the Helena Mining and Reduction Company.

Little Nell.—This Lump Gulch property, situated 3 miles from Clancy, is under bond for \$50,000 to Conlan, Nimo & Co., who will pump out the mine and sink the shaft to the 600-ft. level. The property has produced over \$200,000.

Ramona.—A 1/2 interest in this property, 8 miles east of Clancy, has been purchased by A. W. Church, who will proceed to develop by a tunnel.

Mocking Bird.—Rowan & O'Donald have resumed the management of this property, 6 miles southeast of Alhambra.

Quartz Gulch Gold Mining Company.—On this property, under the management of Joe Appleby, situated 7 miles west of Clancy, the 10-stamp mill is finished and is running on ore from the McDaniels property.

Van Arnim.—Christoferson & Company are working this property, 6 miles west of Wickes, under a lease.

Park County.

(From Our Special Correspondent.)

Crevisse Mountain Mining Company.—This property, situated on the mountain of same name, 5 miles from Jardine, is worked under bond by Sam. T. Green, who is opening the ore reserves and putting the 20-stamp mill in order. Under the old Jewet-Edgerton management of years ago this property was noted for its gold nugget specimens.

Silver Bow County.

Montana Ore Purchasing Company.—This company recently filed its cost bill in the Johnstown case, decided in its favor, against the Boston & Montana. The bill amounts to \$224,124, of which \$258,373 was for development work and \$21,891 for experts.

Ruby.—After a shut-down of some months this mill is again running, operated by the Lowlands Gold Mining Company, on Columbia mine ore. The Lowlands Gold Mining Company's incorporators are Butte men: Henry Muntzer, E. B. Howell, Joseph Hoffman and Chas. H. Nickel. They have leased and bonded the Columbia and the Amazon, supposed to be south extension of the famous Ruby, and have rented the Ruby mill. About 12 men are on the pay roll, but when running full blast about 35 to 40 tons of ore per day are to be worked, requiring a larger force.

Thomas.—This lode claim, in the city limits of Butte, was recently bought by G. H. Casey for \$31,000. It is thought the purchase is for Mr. Tarbet, who recently bought the Smoke House lode.

Teton County.

O. M. Holmes, of Great Falls, J. H. Calderhead, of Butte, and a Boston man are reported interested in mining properties in the ceded strip of the Blackfeet reservation. J. A. Ford, of Kalispell, and other owners of 9 claims in the Boulder district of the strip, have bonded those claims to Mr. Holmes and his associates for \$15,000, the bond to run until June 1st, and Messrs. Holmes and Calderhead have options on 45 other claims in the same district. They expect to begin work at once on the claims and prosecute operations steadily for the next 6 months. The owners of the claims assert that the veins are from 28 to 32 ft. wide, and show values in copper and gold.

NEVADA.

Eureka County.

Eureka Consolidated.—Men are cleaning out the old workings in the mine from the seventh to the ninth levels.

Eureka Mining and Milling Company.—The mining suit of M. Antoniazzi and others against the Eureka Mining and Milling Company has been dismissed and the defendants lease to M. Antoniazzi and Peter Breen all of the Madrid Mine—being the property in dispute—for the term of three years from January 1st, 1900, the lessees to pay a royalty of 15% of the net proceeds of all ore until they have paid the sum of \$1,600, and from that time until the expiration of the lease to pay a royalty of 20%.

Storey County—Comstock Lode.

Ophir Mining Company.—At the annual meeting of the company, 89,958 shares were represented out of the 100,800 shares of capital stock, and the following directors were elected: Charles H. Fish, A. W. Havens, Nat. T. Messer, H. Zaidig, C. Hirschfeld and A. F. Coffin. Charles H. Fish was elected president, A. W. Havens vice-president, E. B. Holmes secretary, and G. McM. Ross superintendent.

OREGON.

Progress in Mining in 1899.—Progress in the district about Baker City during the year has been great. The mines on which new mills were built are the Little Giant, located near the Red Boy, 30 miles due west of Baker City, 20-stamp mill; the May Queen, located in same district, 10 stamps; the Cougar, near the town of Granite, 4 miles from the Red Boy, a new roller mill, capacity of 25 stamps; the Magnolia, near the Cougar, a new 10-stamp mill; the Helmer & Hines, near Prairie City on the John Day River in Grant County, a new 10-stamp mill. The Goldconda, in the Cracker Creek District, has added a Bryan roller mill with capacity of 10 stamps and is constructing a 10-stamp mill. The Star & Starter at Weatherby, 32 miles southeast of Baker City, has a new 10-stamp mill. These mills are all of the latest improved patterns from the Risdon Iron Works of San Francisco and have been tested on the ores they are to work before being put up. One of the most expensive improvements of the season was the construction of the Pomeroy dredge at Weatherby, which cost \$60,000 and has a capacity of 2,000 cu. yds. of gravel per day.

Baker County.

The estimated output of the mines about Sumpter in 1899 is around \$2,000,000.

Anna Lulu.—Simcoe Chapman, of Sumpter, who, as agent for Arthur Hill, of Michigan, owner of the Ibex, recently negotiated the sale of that property to Col. S. W. Ray, of Port

Arthur, Ont., for a reported price of \$300,000, has secured an option on the one-half interest in the Anna Lulu, owned by A. J. Trimble, for \$15,000, and upon the interest of Dr. G. W. Tape in the same property, for \$14,800. The claim lies on what is popularly called the Eureka & Excelsior ledge, and adjoins the Bunker Hill on the north and the Golden Treasure on the south.

Bonanza.—This mine near Sumpter keeps its 40-stamp mill running.

Bunker Hill Mining Company.—The vein, 25 ft. wide, is reported struck in the crosscut at 300 ft. depth. Values are said to go from \$6 to \$24 gold. The company's headquarters are at Sherbrooke, P. Q.

North Pole.—This is the deepest mine about Sumpter, the shaft being down 1,100 ft. It has a 10-stamp mill.

PENNSYLVANIA.

Bituminous Coal.

Braznell.—The coroner's jury at Uniontown rendered the following verdict regarding the recent explosion:

"We find from the evidence that the mine foreman of the said mine was negligent in failing to see that the mine was in safe condition before permitting the workmen to enter it. We also believe the fire boss of said mine was negligent in failing to make a daily verbal report to the mine foreman."

Frick Coke Company.—At the annual meeting of the managers of the company in Pittsburgh, January 10th, H. C. Frick was retired from the office of chairman of the board, and the position was abolished. Mr. Frick continues as a member of the board. His relation with the coke company will be the same as that with the Carnegie steel concern. John Walker and G. B. Bosworth were also retired from the Board, which formerly consisted of 5 men. The number was increased to 7, and James A. Gayley, Thomas Morrison, A. M. Moreland and David M. Clemson were elected new members. The other 3 members are Mr. Frick, George Lauder and Thomas Lynch. Mr. Lynch was re-elected president and will assume the duties of chairman. All the members of the board are Carnegie men, with the exception of Mr. Frick.

Slate.

Slatington Slate Company.—According to W. W. Bouman, secretary, this company in 1899 sold and shipped 26,831 squares of roofing slate; 216,730 sq. ft. of blackboards; 40,000 sq. ft. of mill work and 222,806 school slates. The net value of the manufactured goods as sold was \$124,317.

SOUTH DAKOTA.

Lawrence County.

(From Our Special Correspondent.)

Detroit & Deadwood.—Several of the directors have been in Deadwood. The main tunnel is now in over 500 ft. The stockholders are interested in an experimental plant at Cripple Creek, Colo., using a new process. A carload of ore from different mines in the Black Hills was sent there for a test run, and if the result is satisfactory the company proposes to erect a plant near Deadwood.

Esmeralda.—This mine, in Blacktail District, owned by E. Faust & Son, of Lead and Central City, is running 2 shafts. A cyanide annex treats the tailings. A Huntington mill is used.

Gibbs & Cook Cyanide Plant.—The cyanide plant at the Hildebrand stamp mill, at the mouth of Blacktail Gulch, is being enlarged to 50 tons per day. W. D. Parker, chemist in charge, has made certain modifications in the process, and is getting excellent returns.

Gold Hill Mining Company.—This company composed of capitalists residing at Omaha, Neb., has purchased 10 claims of Thomas Goodman, on the eastern slope of Spearfish Canyon. The company has bought a hoisting plant, and will continue the 70-ft. shaft to quartzite.

Hardin.—It is stated that a consolidation of the 5 Hardin mines is about to take place. It is stated that there will be a lawsuit between the Hardins and the Homestake Mining Company, over the water which the latter company proposes to take out of the upper Spearfish.

Hidden Fortune.—Otto Gratz, owner of this mine, in North Lead District, has miners at work running a tunnel, which is in 175 ft., and is expected in 50 ft. further to cut the rich shoot.

Titanic Mining Company.—This company has decided to continue the shaft to quartzite. It has obtained a patent for its estate in Carbonate District. The shaft is down 150 ft.

Custer County.

(From Our Special Correspondent.)

May.—This mine, which created much interest last summer owing to a rich gold strike, is now worked by Mr. Carr and two sons. They believe that the rich vein, which was about 30 in. wide at the surface, has faulted, and they are trying to find it again.

UTAH.

Carbon County.

(From Our Special Correspondent.)

Sunnyside.—This new coal mine, though owned and operated by R. Forrester, agent, and associates, is closely allied to the Pleasant Valley Coal Company. It is 17 miles from Mounds on the Rio Grande Western, from which point a railroad was built the past season. Production began in December, and the daily output is 300 short tons, which in January will be increased to 500. The 104 coke ovens at Castle Gate will be supplied in part with Sunnyside coal, which, it is averred, will increase the coke yield. Probably by March, if not sooner, the entire coke making plant at Castle Gate will be burning Sunnyside coal.

WASHINGTON.

Ferry County—Republic.

Boundary-Republic Mines, Limited.—The shareholders of the Republic Company have received notices that they will have the privilege of subscribing for the stock of this new company to the amount of 700,000 shares at 30c. per share at the rate of 1 share in the new company for each 4 shares in Republic. The new company has a capital of \$1,500,000 in \$1 shares and will take over the controlling interest in the Quilp Mining Company at Republic, a ¼ interest in the 3 claims of the Valley Group at Republic, the entire interest of the Yankee Girl, Yankee Boy and Bell claims in the Boundary District, B. C.

(From Our Special Correspondent.)

Chico Group Gold Mining Company.—The contractors have cross cut the vein on the 200 ft. level and struck the foot wall, where the quartz is heavy with iron pyrites. The highest assay yet made public is \$6.40 in gold per ton. The manager being absent at present, all the samples are sent to the main office at Tacoma.

Gold Ledge Extension Mining Company.—This company has purchased the Badger claim adjoining its ground on the east. A United States patent has been applied for on the entire property.

Golden Lion.—The crosscut from the bottom of the winze is in 182 ft., but has not encountered the vein.

Merrimac.—The contract for 200 ft. in the new shaft is finished.

Mountain Lion.—Four car loads of steel tanks, supplies and material have arrived, and 11 carloads are on the way from Grand Forks, B. C.

Republic Consolidated Gold Mining Company.—The company began shipping ore to the Trail, B. C., Smelter, December 19th. The Jim Blaine drift on the No. 3 tunnel level has stopped, pending the erection of the new mill.

San Poil.—The south drift from No. 2 tunnel is in over 400 ft. and 150 ft. south of where the last reported pay shoot was struck. For 25 or 30 ft. the ore was mixed with country rock, but the balance ran mainly \$35 per ton. The quartz stands 5 ft. wide at the breast.

Zala Consolidated Mining Company.—Work began again December 26th.

Skagit County.

Skagit Coal and Transportation Company.—It is stated that the Great Northern Railroad has bought the coal mine and land of this company situated at Cokedale. It embraces 4,000 acres of fine coal lands. The product of the mines has heretofore been used exclusively for making coke, 50 ovens being continually in use. The Fairhaven & Southern Railway was originally built to carry this coal to tidewater. Mr. Lewis Stockett, the fuel man of the Great Northern, who recently took formal possession of the mine, will remain there until the arrival of a resident manager from the East.

WYOMING.

Carbon County—Grand Encampment.

Battle Lake Copper Exploration Company.—This company has installed machinery, and will push development all winter.

Doane.—The mine has closed down with 250 tons of ore in the bins.

Eureka.—This claim has two ore shoots in the drift carrying sulphides and black oxides, and development is being pushed.

International Copper Mining and Milling Company.—This company has filed articles of incorporation. Capital stock, \$600,000. Incorporators are: C. W. Freeman, John Ludwig, Andrew Olson, C. W. Anding, Z. Perrot, J. W. Horner and Ferdinand Griesel, all of Winona, Minn. The company has purchased a number of copper claims in the Grand Encampment district and will develop the same.

Rudefaha.—This mine is keeping up heavy shipments and making extensive developments with power drills.

Kurtz-Chaterton.—This mine is to be worked all winter with a large force of men in ore reported to run from \$25 to \$40 per ton in gold

and copper. A reduction plant has been ordered and will be erected in the spring.

Fremont County.

(From Our Special Correspondent.)

Carlissa.—This mine at South Pass, which has been a producer for 30 years, is being developed by air drills. It has large bodies of fair grade ore exposed, and the shaft is being sunk to open up the 4th level. The mine is equipped with a 10-stamp mill, 2 60-H. P. boilers, 60-H. P. Corliss engine, 3 concentrators, electric plant, compressor and Ingersoll drills, being the most complete plant in the State. It is owned by Chicago parties. B. N. Tibbals is manager.

FOREIGN MINING NEWS.

AUSTRALASIA.

New Zealand.

(From Our Special Correspondent.)

October Gold Production.—The output is reported at 36,557 crude ounces, valued at £143,685 (\$718,425), an increase of 6,518 oz. in quantity, and £29,667 (\$148,335) in value, compared with October, 1899. The silver exported amounted to 30,788 oz., valued at £3,625 (\$18,125), all from the Auckland District. The contributors to the gold export were: Auckland, with £78,303 (\$391,515); Otago, with £42,788 (\$213,940); and the West Coast District, with £22,594 (\$112,970). The dredging boom in Otago continues to abate, and no sensational returns have been reported. It is likely that the returns will continue low for some months owing to the Clutha River being high. In Otago and Southland very large areas of alluvial ground have been pegged out, which will in the near future yield steady results, though it is not likely that the average weekly return per dredge will exceed 25 to 30 oz.

Tasmania.

Mount Lyell Mining Company.—This company reports for the four weeks ending December 13th a total of 22,952 tons smelted, the product being matte, containing 708 tons copper, 59,090 oz. silver and 2,429 oz. gold. The average result was 3.08% copper, 2.57 oz. silver and 0.11 oz. gold to the ton.

CANADA.

British Columbia—Nelson.

Hall Mines, Limited.—This company reports for the 4 weeks ending December 29th a total of 3,132 tons ore smelted, producing matte containing 69 tons copper and 40,080 oz. silver. The average result was 2.2% copper and 12.8 oz. silver to the ton.

British Columbia—West Kootenay District.

(From Our Special Correspondent.)

1899 Output.—The revised figures are: Le Roi, 94,000; War Eagle, 64,500; Center Star, 16,800; Iron Mask, 5,600; Evening Star, 1,088; Columbia & Kootenay, 110; Virginia, 100; Miscellaneous, 802—total, 183,000 tons valued at \$3,300,000, an average of \$18 per ton. The output in 1898 was 111,282 tons valued at \$2,470,811, an average of \$22.80. The average value in 1897 was \$30.48, and in 1896 \$32.65. The total output beginning with 1894 was 422,710 tons, valued at \$9,889,330.

The output of the Nelson mines in gold, silver and copper is estimated at \$1,250,000; of the Slovan mines in silver and lead, \$1,750,000; and of the East Kootenay mines in silver and lead, \$50,000.

COAL TRADE REVIEW.

New York.
Anthracite.

Jan. 12.

This year's hard coal trade is starting with what may be called good prospects. While the chances are against any such prolonged cold weather as prevailed last winter, yet it will not take as much cold weather to bring out retail buying as in some other winters. There has been a general slackening in output at the collieries. This has come as a natural result of the holidays and colder weather rather than any concerted action among producers. Still there is now no rush for coal, and producers will naturally take things easier. It is also probable that many miners who worked hard during October, November and the first half of December will not try to get out as much coal per day during January. The December output was close to 4,500,000 tons, and this month's may be expected to be less.

In the West generally mild weather has affected retail buying. Stocks on hand at the heads of the Lakes are about as heavy as last winter; with higher temperatures the outlook is for coal enough to last until navigation opens again. At Chicago prices continue well-maintained, while consumption varies with the weather. At Eastern points the market is good again, owing to the cold wave.

Labor organizers who have been working hard in the Schuykill and Wyoming fields are speaking darkly of "necessary concessions" and a "general strike." The concessions to be demanded cover a variety of subjects, and in ef-

fect amount to a complete revision of mining scales by the various companies. It is very doubtful if the companies will consent to this, and a general strike is equally doubtful.

Prices at New York are generally well maintained. Pea and buckwheat sizes are harder to get than ever, while broken and egg are in least demand. We quote for free burning white ash f. o. b. New York; broken, \$3.30; egg, \$3.80; stove, \$4.15; nut, \$4.25.

Bituminous.

The demand for soft coal in the Atlantic seaboard soft coal trade continues active. Producers, however, are probably in better shape to attend to the demand than they were, so that the situation is easier than it was a few weeks ago. Stocks at most points are far from heavy. There is a considerable amount of coal held for shipment to shoal water ports now closed by ice, and there are vessels waiting for this coal hoping that milder weather may bring an opportunity to deliver it. If the cold spell continues the coal will go by vessel to the nearest available port and thence to its destination by rail. This has been done in other winters, but this winter such movements will probably be more numerous than ever.

The demand for coal is probably heaviest from Sound ports, but all-rail deliveries are very heavy.

Transportation from mines to tide is very slow. It is not an uncommon thing for cars to be from one to two weeks making a journey that is often made in two or three days. Car supply continues scanty and at present is about 60% of the demand. In the seaboard vessel market vessels are scarce, many small craft being laid up for the winter. Shipments from Philadelphia have been hindered somewhat by pack ice. Ocean freight rates have fallen a trifle and are now on a basis of \$1.75 from Philadelphia to Boston.

Coal continues to bring high prices. An ordinary price for almost any kind of soft coal at Eastern points is \$5 per ton.

Birmingham, Ala.

Jan. 8.

(From Our Special Correspondent.)

The demand for coal in this State is unprecedented, and the output is enormous. The miners took three or four days off, as a general matter, for the holidays, and as a consequence the supply was cut off some, and the demand has been since considerably greater than the production, and there is complaint being heard in several circles. The production is being enlarged, however, and it is believed before the end of the winter that the output will be sufficient.

There are no labor troubles in Alabama at the present. The places of striking miners at the Dogwood Mine in Shelby County, where about 100 men were employed, have been filled with convicts, making the third mine in the State to employ convicts. The free miners there will seek employment elsewhere in the State, there being plenty of vacancies.

State Mine Inspector J. de B. Hooper is now engaged in gathering figures of the output for the year 1899. It is not doubted but that the output will be close on the estimate given in our yearly review. The Pratt Division of the Tennessee Coal, Iron and Railroad Company had an output last year of 2,035,000 tons, beating the year previous by more than 500,000 tons. Several new mines were opened last year, and have been worked quite steadily. The report of the Inspector shows that during 1899 there were 40 fatal accidents in the mines, against 45 the year previous, when the output was several thousand tons less than the past year, and 39 in 1897, when the output was over 1,000,000 tons less.

Every preparation is being made for increased production. Facilities for handling the product are being enlarged. The Southern Railway, anticipating a great business in coal down the Mississippi River by its barge line, to plantations and sugar refineries in lower Mississippi and Louisiana, outside of New Orleans, have started to work enlarging the tippie at Greenville, Miss., and also building it so that when high water occurs on the river the handling of coal shall not be interrupted. There were 8 or 10 tons of coal sent down the Mississippi River last year, something like 50,000 tons of Walker County coal going down.

The Republic Iron and Steel Company is at work on a mine which will have a capacity of something like 2,500 tons a day. The Southern Railway is building spur tracks to the place and a large force of men are at work doing the heading work.

Chicago.

Jan. 9.

(From Our Special Correspondent.)

Anthracite Coal.—The trade in anthracite coal has dropped off somewhat because of warmer weather. A run of zero weather for a week around the opening of the year brought a considerable business into the market, but warmer weather always is a great factor in cutting down sales. Car-load lots make up the sales, nothing much larger. Prices continue very firm at \$5.75 for egg and stove and \$6 for chestnut. Chestnut coal continues very scarce, and other sizes of

coal are being bought in its place. There is no probability of any advance in hard coal prices for the remainder of the season. The recent advance of Eastern freight rates has not affected prices here.

Bituminous coal is in good demand, the supply as yet being inadequate. Prices continue firm, and under present buying are not likely to go off. Inquiry is remarkably good, indicating that manufacturing lines and railroads are going to buy heavily to carry on increasing business.

Pittsburg.

Jan. 10.

(From Our Special Correspondent.)

Coal.—There is a lull in the coal trade, and no contracts of any consequence are being taken and will not be until the mining rate for the coming year has been fixed. This will be arranged at the interstate convention to be held in Indianapolis on January 23d. The miners are preparing to demand a big advance. The operators are willing to concede a reasonable increase and a satisfactory settlement may be made. No further changes in present prices have been announced.

Connellsville Coke.—The year 1899 was a banner year in the coke industry. The production exceeded 10,000,000 tons, as against 8,460,112 tons in 1898. The holidays interfered with production somewhat last week, and out of 18,813 ovens 876 were idle. The production for the week was 188,920 tons, and the shipments aggregated 9,395 cars, distributed as follows: To Pittsburg and river tipples, 2,895 cars; to points west of Pittsburg, 4,856 cars; to points east of Connellsville, 1,644 cars.

San Francisco.

Jan. 6.

(From Our Special Correspondent.)

The total coal receipts by water at California ports in 1899 were 1,740,027 tons, which compares with 1,832,373 tons in 1898; 1,601,540 tons in 1897, and 1,505,660 tons in 1896. A much larger quantity was expected in 1899, but receipts during the later months of the year were reduced by the scarcity of both sail and steam tonnage.

The use of crude oil as fuel is making much headway in California, especially since a good supply was assured from oil-wells in the State.

The range of prices on foreign coals has been, for Australian, \$7@7.50, cargo lots; English, \$7.25@8.50. The highest prices quoted were in December.

Mr. J. W. Harrison's circular says: "The sources from which we have derived our coal supplies are shown in the following table, in tons:

	1898.	1899.
British Columbia.....	651,208	623,133
Australia.....	201,931	139,333
English and Welsh.....	75,115	93,263
Scotch.....	5,056	.....
Eastern (Cumberland and Anthracite).....	37,560	38,951
Seattle (Washington).....	283,963	271,694
Tacoma (Washington).....	348,474	355,756
Mount Diablo, Coos Bay and Tesla.....	172,506	189,507
Japan and Rocky Mountains by rail.....	26,560	28,390
Total.....	1,832,373	1,740,027

"To secure a complete statement of the entire coal consumption of California, I have been obliged to include deliveries at Port Los Angeles and San Diego by water, which has been added in the above sources of supply. The total amounts received by water at those two ports foot up 184,747 tons.

"Coke.—The total amount of coke received amounts to 31,091 tons, against 41,630 tons received last year. Three-fourths of the coke consumed here is imported from England and Belgium. The ovens at Comox, British Columbia, are now in full blast, as they purpose shipping all their surplus to this market in 1900. They make a very fair grade there.

"The fuel problem is a most serious one to solve in California, and is to-day in a most sensitive position. Our yards are comparatively empty, there are only three or four collieries on the coast of any magnitude whence we may derive supplies, hence if a strike, lock-out or any accident should occur in any one of these, the consequences locally would be most disastrous. It is a perilous position to occupy; the tension is too great."

Shanghai, China.

Nov. 27.

(Special Report from Wheelock & Co.)

Coal.—Japan coal is quiet; Cardiff shows a fairly large business, and Sydney Wallongong is very firm. Arrivals of all coals in the fortnight were 8,862 tons. Quotations per ton are as follows: Welsh Cardiff, 21 taels; Sydney Wallongong, cargo ex-godown, 13 taels, and other sorts, 6.50@7 taels. Chinese Kaiping lump, 8 taels; dust, 5 taels; and mixed, 5.50@5.75 taels.

Kerosene Oil.—American oil shows a large business, principally among native dealers. First hands still ask 2.37 taels per case, while sales by dealers were made at 2.17½ taels. With an arrival of 131,500 cases, stocks amount to 624,000 cases. Russian Batum shows a fair business at 2.05@2.07 taels per case for bulk, while Anchor and Horse Chop are quoted 2.12½ taels, and Star and Crescent Chop 2.11 taels. Sumatra Langkat has been dealt in considerably, selling at 2

taels per two tins, and higher prices are expected. With an arrival of 90,000 cases, made stocks 179,000 cases.

SLATE TRADE REVIEW.

New York, Jan. 12.

The new price lists for roofing slate will soon be ready for delivery, and many sizes are higher than last year. The settlement of disputes between the red slate people some time ago by the contract made by the Mathews Slate Company to take the entire output of the quarries for some time to come, with an option to purchase the properties, has resulted in higher prices. The entire production last year was probably not over 10,000 squares of red roofing slate.

In export circles much comment is made on the methods adopted by some large shippers. We understand prices are being cut rather deeply and competition is stronger. London freight rates are about 15s. (\$3.60), but brokers are not anxious to take long time contracts, even at this price, owing to the uncertainty of vessel room.

IRON MARKET REVIEW.

NEW YORK, Jan. 12, 1900.

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending				From Jan., '99.	From Jan., '00.
	Jan. 13, 1899.	Jan. 12, 1900.	From Jan., '99.	From Jan., '00.		
	F'ces.	Tons.	F'ces.	Tons.	Tons.	Tons.
An'racite & Coke.	180	230,100	254	288,325	444,042	494,271
Charcoal.	20	6,120	30	7,925	11,364	13,986
Totals.	200	245,220	284	296,250	455,406	507,857

We have dropped, in our table, the separate classification of the anthracite furnaces, as it is extremely difficult—and hardly necessary—to draw the line between them and the coke furnaces. All but a very few of the so-called anthracite furnaces now use more or less coke also, and the iron made with anthracite alone is a vanishing quantity. The distinction between anthracite and coke furnaces is becoming almost traditional, and its longer maintenance serves no special purpose.

The estimated output of pig iron at the opening of the year shows some reduction from the December figure, on account of the banking of a number of furnaces over the holidays. This has been especially the case in the South. This is not a permanent condition, however, and the number of active furnaces will be increased before the end of the month. Unsold stocks of pig iron on January 1st were 127,500 tons, an increase of 14,000 tons during December. This does not include the stocks held by the large steel companies for their own use.

The markets generally have been quiet, and they seem to recover slowly from the holiday rest. In all directions they are strong, however, and everyone seems to regard the present quiet as only a passing condition. Some disposition on the part of buyers to hold back in the hope of getting concessions is developing, but sellers regard this with perfect equanimity, feeling that the advantage is all on their side. This disposition is especially manifest in foundry irons, where there is some uncertainty, and some large buyers have not arranged for supplies beyond the first quarter.

In finished material there is no sign of an abatement of demand, and we hear of several large contracts soon to be brought on the market. The troubles in the sheet iron trade seem to be in a fair way toward settlement, and negotiations for a combination have been renewed.

Birmingham, Ala. Jan. 8.

(From Our Special Correspondent.)

The condition of the pig iron market in this section of the country is still very satisfactory. During the last 10 days one furnace has blown in, and within a fortnight the Gadsden Furnace, belonging to the Alabama Consolidated Coal and Iron Company, will be ready for the torch. There has been some trouble experienced in getting a full supply of raw material, especially coal, and as a consequence one or two furnaces have been compelled to bank fires for a little while.

The local consumption has been interrupted some, the Birmingham rolling mills, using several hundred tons of iron a day, being shut down for the last 10 days. It is given out that the cause of the shut-down is the short supply of coal, but on the inside the information is gleaned that there is a hesitancy about the contracts for both metal and fuel. The Republic Steel and Iron Company operates the Birmingham mills. This company has furnaces in this district besides coal mines, but the production of iron and coal is not sufficient for both the Birmingham and Gate City mills. It will not be many months before this company will be in a position to furnish all the iron it needs and also coal, plans having already been drawn for the construction of two more furnaces at

Thomas, and the opening of a large coal mine near Brookside.

The announcement is made that Morris Adler & Brothers, the majority stockholders in the Bessemer rolling mills, which have been repaired and are almost ready to go into blast, have sold out, and that the Republic Steel and Iron Company has been the purchaser. The mills will be completed and put in operation in the near future. There is a good demand for finished iron, and the stocks on hand at the mills hereabouts have been worked down considerably.

The Sloss-Sheffield Steel and Iron Company last week blew in the Philadelphia furnace at Florence, Ala. The Alabama Consolidated Coal and Iron Company will blow in the Gadsden Furnace next week. The Vanderbilt Furnace belonging to the Tutweiler Coal and Iron Company will resume operations at once. The second Ironaton furnace is ready for blast. All the ore mines in the State are being filled with labor, as the demand for iron ore is enormous.

The steel plant at Ensley will be in full operation in a few weeks. The three furnaces which have been running at the steel plant since November have turned out quite a lot of steel, and a few days ago the blooming mill was put in operation, and the ingots are being put into mercantile shape. The steel wire and rod mill will not be ready for operation yet for three or four weeks, possibly two months. This plant will be the most extensive in the district when completed, its cost ranging between \$2,000,000 and \$2,250,000.

There is some talk in this section of the country that the Carnegie Company of Pennsylvania is purchasing ore and furnace properties in this State. During the past 10 days representatives of that company have been in the Birmingham District, and it is asserted that they will be followed shortly by others, who will begin a movement looking to a big purchase. The furnaces at Anniston, ore properties in that section of the State and other properties are the objective.

The following are the quotations given for pig iron: No. 1 foundry, \$18.50; No. 2, \$17.50; No. 3, \$16.50; No. 4, \$16.25; gray forge, \$16; No. 1 soft, \$18.50; No. 2, \$17.50.

There is not much iron in the warrant yards in this district, nor in Bessemer, 12 miles below here. Mr. W. J. Sleep, who was with the Warrant Company for years, has retired from the management of the yards hereabouts and has been succeeded by Mr. Shelow, of Chattanooga.

Buffalo, Jan. 10.

(Special Report of Rogers, Brown & Co.)

The week in review has been quiet so far as sales have been concerned. It is almost too early in the new year to expect buyers to begin purchasing. Shipments on existing orders have been up to the full capacity of local furnaces. Prices remain firm on the basis mentioned below. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 Strong Foundry coke iron, Lake Superior ore, \$24@24.50; No. 2 Strong Foundry coke iron, Lake Superior ore, \$23.50@24; Ohio Strong Softener No. 1, \$24.50@24.75; Ohio Strong Softener No. 2, \$23.25@23.75; Jackson County Silvery, 8%, \$31; Southern Soft No. 1, \$23.50; Southern Soft No. 2, \$22.50; Lake Superior Charcoal, \$26@27; Coke Malleable, \$24.50@25.

Chicago, Jan. 9.

(From Our Special Correspondent.)

Pig Iron.—There has not been much business transacted during the week, a temporary lull having come on the market. Sales made were but few—a car-load up to 500 tons here and there. There has been no advance in prices on either Northern or Southern iron, because of the recent advance of freight rates on Eastern railroads. Inquiries are beginning to come in more freely. Deliveries by nearly every furnace are as yet behind, with but little prospect of their catching up for months to come. Prices continue firm as follows: Lake Superior charcoal, \$25.50@26; local coke foundry No. 1, \$24.50@25; No. 2, \$23.50@24; No. 3, \$22.50@23; local Scotch No. 1, \$25@25.50; Ohio strong softeners No. 1, \$25.50; Southern coke No. 1, \$22.85@23.85; No. 2, \$21.85@22.85; No. 3, \$21.10@21.85; Southern coke No. 1 soft, \$22.85@23.85; No. 2 soft, \$21.85@22.85; Southern silvery, \$26.

Cleveland, O. Jan. 9.

(From Our Special Correspondent.)

Iron Ore.—Very little transpired in the ore business during the past week. There were a few sales made for immediate wants, but the return of the activities of a few weeks ago is still awaited. This condition of the trade may continue for some time, but a change is more apt to take place any day. There appears to be a readiness on the part of buyers to make purchases, and there is little doubt of large sales in the near future, which will perhaps cover all the ore which will be taken out this year. Indications point to a still larger business than during the past year. The following are the prices for the year 1900: Specular and magnetic ores, Bessemer quality, \$6@6.50; specular and magnetic ores, non-Bessemer quality, \$5@5.25; Red hematite ores, Bessemer quality, \$5@5.50;

red hematite ores, non-Bessemer quality, \$4@4.50.

Pig Iron.—The trade in pig iron has also been light. Buyers seem to have had enough iron on hand for immediate use, and attention is supposed to have been given chiefly to the annual inventory and the closing up of last year's business. The market remains very firm, with no inclination to sell any kind or grade of iron for less than the latest advanced prices. The following are the present quotations for iron f. o. b. Cleveland: Lake Superior charcoal, \$26; Bessemer, \$25; No. 1 foundry, \$24.25; No. 2, \$23.75; No. 1 Ohio Scotch, \$24.75; No. 2, \$23.75; gray forge, \$21.

Philadelphia, Jan. 11.

(From Our Special Correspondent.)

Pig Iron.—The only feature which has been developed since the opening of the year is a degree of anxiety resulting in inquiries for pig iron for foundry use. The correspondence had with handlers of Southern irons for the past three days would indicate that a certain class of buyers throughout the East contemplated making provisions for summer requirements by placing early contracts. Southern representatives decline to give any definite information on this point, probably because the matter is hanging fire. Mill owners who have been seen say that they will not anticipate their requirements sooner than they are obliged to, on the supposition that from their way of looking at it there is more likelihood of a weakening of prices than an advance. Quotations remain just where they have been for several weeks.

Billets.—There are several urgent buyers in the East, and some transactions have been closed for small lots. Mill owners are utterly indifferent, and are not meeting desiring buyers half way, and are not even holding out the olive branch. While they have not been booking very many orders lately, they know that the consumptive requirements for billets will keep all mills crowded this year, hence their indifference. No change in quotations.

Merchant Bar.—The promised revival of demand for the middle of January shows some signs, but the outside quotations which mill men insist upon is restricting business to a minimum volume. All the large consumers of merchant bar who are in the habit of contracting away ahead made very favorable terms for the iron they have been using for the past two or three months, and they do not appreciate having to pay the prices that are now quoted.

Skelp Iron.—An inquiry or two for skelp iron is now under consideration.

Sheet Iron.—In a retail way sheet iron is bringing the very outside cent. In a wholesale way there is nothing worth reporting. As to the expression of opinions there is very little difference among manufacturers. The talked-of combination is exciting a good deal of interest.

Merchant Steel.—The representatives of merchant steel makers say that the business of the new year has been of very restricted proportions thus far. The large buyers are undetermined as to what is the best course to pursue. They are satisfied that the manufacturers are not obliged to yield a point for business, but there is a hesitancy among a few, but not all, to rush in business, beyond a prudent covering of actual or probable requirements.

Plate Iron.—A good deal more is talked of than warranted concerning the reductions in iron and steel plate. The reductions appear to be confined mainly to Western mills. Certain buyers of plate in this market who have been seen within a day or two say that the stringency as to getting orders accepted is coming to an end, although this does not mean that orders can be filled within 60 days. Prices are firm and particularly in small lots.

Structural Material.—Constructing engineers who are familiar with what is going on behind the scenes say that a good deal of figuring is being done upon big work, but that is all the information they will give at present.

Steel Rails.—Steel rail representatives say that the only reason why more business is not being done at this time is that they are unable to promise deliveries of rails just at the time wanted. Most of the mills in Pennsylvania are now running on big orders. No change in quotations.

Old Rails.—The market is dull.

Scrap.—No change in quotations. Prices very strong.

Pittsburg, Jan. 10.

(From Our Special Correspondent.)

The iron and steel market continues quiet, but remarkably firm. No new business of any consequence has been offered this year, and until it does come, there will not likely be any change in prices. Buyers who have been waiting for better rates before contracting for their requirements will soon find that the delay in placing their orders has been useless. There are

no prospects of a decline and a stiffening of prices may be expected when active buying begins. The dull season at the close of the year did not have any effect on the markets, as is usually the case. Business is expected to improve within the next few weeks. It is a difficult matter now to purchase raw material in large quantities for delivery during the first quarter of the year, and it may soon be impossible to obtain anything before July 1st. Bessemer pig iron is quoted at \$25@25.25 for delivery during the first three months of the year, and only small lots can be had at those prices. Foundry irons are keeping pace with pig iron, and the indications point to much higher prices before many days. No. 2 foundry is held at \$23 Pittsburg, and gray forge at \$21.50. The steel market is quiet, and no sales of any consequence were made during the week. Billets are still quoted at \$35.50, but some have been sold for delivery during the first quarter at a higher price. The outlook is considered very satisfactory. The plate market is unchanged, and but little tonnage is being placed so far. A heavy volume of business in beams and channels is expected within the next few weeks. Some of the tonnage contracted for last year has not yet been delivered, and there are enough orders on hand to keep the mills busy for at least two months. The bulk of the output of ferro-manganese has been contracted for, and only small lots are offered. The sheet market is much stronger, and some mills are refusing orders at present prices. Galvanized sheets have also stiffened, and higher prices are expected. While there has been no material change in prices there is a much better feeling and an advance may be looked for soon.

Pig Iron.—The market is firm, and \$25@25.25 Pittsburg is quoted for Bessemer, the price at the Valley furnaces being \$24. There are no indications of a decline. A few small sales were made during the week. Foundry irons are also keeping up well, and higher prices are likely to rule soon. No. 2 is quoted this week at \$23.

Steel.—The market is quiet, and prices remain unchanged. Bessemer steel billets are still quoted at \$35.50, but an increase is expected when active buying begins. Steel bars are firmer than at any time during the past six weeks, but prices are unchanged.

Sheets.—The market has developed a much stronger tone during the past week. No. 27 is still quoted at 2.80@2.85c., and No. 28 at 2.90@2.95c.; but these prices will not prevail much longer. Several concerns are refusing to take any orders at the present prices.

Ferro-Manganese.—The price of \$125 still rules, and will likely remain unchanged for some time, as most of the output has been contracted for and only small lots can be had.

New York. Jan. 12.

The local iron market is quiet, but not as quiet as usual at this season. There are plenty of inquiries and some sales.

Pig Iron.—There has been some business done the past two weeks, mostly small lots. Sellers are not quite as firm regarding prices as they were. We quote for delivery to July. Northern brands, tidewater delivery: No. 1 X foundry, \$24.75@25.25; No. 2, \$23.25@24; No. 2 plain, \$22.50@23; Southern brands, New York delivery: No. 1 foundry, \$23@23.50; No. 2 foundry, \$22@22.50; No. 1 soft, \$21.75@22.25; No. 2 soft, \$20.75@21.25; No. 3 foundry, \$21.50.

Warrant irons show only minor fluctuations, Alabama No. 2 going from \$15½@17; No. 3 was steady at \$15; No. 4, \$15; gray forge, \$15.

Plates.—Inquiries are coming in, but buying is light. A lot of 2,000 tons is in the market for bridge work for a large railroad. We continue to quote for larger lots at tidewater: Tank, ¼-in. and heavier, 2.70c.; tank, 3/16-in., 2.80c.; shell, 2.90c.; flange, 3c.; marine, 3.10c.; firebox, 3.10c.; universals, 2.70c.

Bar Iron and Steel.—The demand for bars is pretty easy, and prices show little change. We quote refined iron as high as 2.30c. on dock, and common up to 2.15c. Soft steel bars, 2.45c.

Structural Material.—Contracts for new buildings continue to be placed. We quote for large lots of steel at tidewater: Beams, 15-in., 2.45c.; tees, 2.45c.; channels, 2.45c.; angles 2.45c.; with higher figures for prompt delivery and small lots.

Steel Rails and Rail Fastenings.—The market continues without a stir. We quote for standard sections \$35@36 f. o. b. Eastern mills. Smaller rails are quoted: 12-lb., \$40; 16-lb., \$40; 20-lb., \$40; 30-lb. to 40-lb., \$38; 40-lb. to standard, \$37, with the usual advance for small orders. We quote angle bars, 2.45c.; fish plates, 2.40c.; spikes, 2.75c.

Nails.—Sales are light and mostly for small lots. Prices for wire nails are \$3.55 for carload lots on dock; for cut nails in carloads on dock, \$2.70.

Wrought Iron Pipe.—Demand is moderate. Discounts are unchanged.

METAL MARKET.

NEW YORK, Jan. 12, 1900.

Gold and Silver.

Gold and Silver Exports and Imports At all United States ports in November and year.

Metal.	November.		Year.	
	1898.	1899.	1898.	1899.
GOLD.				
Exports	\$913,467	\$264,310	\$14,975,316	\$33,521,900
Imports	5,324,601	2,904,043	149,406,770	45,714,718
Excess	I. \$4,411,134	I. \$2,639,733	I. \$134,431,451	I. \$12,192,818
SILVER.				
Exports	4,023,079	4,439,166	47,969,406	47,860,823
Imports	2,269,259	2,772,360	25,921,927	27,818,150
Excess	E. \$1,753,820	E. \$1,666,806	E. \$22,047,479	E. \$20,042,673

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

Gold and Silver Exports and Imports, New York For the week ending January 11th, 1900, and for years from January 1st, 1890, 1899, 1898, 1897.

Per.iod.	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$553,450	\$99,948	\$556,026	\$57,289	E. \$952,239
1900..	745,150	166,443	1,224,578	96,296	E. 1,706,935
1899..	105,886	15,315	348,850	93,690	E. 848,231
1898..	25,000	804,735	850,493	141,230	E. 70,529
1897..	42,410	124,169	427,601	25,736	E. 320,102

Exports of both gold and silver for the week went chiefly to Great Britain. Imports of gold were from the West Indies; of silver from Mexico and South America.

The United States Assay office in New York reports the total receipts of silver at 136,000 oz. for the week.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$.47½	\$.45
Peruvian soles and Chilean pesos.....	.43¾	.45
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.84	3.88
Twenty marks.....	4.74	4.79
Spanish 25 pesetas.....	4.78	4.82

Average Prices of Silver per oz. Troy.

Month.	1899.		1898.		1897.	
	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.
January..	27.42	59.36	26.29	56.77	29.74	64.79
February..	27.44	59.42	25.89	56.07	29.68	64.67
March.....	27.48	59.64	25.47	54.90	28.96	63.06
April.....	27.65	60.10	25.95	56.02	28.36	61.85
May.....	28.15	61.23	26.31	56.98	27.86	60.42
June.....	27.77	60.43	27.09	58.61	27.58	60.10
July.....	27.71	60.26	27.32	59.06	27.36	59.61
August....	27.62	60.00	27.48	59.54	24.93	54.19
September.	27.15	58.89	28.05	60.08	25.06	55.04
October..	26.70	57.98	27.90	60.42	26.77	57.57
November.	27.02	58.67	27.93	60.60	26.87	57.93
December.	27.21	58.99	27.45	59.42	26.83	58.01
Year....	27.44	59.58	26.76	58.26	27.55	59.79

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

Average Prices of Metals per lb., New York.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1899.	1898.	1899.	1898.	1899.	1898.	1899.	1898.
Jan.....	14.75	10.99	22.48	13.87	4.18	3.65	5.34	3.96
Feb.....	18.00	11.28	24.20	14.08	4.49	3.71	6.28	4.04
March....	17.54	11.98	23.82	14.38	4.37	3.72	6.31	4.25
April....	18.43	12.14	24.98	14.60	4.31	3.63	6.67	4.26
May.....	18.25	12.00	25.76	14.52	4.44	3.64	6.88	4.27
June.....	17.93	11.89	25.85	15.22	4.43	3.82	5.98	4.77
July.....	18.33	11.63	29.63	15.60	4.52	3.95	5.82	4.66
August..	18.50	11.89	31.53	16.23	4.57	4.00	5.65	4.58
Sept....	18.46	12.31	32.74	16.03	4.58	3.99	5.50	4.67
October..	17.76	12.41	31.99	17.42	4.575	3.78	5.32	4.38
Nov.....	16.93	12.86	29.51	18.20	4.575	3.70	4.64	5.29
Dec.....	16.40	12.93	25.88	18.30	4.64	3.76	4.66	5.10
Year....	17.61	12.03	25.12	15.70	4.47	3.78	5.75	4.57

The price given in the table is for Lake Copper. The average price of electrolytic copper in January was 14.26c.; in February it was 17.02c.; in March, 16.35c.; in April, 17.33c.; in May, 17.20c.; in June, 16.89c.; in July, 17.069c.; in August, 17.42c.; in September, 17.34c.; in October, 16.94c.; in November, 16.49c.; in December, 15.85c.; for the year 1899 the average was 16.67c.

Financial Notes of the Week.

An exceptionally well-informed party comments on the money market as follows: "Money rates abroad have declined again, even Paris feeling the downward impulse. Sterling exchange is easier, both on the European continent and here. Probably our gold export movement is to all intents and purposes over for the season. During the past four weeks very near \$15,000,000 has been exported. During the same period the Treasury's gold holdings have decreased almost exactly \$9,000,000, and its actual cash balance not quite \$5,000,000. This shows that, although most of the exported gold has been provided by the Government through redemption of bonds and anticipated interest, nearly one-third of the gold sent to the Bank of England, and two-thirds of the shipment regarded as simple cash, have come from the bank reserves."

Imports and Exports of Metals.

Port.	Week, Jan. 10.		Year 1900.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum..... long tons				
Antimony ore..... "				
" regulus..... "				
Chrome ore..... "				
Copper, fine..... "	1,739	377	3,235	627
" matte..... "				50
" ore..... "				
" ash..... "			224	224
" sulphate..... "				
" other..... "				
Ferro-manganese..... "				
Iron ore..... "		5,100		5,100
" pig, bar, rod..... "				
" plates, sheets..... "	378		378	
" other..... "				
Lead..... "	940	800	1,040	800
" ore..... "		350		1,350
Manganese, ore..... "			13	13
Metals, old scrap..... "				
Composition..... "				
Nails..... "	1,016		1,016	
Nickel..... "	10		10	
" Ore..... "				
Rail'd material..... "	58		58	
Rails, old..... "				
Spiegeleisen..... "				
Steel bars, plates..... "				
" rails..... "	1,165		1,165	
" hoops..... "				
" wire..... "	299		299	
" not speci'd..... "	117		117	
Tin..... "		175		450
" dross or ashes..... "				
" and black plates..... "		1,727		727
Zinc..... "				
" dross..... "				50
" ashes, skim..... "	17		17	
" ore..... "	1,506		1,506	
" oxide..... "	145		145	
†Baltimore.				
Alumina..... bags				
Antimony regulus..... casks				
Chrome Ore..... long tons	431	164	431	164
Copper, fine..... "				
" matte..... "	243		243	
" sulphate..... "				
" pipe..... "				
Ferro-manganese..... "				
Ferro-silicon..... "		370		610
Iron pig, bar, etc..... "		11,714		20,739
" pyrites..... "				
Manganese ore..... "		5,220		5,595
Metals, old & Rails..... "				
Nails..... "	200		200	
Pipe, iron & steel..... "	235		235	
Spiegeleisen..... "				
Steel, bars, plates..... "	464	20	464	20
" wire..... "				
" rails..... "	4,712		4,712	
" not specified..... "				
Tin..... "		25		25
" and black plates..... "		1,309		309
" other..... "				
Zinc..... "				
" dross, skim..... "				
" oxide..... "				
*Philadelphia.				
Antimony..... long tons				
Chrome ore..... "				
Copper, fine..... "	171		442	
" ore..... "				
" old..... "				
Ferro-manganese..... "				
Ferro-silicon..... "				
Iron, pig..... "				
" ore..... "				
" pyrites..... "				
Manganese ore..... "				
Steel sheets..... "				
Spiegeleisen..... "		25	25	
" and black plates..... "				
Zinc dust..... "				
" ore..... "				

Total United States—\$§

Articles.	November.		Jan.—Nov.	
	Expts.	Impts.	Expts.	Impts.
Antimony..... long tons			8	129
" ore..... "		121		3,879
Copper fine..... "	11,119	4,804	95,868	28,707
" sulphate..... "	124		11,924	
" ore & matte..... "	172	1,522	4,519	21,438
Iron, pig & bar..... "	9,283	8,216	227,386	51,750
" ore..... "	550	62,089	22,833	560,419
Iron & steel plates..... "	799	1,655	55,062	5,974
Iron & steel rails..... "	23,227	216	246,497	2,134
" wire..... "	10,195	100	108,021	2,247
Steel, billets..... "				
" rods, etc..... "	4,408	2,749	71,134	28,091
Lead, pigs, bars..... "				
" & old..... "	2	1	51	209
Lead in ore, etc..... "	5,484	6,175	62,453	75,384
Nails, cut..... "	821		8,983	
" wire..... "	2,863		27,128	
Tin..... "	61	1,150	423	30,453
" & black plates..... "	10	5,389	252	54,140
Zinc..... "	26	103		

The silver market has continued steady and dull, without special feature, but closes lower at 27d. in London, on higher rates in Bombay.

The statement of the United States Treasury on Wednesday, January 10th, shows balances in excess of outstanding certificates as below, comparison being made with the statement of the corresponding day last month.

Table with columns: Dec. 10, Jan. 10, Changes. Rows: Gold, Silver, Legal tenders, Treas. notes, etc., Totals.

Treasury deposits with national banks amounted to \$92,127,428, an increase of \$8,140,077 during the week.

The statement of the New York banks—including the 63 banks represented in the Clearing House—for the week ending January 6th gives the following totals, comparison being made with the corresponding weeks in 1899 and 1898:

Table with columns: 1898, 1899, 1900. Rows: Loans and discounts, Deposits, Circulation, Reserve, Specie, Legal tenders, Total reserve, Legal requirements, Balance, surplus.

Changes for the week this year were increases of \$4,107,600 in loans and discounts, \$8,906,200 in deposits, \$191,400 in circulation, \$504,800 in specie, \$2,311,400 in legal tenders, and \$589,650 in surplus reserve.

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:

Table with columns: Banks, Gold, Silver, 1899, 1900. Rows: N.Y. Ass'n, England, France, Germany, Spain, Aus-Hun, Neth'lds, Belgium, Italy, Russia.

The returns of the Associated Banks of New York are of date of January 6th, and the others are of date of January 4th, 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 year up to December 28th, 1899, are reported by Messrs. Pixley & Abell's circular as follows:

Table with columns: 1898, 1899, Changes. Rows: India, China, The Straits, Totals.

Arrivals for the week this year were £168,000 from New York, while shipments were £187,000 to Shanghai, and £80,000 to Bombay—all bar silver.

The coinage executed at the United States mints in December, and the six months of the fiscal year, is reported by the Bureau of the Mint as below:

Table with columns: Denomination, Pieces, Value, December, July-Dec. Rows: Double eag's, Eagles, Half eagles, Quarter eag's, Total gold, Dollars, Half dollars, Quarter dol's, Dimes.

Total silver 5,859,378 \$1,886,604.95 40,362,299 \$13,286,078.70 Five c. nick's 3,700,777 185,038.85 20,291,087 1,014,554.85 One c. bronze 17,028,777 170,287.77 40,956,097 469,560.97

Total coinage 20,729,554 \$355,926.62 61,247,194 \$1,424,115.82 Total co'age 27,219,529 \$9,711,884.07 105,149,654 \$60,139,394.52 As compared with November, the total coinage in December shows an increase of \$200,814, principally in gold. The silver coinage was less than for November by \$725,395.

Indian exchange has been rather easier, and Council bills were sold in London at an average of 16.06d. per rupee. There was very little buying of silver in London over the close of the year.

Other Metals.

Daily Prices of Metals in New York.

Table with columns: January, Sterling Exchange, Silver (Fine oz., London, Lake), Copper (Elec-tro-lytic, Lond'n stand-ard), Tin, Lead, Spelter. Rows: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

The quotations given for electrolytic copper are for cakes, ingots and wirebars; the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—The market is quiet but the tendency appears to be toward hardening. Demand from manufacturers here is said to be light, but inasmuch as the exports during December were the largest on record for some years and those for January are expected to be not much behind, prices have been influenced favorably and are likely to be still more so should the demand in this country revive, as it no doubt will in the near future. Business with manufacturers here is said to be quite good and is expected to increase considerably as a result of the change in the price of brass, which has been decided upon at a recent meeting of the Brass Manufacturers' Association. We quote Lake copper at 16 1/2 @ 16 3/4 c.; electrolytic at 15 1/2 @ 15 3/4 c. in cakes, wirebars and ingots, and at 15 1/4 @ 15 1/2 c. in cathodes. Casting copper is nominal at 15 1/4 @ 15 1/2 c.

In London the market opened this week at £69, being 10s. higher than the close of the previous week. The following day values improved to £70 for both spot and three months, and ruled at these figures until to-day, when £70 2s. 6d. @ £70 5s. is quoted for both spot and three months.

Refined and manufactured sorts we quote: English tough, £74 @ £74 10s.; best selected, £75 10s. @ £76; India sheets, £80; strong sheets, £82; yellow metal, 6 1/2 d.

A dispatch from Houghton, Mich., January 11th, reports that "the Calumet & Hecla Company is shipping a large consignment of copper to Russia by way of San Francisco, Nagasaki and Port Arthur, China. The expense of overland shipment is very heavy and the dispatch with which the order is being filled marks urgent requirements, leading to the presumption that the copper so obtained is destined to fill pressing needs in naval and military equipment."

Tin.—The erratic movements characteristic of this article are still in evidence. Prices have fluctuated between 25 and 26 1/2 c., but delivery at seller's option during this month and for February has been selling at a discount of 1/2 @ 1 1/2 c. At the close the price quoted for spot is 27 1/2 c.

The London market closed last week at £111 5s., opened on Monday at £108 10s., advanced on Tuesday to £112, and on Wednesday to £113; it then declined to £111, and closes at £116 10s. @ £116 12s. 6d. for spot, and £1 higher for three months.

Lead remains quite steady at 4.70c. New York and 4.65c. St. Louis.

Prices abroad, which had advanced to £16 15s., have eased off during the last few days.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull but firm at nominally 4.60c. Neither buyers nor sellers are making any special efforts to trade.

Spelter.—Prices are again somewhat easier, the metal being quoted now at 4 1/4 c. in New York, and 4.25c. in St. Louis.

The European market, too, is somewhat easier, the prices having declined from £20 12s. 6d. to £20 5s. 9d. for good ordinary brands and £20 10s. for special brands.

Antimony remains without any notable change. We quote Cookson's, 10 1/2 @ 11c.; Hallett's, 9 1/2 @ 9 3/4 c.; U. S. Star, 9 1/2 @ 9 3/4 c.

Nickel is firm and demand very brisk. Quotations are firm at 40 and 45c., according to size of order.

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

Table with columns: Aluminum, Per lb., Bismuth, Magnesium, Phosphorus, Tungsten, Ferro-tungsten. Rows: No. 1, 99% ingots, No. 2, 90% ingots, Rolled sheets, Alum.-bronze, Nickel-alum.

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

Platinum.—Demand is good, and prices are firmer. In large lots we quote \$17.75, and for smaller quantities, \$18 per oz., in New York.

For chemical ware (crucibles and dishes), best

hammered metal, we quote as follows: In lots of 250 grams or more, 67 1/2 c. per gram, and for smaller quantities, 70c. per gram; unmanufactured platinum will be supplied in same quantities at 2c. less per gram.

Quicksilver.—The New York price is unchanged at \$51 per flask for large lots. Smaller quantities sell at \$52.50 @ \$54. The London quotation is £9 12s. 6d., with £9 11s. 3d. named from second hands.

LATE NEWS.

A dispatch from Pittsburg, January 11th, says: "Three hundred men employed in the coal mines of the Pennsylvania Salt Manufacturing Company's plant at Natrona, struck for higher wages to-day. They demand from 2 to 20% increase. The coal supply of the works is shut off by the strike."

A dispatch from Bowling Green, Ohio, January 11th, says: "J. G. Hickok and M. B. Chidester of Bowling Green, have closed a deal with the entire oil interests of the Palmer Oil Company. The price to be paid is \$300,000. The purchase includes 540 acres in fee in Wood County and leases on 3,225 acres in Wood and Hancock counties. There are 155 producing wells on the property with a monthly production of 15,600 barrels."

Cable advices state that on January 11th the Bank of England reduced its discount rate from 6% to 5%. At the opening of 1899 the rate was 4%; the lowest point reached during the year was 3%, which was maintained from February 2d to July 12th. It was advanced gradually, reaching 6% on November 30th.

On January 11th, also, the Bank of France reduced its rate from 4 1/2 % to 4%. The rise in the French rate began December 7th. Previously it had been 3% from October 19, 1898; and before that, 2% continuously from March 14, 1895.

Receipts of specie from Mexico at San Francisco, chiefly by rail, for the quarter ending December 31st, were \$177,577 gold and \$1,000,579 silver. For the full year the receipts were as follows:

Table with columns: 1898, 1899. Rows: Mexican dollars, Silver bullion, Gold bullion, Total.

These imports, especially the silver, have fallen off considerably in the past two years, and the total last year is the smallest in many years. In 1897 these receipts were \$11,899,829, including \$10,618,128 in Mexican dollars. There is no longer that profit in shipping the dollars to China that formerly existed.

(From Our Special Correspondent.)

In the shake-up of coppers in Boston it now seems evident that the Standard Oil folk have no intent of taking in United States mining at Bingham, Utah, at \$10, or any lower price. What is to become of these properties is not easy to foretell, and the committee of bankers and brokers who are nominally in control recognize they have a white elephant on their hands and that Standard Oil has no desire to take it off their hands. In this connection it has come to the surface that Standard Oil no longer holds the control of Utah Consolidated, but Mr. Samuel Newhouse, Messrs. George E. Armstrong & Co. and their associates have the bulk of the stock. This change of ownership of the control may have not a little to do with the proposed enlargement of the smelter and indicates that Standard Oil is not to be longer identified with Utah mining and smelting. At least, such is the undercurrent of opinion among the best informed mining men of Boston.

(From Our Special Correspondent.)

The bi-monthly adjustment of iron workers' wages at Youngstown, Ohio, January 11th, resulted in an advance under the sliding scale of the Amalgamated Association. Secretary James H. Nutt, of the labor bureau of the Republic Iron and Steel Company, who, with officials of the Amalgamated Association, conducted the examination, issued the following statement: "The examination of the returns received show that the average price received for shipments of base sizes of bar iron entitled the workmen to be paid on a 1.8c. basis, which, according to the scale, will make the new price for boiling \$5.75 a ton, or an advance of 25c. a ton over the wages paid during November and December. The price for bar mill heating and rolling will be 69.1c. a ton, or an advance of 2.6c. a ton over November and December, 1899, and 4% advance for guide and 10-in. mills. This advance will make an aggregate raise of nearly 44% to the boilers since April last, making the highest wages paid since the boom year of 1879-1880, and to the men on the bar mills the advance is 35% over the wages prevailing in April, 1899."

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 70.)

New York, Jan. 12.

Heavy Chemicals.—Stocks are low and prices firm. Domestic alkali over next fire sold at 80¢ per 100 lbs. f. o. b. works. Immediate shipments are booked by second hands at 87½¢@90¢. f. o. b. works, and store lots sold at \$1 and upward. Foreign alkali is unchanged. Domestic caustic soda was booked on 1900 contracts at \$2@2.10 f. o. b. works, and foreign at \$2.30. Powdered caustic soda is higher. Sal soda is in fair request at quotations. Bicarb. soda sold for export at \$1.25 f. o. b. works for ordinary grades. Chlorate of potash crystals are small in stock, while powdered is quiet.

Bleaching powder is scarce and higher, and sales of French were reported from dock at \$2.25@2.37½ per 100 lbs. Imports at New York since January 1st were: Bleaching powder, 239 casks, and 25 boxes from Liverpool; alkali, 1,334 casks; caustic soda, 455 drums, 110 bbls. and 50 boxes; soda crystals, 420 casks, 100 bbls. and 56 bbls.

Articles.	Domestic.		Foreign.
	F.o.b. Works.	In New York.	In New York.
Alkali, in bags.	80@90c.	95@1.00	95@1.00
Caustic Soda, high test.	\$2.00@2.10	\$2.10@2.20	\$2.30@2.40
98% powd.	3.67½@4.00		
60@74% pvd	2.75@2.87½		
Sol Soda	60@70c.		67½
"conc.	1.45@1.75		1.60@1.65
Bicarb. Soda.	1.25@1.37½		2.25@2.37½
"extra	3.25@3.50		
Bleach. Pdr., Eng. prime.			2.50@2.75
other brands.			2.25@2.37½
Chl. Pot. Cryst. powd.		9.00@9.25	9.50@9.75
		9.00@9.12½	9.25@9.37½

Prices are generally for large quantities, and in many cases depend upon make, test and package.

Acids.—Consumption is good and prices firm, excepting for blue vitriol, which has sold at \$4.87½ per 100 lbs.

Quotations are in large lots delivered in New York and vicinity, per 100 lbs. unless otherwise specified.

Acetic, No. 8.	\$1.60	Nitric, 42°	4.75@5.00
Blue Vitriol, best	5.00@5.12½	Oxalic	5.75@6.00
Muriatic, 15°	1.20@1.25	Sulphuric, 66°	1.20@1.25
Muriatic, 20°	1.35@1.40	Sulphuric, 60°	1.05@1.10
Muriatic, 22°	1.50@1.55	Bulk 50° ton.	16@17.00
Nitric, 36°	3.87½@4.12	Sulphurous, 100%	
Nitric, 38°	4.12½@4.37½	SO ₂ anhydrous.	8.00@10.00
Nitric, 40°	4.37½@4.75		

Brimstone.—Arrivals at New York were 2,650 tons. Sales of best unmixed seconds were made at \$21.50@21.75 per ton, and shipments are quoted \$20.50@20.75, though \$21 has been asked. Thirds are worth \$2 less per ton. Refined sulphur has advanced 5c., selling in large lots at \$1.75 per 100 lbs. for roll and \$1.85 for flour, while less than carload quantities rule higher.

Pyrites.—The year opens with firm prices and an improved demand. Of Spanish iron pyrites there was an importation at this port of 1,944 metric tons.

We quote American pyrites as follows: Mineral City, Va., lump ores, \$4.50 per long ton (basis 42%), and fines \$4.20; Charlemon, Mass., lump, \$5.50, and fines, \$4.75; Pilley's Island, lump, \$6.50, and fines \$4.50 per long ton, delivered in New York. Spanish pyrites, 13@15c. per unit, according to percentage of sulphur contents, delivered ex-ship New York and other Atlantic ports. Spanish pyrites contain from 46% to 51% of sulphur; American, 42% to 44%, and Pilley's Island, N. F., 50%.

Fertilizing Chemicals.—A slightly better demand exists for the leading ammoniates, but the firm prices are restricting trade. Sulphate of ammonia is dull, although arrivals at this port since January 1st aggregate 1,983 bags. The primary markets abroad for sulphate of ammonia gas liquor report that the "Beckton" brand is not offered for prompt shipment, while at Leith they ask \$10 17s. 6d. @ \$11 (\$52.80@43.46 per long ton); London (outside makes), \$11 @ \$11 1s. 3d. (\$53.46@53.76); Hull, \$11. The average price of the sulphate of ammonia exported to America last month was about \$55.60, which compares with \$64.96 per long ton, the average selling price in New York. High grade Western blood sold at \$1.85 per unit f. o. b. Chicago in a large way, and at the close holders seek 5c. more per unit, against a bid of \$1.87½. Tankage is scarce and higher, and the same applies to fish scrap. The output of tankage in December was much less than 1898. Imports at this port since January 1st included 6,650 bags muriate of potash and 1,000 bags superphosphates.

Nitrate of Soda.—The spot market stiffens, owing to limited freight room and high rates. Stocks in hand here are very small and sales are reported at \$1.85@1.90 per 100 lbs., which is 25@30c. more than for the corresponding week last year. Shipments are quoted to-day at \$1.60 @ \$1.70 per 100 lbs., according to position, the lower price being offered to large consumers. It is estimated that the total shipments from the

West Coast of South America to the United States in 1899 were 125,500 long tons, or 6,000 tons more than 1898. The loadings January 1st for this country were 5,000 tons, as compared with nothing last year. The total shipments to Europe in 1899 were 1,216,000 long tons, or about 100,000 tons more than 1898. The loadings on January 1, 1900, for Europe were approximately 54,000 tons, or 16,000 tons less than January 1, 1899. The total movement to Europe and America in 1899 was 1,341,500 long tons, as against 1,235,500 tons in 1898, showing an increase of 106,000 tons, or about 8%. The total loadings on January 1, 1900, for both countries was 59,000 tons, against 70,000 tons at the same time last year, being a decrease of 11,000 tons.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York Jan. 2d, gives the following statistics:

	1899.	1898.	1897.
	Bags.	Bags.	Bags.
Imp. into Atlantic ports from West Coast S. A., from Jan. 1 to date.	927,772	955,377	599,261
Imp. from Jan. 1 from Europe		55,171	
	927,772	1,010,548	599,261
Stock in store and afloat Dec. 31, in New York	9,586	54,406	9,926
Boston.			3,500
Philadelphia.			1,207
Baltimore.	1,000	4,000	750
Norfolk, Va.			
Charleston.			
To arrive, due Apr. 15, 1900	235,000	206,000	217,000
Vis. supply to Apr. 15, 1900	245,583	264,406	232,383
Stock on hand Jan. 1, 1899.	58,406	15,383	123,593
Deliveries past month.	49,609	39,951	58,852
Total yearly deliveries.	976,592	967,525	710,971
Prices current, Dec. 31, 1899, per 100 lbs.	\$1.85 @ \$1.87½	\$1.60 @ \$1.62	\$1.80

Phosphates.—Scarcity of freight room limits exports. Charters noted are 2,130 tons from Tampa, Fla., to Helsingborg, at 20s. (\$4.80), February sailing; and 1,302 tons from Pensacola to Genoa and Civita Vecchia at 22s. (\$5.28), January sailing. Shipments of phosphates from Punta Gorda, Fla., in December were 3,205 tons to domestic ports and 2,963 tons abroad, making a total for the year 1899 of 35,077 tons domestic and 47,996 tons foreign, principally by the Peace River Phosphate Mining Company. The movement of Florida high grade phosphate rock from Savannah, Ga., in December amounted to 8,243 tons, all foreign, of which 2,687 tons went to Kobe, Japan. The total shipments from this port for the year aggregated 92,299 tons, all to foreign countries. Florida high grade rock shipments from all ports in the 11 months ending November 30, 1899, are reported by Messrs. Auchincloss Brothers at 426,148 long tons, showing an increase of 87,798 tons over the corresponding period in 1898 and 94,408 tons as compared with the 11 months in 1897. The distribution in 1899 was as follows: United Kingdom ports, 37,303 tons (27,959 tons in 1898); Baltic ports, 118,229 tons (98,186 tons); Continental, 257,232 tons (196,585 tons); Mediterranean, 7,711 tons (11,978 tons); Japan and Australasia, 3,250 tons (1,707 tons); domestic ports, 2,423 tons (1,935 tons in 1898). We note domestic charters of 1,098 tons from Tampa to Baltimore at private terms, and 491 tons from Charleston, S. C., to New York at \$3.10 and discharge.

We quote: Florida high grade, 78@80% rock, \$9.50@10 per long ton f. o. b. Fernandina. The freight rate to New York is about \$2 per ton. Florida land pebble, 68@73%, \$7@7.50 per ton, delivered in New York. Florida Peace River, rock, 58@63%, \$4.50 per ton f. o. b. Punta Gorda. South Carolina crude rock, \$4.25@4.50; hot-air dried, \$4.50@5 per long ton f. o. b. Fetterressa, S. C. Tennessee, 78@80% rock, \$4@4.50 f. o. b. Mt. Pleasant, and 75% rock, \$2.75@3 f. o. b. High grade Tennessee rock, ex-vessel New York, \$9 @ \$10 per ton. Hickman County blue-gray rock, 65%, \$2.50@2.75 per ton f. o. b. mines. Concentrated phosphates, 13@15% av. P₂O₅ 60c. per unit at sellers' works. Acid phosphates, \$6.25 per ton for 14% in bulk, f. o. b. Charleston, S. C.

Liverpool, Dec. 20.

(Special Report of Joseph P. Brunner & Co.) Business is somewhat curtailed owing to the near approach of the holidays, but the position of chemicals is very strong, and in several cases manufacturers are now declining to quote for 1900 delivery, they being afraid that production may have to be reduced owing to scarcity of labor. A large number of men employed in the chemical and allied trades belong to the reserves, and they are being called up for service owing to the unfortunate South African business, so that a labor scarcity is feared during the next few months.

Soda ash is scarce and it is difficult to place orders for certain markets. We quote range for tierces about as follows: Leblanc ash, 48%, \$4

15s. @ £5; 58%, £5 @ £5 5s. per ton net cash. Ammonia ash, 48%, £4 5s. @ £4 10s.; 58%, £4 10s. @ £4 15s. per ton net cash. Bags, 5s. per ton under price for tierces. Soda crystals are in demand and for barrels £3 2s. 6d. per ton, less 5% is generally quoted, or 7s. less for bags. Caustic soda is in very small compass and higher prices are looked for. We quote as follows: 60%, £8 5s.; 70%, £9 5s.; 74%, £9 15s.; 76%, £10 @ £10 5s. per ton net cash.

Bleaching powder is firmer for export at £6 15s. @ £7 per ton net cash for hardwood packages.

Chlorate of potash is in request and dearer at 3¼d. per lb. net cash for 1900 delivery.

Bicarb. soda is without change and selling at varying prices according to market, ranging from £5 5s. @ £6 15s. per ton, less 2½% for the finer quality in 1 cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia has gone rather dull and easier at about £11 7s. 6d. @ £11 10s. per ton, less 2½% for good gray, 24@25% in double bags f. o. b. here.

Nitrate of soda is steady at £8 @ £8 5s. per ton, less 2½% for double bags f. o. b. here as to quantity and quality.

MINING STOCKS.

Complete quotations will be found on pages 67 and 68 of mining stocks listed and dealt in at:

Boston.	Philadelphia.	London.
Colorado Springs.	Spokane.	Mexico.
Denver.	Salt Lake.	Paris.
New York.	San Francisco.	Toronto.

New York, Jan. 12.

In many of the higher-priced stocks there has been quite a recovery, though trading in them is limited. In the copper group Amalgamated has been bought on Boston account, selling up from \$83½ to \$85½, but receding again to \$83½ on Wednesday. Anaconda changed hands at \$38@40¼, and closed around \$39. British Columbia sold 500 shares at \$11, or \$2 more than was quoted two weeks ago. Tennessee was dull at \$13½@14½, Whipsaw of Arizona at \$12½ @ \$13½, Markeen at \$6@7, and Arizona Lead at \$10@10½.

American Smelting and Refining common sold from \$37½ down to \$35½, and at the close has recovered to \$36½, while the preferred fluctuated between \$86 and \$88. Standard Oil sold at \$493 @ \$488½, which compares with \$451½@450½ in the last week in December.

Standard Consolidated of California brought \$2.75; Brunswick Consolidated sold at 26c. There is delinquency on the 3c. per share assessment of the Brunswick Company 19,860 shares, of which H. R. Lounsbury is credited with 3,310 shares, E. R. Grant, 1,000 shares, and F. L. Underwood, 500 shares. These parties were interested in the contesting faction of shareholders at the last annual meeting. The annual meeting was held January 11th; the result is not yet known here.

In the Colorado section Isabella made few sales at \$1.35@1.30; Elkton at \$1.15@1.20; Work at 33@31c.; Anaconda, 45c.; Argentum-Juniata, 22@15c.; Mollie Gibson, 22c.; Zenobia, 20c.; Garfield, 16c.; Jack Pot, 60c.; Cripple Creek Consolidated, 15½@15c.; Alamo, 16@17c.; Pharmacist Consolidated, 14½@19c.; Creede & Cripple Creek, 13@10c.; Golden Fleece, 25c.; Damon, 26c.; and Findley at 14½c. Portland has declared a regular dividend of 2c. per share, and an extra of 1c., making a total distribution this month of \$90,000.

Ontario of Utah will hereafter pay quarterly dividends at the rate of 30c. per share instead of 10c. per month, owing to the great number of small shareholders. The first quarterly dividend will be paid January 20th.

A little business has been done in the Comstocks, Consolidated California & Virginia, gaining 10c. at \$1.60; Sierra Nevada receding from 48c. to 40@45c.; and Mexican from 34 to 24c.; Ophir, 75c.; Yellow Jacket, 26c.; Best & Belcher, 24c.; Belcher, 12c. (15c. assessment levied); Hale & Norcross, 48c.; Crown Point, 10c., and Potosi 20c. (10c. assessment levied).

In the industrial stocks trading has been smaller. Tennessee Coal and Iron dropped from \$87½@80½, recovering later to \$83 on Wednesday. Federal Steel sold early in the week at \$51½@53¼ for the common, and \$73@74¼ for the preferred, but later weakened to \$47½@50½ and to \$70½@72 for the preferred. This was due to disappointment in the declaration of only a 1¼% dividend on the common stock, deferred from last July in compliance with law. This dividend does not provide for the current quarter, but it is announced that on February 13th another meeting will be held by the directors. The 3% dividend on the preferred stock will be paid on January 20th. American Steel and Wire common opened at \$46¼ to \$48, receding at \$46 on Wednesday, while the preferred fluctuated between \$90 and \$91@89½. National Steel common weakened from \$44 to \$41, but strengthened again, while the preferred sold at \$92 to \$93½. Pressed Steel Car common shares will receive a quarterly dividend of 1¼%; they sold at \$58 @ \$57; the preferred, which gets a quarterly dividend of 1¼% sold at \$86. Republic Iron and

Steel sold off to \$20¼ for the common, and \$65¼ for the preferred shares, though at the close fractional gains are noted in both. Virginia Iron, Coal and Coke bonds brought \$63@63½ on the curb. Colorado Fuel and Iron common softened from \$44½ last week to \$40 on Wednesday, though at the close it is better. There was listed on the New York Stock Exchange on January 10th \$2,000,000 additional common stock, Steel sold off to \$20¼ for the common, and \$65 making \$15,000,000 to date to enlarge the Pueblo plant. American Tin Plate sold down from \$33 to \$29 for the common, while the preferred was quiet at \$81@80¾, notwithstanding the 1¾% declared payable at the end of this month. Hocking Coal and Iron common sold at \$16@15, and the preferred at \$59½@58. International Steam Pump preferred made a sale at \$64½. Flemington Coal and Coke sold 300 shares at \$21@23 on the curb, subsequent to the rumor of an early dividend.

Boston. Jan. 11.

(From Our Special Correspondent.)

The stock market has been quiet this week and not at all strong. Mining shares have been rather neglected; there have been no sales at all of some well-known stocks, while of others the dealings have been only in odd lots. Upon the whole we may characterize the market as narrow, dull and heavy.

Quotations for copper show the state of the market. Calumet & Hecla brought \$750; Boston & Montana, \$250; Tamarack, \$189; Quincy, \$150; Amalgamated, \$85; Osceola, \$72½; Wolverine, \$41½; Parrot, \$40; Butte & Boston, \$44; Utah, \$27; Isle Royale, \$24; Old Dominion, \$20; Arcadian, \$19½; Franklin, \$14; Arnold, \$7½; Allouez, \$3. In the gold and miscellaneous list Centennial-Eureka was quoted at \$23; American Zinc, \$17; Cochiti, \$12½. There was a fall in United States Oil, which closed at \$20½; Central Oil, \$20. Dominion Coal common brought \$44½, while New England Gas and Coke sold at \$22.

The Boston stock market evidently opens the year in bad shape. The introduction of blind pool tactics has thoroughly demoralized the copper stocks, and there is an ugly undertow which threatens trouble in the future. We shall not hear the last of the Globe Bank business for a good while. Meantime speculators—and investors too—are so far crippled as to limit dealings to a large extent.

In short, Boston is not only hard hit, but is very mad about it, and determined to get even some day, though how to do it is not at all clear yet.

San Francisco. Jan. 6.

(From Our Special Correspondent.)

The opening week of the year was broken up by the holiday, and business has been very light, with prices generally weak. Some quotations noted are: Consolidated California & Virginia, \$1.35@1.40; Ophir, 66c.; Sierra Nevada, 40c.; Potosi, 21c.

To vary the monotony of the reports of the work in the Comstock mines, the news comes from Virginia City that the ground owned by the Hale & Norcross Mining Company on the Brunswick lode and the claims of the Kentucky Consolidated Mining Company at Gold Hill have been jumped.

It is stated that Thomas Pearce and Edward Bowden have filed a notice with the Recorder of Storey County, Nev., claiming to have located 400 ft. northerly and southerly along the Brunswick lode, which they allege was "formerly owned by the Hale & Norcross Mining Company," and was abandoned through "no work having been performed on the ground during the year 1899." The locators also claim the incline shaft and surface tunnels and improvements thereon, the hoisting works known as shaft No. 1 being on Hale & Norcross Brunswick territory.

It appears that the Kentucky Consolidated Mine was relocated by W. L. Semenza and others, but no news has been received that the notice of such relocation has been recorded. In both cases legal steps have been taken to protect the companies' rights, and no serious trouble is expected.

For the calendar year 1897 these sales were 3,102,350. There was a slight increase last year over 1898, but a considerable falling off from 1897.

The sales on regular call at the San Francisco Stock Exchange for the year compare as follows:

	1899	1898
January, shares.....	157,360	121,955
February.....	161,055	350,800
March.....	166,360	272,625
April.....	203,355	209,215
May.....	119,535	164,580
June.....	120,780	201,375
July.....	55,600	147,340
August.....	105,090	153,305
September.....	157,510	136,865
October.....	158,600	168,770
November.....	202,045	167,755
December.....	173,890	138,555
Total.....	1,801,330	2,233,200

Business on the Oil Exchange has been rather light. National has sold at \$6.75; Anaconda,

\$1.50; Barker Ranch, \$1.15; Century, 70c.; Anaconda, 40@45c. No new companies have been listed.

London. Dec. 26.

(From Our Special Correspondent.)

The mining market has been very depressed by the failure of all three sections of the British Army in South Africa. South African shares have been sold and prices have dropped all round. Other departments of the mining market have suffered in sympathy. The money market generally is very stringent, so that many speculators are forced to close their dealings, and thus the quotations tend to drop. Such a thing as the flotation of a new company is at present quite out of the question and promoters are in a very hopeless state.

For some years now the Electrical Copper Company has been before the London public, but unfortunately the periodical reports are far from satisfactory. No doubt your readers will remember that this company was formed to develop the Desmoulin process for forming copper sheets and tubes in the electrolytic bath direct from blister copper, and it was originally promoted by very influential circles. The process is a slight variation of the Elmore process and it appears to be fated to as many vicissitudes. The directors attribute their failure to various causes, such as quarrels in the management, unsuitability of machinery, etc., but they still have, or profess to have, unbounded faith in the process from a metallurgical point of view. The cheap point of the process is that homogeneity of deposit is automatically obtained by a rubber containing grease which presses against the rotary mandril, but I believe the use of grease has had to be abandoned, as it fouls the deposit, and the directors are trying to find some alternative scheme which will work and at the same time not infringe the Elmore patents. Anyhow, public interest in the process has died down.

Another zinc-lead sulphide process which has occasionally been mentioned in your columns is that worked by Mr. Ellershausen and the Sulphides Reduction (New Process), Limited. This process, like the Fry, was introduced to the public long before its practical value had been actually and definitely proved. The Ashcroft process was another example of a proposed metallurgical process being used for the purpose of floating a big company and provide large immediate profits to the promoters. The actual value of the Ellershausen process is more problematical even than that of the Ashcroft process. Mr. Ellershausen experiments on the problem of treating mixed sulphides in quite a rule-of-thumb way, and as he is not a modern type of skilled metallurgist, he naturally goes over the ground already tried by others. His process is always being modified and a complete improved plant is always going to be ready for use in six weeks or two months. The group of promoters who have taken up the process must have realized large profits by selling their vendor's shares at inflated prices, but I believe that Mr. Ellershausen himself has not reaped any large benefit. The promoters are now proposing to amalgamate the company with the company which owns the French patents and which also owns large deposits of sulphides in Angouleme, France. The plant belonging to this company is more complete than that of the English company at Llanely. In order to amalgamate the two interests a new company, called the British Sulphides Smelting Company, Limited, has been formed, with a capital of £1,000,000, and no doubt opportunity will be provided the promoters to get a further dig for themselves. The metallurgical value of the process is quite as much in doubt as ever.

Paris. Dec. 31.

(From Our Special Correspondent.)

Though still somewhat agitated, the stock market cannot be said to present many special points as the year closes. The chief interest just now is in the Transvaal gold stocks, and it is to be feared that the pressure to sell, which has been temporarily checked, may set in again and result in a general breakdown of prices.

A serious strike is now going on in the collieries of St. Etienne, from which the manufacturers in the region including Lyons obtain their supplies of coal. So far, the strike is only partial, but the leaders of the men are endeavoring to make it general. The first demand put forward was only an increase of 50 centimes per day in their pay, with shorter hours; but the affair has been complicated by other demands, including the right of the workmen's unions to take part in the direction of the mines. Many factories are already standing still for want of fuel, or are working only half-time. The stock of coal is so that one merchant has charged 40 fr. per ton for a small supply obtained from England. The subject came before the Chamber of Deputies last week, on a proposal that the Government should intervene to compel the mine owners to increase their production. It was said that the Anzin Company, for instance, only worked half its concession, in order to keep up prices. France is in reality menaced with a

coal crisis, for which the so-called national policy is in a great measure responsible.

For some time past efforts have been made to keep out foreign coal by differential railroad tariffs, in order to protect the French collieries. Such are the reduced rates from the coal regions in the departments of the Nord and Pas de Calais to the manufacturing districts of Rouen and the West of France, which formerly obtained their chief supplies from England. To encourage the exportation of coal to Switzerland and Italy from the basin of the Loire, the Lyons Railway Company granted special export rates, and the Government has been frequently urged to prohibit the bonding of English coal at Marseilles for steamers that call there. The consequence has been the impossibility of accumulating stocks, and difficulties on the first limitation of the daily supplies. The only remedy suggested was to reduce the railroad charges for foreign coal imported into France to the rates for French coal exported. It is probable that the strikers' demands must be granted.

A somewhat absurd outcry is being raised by extreme Nationalists that France is being drained of gold for the benefit of England. The Bank returns and the export returns do not show it; but these wise men are sure that 200,000,000 fr. at least has crossed the channel in a few weeks. I mention this only to show what ridiculous assertions can be made—and believed. Azote.

DIVIDENDS.

NAME OF COMPANY.	Latest Dividend.			Total to date.
	Date.	Per share.	Total.	
Amalgamated, Mont.	Jan. 22	\$2.00	\$1,500,000	\$3,000,000
Am. Steel Hoop, pf....	Jan. 31	1.75	245,000	375,000
Am. Tin Plate, pf....	Jan. 31	1.75	315,000	1,260,000
Apollo, Alaska.....	Jan. 8	.07	70,000	210,000
Con. Zinc & Lead, pf....	Jan. 15	.20	8,000	8,000
Daly-West, Utah.....	Jan. 13	.20	30,000	150,000
Federal Steel, com....	Jan. 30	1.25	581,054	581,054
Federal Steel, pf....	Jan. 20	3.00	1,597,831	4,793,490
Grass Valley Expl....	Jan. 20	.25	7,500	37,500
Mammoth, Utah.....	Jan. 10	.10	40,000	1,650,000
N. Y. & Hond. Rosario	Jan. 13	.10	15,000	1,175,000
Ontario, Utah.....	Jan. 20	.30	45,000	13,617,500
Penn. Steel, pf.....	Jan. 15	1.75	26,250	52,500
Pittsburg Coal, Pa., pf	Jan. 15	1.75	539,000	539,000
Portland, Colo.....	Jan. 15	.03	90,000	2,587,080
Pressed Steel Car, pf.	Jan. 15	1.75	218,750	875,000
Swansea, Utah.....	Jan. 10	.10	10,000	271,000
Vindicator, Colo.....	Jan. 25	.05	53,250	357,750

ASSESSMENTS.

NAME OF COMPANY.	Location.	Div.	Date.	Assmt.
Ben Butler.....	Utah	2	Feb. 5	Mar. 3 .004
Brigham City Cop.&S.	Utah	1	Jan. 13	Feb. 1 .004
Brunswick Con.....	Cal.	13	Dec. 19	Jan. 17 .03
Bunker Hill.....	Utah	3	Jan. 16	Feb. 2 .01
Challenge Con.....	Nev.	28	Jan. 11	Feb. 1 .10
Chollar.....	Nev.	5	Jan. 11	Jan. 31 .01
Cleveland.....	Utah	2	Jan. 15	Feb. 14 .01
Con. New York.....	Nev.	16	Jan. 4	Jan. 25 .03
Eureka Con. Drift....	Cal.	22	Jan. 6	Jan. 27 .004
Goleta Con.....	Cal.	1	Feb. 1	Mar. 5 .06
Golden Star.....	Cal.	1	Jan. 20	..... .01
Gould & Curry.....	Nev.	88	Dec. 27	Jan. 18 .15
Grape Vine Canyon.	Cal.	1	Jan. 8	Jan. 29 .10
Jennie Lind.....	Cal.	1	Jan. 15	..... .01
Martha Washington.	Utah	3	Jan. 4	Jan. 25 .01
Mayday.....	Cal.	3	Jan. 9	Feb. 20 .10
Meteor.....	Utah	1	Dec. 18	Jan. 22 .004
New Imperial.....	Utah	1	Jan. 2	Jan. 20 .01
Occidental.....	Nev.	34	Jan. 3	Jan. 24 .05
Old Home Con.....	Cal.	1	Jan. 27	..... .014
Omaha Con.....	Cal.	1	Jan. 30	..... .50
Potosi.....	Nev.	54	Jan. 16	Feb. 7 .10
R. G. W.....	Utah	3	Jan. 14	Jan. 29 .004
Savage.....	Nev.	95	Jan. 10	Jan. 30 .10
Yankee Con.....	Utah	1	Jan. 12	Feb. 12 .01
Yellow Jacket.....	Nev.	2	Dec. 26	Jan. 31 .15

ANNUAL MEETINGS.

Name of Company.	Location.	Date.	Place of Meeting.
Battle Mtn. Con.....	Colo.	Feb. 23	Victor, Colo.
Cannelton Coal.....	W. Va.	Feb. 1	115 Broadway N.Y. City
Dalton.....	Utah	Jan. 29	McCormick Bldg., Salt Lake City, Utah
Daly.....	Utah	Feb. 15	Salt Lake City, Utah
Great Eastern.....	Utah	Feb. 13	Salt Lake City, Utah
*Highland.....	St. Dat.	Jan. 9	Mills Bldg., San Francisco, Cal.
*Home Horseshoe Bar Con	Colo.	Feb. 19	Leadville, Colo.
Is-bell.....	Colo.	Jan. 17	339 Pine st., San Francisco, Cal.
Little Pittsburg.....	Utah	Jan. 16	Colorado Springs, Colo.
Mammoth.....	Utah	Feb. 8	Salt Lake City, Utah
Maryland Coal.....	Md.	Feb. 6	Broadway, N.Y. City
Moon Anchor.....	Colo.	Feb. 15	Colorado Springs, Colo.
Morgan.....	Utah	Feb. 19	Salt Lake City, Utah
Ontario.....	Utah	Jan. 7	Mills Bldg., San Francisco, Cal.
Ophir Hill.....	Utah	Jan. 30	280 D. F. Walker Bldg., Salt Lake City, Utah
Sierra Nevada.....	Nev.	Jan. 8	39 Montgomery st., San Francisco, Cal.
*Star Gold & Silver	Utah	Jan. 16	149 So. Main st., Salt Lake City, Utah
Utah Con.....	Nev.	Jan. 25	309 Mont omerly st., San Francisco, Cal.

* Special meeting.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Adams, Alamo, Alice, Amalgamated, Anaconda, etc., with columns for Name of Company, Location, Par. val., and dates from Jan. 5 to Jan. 11.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Acta, Adm. Cons. G., Allouez, Am. Z. & S., Anaconda, etc., with columns for Name of Company, Par. val., No. of shares, and dates from Jan. 4 to Jan. 10.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stocks, listing companies like Am. Sm. & Ref., Am. S. & W. Con., Central of N. J., etc., with columns for Name of Company, Par. val., and dates from Dec. 27 to Jan. 9.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa., listing companies like Am. Alkali, Bethlehem pf., Bethlehem Iron, etc., with columns for Name of Company, Location, Par. val., and dates from Jan. 4 to Jan. 10.

SALT LAKE CITY, UTAH.*

Table of stock quotations for Salt Lake City, Utah, listing companies like Ajax, Alice, Anchor, Buckeye, etc., with columns for Name of Company, No. of shares, Par. val., and dates from Dec. 22 to Dec. 23.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Alamo, Anaconda, Arg. & W. Con., etc., with columns for Name of Company, Par. val., and dates from Dec. 27 to Jan. 9.

SPOKANE, WASH.*

Table of stock quotations for Spokane, Wash., listing companies like Admiral Dewey, Anaconda, Athabasca, etc., with columns for Name of Company, Par. val., and dates from Dec. 23 to Dec. 23.

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

*Official quotations Spokane Stock Exchange. Total sales, \$5,000.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing various companies and their prices for Dec. 9, Jan. 1, Jan. 2, Jan. 3, Jan. 4, and Jan. 5.

Official Quotations Denver Stock Exchange. Total sales, 117,560 shares. * Holiday.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, California, listing various companies and their prices for Jan. 4, Jan. 5, Jan. 6, Jan. 7, Jan. 8, Jan. 9, and Jan. 10.

Official telegraphic quotations of San Francisco Stock Exchange

TORONTO, ONT.

Table of stock quotations for Toronto, Ontario, listing various companies and their prices for Jan. 2, Jan. 3, Jan. 4, Jan. 5, Jan. 6, and Jan. 8.

Official quotations of the Standard and Toronto Mining and Industrial Exchanges. Total shares sold, 48,200.

MEXICO.

Dec. 29.

Table of stock quotations for Mexico, listing various companies and their prices for Dec. 29.

PARIS.

Dec. 21.

Table of stock quotations for Paris, listing various companies and their prices for Dec. 21.

LONDON.

Dec. 29.

Table of stock quotations for London, listing various companies and their prices for Dec. 29.

* Ex-dividend.

DIVIDEND-PAYING MINES.

Main table containing dividend-paying mines with columns for Name and Location of Company, Capital Stock, Shares (No., Par Val), Dividends (Paid 1899, Total to Date, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Dividends (Paid 1899, Total to Date, Date and Amount of Last).

NON-DIVIDEND-PAYING MINES.

Table containing non-dividend-paying mines with columns for Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Levied 1899, Total to Date, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Levied 1899, Total to Date, Date and Amount of Last).

G., Gold. S., Silver. L., Lead. C., Copper. Z., Zinc. This table is corrected up to Dec. 1. Correspondents are requested to forward changes or additions.

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

Table with multiple columns listing various chemicals and minerals such as Abrasives, Acids, Alkalis, Calcium, Carbonates, Chlorides, etc., along with their current market prices and measurement units.

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-29th. 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.