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Electricity vs. Strikes.

The electric search light has been put to a practical use in England, in assisting in putting down a strike at a large manufacturing plant in Lancashire. During the continuance of the strike the light was used nightly to prevent strikers coming too close to the company's property for the purpose of setting fires or committing other unlawful acts, and was found so effective that a large number of extra police were dispensed with. This offers a suggestion for the owners and operators of mining and metallurgical works in this country, where, unfortunately, strikes and attempts at violence are not unknown. The same idea has been carried out here by increasing the number of arc lights in works covering a large area during a strike, so that the night force of watchmen was the same as those patrolling during the day.

Electric Companies in Harmony.

The indications are that attempts are being made to increase the scope of the so-called electric treaty recently made between the Westinghouse and General Electric companies, by which a truce was declared in the otherwise apparently interminable fight which has been going on between these two companies in the question of infringements of patent rights. The plan now seems to be to regulate prices and to bring into the arrangement several of the other leading manufacturing companies in the electrical field. The results will be watched with interest and the effect may be higher prices to the consumer, though it would seem that with the enormous saving in legal expenses that is now effected, practically the same prices could be retained and show a satisfactory increase in net receipts. We referred to this subject under the head of Financial Notes of the Week in our issue of March 14th, giving the details and defining the deal more as an arrangement than an agreement.

Extremes in Gold Mining.

The latest news from West Australia present a sorry picture of the situation from lack of water and intense heat. Many prospectors, miners and traders are leaving to escape sickness and death. It is true that the Government is doing all in its power to remedy the water famine and is prepared to spend \$1,000,000 to that end. But unfortunately the Government cannot control the temperature and it is the recent intense heat that has caused so much and such fatal sickness.

From San Francisco we learn that an unprecedented exodus of miners and prospectors for Alaska is taking place even at this early period in the season. This is the other extreme, and the hardships that will be encountered in reaching the upper waters of the Yukon will no doubt be fatal to some of the gold seekers from cold and privation, not to say starvation, as that has been the record even in the past season when the conditions were fairly known.

The Ways of the London Promoter.

An example of the methods of promoters who exploit the English market is to be found in the exposures of Mr. Begelhole in the Coolgardie Court. This gentleman, whose record shows him to be a mediocre if not incapable mining engineer, is a promoter who has been undoubtedly successful in disposing of various West Australian properties, good, bad and indifferent, in London during the past eighteen months. The trial in the Coolgardie Court was of no direct interest to mining men in general, as it was simply an action by Mr. Begelhole against Messrs. Pettigrew and Urquhart for disposing of the Brownhill Consols property to other parties after Mr. Begelhole had paid a deposit on its purchase. The feature we wish to draw attention to relates to the evidence of Mr. H. C. Wilson, an accountant, of Adelaide, who was called as a witness for the defense. This witness stated on oath that he had been sent to examine the books of the Leviathan Battery Company, and had found that the manager of the battery company had been regularly bribed by Mr. Begelhole to state that the gold produced had been obtained from smaller quantities of ore than was really the case and thus to afford a so-called basis of facts for Mr. Begelhole's claims for the richness of the ore. Directly this evidence was given, the Warden of the Gold-fields, Mr. Finnerty, who was trying the case, said no further evidence was needed and abruptly closed the proceedings. No attempt was made to challenge Mr. Wilson's allegations, but Mr. Begelhole assaulted Mr. Wilson in the street and got bound over to keep the peace. Mr. Wilson has since reiterated his statements as to the Begelhole methods and no steps have been taken to sue him for libel, so we may take the allegations as substantially true. The remarkable part of the whole matter is that the English newspapers have not taken any notice of this incident, a fact which goes far to prove that the London press finds it more remunerative to be on the side of the promoters than on that of truth.

The Mineral and Metal Production of the United States in 1895.

The total value of the mineral and metal production of the United States in 1895, as shown in the accompanying table, amounted to the enormous sum of \$673,689,505, which compares with a similar total of \$578,463,002 for 1894, showing a total increase of \$95,226,503 for the year. Of the whole amount last year \$240,615,120 represented the value of the metals; \$433,074,385 that of the non-metallic products, including \$5,000,000 for various unspecified products.

From these totals, however, it is necessary to make some deductions for articles which have been necessarily duplicated in the table. Among these is the iron ore used in making pig iron; a large part of the lead used in making white lead; the zinc used in making zinc oxide; the coal in making coke; the antimony ore used in making the metal; the manganese ore employed in making spiegeleisen, which is included in pig iron, and some other articles of the kind. A careful estimate of the proper amount of these deductions would give about \$45,000,000 in 1895, against \$34,000,000 in 1894.

Making these deductions we have a total net value for 1895 of \$628,689,505, as against \$544,463,002 for 1894, the increase amounting to \$84,226,503, or 15.5 per cent.

In the *Engineering and Mining Journal* for January 4th last we published a provisional statement of the production of a number of the important minerals and of all the metals. That statement was necessarily subject to some corrections, as the output for the month of December was estimated in part. Nevertheless its substantial accuracy is shown by the fact that in the case of pig iron the estimate differed from the corrected statement by only 0.5 per cent.; in the case of copper the variation was only 0.1 per cent. from the full returns now given; in lead it was 2.5 per cent.; in the case of coal the difference was only 0.7 per cent., etc.

The statistics here given have been collected for Volume IV. of *The Mineral Industry, Its Statistics, Technology and Trade*, the preparation of which is now well advanced, and with but few exceptions they are full and complete; in a few cases some slight revisions will be made before the volume of *The Mineral Industry*, goes to press, but these changes will be comparatively small and the figures here given may be relied upon as substantially correct.

In this table the figures are limited strictly to our domestic production. In the cases of gold, silver, copper and lead the representation is an altogether inadequate one, for large quantities of those metals are obtained from foreign ores and base bullion smelted or refined here; we have, therefore, added in a supplementary table below a separate statement of this production.

We have included iron ore in our tables this year, though we do not report lead, copper, zinc, silver or gold ore separately. This admitted inconsistency is in part due to the fact that the same ores yield gold, silver and copper, or gold, silver and lead, and in some cases also lead and zinc are obtained from the same ores, so that an exact distribution of quantities and values would be impossible, and indeed of little practical value.

The production of so-called "mineral waters" is omitted, as heretofore, from these statistics. Waters cannot properly be considered as minerals except in cases where they are used to extract minerals from, as metals are won from their ores, and as salt, bromine, etc., are extracted from certain waters. All waters contain more or less mineral matter. If the production of "mineral waters" is to include only the water sold, then the supplies of our town and city water-works should be counted, and they amount to over 1,000,000,000,000 gals., or say 42,100,000,000 short tons a year, sold at an aggregate value of about \$200,000,000. Moreover, the vast amount sold for irrigating, for power or other purposes, and not included in the above, should not be neglected while a comparatively infinitesimal amount, largely artificial mixtures, varying from carbon dioxide water to "ginger ale," is cited by some authorities as the production of "mineral waters."

The totals given are, of course, of values only, as it would be impossible to present a total of quantities made up of such varied products. In studying the table, however, it must be remembered that to make the comparison a fair one the quantities of the various articles produced should be considered. The year 1894 was one of extremely low prices, and while in some directions the recovery has not been as great as had been expected, in some important lines—principally in iron and copper—the level of prices in 1895 was much higher for a considerable portion of the year. The values, therefore, will naturally show a greater increase than the quantities.

The statistics given, like all those in *The Mineral Industry*, have been obtained, as a rule, directly from the producers, themselves, and the greatest care has been taken in their collection and arrangement, in order to present accurately in a condensed form the results of the great industry which is represented by the *Journal*.

It is true that no statistics of this kind, representing so many and varied products and in a country as large as the United States, can be absolutely correct, but we believe that these figures are the fullest and the most nearly accurate that have ever been obtained. In making the comparisons the figures for 1894 as published in Volume III. of *The Mineral Industry* have been revised wherever necessary in accordance with our practice, which is to present the latest and best information.

We have given the production of the different articles in metric tons (or kilograms in the case of precious metals), as well as in the customary measures, for the reason that the metric measures are those recognized and used by almost all of the civilized world, and are rapidly gaining recognition in the few remaining countries which have not yet fully adopted them. In our own country they are already legalized, with the prospect of their compulsory and exclusive use at an early date. How desirable such a change will be can be best appreciated by those who have had occasion to collect or use statistics of this kind.

The year 1894 was, as most of our readers are well aware, one of general depression, of decreased production and demand. In most of the leading articles of mineral production 1895 showed a notable revival, and while we cannot claim to have reached the full measure of prosperity which we hoped for, the record for the past year is still a very encouraging one. In some cases the production for the year was the largest ever yet attained, and in others such gains were made as to show the possibilities of the future.

Generally it may be said that in the precious metals gold showed a large increase, and silver a smaller decrease than had been expected. In the useful metals and minerals coal showed an enormous increase, amounting to 17 per cent., and the materials of construction also gained largely in amount. Our production has been developed on a few new lines, while showing no very important changes in direction during the year.

The figures given show that the United States last year took the first rank as a producer, not only of the precious metals, but also of the most important of the useful metals, iron and copper, while in coal it is still second only to Great Britain, with the certainty that in a few years it will take the first place. That this degree of development has been reached in a comparatively short period makes it all the more extraordinary, even when we consider the wonderful resources of the country.

All those who are interested in comparing our own growth with that of the older mineral countries of the world will find the material for such a study in the forthcoming Volume IV. of *The Mineral Industry*, which is now approaching completion, and which will contain the mineral statistics of all countries brought up to the latest possible dates.

The history of Mining and Metallurgy for the past three years, as there recorded, shows that a period of depression is not always an unmixed evil. During such a period we find often that great advances are really made. Attention is given to improvements in systems, economies in operation and reductions in cost, which are too apt to be neglected in prosperous times. The necessity of producing at low prices if production is continued at all is often a stimulus to invention, and there have been many notable cases where the results have been most fruitful. The past two or three years have been no exception to the general rule.

To sum up we may say that our mineral industries made a notable advance during 1895, not only in the quantity of their production, but in the methods, and in many cases in the quality of the output. The figures given above show the very great importance of those industries to the prosperity of the country, and while the result for 1896 is still a little doubtful we have every reason to believe that there will be at least no ground lost, and that this year will show a substantial gain over any previous one in our history.

THE METALLIC PRODUCTION.

The metallurgical production, representing the results of the mineral industries in finished form, attracts the most general attention

Aluminum.—The output of aluminum increased about 10 per cent., owing to an improvement in the manufacturing facilities of the only active producer. The use of this metal in the arts is growing slowly, though it is still limited by the high price.

Antimony.—An increase, large in proportion though not in actual amount, is reported in the output of this metal. Its history for 1895 has been a record of a moderate growth in demand, a more rapid increase in production and a consequent lowering in prices.

Copper.—The production of this metal in 1895 amounted to 175,294 metric tons (386,453,850 pounds.). Thus the output, which showed an actual increase in quantity even during the years of depression, again displayed a steady growth, and the increased demand at one time during the year forced prices up to the highest level known for several years. While this gain was not fully maintained there was still a substantial improvement in the average price for the year. Nearly all the leading mines maintained their output, and many of the smaller ones increased it considerably. There was a decrease of about 12 per cent. in the exports of copper for the year, so that the increase in price was largely due to the heavy domestic demand.

The production by States was as follows:

UNITED STATES PRODUCTION OF FINE COPPER IN 1895.

Table showing production of fine copper in 1895 by state, including Arizona, Michigan, Montana, Colorado, Utah, Eastern and Southern, and All others, with columns for Pounds and Metric Tons.

Gold.—There was a notable gain in the amount of gold obtained from our mines, which in 1895 reached a total of 70,470 kilograms (2,265,612 ounces) fine metal, value \$46,830,200, showing a gain over 1894 of 7,671

ut ed, the most notable gain has been made in Colorado, where it was due not only to the active working of the Cripple Creek mines, but to the steady gain reported from the older gold districts of the State. The other Western States have also shown considerable gains; Montana and Idaho both recording large advances, while California also showed a large increase, and the development of the gold-fields of Utah proceeded quietly but on an important scale. In Arizona, owing to local circumstances, there was a decrease in the gold output. In the Southern States, there has been little change.

Iron.—The production of iron in 1895, as compared with the previous year presents the most remarkable change ever shown in two consecutive years in this country. Not only was there a sharp reaction from the depression of the previous year, but the output reached the highest level yet attained.

There was made in the United States last year 9,600,603 metric tons (9,446,308 long tons) of pig iron, an increase of 42 per cent. over 1894, when the total was 6,764,572 metric tons (6,657,388 long tons). The highest production on record previously was 9,353,020 metric tons (9,202,702 long tons), in 1890. This advance once more puts the United States in the position of the leading iron-producing nation of the world. A comparison of the four principal countries shows that while we made 9,600,603 metric tons of pig iron, Great Britain turned out 7,620,000 tons; Germany, 5,788,798 tons, and France, 2,005,889 tons. That is, to put it in another form, if we take our own output at 100, that of Great Britain was 79, Germany 60 and France 21.

An increasingly large proportion of this iron is each year converted into steel, and our steel production in 1895 was nearly 6,004,000 metric tons, of which approximately five-sixths were Bessemer and one-sixth open-hearth steel. The total was 20 per cent. greater than the largest heretofore reported in any one year.

In making this pig iron there were used a total of 17,753,710 metric tons (17,474,123 long tons) of iron ore, of which 17,221,200 metric tons (16,950,000 long tons), were produced from our own mines, and 532,510 metric tons (524,123 long tons) were imported. Thus about 3 per cent. of the pig iron was made from imported ores, though native coal and flux were used in its manufacture.

Lead.—The production of lead from domestic ores in 1895 showed a decrease from the previous year. It amounted to 142,298 metric tons (156,854 short tons), a decline of 2.5 per cent. This was due to the very large quantity of lead smelted from foreign ores or refined from foreign bullion, the total consumption showing a considerable increase. The details of production and consumption are shown in the following table:

UNITED STATES PRODUCTION OF LEAD IN 1895.

Table showing production of lead in 1895, including production, stock, and consumption, with columns for Production, Tons of 2,000 lbs., and Metric tons.

Quicksilver.—There was a marked increase in production in 1895, the total being 1,219 metric tons (35,122 flasks), against 1,056 metric tons (30,440 flasks), in 1894. The metal was entirely from the California

mines, no new sources of production having been developed during the year.

Silver.—The silver production again showed a decrease; in 1895 it amounted to 1,441,087 kilograms (46,331,235 ounces) of fine metal, of the commercial value of \$30,244,296, a decrease of 109,300 kilograms (3,515,640 ounces) from 1894; while the total was about 76 per cent. of the production of 1893. The quantity of silver actually refined and put upon the market by the various smelters and refiners in the United States was considerably greater than this, but we have carefully deducted all the metal produced by them from foreign ores

MINERAL PRODUCTION OF THE UNITED STATES IN 1894-95.

Compiled for THE MINERAL INDUSTRY, Vol. IV.,

By Richard P. Rothwell, editor of the Engineering and Mining Journal.

Main table of mineral production for 1894 and 1895, categorized into Non-Metallic and Metals, with columns for No., Products, Customary Measures, Quantity, Value at Place of Production, and Metric Tons.

(a) Bituminous coal includes brown coal and lignite. The anthracite production is the total for Pennsylvania, Arkansas, and Colorado. (b) Estimated. (c) Kilograms.

kilograms (243,331 ounces). This result shows that the impetus given to gold mining all over the world by the events of the past two years has not reached its maximum. Since there has been no general resumption of hydraulic mining in California the increased production of gold has been due to an extension of the working of old mines; to the opening of new mines, and to a continued improvement in methods of working and reduction of ore which now permits the profitable exploitation of mineral properties too low in grade of their ores to pay under former wasteful or imperfect systems. While the increase in the production of the yellow metal has been very generally distrib-

and bullion, and the quantity given is only that of the metal obtained from domestic ores. The reduction in output, combined with other circumstances, has had the effect of raising the price of silver slightly, the average price or commercial value for the year being 65.3 cents per ounce, or about 2-3 cents per ounce greater than in 1894. We may note here the fact that in spite of the continued low price and the general decrease in output some of our larger mines have continued steadily at work with fairly profitable results. Such mines as the Ontario and the Daly in Utah have shown no disposition to abandon production, and the silver-lead mines of Idaho have diminished their output rather on account of other circumstances than because of the price of the white metal.

Zinc.—The total production of spelter, or commercial zinc, in 1895 was 74,245 metric tons (81,858 short tons). The year was marked by an extension of mining and of output to an extent greater than the consumption, resulting in continued low prices. With the present abundant supply these may be expected to continue until new uses are found for the metal and the demand is correspondingly enlarged; unless, indeed, the combination which now controls a large part of the production of spelter should attempt to advance prices above 4 cents per pound when a further restriction in consumption might be expected.

PRODUCTION OF METALS FROM FOREIGN ORES.

The work done by our metallurgical plants is not fully expressed by the figures given in our table, which are limited to the production from domestic ores. We add below a supplementary table, showing the quantities smelted, refined or otherwise extracted from foreign material in 1895:

METALS PRODUCED FROM FOREIGN ORES AND BULLION.

Metals.	Customary measure.	Quantities.		Values.
		Customary measure.	Metric tons.	
Copper.....	Lbs.	14,000,000	6,359	\$1,330,000
Gold.....	Troy oz.	205,763	6,470	4,253,121
Lead.....	Short tons.	70,745	61,166	4,570,127
Nickel.....	Lbs.	3,880,000	1,769	976,000
Silver.....	Troy oz.	28,199,521	876,838	18,380,222
Total.....				\$29,593,543

* Kilograms.

These metals were chiefly from material received from Mexico and British North America. In the case of our northwestern neighbor the smelting ores from the mines are usually sent to our smelters at Tacoma, San Francisco and elsewhere. From Mexico we receive chiefly base bullion, from which a very considerable part of our lead supply is obtained, as noted in the paragraph on that metal. The nickel is all from ores or matte received from the Sudbury mines in Ontario.

We have not included above the iron smelted from foreign ores, which is small in actual amount, and very small in comparison with the total output.

The lead industry is the trade most affected by the use of foreign material, the quantity of copper being comparatively small. In the case of nickel no ores of that metal are now produced in the United States.

THE NON-METALLIC PRODUCTS.

The total amount of the non-metallic products is greater than that of the metals, because of the large quantities and values of a few items.

Abrasives.—Little remark is called for on these substances. The results shown are varying, corundum and emery showing some decrease, as do also tripoli and infusorial earth, while there was a large increase in grindstones and whetstones.

Alum.—The growth of this industry is steady and satisfactory, as is shown by the large production. Some alum is made from imported bauxite and other materials, including cryolite which is not produced in this country.

Asbestos and Talc.—The output of asbestos showed a considerable increase in 1895, chiefly due to the working of mines in Georgia, which have been opened within the past two years. We still continue to import a large part of our supply. The output of fibrous talc was increased to meet a growing demand; it all comes from a limited area in New York, where the mines are actively worked under a combination. The production of talc and soapstone declined slightly.

Asphalt.—The asphalt and bituminous rock reported are chiefly from California. The gilsonite deposits of Utah are not actively worked, owing to difficulties of transportation. The use of asphalt in the United States is rapidly extending, but the chief reliance is on imported material, the island of Trinidad furnishing the larger part of the supply.

Barytes.—There was a slight decrease in this mineral, coupled with an increase in its value.

Bauxite.—A considerable increase is reported, due to the organization of new companies and the opening of new beds in Georgia and Alabama. No other deposits have been worked.

Borax.—No change in production or methods is to be reported. The output—wholly from California and Nevada—shows a slight increase.

Bromine.—Only slight changes are noted, with no difference in methods.

Cement.—Notwithstanding the extent of our natural resources in cement

materials, an increased demand in 1895 was supplied from abroad, and our own production shows little change.

Clays.—The production of clays increased with the demand for building materials. The increase was especially to be noted in the refractory clays used for the manufacture of fire-brick and the like, and in the china clays, such as kaolin and feldspar.

Coal and Coke.—As might be expected in a year of industrial activity, the coal production showed a notable gain. In the *Journal* of January 4th we estimated the total output for 1895 at 176,904,000 metric tons (195,000,000 short tons). The fuller returns now received put the total at 178,212,591 metric tons (196,442,451 short tons), showing a change of 0.7 per cent. from our preliminary statement, and an increase of 17 per cent. over the output in 1894.

A few corrections are still to be made, but the present figures will not be materially changed in the final statement for *The Mineral Industry*, where the details of production will be found. The output was as follows:

	Metric tons.	Short tons.
Anthracite.....	52,916,300	58,362,586
Bituminous.....	125,265,691	138,079,466
Total.....	178,212,591	196,442,451

The total quantity of coke made increased largely, as might be expected; it was 9,006,090 metric tons (9,927,348 short tons) in 1895.

Our coal resources are so large and the competition of the different producing regions for the important markets is so sharp, that there was very little change in the average prices; less, indeed, than in any of the other staple articles in the list. The anthracite coal production was perhaps unduly large, owing to the peculiar conditions of that trade during the year. The output of bituminous coal and of coke was stimulated by the activity in the iron market and in manufacturing industries generally. Some efforts were made during the year to increase our export trade in mineral fuel, but with comparatively little success, in spite of the abundance of our supplies and their excellent quality.

Cobalt Oxide.—The small production showed little change in its amount or sources.

Copperas.—But little change is reported, but there was a decrease in prices and values.

Copper Sulphate.—This is an important product, and our exports last year to Europe and Mexico reached a considerable figure.

Fluorspar.—The single producing mine in Illinois showed a decrease, this being one of the few products which declined in amount.

Graphite.—No new developments have been made and the home production is still chiefly controlled by a single interest.

Gypsum.—The use of this material varies little from year to year. Considerable developments have been made in the extensive fields existing in Iowa.

Lime.—This widely made material, like others used in construction, shows a fairly steady growth, but no special features are to be reported. A total of 5,443,164 metric tons (60,000,000 barrels) shows the importance of the industry, but the statistics of production are not satisfactory owing to the burning of lime in so many places and by farmers who keep no record of their output.

Magnesite.—The production in 1895 showed a total of 1,995 metric tons (2,200 short tons). It is derived from the California deposits entirely, and the production increases slowly as the use of the material extends.

Manganese Ore.—Our production—15,121 metric tons (14,883 long tons) in 1895—is chiefly limited by the cheapness with which supplies can be imported. There was an increase of nearly 25 per cent. in 1895.

Mica.—The production of 343 metric tons (38,356 pounds) continues to come chiefly from New Hampshire and North Carolina. Some new deposits in Idaho are being developed.

Mineral Wool.—We have introduced this product for the first time, its manufacture from blast furnace slag representing the partial utilization of material formerly wasted. There were 6,115 metric tons (6,742 short tons) made in 1895.

Monazite.—The special demand for this mineral continues to increase, and the total reached 863 metric tons (1,900,000 pounds), or much more than double that of 1894.

Mineral Paints.—An increased demand is apparent in the figures of the table. The largest gain is in white lead, of which in 1895 there were 83,462 metric tons (92,000 short tons) of "dry" produced.

Phosphates and Marls.—The output of mineral fertilizers for domestic use showed some increase, but owing to the diminished exports the total production of phosphate rock fell off both in quantity and in value. The cause of the smaller sales abroad is found to be in part the opening up of the deposits of phosphates in Tunis and Algiers, and in part the use of other sources of phosphoric acid, such as the Thomas slag from the basic steel process.

Precious Stones.—No change was made in our small production.

Pyrites.—The total production, chiefly used in the manufacture of sulphuric acid, was 82,296 metric tons (81,000 long tons), showing a decrease from 1894, largely due to the cheapness of imported supplies.

Petroleum and Natural Gas.—The petroleum and natural gas industries

show but little change. While our petroleum production is not diminishing, and while the consumption steadily increases here, the exports are slowly decreasing owing to the increased competition of Russian oil in the Eastern markets, which were formerly supplied entirely from this country; and in Europe not only to the use of the Russian oil, but to the largely and rapidly gaining production of Galicia, which threatens in time to be sufficient to supply a large part of Eastern and Southern Europe.

Salt.—Of the minerals necessary to existence, salt shows an increase a little greater in proportion than the normal growth of our population, due to our growing chemical industries, and that demand may be expected to continue increasing, as those industries are developed on a scale approximating the growth which they have already attained in Europe.

Slate, Stone and Other Building Materials.—All these substances show increases, due to the greater amount of construction work and the revival of business. The value of these products in the aggregate is large, but it is extremely difficult to secure accurate statistics of some of them, owing to the widely scattered nature of the industries, and the fact that they are largely carried on in a small way and intermittently, as demand requires. The estimate given is as close as the circumstances permit.

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.

Australian Mining Manual; A Handy Guide to the West Australian Market. By G. B. Beeman. London, England; C. Mathieson & Sons. Pages, 233.

A Glossary of Mining Terms; Being a Compilation of Terms in Most Common Use in the Metal Mines of the United States. By L. W. Tatum. Denver, Colo.; Published by the author. Pamphlet; pages, 30.

Report of the Engineer Commission of Cincinnati on the Extension and Betterment of the City Waterworks, March 20, 1896. Cincinnati, O.; Published by the Board of Administration. Pages, 84; with map and diagrams.

CORRESPONDENCE.

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

Oil Shale.

Sir: Will you or any of your readers kindly inform me if there are beds of oil shale being worked in this country, and if there is any one dealing in the article or its products; also if there are mining engineers who have had practical experience in this line. Any information will be greatly appreciated.

NEW YORK, March 18th.

H. M. BARRY.

[None are now worked in the United States.—ED. ENGINEERING AND MINING JOURNAL.]

Treatment of Refractory Ores.

Sir: In your *Journal* of February 1st appears a note from Mr. Parker C. Choate asking for information for the treatment of refractory ores. I would state that in Peru a large quantity of such ores exist, and especially in one particular mine the "Carahuacra" (having a lode from 60 to 75 meters wide, the whole of which carries silver mixed up with zinc, a little lead in places, sulphur and other metals), no treatment has been successfully tried that has as yet benefited these ores, the ley of the mass would be from 90 to 100 oz. silver per cajon of 6,000 lbs. It would be extremely interesting to hear more on this subject in the way of practical results. (The mine, I would state, is situated some 16,000 ft. and the plant for its treatment was some 14,500 ft. above sea-level.)

E. I. PREW, A. M. I. C. E.

LIMA, March 6, 1896.

The Extraction of Metals from their Ores in Place.

Sir: I wish to put upon record the fact that sometime during the year 1888 or 1889, we had as visitors to the Arminius Copper Mines several gentlemen who were interested in the extraction of precious metals from solutions, they having had a large experience in such working as would naturally be conducted on ores of the character mined by us. Their inspection of the underground levels in our No. 3 shaft (where for some time we had been conveying the strong mine waters into basins, etc., for extraction of copper) led to the very significant remark from one engineer, that it would be possible at a moderate expense to utilize the mine waters, which had been freed from copper, etc., by pumping it into surface reservoirs at convenient places above the copper bearing slates and from these reservoirs to distribute the strong liquors through the slates for the purpose of further and definite extraction of their metallic contents. It was suggested by this engineer that cargo lots of salt could be imported into Norfolk, Va., and brought to our mines for this purpose, and that a solution of chlorides would be much more effective if percolating the strata—not only rapidly bringing the copper, but all precious metals into a condition easily obtainable by precipitation methods then in general use. The engineer's name is Walter M. Chadwick, and his suggestion will probably bear fruit in the near future, arrangements being in contemplation for carrying out this plan for the recovery of gold, silver, copper, etc., from metalliferous slates too poor to be worked by present methods of mining, crushing, lixiviation, etc.

W. H. ADAMS, M. E.

MINERAL CITY, VA., March 31st, 1896.

Efficiency of West Virginia Coals.

Sir: In your issue of March 21st, you print Mr. Wm. Kent's criticism upon the article on the "Efficiency of West Virginia Coals" published in your *Journal* March 7th.

The forepart of Mr. Kent's criticism is well deserved, and shows that there is an error, not due to the compositor.

The proximate analysis of No. 6 coal has been misquoted from a selected sample of coal, and the writer regrets that this error was not detected before going into print.

The proper analysis of No. 6 coal is as follows:

H ₂ O	Volatile.	Fixed carbon.	Ash.	Heat value.
.96	20.57	73.65	4.82	b. t. u. 13,685

Following out Mr. Kent's calculations, and ignoring the water and ash as absorbents of heat, they show that the volatile matter of No. 6 gives 74% of the heat evolved from the volatile matter of No. 1 sample.

The table of tests is the result of repeated tests upon each sample, and any variation in the relative heating value of the volatile constituents is most probably due to the percentage of oxygen gas present in the coal.

Messrs. Noyes, McTaggart and Craver in the journal of the American Chemical Society upon the "Determination of the Heating Effects of Coal" do not give the proximate analysis of a coal as the safest means of calculating its heating effect, and, in summarizing their tests, say "there can be little doubt that the calorimeter gives most accurately the relative heating value of these coals."

Regarding the last column of figures, in the table published, being of no value, it is probable that this would be true if some of the coals were to be burned under a cylinder boiler and others in a climax boiler. The same coal would give vastly different results.

No. 1 coal giving but 61% under a marine boiler it is evident that the remaining coals should be burned under a similar boiler to realize the results given in the column of commercial efficiency.

Little has been published regarding the inferior coals of West Virginia, but that does not prove their non-existence.

There are coals in our State at present used only for domestic purposes, which would not give an evaporation of 4 lbs. of water.

My article dealt with the representative coals which are in the general market, and it is not surprising that the most inferior of these should run so high as 7.78 lbs. H₂O evaporated per pound of fuel.

THOMAS, W. VA., April 4th, 1896.

JAMES W. PAUL.

The Estimation of Pyrrhotite in Pyrites Ores.

Sir: With reference to determination of pyrites and pyrrholite in the example given in your last issue, I wish to submit the following method: This does not require a magnetic separation, which is almost impossible to effect accurately on such a material, and, in my opinion, the results are more accurate than when the magnetic separation is used. The method here used is published in the *Journal of the American Chemical Society* for February, 1896. The results by this method are within 1% of the magnetic separation method, and, in my opinion, closer to the truth. Even if such were not the case, this slight difference would not affect the results for technical purposes.

It is only necessary to find the weight of the mixture of FeS₂ and Fe₇S₈, and the total sulphur or total iron. (In this case the total sulphur is taken.) In order to find either salt, multiply the weight of the mixture by the co-efficient of the other salt; find the difference between this amount and the weight of the common constituent, and divide this result by the difference of co-efficients of the salts.

The co-efficient is the amount of common constituent in one part of the salt.

Pyrites = 0.533 sulphur.
Pyrrhotite = 0.395 sulphur.

Determination of pyrites and pyrrhotites by indirect analysis (*Jour. Am. Chem. Soc.*, Feb., 1896):

Total sulphur.....	Per cent.	Insoluble.....	Per cent.
" iron	35.97	Pyrrhotite.....	2.78
Oxygen as Fe ₂ O ₄	57.50	Pyrites.....	61.1
Copper.....	4.26	Iron as Fe ₂ O ₄	20.02
	0.25		11.2
	57.50 - 11.20 = 46.3		
	35.97		
	81.37 = FeS ₂ + Fe ₇ S ₈		
	FeS ₂ = 53.3% S		
	Fe ₇ S ₈ = 39.5% S		
	81.37 x 0.533 = 43.37021		
	43.37021 - 35.97 = 8.30021		
	8.30021		
	0.138		
	61.1 - 60.14 = 0.96%		

PHILADELPHIA, April 6, 1896.

EDWARD K. LANDIS.

Conductivity of Aluminum.—Lord Kelvin has published a brief note correcting the statement made by Addenbrooke as to conductivity of aluminum, says the *Electrical World*. He found a bad error in his tests which were referred to, and now finds that his measurements give results substantially agreeing with those already published in most of the recent text-books for approximately pure aluminum; no specific data are given.

Electric Lifting Magnets.—Much attention is being paid at the Royal Arsenal, Woolwich, England, to the subject of electric lifting magnets attached to cranes. With one type of magnet, taking from 3 to 4 amp-res, it forms 20 to 30 volts potential, two 1,800-lb. shot have been lifted, and this 3,600-lb. load does not appear to be the limit.

Electric Rock Drills.—Electric rock drills are, it is said, being adopted at the iron ore mines of the Hernadthal Hungarian Iron Industry Company at Krompack. Six drills are at first to be brought into use, and the generating plant, which is being put down by Messrs. Siemens & Halske, of Vienna, will comprise a semi-portable engine and boiler, and a 16-kilowatt continuous-current dynamo.

ABSTRACTS OF OFFICIAL REPORTS.

The Central Mining Company.

The Central Mining Company reports a mineral product for 1895 of 647,930 lbs., averaging about 59% pure copper. The operations were:

Sold 379,920 lbs. of copper at 10 3/4c.....	\$41,409
Interest received.....	1,763
Total.....	\$43,172
Working expenses.....	\$46,136
Smelting, etc.....	11,490
	57,626
Deficit for year.....	\$14,454
Surplus from 1894.....	\$79,421
Timber credit.....	200
	79,621
Surplus December 31st, 1895.....	\$65,140

The assets and liabilities December 31st, 1895, exclusive of real estate and mine plant, were:

ASSETS.	
Cash.....	\$43,706
Loans.....	18,600
Copper on hand.....	6,600
Wood and supplies.....	5,940
Total.....	\$74,847
LIABILITIES.	
Indebtedness at mine.....	\$7,218
Accounts payable.....	2,478
	9,706
Balance of assets.....	\$65,140

The receipts and expenditures of the company, from its organization to December 31st, 1895, show:

RECEIPTS.	
Capital stock paid in.....	\$100,000
Copper, and including silver.....	9,614,865
Profit on timber sold.....	79,211
Total receipts.....	\$9,794,077
EXPENDITURES.	
Mining costs, equipment, smelting, etc.....	\$7,758,937
Balance of receipts.....	\$2,035,140
Deduct dividends paid.....	1,970,000
Net surplus December 31st, 1895.....	\$65,140

The directors say: "The directors are disappointed in the results obtained during the past year. Operations have been conducted mainly with the object of determining beyond question that the vein has been 'faulted' at the point of its intersection with the bed of conglomerate known as the 'K'-large conglomerate, and at the same time of making a thorough exploration of the ground in the vicinity of the 'fault,' in order to find, if possible, a continuation of the ore body which has been so productive from the surface to the 31st level, or to make it certain that such a continuation does not exist, before abandoning work in the bottom of the mine. At times some encouragement has been given by finding patches of copper ground on top of the conglomerate in the vicinity of the vein, but on the whole these occurrences have not yielded copper in sufficient amount to pay for the expenses of maintaining the working force, keeping machinery in operation and hoisting the water from such a great depth."

CYANIDE ASSAY OF LOW-GRADE GOLD AND SILVER ORES.

A preliminary paper on this subject was read at the Cleveland meeting of the American Chemical Society, and the methods used and recommended by William J. Martin, Jr., will prove very interesting to many who have been bothered in practice by the extreme low grade of the ore of which the determination or assay had to be made. Mr. Martin says:

Having undertaken this work, at the suggestion of Professor Mallet, only within the last two or three weeks, I have no exhaustive report of any nature to present. The work has not as yet advanced to such a stage that results can be stated satisfactorily in numbers. The attempts to apply this method to assay purposes may have been already made. If so, I have been unable to find any statement of that fact, and have no knowledge that such an attempt has been made.

I am at present comparing the method with the methods using chlorine and bromine. Quartz ores, too poor in gold or silver to be advantageously worked by the ordinary method of crucible assay, are the ores so far used.

The pulverized ore is well and repeatedly shaken with 0.25 per cent. solution of potassium cyanide, free access of air being provided for. After filtration and partial evaporation, the liquid is slowly passed over pure zinc filings. The zinc is then scorified with a larger amount of lead and the button cupelled.

The work has only progressed far enough to give hopes of good results. It seems at this stage to offer several advantages over the other methods mentioned.

The cyanide extracts the silver as well as the gold; bromine and chlorine only extracting the gold. The extremely disagreeable fumes of the other methods are entirely avoided. The work can be conducted without the use of hoods or fume rooms.

The method yields the metals in a condition in which they can be more easily handled and their weights determined than can be the exceedingly fine precipitate from the bromine or chlorine solution.

The time is materially shortened, the long delay in the collection of the gold by the use of ferrous sulphate or oxalic acid being avoided.

In the few comparisons made, the amount of gold (and silver) extracted has been greater with the cyanide method than with the others, though sufficient work has not as yet been done to make this reliable.

Before pronouncing on the availability of the method, other classes of ores than those so far used (quartz ores, with and without pyrite) will be treated.

ON THE CASTING OF STEEL.

By Sergius Kern, M. E., St. Petersburg.

At the Obouchoff Steel Works, St. Petersburg, great inconvenience was felt for a long time in casting large round ingots of five tons and upward, for forging guns. The stream of steel falling from a considerable height into the mould, from the 30-ton ladles of the Siemens-Martin furnaces, gives rise to a considerable quantity of splashes, which in return produce cracks on the surface of the ingots.

The same annoyance was also observed in casting rectangular ingots of 25 to 30 tons for armor plates.

M. Posnikoff, the manager of the steel department of the above-named works, has devised a very simple method, preventing the steel from splashing. It may perhaps be already in use elsewhere, but anyhow it deserves mention.

A tube is prepared of thin sheet-iron, such as is used for roofing. The tube is 24 in. in inside diameter, and is suspended from an iron ring, to which there are rivetted three bars on the surface of the mould just before casting. The steel is poured from the bottom of the ladle into the middle of the iron tube. All the splashes are thrown on the walls of the tube, which gradually melts away during the rise of the surface of the liquid steel in the mould.

We had the pleasure of seeing this device in perfectly successful action at the Obouchoff Works, where it is now in constant use.—*Chemical News.*

PROTECTION OF ELECTRIC CIRCUITS FROM LIGHTNING.

Some interesting figures on protection of electric circuits from damage by lightning are made public by Mr. A. J. Wurts in a paper published in *Electric Power*. The entire trolley and feeder lines of the McKeesport & Wilmerding Railway were equipped with lightning arresters placed at intervals of about 100 ft., 272 arresters being installed, and by a special spark gap arrangement, whenever an arrester received a discharge, a tissue paper was perforated. These were collected and renewed after each storm and the results tabulated. During the season there were 12 thunder storms. The largest number of arresters which received discharges during any one storm was 63. During the entire season 163 of the 272 arresters received discharges. Of these—

2 arresters received discharges during 7 storms.	
5 " " " " " " " " " "	5 " "
5 " " " " " " " " " "	4 " "
10 " " " " " " " " " "	3 " "
47 " " " " " " " " " "	2 " "
94 " " " " " " " " " "	1 " "

No discharges entered the station at any time and the service was not at any time interrupted, though several storms were of unusual severity. It is of interest, further, to note that the discharges occurred regardless of elevation, woods, open country or ravine, and the only adequate protection for exposed lines seems to lie in a liberal use and thorough distribution of arresters.

ELECTRIC POWER AT BARBERTON.

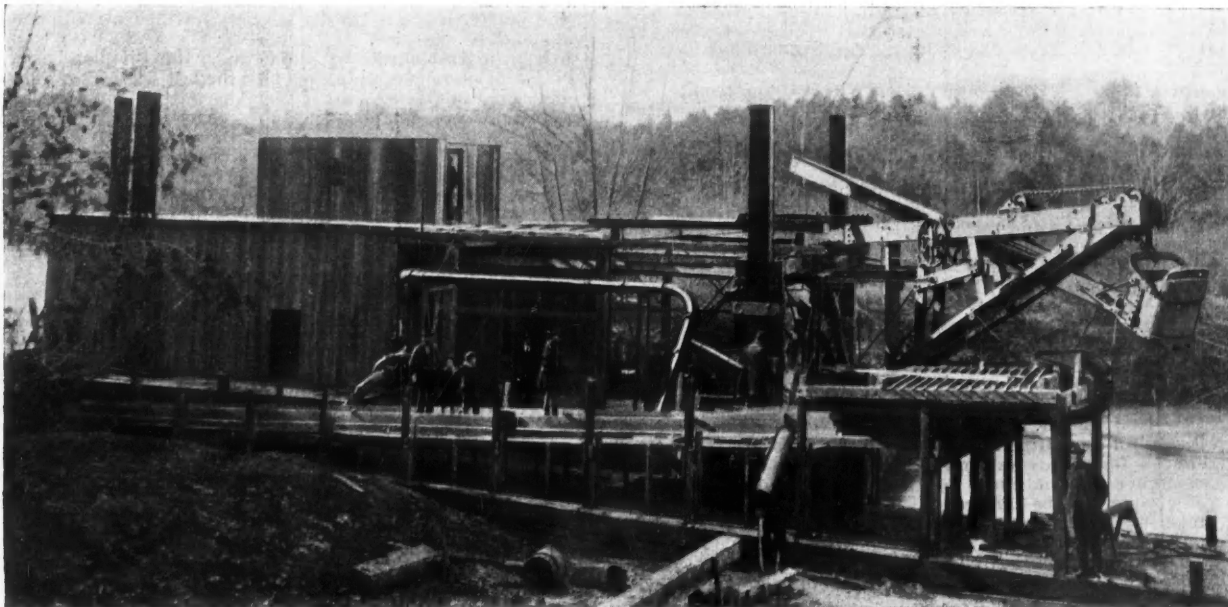
Mr. W. B. Eason, writing to the London *Financial News*, says: "I have read with interest the leader on 'Barberton Mining' in your issue of the 24th inst., but with regret note the results of the attempts to crush by electric power at the Moodie's Fortuna. To the uninitiated your remarks, and also the report of the Moodie's Fortuna board, would amount to a condemnation of electric transmission of power as applied to gold mining. It is my purpose to show, however, that, properly engineered, power transmitted electrically can be made as reliable as power obtained by any other means, steam included, and that the uncertainty of the electric power at the mine in question, due to whatever cause, cannot be held as condemning in any sense the use of electric power generally. By a curious fate the Sheba Mine, which might be called next door to Moodie's, has also an electric plant, and has for over 12 months depended solely and absolutely for its crushing of power transmitted electrically. By a still more curious fate, while Moodie's Fortuna records a failure, the Sheba has recently recorded crushings which have been unprecedented, and which, you will allow, bears ample evidence of what electric power can do. In the reports of Moodie's Fortuna it is stated that doubts as to the practicability of electric power were entertained from the first. When Messrs. Johnson and Phillips took the order for the power plant at Sheba there were no doubts whatever in the minds of the contractors or their engineers as regarded the ultimate success of the scheme. Applied to the exigencies of gold mining, there were, of course, certain details which required to be modified as the work proceeded; but respecting the final results which would be brought about there was no question. As the system at Sheba is quite different from the system at Moodie's, it is possible that to this is to be attributed in no small measure the difference in the results. The use of two alternating currents for the transmission at Sheba enables the whole plant to be much more easily managed than would be possible were a direct current used, as I understand is the case at the neighboring mine. The results at Sheba speak for themselves. The electric power is transmitted through cables five miles long, and the mill works night and day, never stopping save for an occasional examination of the machinery at the generating or receiving end of the lines. For the four months ended February 29th the mill worked night and day, with stoppages aggregating in that time only one day and a half in all. This amount of stoppage was made up of a quarter of an hour here and 20 minutes there to take up a belt, adjust a rope, examine a bearing, or to give to the plant any of the little attentions always required from time to time by running machinery. The record, as it stands, forms an undeniable tribute to the success of power transmission by electricity, and it will be obvious that what has been done at Sheba can be done elsewhere, if the problem be tackled in the right manner."

GOLD PLACER MINING IN GEORGIA.

Energetic and systematic work is being done by various enterprising people in this direction, and among others by Messrs. Benham & Helmer, of New Bridge, Ga. They are confining their operations at present to the bed of the Chestatee River, in Hall County, Ga., and to do the work in the most economical manner they are using a Marion Steam Shovel Company's dredge of the type called the Barnhart 1 1/2-yard dredge. This pattern is especially built for river and harbor work, and the one in question has now been in operation for several months, better results having been obtained than were at first anticipated. The Marion Steam Shovel Company evidently has the most complete confidence in the efficiency of the machine, as it has given Messrs. Benham & Helmer a guarantee that the dredge will handle from 800 to 1,200 cu. yds. per day of 10 hours. They have a pontoon in connection with the dredge on which is placed the sluice boxes, the material, gravel, etc., taken from the bed of the river being dumped onto a grizzly on which is thrown a stream of water from a No. 8 Held & Cisco centrifugal pump having a capacity of 4,500 gallons per minute. The finer material passes through the bars of the grizzly into a plate-iron hopper, and from thence to the sluice boxes which are 70 ft. long, 64 in. in width and 12 in. in depth. The boxes are provided with riffles, and such gold as is not sufficiently heavy to be saved by its own specific gravity is caught by amalgamation to a great extent by the quicksilver with which the riffles are charged. There is an ingenious device in connection with this dredge by which the tailings are carried back and deposited in the excavation behind the machine.

Although this may be termed only experimental work, yet it is experimental work on a practical scale, and the firm operating the dredge find that their expenses are about \$18 per day, while the gross returns have been from \$40 to \$120 per day.

The nature of the bed-rock, which is decomposed and soft, makes it



MARION STEAM SHOVEL.

very favorable for dredging operations not only in this river but in others of the State.

Another device for disposal of the material excavated is an incline similar to the incline used on the Chicago Drainage Canal, which, for dry work where a steam shovel or traction dredge would be required is the method best adapted for that class of work. The incline in operation is complete within itself. It is propelled along as fast as the machine cuts ahead, and it may be either double or treble tracked according to the capacity of the excavating machine and washer. It elevates the material to a sufficient height so that the tailings can be carried off and disposed of. The machine of Benham & Helmer, represented by the accompanying cut, has given such good satisfaction that the Marion Steam Shovel Company, expects to make such arrangements as will greatly increase its present capacity. The bucket is made as near tight as is practical so as to prevent the material after it is once taken up from washing back. One idea of placing on this dredge a powerful centrifugal pump is that any fine gold that may be left in the crevices of the rock, which is the bottom of the excavation, can be taken up and passed through over the washers, thus making it a combination centrifugal pump and dipper dredge, so as to avoid loss as much as possible.

Trimming Ore Cargoes.—Another important improvement is certain to follow the introduction of 400-ft. ore carriers on the lakes, says the *Cleveland Marine Review*. The immense open holds of these big vessels offer special opportunities for the development of a machine for trimming the ore after it is dumped into the vessel from pockets in shipping docks at the upper lake ports. The labor cost of about 3c. a ton which is paid for trimming is an important item, and then too there has been more or less trouble of late with this kind of labor. At least two of the big ship building companies are trying to work out the details of a machine for trimming ore, to be located permanently in the vessel's hold, and it is quite probable that such a machine will be ready for use before the coming season is at an end.

BLAST FURNACE HEAT BALANCE SHEET.*

By H. H. Stook.

To study the action of a blast furnace it is necessary to have an exact statement of the heat carried in by the blast and that produced by the combustion of the carbon in the several zones of the furnace, as well as of the quantities of heat utilized on the interior of the furnace and the amounts lost by conduction or convection. Such a study or statement forms the heat balance sheet of a blast furnace, and the following is in brief the method of preparing such a balance sheet as given by Mr. Grüner.

1. Quantities of heat produced by combustion.—Let *a* be the weight of carbon contained in the amount of coke consumed in making a ton of pig iron, and *b* the weight of carbon contained in a corresponding quantity of flux. Then let *m* be the ratio between the weights of CO₂ and CO in the gases escaping at the throat of the furnace and *y* the weight of CO in these gases per ton of pig iron produced.

The total heat produced in the furnace is due to the transformation of the solid carbon into a certain mixture of the gases CO and CO₂. Or, if the weight of carbon absorbed by the pig iron per ton of metal produced be represented by *c* the total amount of carbon to be found in the gases at the throat of the furnace per ton of metal produced is equal to *p*, and

$$p = a + b - c$$

Moreover it is evident that

$$\frac{3}{8}y + \frac{1}{11}my = p$$

Hence *y* (the weight of CO) = $\frac{11p}{33 + 21m}$

The weight of CO₂ is therefore equal to *m**y*.

In order to calculate the heat produced from the formation of these

two gases it is necessary to take account of the weight of carbon *b*, which exists in the CO₂ of the flux and which does not result from combustion in the furnace. The heat given out by combustion is therefore given by the formula.

$$(1.) Q = \frac{3}{8}y \times 2473 + (\frac{1}{11}my - b) \times 8080$$

To establish the distribution of this heat between the top and bottom, if *f* be the weight of iron contained in a ton of pig iron; in the ore it was combined with a weight of O equal to $\frac{2}{3}f$. If the ore is entirely reduced by CO, the CO₂ produced contains a weight of C equal to $\frac{2}{3} \times \frac{3}{8}f = \frac{1}{4}f$ and there will be found at the throat of the furnace a quantity of CO₂ corresponding to $(\frac{1}{4}f + b)$ of carbon.

The difference $(\frac{1}{4}f + b) - \frac{1}{11}my$ is the quantity of CO₂ reduced by the carbon in the shaft of the furnace, (CO₂ + C = 2CO), or the weight of C in the CO₂ decomposed equals the weight of C necessary to effect that decomposition and the expression under consideration represents the weight of C burned in the stack. This assumes that all of the ore is reduced by CO and that after the reaction by which the oxide of iron is reduced the C reacts upon the gaseous products of combustion or this reduction. The same result will be reached by admitting that a part of the C burns in the direct reduction of the ore with the formation of CO, the combustion of one kilogram of C under such conditions giving off 2,473 calories.

The quantity of CO₂ produced by the reduction of the ore corresponds to a weight of C equal to $(\frac{1}{11}my - b)$. The heat given off by this reaction amounts to 5,600 calories per kilogram of carbon.

The amount of C burned to CO at the tuyeres equals

$$a - c - (\frac{1}{4}f + b - \frac{1}{11}my)$$

This reaction gives off 2,473 calories per kilogram of carbon.

The total amount of heat therefore produced in the furnace equals the sum of these three quantities of heat as follows: (a) that at the tuyeres forming CO, (b) that generated in the hot region of the stack forming

* Translated from the French of M. deBilley's "Fabrication de la Fonte."

CO, (c) that generated in the higher zones of the furnace forming CO₂; the expression for which is

$$Q = [a - c - (\frac{2}{28}f + b - \frac{3}{11}my)] \times 2473 + (\frac{2}{28}f + b - \frac{3}{11}my) \times 2473 + (\frac{3}{11}my - b) \times 5600$$

Since (1) and (2) are equivalent expressions, they may be placed equal to each other, and evaluated for the several quantities contained.

II. Amount of heat furnished by the blast.—It is necessary to calculate the weight of blast blown, and the weight of gas at the throat corresponding to the production of one ton of pig iron.

Let x = the oxygen brought in by the blast; d the oxygen furnished by the ore and the CO₂ of the flux. Assuming that the weight of O contained in the escaping gases is the sum of the weights furnished by the blast, the ore and the flux, we have the equation $\frac{1}{2}y + \frac{3}{11}my = d + x$, from which we get

$$x = y(44 + 56m) + d$$

Assuming that the air, taken at 12°–13°C. contains 8 grammes of water per cubic meter weighing 1,300 grammes, the O contained in this weighs 0.0055 of the weight of the dry air.

Let z = the weight of O coming from the dry air, then, $z = 0.07677x$, and from this we have

$$\begin{aligned} \text{weight of N} &= 3.33z, \\ \text{of dry air} &= 4.33z, \\ \text{of moist air} &= 1.0062 \times 4.33 \times z. \end{aligned}$$

Then let T be the temperature at the tuyeres in degrees Centigrade, the specific heat of air being 0.239, the amount of heat carried by the blast will then equal

$$Q' = T \times 1.0062 \times 4.33 \times z \times 0.239.$$

The sum $Q + Q'$ is the total heat furnished to the furnace.

III. Amount of heat consumed in the blast furnace, -1° ;—vaporization of the water of the charge, $-$. Let t = the temperature of the gas at the throat; q = the weight of water to be vaporized. The number of calories will be given by the formula:

$$q(637 + 0.48(t - 100))$$

2°.—The sensible heat of the gas at the throat:—The specific heats are for N, 0.244; for CO, 0.246; for CO₂, 0.216, the expression for the sensible heat will then be

$$t(3.33z \times 0.244 + y \times 0.246 + my \times 0.216)$$

3°.—Reduction of the weight f of iron.—The reduction of 1 kilogram of iron from the form Fe O₂ gives about 2,000 calories.

4°.—Decomposition of the flux. The decomposition of 1 kilog. of CaCO₃ into CO₂ and CaO gives 424 calories.

5°.—Reduction of the metalloids which enter into the composition of the pig iron. P, Si, Mn., and S., are found in the ore as phosphoric, silicic, and sulphuric acids, and as binoxide of Mn., from which compounds the reduction of 1 kilog. of Si. will give 7,828 calories.

P	"	"	5,868
Mn	"	"	2,192
S	"	"	3,283

6°.—Heat of fusion of the pig iron and cinder. We may take for the total heat of fusion of No. 3 gray iron 300 cal. per kilog; for No. 1 cast iron 310 cal.; and for white iron 280 cal. For slags very different values are given by different authors, according to their very variable compositions. Sir Lowthian Bell found 550 cal. for the total heat of a very aluminous Cleveland slag. M. de Vathaire gives for French ores the following: 500 cal. for slags from No. 1 iron; 475 cal. for slags from No. 3 gray iron, 375 cal. for white iron working cold.

7°.—Dissociation of the moisture of the blast. The dissociation of 1 kilog. of water vapor absorbs 3,233 cal.

IV.—Quantities of heat resulting from the formation of slag and the impregnation of the iron with the several metalloids.—The heat of formation of slags has never been measured exactly. However, we may assume that the quantity of heat given out by the lime in its combination with the silica is about equal to the amount of heat given out in its combination with carbonic acid. We may then with a certain approximation take account of this quantity and the heat corresponding to the impregnation of the cast iron by the metalloids, but neglect the heat corresponding to the decomposition of the flux.

V.—Heat lost through the walls. The loss through the walls and in the tuyere water can be calculated by differences. The measurements of this heat as given by various authorities are generally too small.

COAL-FIELDS OF CHINA.

There are symptoms indicating that the Chinese near Pekin are awakening to the advantage of employing foreign engineering knowledge and machinery, says a correspondent in the *Pekin and Tientsin Times*. Considerable coal-fields extend over a vast area of the mountains north and west of the capital, at a distance of about 100 li from it. They have hitherto been worked by the stereotyped, irrational, mole fashion, so characteristic of Chinese. When the natives discovered the coal seams on the sides of the mountains, they commenced digging into them, and in some places they have penetrated as far as 8,000 feet, in others only a few hundred feet, when they were stopped by water, with which difficulty they have been entirely unable to cope, and the mines have consequently, in many cases, been abandoned. We are glad, however, to hear that some rich Chinese, stirred by the railway movement, have entered into contracts with a foreign engineer to develop the mining possibilities of the northern districts.

China's coal-fields are exceeded by none but those in America, and in a more distant time they will have equal effect on the commerce and manufactures of the world. The cost of sea freights has been low enough to allow the coal to be carried to distant countries and sold more cheaply than coal from nearer sources; but the construction of railways, the improvement of navigable rivers and other means of transport are, in many countries, entirely altering the conditions of the coal trade, and in Japan, India and Australia the native coal is rapidly superseding the imported coal, and the same change will eventually take place in South Africa and in China when the coal deposits are developed.

THE SIMPLON TUNNEL.

After a varying lapse of time the necessity of additional means of communication between the countries north of the Alps and Italy makes itself felt; and just so sure as that the Mont Cenis Tunnel would be followed by that of the St. Gothard, but whether in 10, 15, or 20 years, could not be foretold at the time, so it was equally certain that the Alps would once more be pierced at the Simplon. The constructors guarantee the necessary installations, the completion of the first tunnel, and the gallery for the fixed sum of 54,500,000 fr., and the completion of the gallery by turning it into the second tunnel with a permanent way for an additional 15,000,000 frs. From the time the traffic begins ventilators will be used to renew the air of the tunnel and to reduce the quantity of carbonic acid caused by the locomotives. Each train after passing through will close automatically the door of the tunnel, and air will be driven into the same by suitable side passages. The need of ventilation from tunnel No. 2 will of course, have ceased.

The advantages of the Simplon as an international route consist not only in the reduction of distance between Calais and Milan, but specially in the conditions of level, which are much more favorable than in the Mont Cenis and the St. Gothard. The culminating point in the three tunnels is stated thus:

	Metres.
Mont Cenis.....	1,291.70
St. Gothard.....	1,154.60
Simplon.....	705.20

Thus the augmentation in the speed of trains at this point will be very considerable, but, as the construction of the Simplon will entail certain alterations in sections of the Swiss railway system, it is impossible to state at the present moment what the economy in time will be. An important question, that of the fortification of the great tunnel, has not yet been settled in the War Departments of the respective countries. Probably, as far as Switzerland is concerned, a fort will be constructed at the Brigue entrance; and, moreover, the line of the Simplon follows the Rhone Valley, which is already strongly fortified at both ends at Furka Pass and at St. Maurice.

The project of a railway tunnel under the Simplon has occupied the attention of engineers and experts for the last 35 years. The scheme has been delayed by the piercing of the Alps at the Mont Cenis and the St. Gothard, but its accomplishment now seems assured. An agreement to this effect was signed between Switzerland and Italy on November 25th last; the necessary subventions are guaranteed on both sides; and a definite offer from a syndicate of contractors of the highest renown to construct the tunnel for a fixed sum will facilitate the contribution of 40,000,000 fr., which must be furnished by private capital.

The tunnel, which will pass under the massif of Monte Leone between Brigue (Switzerland) and Isella (Italy), will be 19,731 m. long, and its highest point in the interior 705 m. 20 cm. above the sea-level, with a downward slope in both directions of 1 m. in every 50 towards Brigue and one in 143 towards Isella. The principal difficulty in piercing the tunnel will consist in the very high temperature—40° centigrade—in that part of the route which lies deepest under the mountain, and, therefore, the authors of the project have adopted a new system in piercing it which is very ingenious. The mountain will be tunneled by two parallel passages at a distance of 17 m. from each other. The first tunnel will be completely finished so as to admit a single line of rails of the normal gauge; the second tunnel will serve as a gallery and will only be completed so as to admit the double line some years after the completion of the first. This gallery, with its transverse galleries connecting it at every 200 m. with tunnel No. 1, will serve for ventilation, the arrival of ballast trains and other working material for conducting water at high pressure and laying down electricity for lighting purposes. The transverse galleries will be closed by doors, but the advanced transverse galleries which are nearest the workings, when the piercing of the rock is being pushed forward, will be left open. This door will prevent the current of air from passing through the earlier passages and secure a good ventilation at the actual spot where the workings are furthest advanced. This draught will then pass through the two advanced transverse galleries and will return by tunnel No. 1. While one of these cross galleries is being pierced, of course there can be no current of air through it; in this case the air will be forced in by means of injectors. The temperature already lowered by the fresh air from the ventilators will further be closed by jets of cold water spray. After each case of blasting the *débris* will be cleared away by hydraulic force, and the Brandt perforators used to pierce the rock will also be worked by the same power. The geological formation of the mountain is favorable to the work, as gneiss will chiefly be met with. The motive force will be supplied at Brigue by the Rhone and at Isella by the Diveria or the Cairasca. A boring of 700 m. at Berisal above the tunnel will serve for the passage of the water of the Steinenbach, which will supply hydraulic force by its own natural pressure.

As regards the workmen, great precautions will be taken to insure their sanitary well-being. They will each receive a special kind of clothing to be put on before entering the tunnel, on leaving they will come out into a covered building, where they will be compelled to change their clothes and take a warm bath before passing into the cold mountain air. With careful medical inspection, good constitutions, and an ample diet it is hoped and expected that they will not suffer from their cyclopean toils. In fact, from both a technical and a sanitary point of view, every precaution will be taken to meet any obstacles that may arise.

Canal Competition with Rail.—Efforts are being made to restore water communication between the Forest of Dean coalfield and London. Some years ago the canal which crosses the Cotswold Hills and connects the Severn Canal system with that of the Thames, fell into the hands of one of the railway companies, and the pumping stations being neglected, the canal became unnavigable. It is stated that, through the joint action of the Gloucestershire County Council and the Birmingham Navigation Trust, steps have been taken to remedy the neglect, and in a short time coal will once more be brought to London by water from the western coalfields.

INFLUENCE OF SMALL QUANTITIES OF IMPURITIES ON COPPER.*

The influence of a few tenths per cent. of impurity on the physical properties of metals is a most important subject and the method of investigating this by the aid of the microscope is most instructive. The authors also deal with gold and the effect of impurities or alloys on that metal, but in this extract we shall confine ourselves to copper.

Preparation of the Copper Alloys.—The copper used was prepared by electrolysis. It was found on analysis to contain traces (about 0.002%) of sulphur, and when cast it almost certainly contained a little oxygen in the form of cuprous oxide. No other impurities could be detected by qualitative analyses made on large weights of the electrolytic metal. The copper alloys were prepared by fusion in gold-annealing pots, the latter being imbedded in sand in graphite crucibles, air being excluded by means of fragments of charcoal. Two-tenths per cent. of the pure alloying elements were firmly encased between the rolls of pure copper, the whole being fused and allowed to slowly cool *in situ*. The sulphur and oxygen were respectively added as pure CuS and CuO . As in the case of gold, some difficulty was experienced in alloying the silicon, a high temperature being necessary to effect the combination. Two test bars were cast in carbon moulds and broken under cold flexion,

fell out, the result being that the polishing track on the kid skin became coated with gray bismuth powder, and an increase in the friction was manually distinct. After etching, the section was slightly repolished, when the cavities formed by the falling out of the globules and membranes became filled with a mixture of rouge and bismuth powder, then presenting the appearance figured.

Copper and Bismuth (Fig. 3).—This reproduces a portion of Fig. 2, reduced from a drawing magnified 220 diameters. It will be noticed that the sectional bismuth meshes each present a remarkably definite and straight plane of cleavage. Figs. 2 and 3 seem to offer a satisfactory explanation of the enormous falling off in the electrical conductivity of copper produced by the addition of small quantities of bismuth. A current in the case of the pure metal traverses a series of cohesive copper crystals; in the bismuth alloy it has in its passage from one crystal of copper to the next to pass through a well of bismuth divided by a cleavage plane. A micrographic analysis of the metal bismuth itself reveals the presence of innumerable planes of cleavage resembling those of calcite, a fact which probably accounts for its high electrical resistance.

Copper and Antimony (Fig. 4).—This section, drawn from an alloy of copper containing about 0.2% of antimony, shows that the latter metal produces very thick brown cell walls or sectional meshes, which seem in volume or area altogether out of proportion to the percentage of anti-

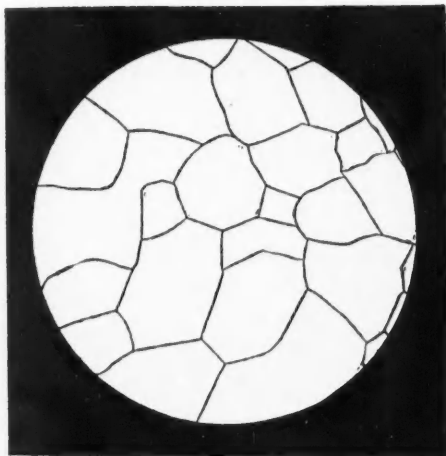


FIG. 1.—MAGNIFIED 11 DIAMETERS.

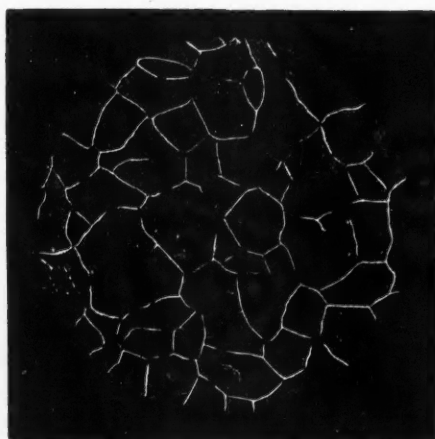


FIG. 2.—MAGNIFIED 11 DIAMETERS.

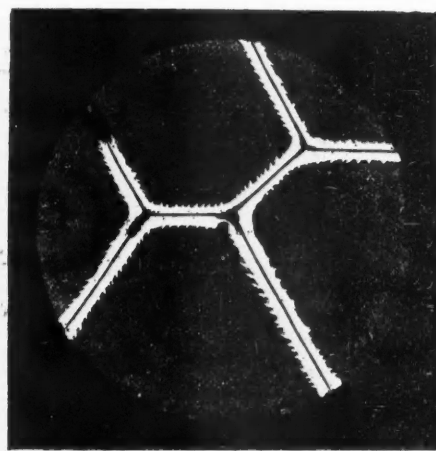


FIG. 3.—MAGNIFIED 65 DIAMETERS.

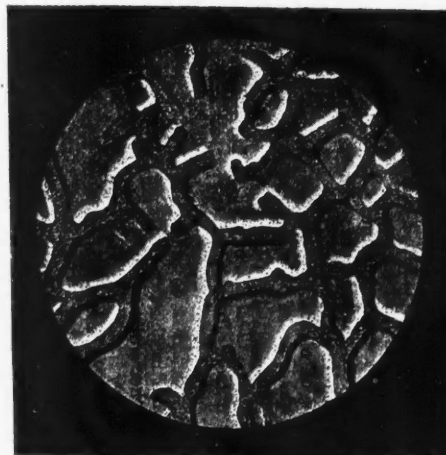


FIG. 4.—MAGNIFIED 36 DIAMETERS.



FIG. 5.—MAGNIFIED 66 DIAMETERS.

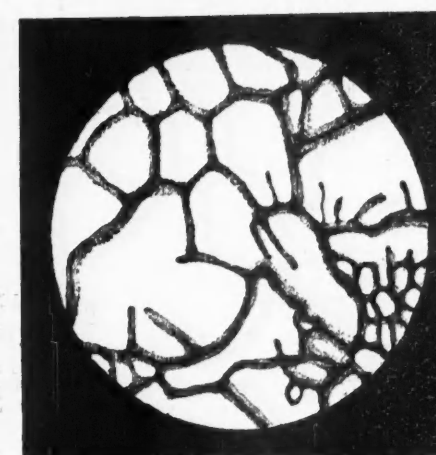


FIG. 6.—MAGNIFIED 11 DIAMETERS.

namely, the pure copper, which bent through 225° , and the bismuth alloy, which snapped at 0° .

Pure Copper (Fig. 1).—This drawing reproduces the primary crystals of pure copper magnified as before. Under high powers minute globules of the sulphide of copper were readily detected, although only 0.002% of sulphur was present. A shadowy granulation around the edges of the crystals also indicated the presence of traces of oxygen. In the copper alloys, unlike those of gold and excepting in the case of sulphur, the cell walls appeared in relief, being less soluble in the boiling dilute aqua regia used for etching than the copper itself.

Copper and Bismuth (Fig. 2).—In the alloy of copper with 0.2% of bismuth the crystals did not appreciably differ from those of the pure metal, and the investing membranes were so thin as to suggest that no alloy had been formed, but that the cell walls consisted of almost pure bismuth. It was also noticed that each sectional mesh appeared to be split down the center.

To obtain more conclusive evidence, an alloy containing 0.5% bismuth was made. The magnified section of this metal is figured in Fig. 2. The bismuth occurs not only as cell walls, but in isolated irregular globules. Professor Goodman has shown that the addition of small percentages of metals of high atomic volume produces a remarkable increase in the friction of bearings. This fact appears to be explained by the behavior of the present alloy. It was observed during polishing that the isolated globules of bismuth, and indeed portions of the membranes themselves,

mony present. However, on examination at high powers, the antimonide meshes are found to possess a distinct compound structure, consisting of alternate light and dark laminae, suggesting that in the first instance an attenuated antimonide involves the copper cells at a high temperature, but that at a lower temperature the walls split up into plates of pure copper, alternating with those of a less basic antimonide. In this alloy the secondary crystals of copper contained within the antimonide membranes consist of remarkably perfect octahedra. This illustrates a fact noted throughout the present investigation—that thick cell walls usually inclose very geometrical secondary crystals, suggesting that the perfection of the latter is due to the protective action of the walls in relieving the cells themselves from contraction stresses.

Arsenic and Copper.—The alloy containing about 0.2% arsenic presented a structure resembling that of the antimony alloy. The meshes, however, were green in color; and their compound structure was granular rather than laminated. Also the lines of division between the cells and walls were less acutely defined than those of the antimony alloy.

Copper and Sulphur (Fig. 5).—The section of this alloy presented well-defined and geometrical primary crystals surrounded by somewhat attenuated sulphide walls. The sulphide also occurred in the form of green globules in the interior of the crystals, or sometimes near the edges in groups of elongated leaves. Sulphide which has escaped corrosion by the etching acid is green, but the cavities from which it has been dissolved out present a red-brown color. Often isolated globules or elongated patches of the green sulphide appear in brown cavities between the copper crystals.

* By J. O. Arnold and J. Jefferson, respectively Professor and Demonstrator of Metallurgy at the Sheffield Technical School.

Copper and Oxygen (Fig. 6).—This section is that of copper containing 0.2% of oxygen reduced from a drawing magnified 40 diameters. The cuprous oxide arranges itself in granular shadowy meshes, not only between the primary crystals, but also in the interior of the latter.

Zinc and Copper.—Zinc appears to dissolve in copper, certainly in proportions up to 0.5%, without producing any noticeable change in the micro-structure. Its behavior with copper appears to be identical with that of silver with gold.

Copper and Silicon.—The structure of this metal presented a marked resemblance to that of the gold-silicon alloy, the sectional meshes of silicide being, however, in relief, granular in structure, and larger and less elongated than those of the gold alloy.

It will be obvious that the facts recorded in the present paper open up a wide field of research, not only in metallurgy, but also in chemical physics.

It is only just to recall the fact that the sagacious conception that metals should be regarded as crystallized igneous rocks, was originally due to Dr. Sorby. The truth of this conception he proved in 1864 by his classical research on the micro-structure of iron and steel; but it was only after the lapse of a quarter of a century that metallurgists realized the fact that in his marvelously patient investigations was to be found the clue to those puzzling mechanical eccentricities of metals which chemical analysis utterly failed to explain.

COAL BRIQUETTES.

In a very interesting technical work, "Chemical Recipes," published by the Atlas Chemical Company, Sunderland, England, there is a chapter entitled "Fuel Briquettes," which contains some hints that may be useful to many of our readers. The work, says the *Colliery Guardian*, generally is full of valuable chemical information, particularly useful to manufacturers in a small way of business, who have not elaborate and costly plant and machinery at their disposal. Those who are engaged in iron, lead, zinc, cobalt, tin, copper, gold, or silver mining will find these "Chemical Recipes" at once interesting and useful, for there is no reason to doubt that mineral colors are to be the colors of the future.

Speaking of fuel briquettes, however, the authors say the ingredients required for the manufacture of these articles are coal dust and any binding material easily procured. Clay can be used for binding a cheap article, but has the fault of caking in a hot fire, and rendering the ash extremely difficult to remove. The process in general use now is to have steam jacketed pans, and to mix with the coal dust a certain proportion of resin, pitch, and crude naphtha, and after these articles have undergone a thorough mixing, they are let out through a door at the bottom of the pan, and passed on to a press. In this machine they are pressed into blocks of a suitable size, and after leaving it they are ready for market. If clay is used as a binding material, it greatly improves the look of the product to finish it off with a coat of crude resin; this is done by melting the resin and dipping the blocks into it. There is very little skill required in the production of these goods, when once the proper proportions of the different ingredients are obtained. Almost any resinous or tarry matter may be used in their manufacture. Sea-weed, boiled down in water, may be very advantageously used by colliery owners whose works are situated near the coast. The weed, on being boiled for some hours, produces a glutinous mass, and acts as a good binding material; it should be mixed with the coal dust in the pan. Pine sawdust—7½%—mixed with the coal-dust before going into the pan, improves the quality of the briquettes. Any kind of sawdust may be used, but pine is the best. The quantity of each binding material necessary can be best ascertained by experience, and presents no difficulty.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

PURCHASE BY CO-TENANT OF MINING CLAIMS.—A tenant in common in a junior mining claim cannot buy in the title of a senior conflicting mining location, and assert it against his co-tenant in the junior claim.—*Franklin Mining Company vs. O'Brien* (43 Pacific Reporter, 1016), Supreme Court of Colorado.

MEASURE OF DAMAGES FOR TRESPASS ON COAL LAND.—In an action for an intentional trespass to land, consisting of the mining of coal from same, the party suing may recover as damages the highest value of the coal after severance until suit was brought, without any allowance for the cost of mining the coal.—*Sunnyside Coal and Coke Company vs. Reitz* (43 Northeastern Reporter, 47), Appellate Court of Indiana.

TRESPASS BY AGENT OF MINING COMPANY.—That the agent of a mining corporation, in mining coal in certain land, acted under the belief that the coal was owned by the company, when in fact it did not have even color of title, there being no mistake in the identity of the land, does not prevent trespass from being an intentional one.—*Sunnyside Coal & Coke Co. vs. Reitz* (43 Northeastern Reporter 47), Appellate Court of Indiana.

WHEN PUNITIVE DAMAGES WILL NOT BE ALLOWED.—In the absence of evidence, in a personal damage suit against a coal company, of malice or reckless conduct on the part of the company indicating a purpose to have the employee injured, or of a reckless disregard of the safety of the employee, the jury should be confined, in case they return a verdict against the company, to compensatory damages only.—*McHenry Coal Company vs. Sneddon* (34 Southwestern Reporter, 228), Court of Appeals, Kentucky.

NON-LIABILITY OF COAL COMPANY FOR INJURY TO EMPLOYEE.—An employer is not liable for the death of an employee by his falling after having been caught by a rope, part of a hoisting apparatus, which commenced to tighten up just as he was stepping over it, where the employee was fully acquainted with the apparatus, and it was working as usual on the day of the accident, and the employee had been forbidden, and his duties did not require that he should cross the rope.—*O'Brien vs. Staples Coal Company* (43 Northeastern Reporter, 181), Supreme Judicial Court, Massachusetts.

MINING PARTNERSHIP IN MONTANA.—To constitute a mining partnership under the provisions of the laws of Montana, two or more persons must not only own or acquire a mining claim for the purpose of working it, but must actually engage in working the same; and the fact that one part owner of the claim is charged by another with unlawfully extracting ore from a portion of a vein, the apex of which is alleged to be within the claim, does not create the relationship of mining partners between the parties.—*Anaconda Copper Mining Company vs. Butte & Boston Mining Company* (43 Pacific Reporter, 924), Supreme Court of Montana.

Mossberg Roller Bearings.—The roller bearing has again been tested under heavy load. A standard car truck fitted with two General Electric motors of the latest type was used in the test. One motor had the ordinary bearings in general use, and the second motor was equipped with roller bearings of the Mossberg pattern. The axle with which the armature of this motor engaged also was fitted with the Mossberg bearings. The load was applied by a brake, the truck being suspended. In the first test, with no load, it took 190 lbs. pull to start the motor with ordinary bearings, and only 2 lbs. to start the roller bearing motor. With a load of 3,660 lbs. it took 240 lbs. pull to start the first motor and 18½ lbs. for the second.

The Holophane.—A new glass globe called the Holophane for diffusing the rays from intense lights is being introduced in England. It is intended particularly for use with arc lamps and incandescent gas lights as a substitute for ground glass and opal glass, which are used at present. The globe is made of perfectly clear glass and it has two series of ridges on its surface, one set vertical round the inside and the other set horizontal round the outside. The orb of light thus produced is very pleasant to the eye, while the amount of illumination is undiminished. It is unfortunate, however, that the promoters of the company floated to manufacture the globes have far too large ideas, and, consequently, the investing public will do well to keep away from the shares in the company and confine themselves to buying the globes.

Water Pipes and Lightning.—M. A. Houdry, in a recent issue of the *Genie Civil*, described a curious case of damage to water pipes, caused by lightning. The water supply of a suburb of Havre was cut off, although the pressure at the distributing point should have been 36 to 44 lbs. per square inch. It was evident that a leak or a stoppage had taken place. Tests showed that it was a leak. The mains were examined and it was found that a number of lengths of pipe were split. On looking into the matter more closely the pipe was found completely perforated at a spot where the root of a tree was just touching it. This very tree had been struck by lightning, and from the point of puncture for a distance of 80 meters almost every length of pipe was split longitudinally. M. Houdry thinks it worth while to call attention to this curious instance, with a view of warning those who are entrusted with the laying of water pipes to keep as far away as possible from trees, not only on account of the damage that may mechanically be done to the pipes by their roots, but on account of the damage that may be done by lightning.

PATENTS RELATING TO MINING AND METALLURGY.

United States.

The following is a list of the patents relating to mining, 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 MARCH 31st, 1896.

- 557,121. **MAGNETIC ORE-SEPARATOR.** Oriel M. Graves, North Yakima, Wash. Combination with a frame and ore-conveyer, of an endless needle-carrier above the ore conveyer, magnetic needles projecting from the carrier, and a vertically-pivoted oscillating hammer in operative proximity to the edge of the needle-carrier.
- 557,127. **BLAST FURNACE.** Malvern W. Iles, Denver, Colo. In combination with a blast furnace, a deck-plate independent of and situated above the water-jackets, the deck-plate consisting of a number of sections each formed of flanged iron beams and plates riveted together to form a water-tight conduit, the beams being set vertically to support the superstructure, a water-supply leading into one or more of the sections, a set of sectional water-jackets inclosing the furnace, coupling-pipes for connecting each section with the next, an outlet pipe or pipes leading from the deck plate and serving as an inlet or inlets to the water-jackets.
- 557,144. **MINING MACHINE.** Edward S. McKinlay, Denver, Colo. Combination of a sliding carriage having two side bars and cross-bars joined to form a quadrangular frame, a transverse cutting apparatus, and connecting devices for uniting the cutting apparatus to the carriage, of feed-cylinders, and pistons therein supplemental to the carriage-bars, the piston being united with the aforesaid connecting devices whereby the cutting apparatus is connected with the side bars and to the pistons.
- 557,172. **COAL SCREEN.** Frank H. Symons, Boston, Mass. Assignor to Henry G. Jordan, same place. Combination of a sieve loosely suspended in an inclined position, a rotating shaft, crank thereon, and link connecting the crank with the sieve, a pivoted spring-actuated striker and cam secured to the shaft constructed and arranged to move the striker in opposition to its actuating-spring and to release it while the crank is upon its dead-center.
- 557,216. **STONE BREAKER.** Robert McCully, Philadelphia, Pa. Combination of a housing or frame top plate having a central hub-opening, a gyratory shaft having an enlarged cylindrical upper end, a sleeve or bearing in the hub-opening, the sleeve having at its lower edge an inwardly-projecting flange forming a support for the lower end or edge of the cylindrical end of the shaft and adjusting mechanism for raising and lowering the sleeve and shaft.
- 557,340. **MINING MACHINE.** Charles O. Palmer, Cleveland, O. Combination of a cutter bar frame, two parallel cutter-bars journaled in the frame and projecting an unequal distance therefrom, each cutter-bar having a series of radial cutters which project from its side, the cutters on the longer bar being on that part thereof which projects beyond the shorter bar, means for simultaneously revolving the cutter-bars, and means for moving the frame in a direction transverse to the axis of the cutter-bars, whereby when the frame is moved as described, with the shorter bar in advance, the shorter cutter-bar in revolving cuts a kerf beneath the coal and the longer cutter-bar deepens the kerf.
- 557,481. **MINE TRAP-DOOR.** James O. Brien, Evansville, Ind. A lever-rail fitted to a curved track section having pivotal connections at its extremities with the tie-chairs, and similar connections with the ties between the extremities having double pivot joints.
- 557,529. **ORE CRUSHING MILL.** Henry P. Holland, Oakland, Cal. Combination of a main shaft, rollers and their carrying shafts, a battery, arms connected to the main shaft and inclined downward and outward, and guide-blocks for the roller-carrying shafts, adjustable between members of the arms.

PERSONAL.

MR. JOHN P. BRENNAN has resigned the position of general manager of the McClure Coke Company, of Connellsville, Pa.

MR. LEWIS A. RILEY has been elected president of the Lehigh Coal and Navigation Company, succeeding Mr. CALVIN PARDEE, resigned.

MR. J. W. PAUL, of Moundsville, W. Va., has been appointed chemist for the Davis Coal and Coke Company, at Thomas, W. Va., to succeed Mr. J. C. Attix, recently appointed assistant professor of chemistry at the Pennsylvania State College.

MR. W. GEORGE WARING, Mining Engineer and Metallurgist, whose work in Mexico and New Mexico is familiar to our readers, has made his permanent address at Tyrone, Pa., though his work will continue to be chiefly in the Southwestern States and in Mexico.

MESSRS. MARINER & HOSKINS, of 81 South Clark street, Chicago, Ill., announce that in addition to their business as analytical and consulting chemists and assayers they have perfected arrangements with professional men of experience and high repute to make examinations, reports, estimates and plans for the opening and development of mines. They will also give particular attention to processes for the metallurgical treatment of ores; plans for the erection of mining plants, mills, concentrators, etc.

MR. R. W. BARRELL has been appointed assistant manager of the Chloride Mining and Milling Company and the Maxwell Gold Mining Company, of La Grande, Ore. Mr. Barrell secured this position through the *Engineering and Mining Journal's* well-known "Positions Vacant" column, which has been the means of procuring excellent engagements for many hundreds of engineers, metallurgists, chemists, etc., in all parts of the world, and it is now recognized by prominent mining men everywhere as the best means to secure the proper assistants.

OBITUARY.

HENRY BOWER, a prominent manufacturing chemist, died in Philadelphia, Pa., on March 26th, aged 63 years. In 1880 and 1890 he was an agent of the Census Bureau for the collection of the statistics of the chemical industry.

RICHARD TOWNLEY HAINES died in New York City on April 3d, aged 42 years. In 1877 he went to Leadville, Colo., and remained there several years and engaged, among other things, in developing the resources of the community. He returned to New York later and was connected with various industrial enterprises.

EDWARD SAMUEL, a well-known iron and steel merchant and manufacturer, died at Philadelphia, Pa., on March 27th, aged 51 years. His early business career began when he became superintendent of Pusey, Jones & Co.'s shops, at Wilmington, Del. In 1867 he engaged in the iron commission business under the firm name of Farnum & Samuel, after which it became Edward Samuel & Co. He was at the time of his death the head of this firm and vice-president of the William Wharton, Jr., Company, Incorporated. He was also president of the North Branch Steel Company, of Danville, Pa. He was a heavy stockholder in this company, and was also largely interested in other enterprises.

SOCIETIES AND TECHNICAL SCHOOLS.

ENGINEERS' CLUB OF ST. LOUIS, MO.—At the meeting held on April 1st. Mr. Julius Pitzman read a paper on "Municipal Engineering," having special reference to the laying out of grades and subdivisions, and of parks and public places.

INDUSTRIAL NOTES.

The Willson calcium carbide works, at Spray, N. C., were destroyed by fire last week.

The entire plant of the Oxford Iron and Nail Company, consisting of blast furnace, rolling mill, nail factory, mines, stores, farms and dwelling-houses, was sold at Belvidere, N. J., April 7th, under foreclosure by the Farmers' Loan and Trust Company, of New York, for \$70,000, to the Delaware, Lackawanna & Western Railroad Company, which held the first mortgage.

The selling department of the Picher Lead Company, of Joplin, Mo., has been removed to the Western Union Building, Chicago, Ill., and Mr. D. A. Preston, the treasurer of the company will be in charge of it. Orders and remittances should be sent there. The company is prepared to furnish its "A" brand sublimed lead, and will soon be in market with first-class litharge.

Messrs. W. J. Clark & Co., of Salem, O., manufacturers of the Salem elevator buckets, have rebuilt and re-equipped their works which were destroyed by fire in September last. The new plant is probably the largest one in this country for that particular line of business and is equipped with the best machinery which the long experience of the firm has enabled them to devise for making their several

specialties. The Salem elevator bucket is well and favorably known among mine operators. The firm also make a large line of heavy sheet and plate metal work for which they have exceptionally good facilities.

TRADE CATALOGUES.

The H. Channon Company of Chicago, Ill., is about to issue a 240-page catalogue descriptive of its articles of manufacture and to those interested in mining, contracting or mechanics of any kind this book will be found of much value. The book will contain lists of ware and manilla rope, tackle blocks, chain and chain hoists, shovels, wheelbarrows, etc. Copies will be sent on application.

MACHINERY AND SUPPLIES WANTED.

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

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GENERAL MINING NEWS.**ALASKA.**

ALASKA MEXICAN GOLD MINING COMPANY.—Another shaft will shortly be sunk at the Mexican, which will run down alongside the present shaft as far as the adit level, a depth of 150 ft. It will be used to furnish additional hoisting facilities, made necessary by the recent doubling of the mill's capacity. The tunnel, which is being driven at the 220 ft. level, is well in the ledge says the *Juneau News*. The ore at this level is reported to be richer than at the adit level.

Work on the addition to the Mexican mill was begun on March 23d. The entire plant was supplied by Fraser and Chalmers. In addition to the 60 stamps there are 12 mortars, 24 Frue concentrators and also a large boiler, which is to be added to the steam plant. Three or four months will be occupied in building the mill and getting it into operation, during which time an additional force of 25 or 30 men will be employed. The work will all be under the personal supervision of Mr. A. Mackay.

READY BULLION.—The management is pushing development work as fast as two shifts of men can drive it. From the end of the 50-ft. tunnel an upraise to the surface, 48 ft., has recently been put in. Men are now at work driving an incline on the ledge, running from the inner end of the tunnel. The ore they are now in according to the *Juneau News*, is of good quality.

ARIZONA.**COCHISE COUNTY.**

TOMBSTONE MINING AND MILLING COMPANY.—This company will start up its cyanide plant within a few days, giving employment to 15 or 20 men. The Scribner & Barron cyanide mill will also start very shortly.

CALIFORNIA.**AMADOR COUNTY.**

RED CLOUD.—The shaft of this mine at Plymouth is down 250 ft., showing an 8-ft. vein of \$30 ore.

BUTTE COUNTY.

SPRING VALLEY HYDRAULIC MINE.—This mine, at Cherokee Flat, has been in the courts for the past eight years. On March 27th Judge Prewitt, of Placer County, sitting as a Court of Equity, handed down his decision in the mining bond suit which involved the possession of this mine. The decision was in favor of the bondholders, and against the Bank of California and Rideout & Smith. He orders the foreclosure of the bonds, representing \$151,000 principal and \$129,759 interest, due February 1st, 1896, and directs that Receiver Whitcomb, who is in charge of the property, shall proceed to advertise the sale of the mine in accordance with the foreclosure proceedings. The principal holders of the bonds are Louis Glass, of San Francisco; David Gage, of Oakland; A. Foster Higgins, Charles F. Post, C. M. Fry and W. L. Jenkins, of New York. This mine has a good record as a gold producer. Almost \$13,000,000 in gold has been taken out. The gravel deposit is over 1,000 ft. wide, and the extent of the workings is over a mile in length. Under leases from the receiver, over 100 men have for years been making wages on the old workings of the mine.

The ditches conveying the water to the mine, and the provision made for the care and disposal of its debris are both on a gigantic scale. The water is brought over 100 miles in ditches, pipes and flumes, and the canal by which the slickens are conveyed to the tules is over 30 miles long, and from 1,000 to 2,500 ft. wide, with levees 7 ft. high. To bring in the water alone cost \$750,000, and the construction of the canal \$500,000 more. The water

rights are considered very valuable, as the ditches tap the largest watershed in that part of the Sierras and furnish over 5,000 in. of water during the driest season.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

GWIN.—At this mine three miles west of Moke-lumne Hill a connection has been made by drill with the old works, and, contrary to expectations, a very small flow of water was encountered. At present it will not exceed 10,000 gals. per day. The last 20 ft. of drilling was through quartz of good quality, containing a large percentage of sulphurets. The work of sinking has been commenced.

EL DORADO COUNTY.

(From Our Special Correspondent.)

LONE JACK MINING COMPANY.—Judge Morrow, sitting as United States Circuit Judge April 1st, granted the suit of William Megginson against the Lone Jack Mining Company and others to quiet the title to the Lone Jack Mine of Garden Valley District.

KERN COUNTY.

(From Our Special Correspondent.)

BLUE CHIEF.—This mine, located on Greenhorn Mountain, prospects well; about 70 ft. of the ledge has been stripped and it shows a width of 5 ft., with hanging wall of porphyry and foot wall of granite. It is believed to be a true fissure vein. Assays from the croppings averages \$22 gold and 145 oz. silver. A carload of ore will be shipped to the smelter for treatment.

LOS ANGELES COUNTY.

(From Our Special Correspondent.)

LONE JACK.—This mine, in the Little Tahunga Canyon, has been sold to Falkenburg, Bliss & Kenney. There is a large quantity of low grade, free-milling ore in sight and the new owners expect the new plant, which consists of a 60-stamp mill, boiler, engine and appurtenances, will be put in position within 30 days.

MONO COUNTY.

BULWER CONSOLIDATED MINING COMPANY.—The latest weekly official letter from the Superintendent says: We extracted 9 tons of ore, estimated value from \$25 to \$27 per ton, from several openings on the Bulwer tunnel and 200 ft. levels. The seams of good ore continue small and increased in hard country rock. The upraise above main drift, south of waste chute, Bulwer tunnel level, was extended 8 ft., the face showing a small seam of good ore. Drift from upraise, south of crosscut No. 4, 200-ft. level, was extended 17 ft. Upraise, 150-ft. level, was extended 16 ft.; face shows small seams of quartz that goes from \$10 to \$20 per ton.

NEVADA COUNTY.

GOLD HILL.—This mine, in the Grass Valley district, is about to resume operations after a shut-down of several years' duration. The completion of the Nevada County Electric Power Company's plant is the cause of the reopening, placing electric power at the disposal of the mine at a price far below what steam power costs. The Stanley Electric Company's two-phase apparatus is used transmitting power from a water privilege several miles away.

NORTH STAR MINING COMPANY.—James D. Hague, president of this company, has completed arrangements, says the *Grass Valley Union*, for the purchase of the Shanghai, White Ledge, Great Britain and Tribute claims on Massachusetts Hill, by making partial payments on them and placing the deeds in escrow to be secured at the expiration of a certain time. This transfer will give the North Star Company possession of the whole of the Massachusetts Hill, save the claims owned by Martin Ford. The claims purchased recently were quite valuable to the company, as it is known that the apex of the ledge of one of the locations previously owned by the North Star Company is on them.

PLACER COUNTY.

(From Our Special Correspondent.)

AMERICAN BAR.—This property is 2½ miles southwest from Michigan Bluffs. The ledge is about 100 ft. wide and contains several seams of high-grade ore. The largest is 11 ft. wide and is worked by an open cut. A 10-stamp mill is kept running steadily.

RIVERSIDE COUNTY.

(From Our Special Correspondent.)

SANTA ROSA.—This mine has commenced work again with about 25 men, who keep a 10-stamp mill running. The late trouble is supposed to have been settled.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

OWENS.—The development work at this mine in the Julian district is being rapidly pushed. On the 250, 300 and 350-ft. levels crosscuts are being run to tap the ledge.

RANCHITA.—The main shaft of this mine, near Banner, is down 130 ft., at which depth a drift was run on a 4 ft. vein for 40 ft., showing the same width of pay ore all the way. A winze has also been sunk 10 ft. near the face of this drift, the ore in view being the same as the above in quantity and quality.

TRINITY COUNTY.

(From Our Special Correspondent.)

PRANGMORE.—This mine east of Morgan Gulch, 4 miles from Hay Fork, is a new location. The vein

is 4 ft. wide between slate and granite formations. Several hundred tons of good ore have been taken out and an arrastra has been erected.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

MOUNT ZION.—This mine, one mile east of Groveland, has been bonded by the Tuolumne County Mining and Development Company, of Fresno, for \$5,000. Development work will be commenced at once.

COLORADO.

BOULDER COUNTY.

(From Our Special Correspondent.)

AMERICAN.—A force of 25 men is at work in the 100, 140 and 200-ft. levels and large shipments of good smelting ore are made regularly. The big pump will be put in next week and the deep workings drained.

BIRMINGHAM.—Some good tellurium specimens have been taken out this week. At a point 75 ft. from the adit, the tunnel entered decomposed quartz, which promises well.

BUENA.—A four-ton lot was shipped by lessees this week, which returned a net profit of \$1,100 representing the result of three men's work last month.

CLEVELAND.—This old-time producer has resumed operations under lease, after an idleness of several years. Some good ore was recently uncovered and more men will be added as needed.

COLUMBIA.—A large body of pyrites was opened up this week and a 40-oz. retort was sent to Boulder on April 3d.

DENVER.—The shaft is to be sunk 100 ft. deeper and levels run in on the vein. The upper workings have been abandoned, as the low-grade ore cannot be shipped at a profit.

EFFIE NOS. 1 AND 2.—Both these properties are being developed by the same company, and have parallel veins of excellent ore. Regular shipments are made.

GLADIATOR.—The vein is somewhat smaller lately, but the ore has increased in value and shipments continue regularly.

GLADSTONE.—A company organized in Denver will take hold of the Gladstone, once a big producer, and resume development in the immediate future.

GOLDEN AGE.—In the 520-ft. level Hanby & Carpenter are mining some rich ore. Below the tunnel level Judge Lively and Scott Turner have been developing a streak of rich ore. The ore averages \$100 a ton without sorting.

GRAND CENTRAL.—The company will open up considerable new ground in the near future. Lessees in the lower workings are doing well.

GRAND REPUBLIC.—Mercur & Co., have struck a rich streak of gold ore, and it is expected to begin shipping at once.

GREAT SPHINX.—A massive body of low-grade ore was opened up recently and is being developed. The tunnel is being driven with all possible haste, and a cyanide mill will probably be erected during the summer. The Great Sphinx is owned by Samuel Heilner, of Philadelphia, and is managed by Martin Cummerford.

HOPE.—Dustan & Co. have secured a lease on this property. The vein is small but very rich.

INTER-OCEAN.—A company of six men has secured a lease and are actively developing the property. The work is in the new shaft and shipments are large and regular.

INVINCIBLE.—The company is removing water from the old workings, after years of idleness, and the mine will be repaired throughout, preparatory to extensive development.

LEFT HAND.—Mr. C. C. Pennock has secured several claims and has a force of men at work on development. A small streak of good ore is being followed with excellent indications.

LITTLE JENNIE.—Henry Neikirk has charge of this property and is rushing development. The vein is quite large and has improved in value lately.

MILWAUKEE.—Negotiations are pending looking toward the investment of considerable capital this summer. New machinery is to be put in and economic processes introduced for handling the large bodies of low-grade ore now in sight.

MODOC.—A new compartment shaft is being sunk by the Modoc company. The mill has been increased to 10½ tons capacity daily.

MONONGAHELA.—The tunnel is being driven on the vein, with the expectation of cutting other veins which cross in that vicinity. The Monongahela was a big producer in years gone by.

MORNING STAR.—In sinking a shallow winze 200 ft. from the shaft in the 180-ft. level, a vein of pyrites was encountered this week, which ran high in gold. The first four shots broke 7½ tons, which averaged \$152 per ton by mill run. The vein is 3¼ ft. wide.

NELLIE BLY.—The mill is nearing completion, but the company fears the ore supply will run short, as the product has been considerably diminished of late. The Kekionga output will be treated by the Nellie Bly mill.

ORANGE BLOSSOM.—A company, headed by L. L. Davis, has secured the Orange Blossom, and work has been started on an extensive basis. The old ore bodies are being developed.

ORPHAN BOY.—This group was sold at sheriff's

sale last week for \$3,022 to Mary E. Schnekkie, of Denver.

POPULIST.—Samuel Knott has recently discovered some very good looking sylvanite and has several fine specimens of ruby silver taken from the Populist. The shaft is only 40 ft. deep.

REDEEMER.—This property is to be started in a few days by O. E. Dubois, with plenty of capital behind the enterprise and a big force of men.

SCOTIA.—A large amount of rich ore was shipped to Denver last month. The Black Cloud mill, close by, is to be started soon with a bromine process, and will be kept busy treating the Scotia's product.

STANDARD.—An exceedingly rich streak has been uncovered, and a large body of low-grade milling ore is in sight. Shipments are handicapped, however, owing to its distance from the nearest milling point.

TILLIE BUTZEL.—Large shipments of both high and low grade ore have been made from this property for several weeks. The mine was shut down temporarily some time ago, and new machinery and buildings erected. Twelve men are employed.

TROJAN.—The shaft is in a big body of good mineral at a depth of 60 ft., and operations are being rushed. The ore goes to the Boulder Sampling Works.

VICTORIA.—Charles Davis purchased at trustee's sale this week, a ¼-interest in this mine, the price paid being \$4,608. He expects to begin active development on an extensive scale at once. The Victoria is an old-time producer.

WHITE CLOUD.—A streak of tellurium and free gold was disclosed this week and shipments will begin at once.

WHITE CROW.—Only two men are at work, having secured a lease on a small block in the upper workings. A rich streak of gold ore is being followed. The company is keeping the workings drained.

YOUNG AMERICA.—Lessees are breaking and shipping considerable low-grade stuff to an adjoining mill.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

B. B. TUNNEL.—This is a new undertaking to cut the mountain ridge between Soda and Chicago creeks at Idaho Springs. Some good veins will be cut by it at a depth of 400 ft.

BISMARCK.—This is one of those mines near Idaho Springs which has received many a hard knock through the difficulties of management. It is now worked by lessees who last week found a big mineral blow-out at the surface and within 50 ft. of the shaft. Its extent is not yet known, but a test run during the latter part of March returned \$24 a ton.

CHLORINATION PLANT.—Martin D. Corrigan was in Idaho Springs last week looking over the district with a view of putting in a new system of chlorination, for the values in some of the low-grade ores which cannot be saved by either amalgamation or concentration.

KATE EMMETT.—Cleveland capitalists are taking charge of the property and intend doing a large amount of development work. The mine is located on Ute Creek.

KNICKERBOCKER.—Denver and Boston parties are driving a tunnel on the Emerson lode up Fall River to reach the mines of Belview and Seaton Mountains at a greater depth.

STANLEY.—The owners of this property are arranging to install a big electric light plant at the mine and also supply Idaho Springs with electric light and power.

SUMMIT.—An 80 H. P. boiler has been put in and the shaft will be continued to a depth of 400 ft. Idaho Springs and Leadville parties are doing the work.

COLORADO.

EL PASO COUNTY—CRIPPLE CREEK DISTRICT.

CHIEF.—This property, on Raven Hill, employs 17 men. The apex of a new vein, having a course of northeast and southwest, was recently found in the shaft at a depth of 160 ft. The future of this claim looks bright. It is being worked by the owners, Messrs. Cone & Robinson.

CHRISTMAS.—This mine, on Bull Hill, is driving a drift north 75 ft. from shaft and all in good grade ore. It is a phonolite dike, carrying telluride of gold in the seams.

DOCTOR.—This mine, on Raven Hill, maintains a shipment of about 20 tons a day of about 5 oz. ore. The shaft has been sunk 330 ft. on the course of the vein, and it is contemplated to sink a vertical shaft to strike the vein at a depth of 500 ft. The present shaft is inadequate for the working of a large force.

ELKTON.—Tais company, on Raven Hill, is busy erecting a compressor. A shipment of one car last week netted \$19,630. The mine shows well in almost every point.

GLADSTONE.—This property on Globe Hill is being actively developed by lessees. The shaft has been sunk 118 ft., but not much drifting has been done. The claim is equipped with a powerful steam hoist and commodious shaft house.

GROTTO.—At this property, on Bull Hill, at a depth of 145 ft., a rich strike was made last week. The part of Bull Hill on which this claim is located has not been classed much as a shipper, but this strike may call attention to it and other parties may

do development work and add much to the output of 1896 from Bull Hill.

IRONCLAD.—This mine is being worked by lessees who ship about 10 tons a day of \$20 ore. In fact no waste is being hoisted, and everything in the vein is sent to market. The shaft is 150 ft. deep. It is stated a steam hoist will shortly be erected.

JUBILEE.—This property, on Gold Hill, is being worked under lease. The shaft has been sunk 155 ft., but the vein at that point carried only a few dollars value. The lessees, therefore, decided to drive a level at the 80 ft. level, and it is reported with the most gratifying results.

LUCKY BILL.—This claim is situated on Womack Hill, within 300 ft. of the eastern limits of Cripple Creek. The shaft has been sunk 260 ft., and the drifting has kept pace with the sinking of the shaft. In February the development paid for all expenses and in March from development alone a profit was made. The lowest grade of ore shipped has been 10 oz. of gold per ton; and recently 40 lbs. was sold which yielded \$15 per lb. This property is being worked as a close corporation.

LUCKY GUSS GOLD MINE, LIMITED.—This company has been registered in London. The prospectus issued there states that the Lucky Guss has been producing pay ore for the past six or eight months, and smelters' returns are appended, showing an approximate yield of 2½ oz. per ton. The capital of the company is £120,000, in £1 shares, and the purchase price is £100,000, of which £80,000 is to be in fully-paid shares, and leaving £20,000 available for working capital; 50,000 shares are offered for subscription, and 10,000 shares are reserved for future issue. It is stated that the working capital has been guaranteed.

MOOSE.—This property, on Raven Hill, maintains its working force at 88 men, and is being developed by three Ingersoll-Sergeant rock drills. The main shaft has been sunk 662 ft., but sinking was recently discontinued on account of the big influx of water, about 100 gals. per minute. The No. 5, or south shaft, has been sunk 225 ft., and is being sunk by machine drills at the rate of 5 ft. per day. A sample taken across the vein from this shaft assayed 17 oz., or \$340 per ton. The shipments this month will be larger than for several months past.

PHARMACIST.—This mine at a depth of 660 ft., presents hopeful appearances of permanency. The vein or ore shoot has continued for 60 ft. in depth and for 75 ft. in length, and on the bottom drift is now 3 ft. wide. The gold from the bottom of the shaft is of a bright color, unlike the dull heavy bronze color found nearer surface and is the brightest gold seen in Cripple Creek. In the shaft there is no trace of tellurium or even of water. A winze is being sunk on the new vein at the fifth level, the lowest assay taken from the pay streak 6 in. wide has been \$200, while several samples of \$500 have been taken.

VICTOR GOLD MINING COMPANY.—The Victor mine, on Bull Hill, will, this month, make the largest tonnage and highest value of shipment it has ever done in one month. At the sixth or 350-ft. level of the new vertical shaft, at the junction of the two veins, is a deposit of ore over 20 ft. wide, the value of which is very great. The mine employs 110 men.

VINDICATOR.—At this mine, on Bull Hill, there was recently struck a 5-ft. vein at the 200-ft. level. The whole of the vein where intersected makes a very good shipping ore. The vein was found 30 ft. on the east of the shaft, and has a course of north and south, but dips southwest a little. At the 200-ft. level the dike is fully 80 ft., but this vein is standing intact to surface. The old vein at the 100-ft. level, which has been driven north 200 ft., shows well, as does a winze in this level 3 ft. wide, sampling \$93 per ton.

GILPIN COUNTY NOTES.

(From Our Special Correspondent.)

THE CORYDON-ADALINE MINING COMPANY.—This company has been incorporated in Denver, with a capital stock of \$300,000, to reopen the Corydon mine. The Corydon, formerly worked by a pool of local men, was flooded out last spring, at which time it was shipping considerable pay-ore. Want of capital, combined with the death of one of the partners, has hitherto prevented the reopening of what is generally considered a good mine. A pump of 200 gals. per minute capacity is to be put in at once.

FISK.—An injunction has been applied for against this mine by the owners of the Cook, or the southwestern extension of the Fisk vein. The Cook has been restarted recently, and its shaft has holed into workings from the Fisk. It is reported that the trespass into the Cook ground took place during the latter half of last year, when the rise of the water in the Bobtail suspended work in the lower levels of the Fisk.

GOLD COIN.—Owing to some difference between the California and Gold Coin Companies, the former has ceased hoisting the water, which is now rising in both mines. It is to be hoped that arrangements will promptly be made to handle the water, as otherwise the lower levels of the Hidden Treasure and Indiana properties, which have been producing so largely of late, will be flooded within a few weeks. It is reported that arrangements are being made to drain the mine through the Hidden Treasure shaft with steam pumps, which, however, proved a costly experiment last spring.

GUNNELL-CONCRETE.—Former reports as to a com

promise between these two mines seem unfortunately to have been incorrect. On March 31st the Concrete men, in attempting to re-enter the bottom level were again "smoked out" from the Gunnell workings, which are 100 ft. deeper. An injunction has now been applied for against the owners of the Gunnell to restrain them from further working in what is claimed to be Concrete ground.

NEW MINES.—Each week contributes its quota of new mines to the active list of Central City; either abandoned mines now re-opened, or entirely new developments on practically unworked claims. In addition, great things are reported as to recent strikes at Pine Creek, Yankee Hill and other outlying camps, the reports as to which, however, must be received with caution until the weather enables them to be submitted to the test of shipment results. But, notwithstanding this increased activity, the fact remains that the average supply of ore to the custom mills at Black Hawk has been very low for the past two months, from which it is evident that many of these new enterprises have as yet hardly passed the paper stage.

LAKE COUNTY.

(From Our Special Correspondent.)

AGWALT.—Mr. Wood is now endeavoring to catch the big Ibex ore chute which should be found crossing his ground. The big tunnel has been run a sufficient length and good results can be looked for.

BIG SIX MINING COMPANY.—The directors meet this week to declare a dividend and to take action concerning the extension of the lease. Operations are being pushed on the Nettie Morgan shaft, and 10 tons a day are being shipped of ore that runs \$25 to \$30 to the ton.

BLACK PRINCE.—Eastern and Denver capitalists are opening up a great mine out of the Black Prince. A new plant of machinery is now in position and shipments have been increased to 20 tons daily.

COLUMBIA GROUP.—The vein, caught last month in the tunnel, has been opened up for 20 ft. and has now widened to 4 ft. The ore is very rich in silver and some of it runs high in chlorides. The group consists of the Columbia, Nightingale, Minnesota, Little Flo and Veda claims.

HOPE.—The ore body opened up recently has dipped away, so it has been decided to sink the shaft deeper to operate this ground. It is believed that the big ore chutes of the Chip and Turbot will be caught in the Hope workings.

KATY.—A drift is being run at 160 ft. and several ore stringers are being followed. The gold belt ore chute should be encountered.

LONG AND DERRY.—Lessees on the Faint Hope & Dana claims of the Long & Derry group have opened up and are taking out some rich ore from the bottom of the shafts. The ore assays as high as 90 oz. silver and some gold.

MANGANIFEROUS IRON.—The shipments to the Illinois Steel Works on the 10,000 tons contract are growing satisfactory, and I understand that arrangements are under way to make other contracts which will send the production of this class of ore up to 300 tons a day.

NORTHERN MINING COMPANY.—Considerable development work is being done and regular shipments are being made of a good grade of oxidized ore.

RANSOME LEASING COMPANY.—This company controls the Matchless mine, and is making some big iron shipments.

RESURRECTION MINING COMPANY.—This company has been re-incorporated under the laws of West Virginia and Manager Carnahan is now pushing development work in every direction. Over \$70,000 was expended by these people before they shipped a pound of ore and they are again preparing for a great deal of new work.

SEVEN-THIRTY.—This property is located on Printer Boy Hill, and a contract has just been let to sink the shaft 300 ft. deeper. This property was operated at a depth of 140 ft. in the early days, and some good lead sulphides taken out. Chicago people are owners of the property.

SILVER CORD.—Lessees are developing this property, but no shipments are being made. The big tunnel is being pushed ahead rapidly.

SAN MIGUEL COUNTY.

COMMERCIAL.—J. S. Blake shipped a car of his high-grade ore from this mine recently, and he says that in a short time the mine will be in a condition to take out and ship one car daily. The force in the mine is being gradually increased.

IDAHO.

ADA COUNTY.

BLACK HORNET.—Another strike is reported to have been made in an upraise in the south drift. It is from 4 to 8 ft. wide and averages \$30 a ton. Sixty per cent. of the value is said to be free milling.

LATAH COUNTY.

SILVER WHITE MICA MINING COMPANY.—Captain E. E. Rogers, manager of this company, is reported to be making arrangements to increase the working force at the mines and begin a shipment of the prepared product. The company has bonded the Last Chance and is driving tunnels so that a large force can be put at work in the next 60 days. The vein now penetrated by the tunnel is about 100 ft. thick, is 90 ft. in the mountain and about 70 ft. down on the vein. A new tunnel will be run this summer,

tapping the vein several hundred ft. lower down, preparatory to sinking a shaft. In the present tunnel tons of merchantable mica are already in sight. This will be prepared for shipment the coming month. Negotiations are in progress for the purchase of an electrical plant and hoisting works.

LEMHI COUNTY.

(From our Special Correspondent.)

COLEMAN PLACER COMPANY.—This company expects to start operations next month.

IDAHO CHEMICAL GOLD MINING COMPANY.—The machinery for a 50-ton chemical plant for this company is now on the road between Yellow Jacket and the railroad. They expect to have it in running order by the middle of May.

IDAHO YELLOW JACKET GOLD MINING COMPANY.—Mr. P. J. Cirkel, General Manager of this company, has just returned from New York. He informs me that the Idaho Yellow Jacket mine and mill properties have been sold to New York capitalists for \$1,000,000, and that the new company will continue to operate the 60 stamps to their full capacity, and is contemplating the addition of more machinery. While on a visit to the mine last week I was informed by Mr. Kelly, the superintendent, that the mine was showing up well, and that they had very large bodies of ore, with enough in sight to run for some years. They are running through about 200 tons per day. They have eight batteries double discharge, and through these they are running about four tons to the stamp.

WILSON CREEK.—The excitement over the gold discoveries at Wilson Creek, 18 miles from Yellow Jacket, continues. While most of the ledges are small, they are very rich.

OWYHEE COUNTY.

MORNING STAR.—H. W. Barry, manager of this mine at Silver City, has received samples of the ore from the 400-ft. level of the mine, which was only recently opened up. A drift has been run about 300 ft. on this level, exposing a good body of ore. There is a 20-in. streak that it is said will run very high.

MAINE.

OXFORD COUNTY.

CANTON MICA MINING COMPANY.—This company will commence operations this spring on the farm of Thomas Reynolds in Canton. Valuable deposits of mica, red, garnet, black and green tourmaline and quartz rock have been found there.

MICHIGAN.

COPPER.

CENTENNIAL MINING COMPANY.—At its annual meeting of this company held in Boston on April 8th, the reorganization committee took control, 51,369 shares out of a total of 80,000 being voted. The following officers and directors were elected: H. F. Fay, president; M. W. Watson secretary; T. H. Perkins, William Bassett, J. C. Watson and J. R. Dee, the latter of Houghton, Mich., directors. The sale of the property under the reorganization plan was authorized.

IRON—MARQUETTE RANGE.

PLATT.—This mine, south of Negaunee, has been closed down and will be abandoned, the ore deposits having been mined out. The miners thrown out by the closing down will secure employment at adjacent workings.

QUEEN.—This mine, at Negaunee, which has been idle since January 1st, resumed operations last week with a large force. The royalty difficulty has been settled. The Platt mine, Cascade Range, will cease operations. The ore deposit is about exhausted.

MINNESOTA.

(From Our Special Correspondent.)

MINERS' PROTECTIVE UNION.—The question of labor is agitating the mining companies more than they care to admit. Last week showed considerable power in the new Miners' Protective Union in all the mining districts and a willingness to clash seemed altogether too much in evidence. Later there was sent from Iron Mountain a report that the union was to demand an 8-hour day and failing to secure it would strike. It is not believed by the mining interests in Minnesota that any attempts to cut down the time of labor or to hoist the rates of pay, much above that now paid, which is conceded good, will succeed and they say they will not attempt to ship ore if they cannot ship as they want to.

The St. Louis Bay and the Ironton land companies have brought suit at Duluth, for \$125,000 and \$100,000 respectively against the Ironton Structural Steel Company and James E. York. They also ask for the cancellation of deeds to property which they claim to be worth \$8,000, on which is located the works of the deficient company. These companies claim to have paid the sums they sue for the steel company in 1890 as a bonus for the establishment of its plant at Ironton, a suburb of Duluth, on condition that it be in running order and employing 500 men in 1892. This the company was unable to do. The company was to use a new universal rolling mill, patented by Mr. York, and it was found that considerable more time was necessary to perfect the invention than was expected, especially by the real estate men interested in the affair. It has taken until nearly this time to perfect the invention and several mills have been built and smashed in the progress of the new machine. Now, however, the company is about ready to go to work and has contracted for a large amount of machinery in the

past few months. It intends to be rolling beams in the fall, if not too seriously incommoded. It has just put in a complete machine shop and pattern shop, is putting in a rolling mill of very large size, has started work on a blooming mill, has ordered two electric cranes, generator and soaking pits, and will put in a 30-ton basic open-hearth furnace, in addition to two Bessemer open-hearth furnaces.

The Duluth and Iron Range Railroad put on this week an ore train schedule and will fill its ore docks rapidly from this time on.

The Minnesota Iron Company has ordered two new steam shovels of the largest size from the Bucyrus Works and the Mahoning Ore Company has ordered a duplicate of the 60-ton shovel that it put in place last summer. This shovel lost no time at all in mining ore from the time it was put in till navigation closed.

IRON.—MESABI RANGE.

(From Our Special Correspondent.)

ADAMS IRON COMPANY.—At this property Capt. W. H. Knight, late from the British South Africa Company's employ, has taken the captainship of this mine, under Superintendent J. H. Hearing, also formerly of Ironwood.

BIWABIK IRON COMPANY.—The allotment given to this company for the season is 350,000 tons. Work has begun at the mine.

CINCINNATI IRON COMPANY.—This mine has begun operations under Capt. Harry Roberts with a small force, getting ready for hoisting.

LAKE SUPERIOR CONSOLIDATED MINES.—The allotment made to this group of mines, including the Adams, Mountain Iron, Lake Superior group and Minnewas, is 782,000 tons. The Mountain Iron has taken off 1,000,000 of earth and has 27 acres of ore stripped ready for mining, with tracks sunk into 20 to 25 ft. faces of ore.

MIKADO IRON COMPANY.—A churn drill is being put down for this company in section 23, 58-20. Considerable ore is being found.

MINNESOTA IRON COMPANY.—It is stated that this company has secured options on the iron lands of the C. N. Nelson Lumber Company, which is to go out of business after selling its pine lands, mills and railroads to the Weyerhaeuser syndicate for about \$2,000,000. The price to be paid for iron land by the Minnesota company is not given, but it is supposed to be in the neighborhood of \$1,200,000, making it the largest deal ever made on the Mesabi range. These lands include the Auburn mine, for the lease of which at 25c a ton, together with some undeveloped lands the Minnesota company paid over \$400,000 three years ago, and other lands prospectively very valuable.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

JOPLIN ORE MARKET.—The top price paid for zinc ore was \$23 per ton, with an average of \$21 per ton, which was the price paid last week, but the price of lead was less, being \$16 per 1,000 lbs., with 50c. added for hauling. For the week ending April 4th there were shipped 436,410 lbs. of zinc ore less and 45,550 lbs. of lead more than the week before.

The turn-in from the different camps was as follows: Joplin zinc, 1,206,980 lbs.; lead, 387,300 lbs.; value, \$20,982; Oronogo zinc, 3,550 lbs.; lead, 15,400 lbs.; value, \$219; Aurora zinc, 495,000 lbs.; lead, 80,000 lbs.; value, \$5,077; Galena, Kan., zinc, 2,110,000 lbs.; lead, 386,000 lbs.; value, \$25,359; Webb City zinc, 1,161,930 lbs.; lead, 21,750 lbs.; value, \$12,611; Carterville zinc, 1,149,060 lbs.; lead, 323,050 lbs.; value, \$17,332. Totals for the district, zinc, 6,126,500 lbs.; lead, 1,216,500 lbs.; value, \$81,580.

BLUE BELLE.—Ben Dixon has bought and is operating the Blue Belle plant on the North Tracey land near Webb City. The plant has been put in fine shape and was started up March 16th. The first week it produced 66,000 lbs. of zinc ore and 20,000 lbs. of lead, and second week 57,000 lbs. of zinc ore and 14,000 lbs. of lead and last week 80,000 lbs. of zinc ore and 25,000 lbs. of lead. Mr. Dixon is drifting at 150 ft. on a 30-ft. by 43-ft. face of ore in open ground and is hoisting 325 tubs of dirt and making 7 tons of zinc ore and 3,500 of lead each 10-hour shift. This week he will start drifting another shaft 90 ft. on a large face of lead and jack in open ground and will largely increase his output of ore.

SIXTEEN TO ONE.—The "16 to 1" plant is located on the Elliot & Zimmerman land near Webb City. The plant is owned and operated by Shelton, Bryant & Moody who last week made their first turn-in of 65,120 lbs. of zinc ore. They are handling good pay dirt and are producing over 4 tons of zinc ore each shift. They are drifting at 160 ft. on a large face of zinc ore in shooting ground and strong water. They have just cut through an 8-ft. rib of flint into a rich body of zinc ore and will put on more men as soon as they enlarge the face of the drift. They will then make over 50 tons of zinc ore each week.

MONTANA.

BEAVERHEAD COUNTY.

INDIAN QUEEN.—A. E. Driggs & Co. have bonded promising copper property near Apex and are now engaged in development work. The showing is said to be very good, and some shipments of the ore to Butte have been made within the past six months.

JEFFERSON COUNTY.

FREE COINAGE.—This property is now sinking to the 400-ft. level. When the shaft is down to the 350 a cross-cut will be run to the lode and again at the 400.

HOMESTAKE.—A good copper strike is reported to have been made in the 450-ft. level of this mine. At the present time a station is being built on this level, and development will proceed as soon as this is completed.

HOPE.—It is reported that operations in this mine at Basin will be suspended soon. No reason is given for the shut down. Work will probably be resumed in the fall. Meantime arrangements will be made to develop the mine on a larger scale.

KING SOLOMON.—It is reported that the Reddings have bonded to Chicago parties this mine for \$40,000, and that they will enter into possession of the property at once and work it on an extensive scale.

OLD DAN TUCKER.—Work will be resumed on this property at once by the same parties who conducted operations there when it was closed down last fall. The following are the officers of the Old Dan Tucker Company: F. W. Wright, president; Jas. Gourley, vice-president and manager; Steve Carpenter, secretary. These together with R. A. Bell, W. Smith and Angus McQuade constitute the board of directors.

MADISON COUNTY.

BANKER.—Dunkle Brothers, of Pony, are preparing to commence operations on this mine in the Potosi district, located 10 miles southwest of Pony. It is reported that they have a 3-ft. vein of 250 oz. silver ore in the face of their tunnel. This ore is also said to carry from \$10 to \$20 in gold to the ton.

SILVER BOW COUNTY.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The Atlantic shaft of this company east of Meaderville has reached a depth of 550 ft. At this depth such a flow of water was encountered that the management deemed it advisable to suspend sinking operations temporarily until a station was cut at the 500 in order that a station pump might be placed at that level. When this is completed the work of development of the shaft will be renewed. Although no copper ore has yet been found in the Atlantic the management feel much encouraged at the results of the development work. The miners had just gone through a body of hard glassy granite when the big body of water was encountered.

NEW MEXICO.

GRANT COUNTY.

MOUNTAIN KEY.—There are 35 men employed at this mine, and ore is being mined from the first, second and third levels. The lower levels, down to 700 ft., will be drained and re-timbered as soon as possible.

TREASURE MINING COMPANY.—This company, of Denver, has 25 men employed on the Atlantic mine at Pinos Altos. The shaft is down 235 ft. and is being sunk as rapidly as possible with three eight-hour shifts. At a depth of 300 ft. new levels will be started north and south. There are five distinct and well defined veins within the boundaries of the Atlantic claim and the management, says the Silver City *Enterprise*, will explore all of these veins by cross-cuts from the lower levels of the original Atlantic vein, upon which the main shaft has been sunk. Mr. J. H. Shockley is the manager of this company.

SOCORRO COUNTY—COONEY MINING DISTRICT.

(From Our Special Correspondent.)

CONFIDENCE.—The mill which has been shut down for repairs started on April 1st. The ore bins at the mill are filled with ore, about 1,500 tons.

COONEY MINE.—Only the lessees are working, taking out a good grade of ore. Recently a body carrying stephanite was struck in the bottom of the winze, assaying very high in silver.

COPPER QUEEN.—It is reported that the building of a mill, for which grading was commenced, has been postponed, awaiting further development of the mine.

DEADWOOD.—On this property, after having drifted for about 100 ft. in barren ground, excellent ore was recently struck. The drift now shows 6 ft. of \$25 ore, the width of the ore has not yet been determined, but the croppings guarantees a big ore-chute. The vein matter is a hard quartz with silver sulphide and iron pyrites, half its value being in gold.

DEEP DOWN.—The mill is now getting ready for operation. Five stamps are in place, and five more will be running within a week. The hoist has arrived and will soon be in place. The winze is down about 50 ft. and shows 8 ft. of good milling ore. This property is worked under lease and bond by Messrs. Kimball, Macphalder and Brown, of Denver, Colo.

LITTLE CHARLIE.—This property has been bonded to Eastern parties for \$10,200.

LITTLE FANNY.—Nothing is being done with this property. It is reported that a sale of this mine and two-thirds of the Champion mine is now pending. The consideration is said to be \$180,000.

MAUD S.—The mill is running all 15 stamps on free milling ore from the Last Attempt, formerly known as the Gray Hawk, and the Maud S. mine. All the ore from the Maud S. mine is taken out from the 300-ft. level.

TAOS COUNTY.

BESSEMER.—Men are at work on the Bessemer group, and are finding a better quality of ore than was supposed to exist along Comanche Creek, says the *La Belle Cresset*.

COLORADO TUNNEL.—Another shift has been put on the Colorado Tunnel. Johnson & Larson are pushing their contract and also enlarging and straightening the tunnel. The Denmark No. 2 vein will probably be cut in this tunnel in a short time. The tunnel penetrates the main mineral bearing hill of the district.

DENMARK.—John Johnson made another shipment of Denmark ore to the Gold and Silver Extraction Company at Denver, Colo., last week for further tests by the cyanide process. He will also send some to be tested by the Pelatan-Clerici process in a few days.

OREGON.

BAKER COUNTY.

BRAZOS.—This mine about 10 mile southeast of Baker City, has been sold by the original locators to Messrs. Jones & Walley, of Salt Lake City. The consideration was \$12,000. The property presents a good showing, says the Baker City *Democrat*, the ledge being wide and the ore free milling. Messrs. Jones & Walley will push development work.

EXPLORING SYNDICATE OF MINES AND MINING COMPANY.—It is reported that this company, of France, have instructed their agent at Baker City, Mr. E. L. Giroux, to proceed at once with extensive work on the Flagstaff mine, purchased recently. Mr. Wm. O. Reynolds, who has been appointed superintendent, is perfecting his plans and will commence work at once.

HARNEY COUNTY.

The mines of Harney County are beginning to attract the attention of mining men in other portions of the State, says the *Burns Times*. The Pueblo ledges, in the southern part of the county, are showing up well, and the Trout Creek properties will be examined by an engineer shortly.

LANE COUNTY.

ANNIE.—The Hammond Manufacturing Company, of Portland, has taken a contract to build a 20-stamp gold amalgamating and concentrating mill, with electric power, on the Annie mine in the Bohemia district. This is one of the largest mill contracts ever let in Oregon. The stamps weigh 1,000 lbs., and the electric motors will be run by water taken from a mountain stream four miles distant from the mill site, where this plant is to be put in operation. The Hammond Company built last fall a 10-stamp mill on the same ledge, which is owned by the Champion Company, and which is now about to start up, having been shut down for some time on account of snow.

UNION COUNTY.

OREGON GOLD MINING COMPANY.—The stockholders of this mining company, of Louisville, Ky., whose properties were located at Cornucopia, and which were recently sold under execution for \$9,000, although the judgment was for over \$300,000, have decided their interest in the properties to John Dorhofer, as trustee. Mr. Dorhofer has arrived at the property and has commenced proceedings to redeem. The amount required to do this is \$16,784 which has been paid into court. The properties were redeemed some time ago by J. R. Farrell, of Cornucopia, who had a subsequent judgment against them, but the Louisville people claim this redemption is invalid.

PENNSYLVANIA.

ANTHRACITE COAL.

LEHIGH COAL AND NAVIGATION COMPANY.—The legal battle between this company and the commissioners of Carbon County as to the valuation of the company's coal lands in Mauch Chunk Township, Summit Hill Borough and Lansford Borough began at Mauch Chunk on April 7th. The company is appealing from the following valuations as fixed by the county commissioners: 3,637 acres containing mammoth vein coal, valued for taxable purposes at \$500 per acre and 560 acres containing smaller veins, of which there are four, at \$250 per acre. These figures are considered one-third value. All real estate in Carbon County is assessed for taxable purposes at one-third value. The company, in its bill of exceptions, claims an excess of acreage and an excess of valuation. The property was formerly valued at \$658,875 for taxable purposes.

SCHUYLKILL COAL EXCHANGE.—The committee of this exchange met at Pottsville last week, and fixed the rate of wages to be paid the miners in this region for the last half of March and the first half of April at \$2,503, which is a slight raise above the basis. Wages have been below the basis since the last half of January and the first half of February, 1894, when the rate was 4% above. The price of coal has been gradually going up since December, when the price was 11 below the basis. It was 9 in January and 5 in February, when one month's trial of a reduced output brought it up to the basis of \$2.50.

UNITED MINE WORKERS.—About 200 representatives of the local union of United Mine Workers met at Shamokin this week and effected a permanent organization of the Shamokin Sub-District, to embrace Silver Hill, Shamokin, Brady, Coal Run, Mt. Carmel, Locust Gap, Sagon, Centralia, Dark Corners, West Shamokin and Trevorton. Daniel Gallagher, of Mt. Carmel, was chosen president. On April 13th there will be a mass meeting at Springfield, and thereafter nightly meetings will be held in Sagon, West Shamokin, Dark Corners, Centralia and Mt. Carmel. In the latter place, on April 19th, the Sub-District Convention will be held. At this session a non-English speaking vice-president will

be chosen, in recognition of the large Polish and Hungarian following. The order does not advocate strikes; arbitration is said to be the motto.

NORTHAMPTON COUNTY.

SLATINGTON-BANGOR SLATE SYNDICATE.—At Allentown on April 7th, Joel Neff, Treasurer of the Slatington-Bangor Slate Syndicate, made an assignment to Frank Jacobs and Oliver Neff. The failure is considered one of the heaviest in the history of the Lehigh slate regions. No definite estimates of assets and liabilities are obtainable, but these judgments have already been entered against Mr. Neff: Slatington National Bank, \$30,000; Frank Jacobs, in trust, \$38,677; Thomas Kern, \$10,950, and Frank Jacobs, \$925; making a total of \$80,552.

OIL.

PRODUCERS' OIL COMPANY, LIMITED.—An important suit was filed at Warren on April 4, by Col. John J. Carter, of Titusville, to compel the Producers' Oil Company, Limited, to give him new certificates for 16,000 shares which he had bought. He purchased 29,764 shares in all. There are 60,000 shares, but Carter already owned 300 as an original member of this company, which was organized as a limited partnership, a majority in numbers as well as interest electing the managers. The Producers' Oil Company, which owns 10 miles of pipe lines from McDonald to Coraopolis, is part of the independent or anti-Standard movement, composed of four companies having pipe lines and refineries, all representing an investment of about \$4,000,000. Carter wants the Warren court to issue an injunction to compel the transfer and give him the accompanying rights. He wants a master appointed to preside at the annual election in June, and charges the illegal issue of \$100,000 of stock at 2 o'clock on the morning of the annual meeting of 1894 in order to control the meeting, his purchases having been made prior to that date. The managers of the Producers' Oil Company say that they are not at all fearful of the outcome of the suit, and deny many of the allegations in the bill. They say it is a Standard Oil Company conspiracy to get control.

SOUTH DAKOTA.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

ANNIE.—Extensive development will soon begin upon this property situated four miles east of Hill City, in the J. R. district. John Heinrich, of Hooker, Neb., one of the gentlemen interested in the development of the Mercur mine, at Mercur, Utah, is at the head of the company which will exploit this mine. A recent mill test of 60 tons yielded \$7.50 per ton in free gold.

BIG HIT.—The 200-ft. shaft upon this group, one mile southeast of Keystone, has attained a depth of 115 ft. Milwaukee investors, headed by John Barth, are doing the work, and have a block of claims under bond. Surface indications point to a ledge of great width, and 25 ft. of the vein stuff is known to carry from \$5 to \$6. The ledge resembles that in the Bullion and Bismark properties now under successful production.

J. R.—A depth of 40 ft. has been reached in the new 200-ft. working shaft now being sunk upon this group. The contract calls for a 200-ft. shaft, or the depth necessary to cut the ledge exposed in the old workings, the price per foot for sinking and timbering, 7 × 4½ in the clear, being \$14 per foot, which shows the low cost at which mining operations are carried on in the Black Hills. The present is the fourth attempt to recover the lost pay chute.

KEYSTONE.—But 15 stamps are now in operation at the Keystone mill, the water supplied by the pump now in use being insufficient. A new pump is on the way, and upon its arrival 30 stamps will be constantly employed. Frue vanners are being put in to save the heavy concentrates from a 20-ft. body of quartz and hornblende recently opened upon the 400-ft. level.

KEYSTONE CAMP.—The bonding of several properties for development by Chicago and Eastern parties is announced. Among them are the Golden Rod, Hidden Treasure, Shamrock and McCann claims. These prospects are situated upon what is known as the "belt," extending northwest from the town of Keystone.

NEW ELDERADO.—Another producer has been added to the increasing list in the Hill City districts. A mill test recently made upon some 25 tons of ore, gave about \$23 per ton in free gold. This property, opened without capital by Smith Bros., prospectors, lies near the Tea and Dolcode claims on Palmer Gulch, a district which has yielded liberally in placer gold. After a lapse of nearly 18 years the sources of placer gold are apparently being discovered in rich decomposed ledges along the gulch.

WEALTH.—The 20-stamp mill upon this property in Tepee gulch is nearing completion and will start up about April 15th. A body of ore, said to average \$5 per ton, sufficient for eight months' operation has been blocked out.

UTAH.

JUAB COUNTY.

BLACK DRAGON.—This mine, near Silver City, Tintic mining district, has been purchased of C. H. Blanchard by Lon Terry and his associates for it, is said, \$8,000. The Black Dragon has, in a desultory way, been worked for several years. It is the

intention of the new owners to systematically explore it.

GEMINI.—The main shaft in the Gemini is now down to the 1,000 level. A station is being cut and sinking will continue to the 1,200.

GODIVA.—At the Godiva the work of cutting out a chamber on the tunnel level to make room to begin the two compartment shaft is being pushed ahead. The sinking of the working shaft will be commenced next week and carried down to the 300 level as rapidly as possible.

INDEPENDENCE.—J. W. Caine and associates have secured a lease and bond on the Independence mine near Diamond, which was in abeyance some time owing to a disagreement as to the amount of the cash bonus to be paid. The owners of the property are Dennis C. Sullivan, T. D. Murphy and John More, and the bond is for one year.

OLD DIAMOND MINING DISTRICT.—This district, south of Silver, is coming to the front in a gratifying manner, says the *Eureka Democrat*. Four properties are producing ore, and last week Judge Green and T. H. Beck made shipments from their properties.

UTAH AND GALENA.—Charles Crismon, superintendent of the Utah and Galena mines at Fish Springs, reports that the Utah is shipping 100 tons to the Galena's 50, but the ore is high-grade, going 125 oz in silver and 45% lead. Mr. Crismon is working 33 men. In the same locality are the Vulcan and Emma mines, which are working about seven or eight men each and are making shipments of good ore.

HILLSIDE GOLD MINING COMPANY.—Messrs. R. C. Chambers and R. Mackintosh have purchased one-half of the stock of this company, which owns the Hillside group of nine claims adjoining the Mercure mine on the south. It is the intention of the new purchasers to begin development work as soon as practicable.

WYOMING.

ALBANY COUNTY.

(From Our Special Correspondent.)

BETSEY JANE.—A. W. Stone, president of a Chicago syndicate, has just returned to Laramie from a week's visit to the Cummins mining district, some 35 miles west in the Medicine Bow range, bringing with him rich samples of quartz containing both copper and gold. The property examined was the Betsy Jane, owned by Messrs. Miller and Peabody of Laramie. It is said that arrangements have been completed to commence active operations on the property at once and papers will be filed to that effect.

CARBON COUNTY.

(From Our Special Correspondent.)

COOPER HILL DISTRICT.—The Little Ella Mining Company expects to complete the 150-ft. tunnel, connecting the shafts of the Little Ella and the Senator Stewart by April 15th. This tunnel connects the two properties at a depth of 100 ft. A contract has also been let to sink the shaft on the Little Ella 100 ft. deeper. At the bottom of the shaft the ore body is 12 ft. wide, and the average of 90 assays made on the ore at this depth gives \$23 per ton.

SWEETWATER COUNTY.

(From Our Special Correspondent.)

GREEN RIVER OIL AND GAS COMPANY.—While drilling for oil and gas this company encountered a strong flow of water containing nearly 9% of carbonate of soda. Crystals produced by evaporating this water have been analyzed and found to be 93% pure. The company contemplate the erection of vats for solar evaporation and placing the product on the market.

FOREIGN MINING NEWS.

NEW GUINEA.

The following report on gold mining in New Guinea is contained in the annual report of the administrator of the government of New Guinea: The alluvial mining was much the same as in the previous year, and although a good deal of labor was spent during the year on the quartz reefs discovered in Sudest, no definite steps had at the end of the year been taken to begin actual quartz mining. But although mining remained as before, there was more prospecting. A rather feeble attempt was made to find gold in the islands of Normanby and Ferguson, but the search did not last long, nor was it successful. In September 15 miners arrived from Queensland, went to Bartle Bay, on the north-east coast, and searched the hill country at the back of the bay. The death of one of the party—killed by the hillmen—put an end to the expedition. The country in which they sought for gold is very hilly, not to say mountainous, hard to travel over, and difficult to prospect. The ravines are said to be much filled up with soil, that has only recently been washed into them from the surface of the hills. The party found particles of gold here and there, and obtained in all about 7 oz. of the metal. Four or five of the party subsequently went back to the same localities, but finally joined the next party that came there, and left again. In the beginning of March, 13 miners came over to the Possession, who were sent in a government vessel to Bartle Bay. They went inland, joined the few miners who

were there, and they all searched the country for some weeks, but without success. All the men then returned to the coast.

LATE NEWS.

Mr. W. J. Chalmers, president of Messrs. Fraser & Chalmers, is in New York City on business.

The Romeo group of mines, near Baker City, Ore., was sold this week to local capitalists for \$10,000.

George H. Howard, a prominent coal dealer of Buffalo, N. Y., died in that city this week, aged 56 years.

Mr. George Austin Morrison, of the American Oil Company, New York City, has been elected president of the corporation, succeeding T. R. Chaney, resigned.

(Special Telegram to the Engineering and Mining Journal.)

SALISBURY, N. C., April 10th.—A nugget weighing 22 lbs. was found yesterday at the Reid gold mine, Cabarrus County, N. C.

It is reported that the Standard Mining Company, near Wallace, Idaho, is building a new flume to take the water from Canyon Creek, two miles above the mill, bringing it down to the mill and running a dynamo with it. The power generated by it will be used to drive the drills in the Campbell tunnel four miles up the creek.

The Canadian Society of Civil Engineers held a meeting in Montreal on April 9th. A paper by Mr. W. Bell Dawson, on "Retaining Walls," was discussed, as was also Mr. Carroll's paper on "The Effects of Engineering Works on Water Currents." Mr. H. F. Perley then read a paper on "The Dry Dock at Kingston, Ontario."

A fire took place at the Hope mine, in Basin, Mont., this week. A dispatch from there, dated April 9th, stated that the fire had been extinguished, but that the seven men imprisoned in the mine are undoubtedly dead. The shaft is filled with burned timbers, and it will be several days before the bodies can be rescued. The origin of the fire is still unknown.

The Tacoma Smelting and Refining Company, of Washington, reports the amount of its pay roll for February at \$5,083, 63 men being employed. In addition to this sum \$508 was paid for wood choppers and teams, bringing the total up to \$5,591. The product for the month was 4,000 bars of bullion, weighing 411,300 lbs. The contents of this bullion were: Gold, 1,822.74 oz., \$37,676; silver, 36,983.38 oz. (at 68% c.), \$25,287; lead, 408,638 lbs. (at \$3 per cwt.), \$12,230. The total value of the product for the month was \$75,222.

A press despatch from Houghton, Mich., says that the centrifugal sand pump, which has been a failure elsewhere in the district, is proving a success since a stamp shoe steel lining was placed in the one used by the Franklin Mining Company. The Franklin was crowded for room for its sand and would have had to move from Portage Lake in two or three years but for the present method of disposing of the sand from the mill. This probably means that the Franklin, Jr., if it becomes a larger mine, can use the present mill.

The owners of the Durango mine near Deadwood, S. Dak., have run into a streak of ore at the bottom of the rich gold chute from which they have been taking ore for a number of months past. This richer part of the lode is 1 1/2 ft. thick and is sacked as fast as broken. The ore is refractory. About two months ago 100 tons was shipped by the owners to the Kansas City smelter from which they received a draft for over \$18,000, and a short time before that a shipment was made that netted the owners a little above \$16,000.

A charter has been granted at Harrisburgh, Pa., to the Butler & Pittsburg Railroad Company, with an authorized capital of \$5,000,000. The new line is to connect the Pittsburg, Shenango & Lake Erie Railroad at Butler with the Union Railroad, owned by the Carnegie Steel Company, which will thus find a more direct and quicker route for ore and coal shipments. The new company is officered as follows: President, John Dick, Meadville; secretary, N. C. McLaughlin, Meadville; treasurer, A. B. Westervelt, New York. The directors are John Dick, W. S. Rose, J. G. Foster, W. K. Richards, N. C. McLaughlin and W. G. Sargeant, of Meadville, and J. T. Blair, of Greenville, Pa. The long-talked-of extension of the Pittsburg, Shenango & Lake Erie Railroad into Pittsburg is thus materialized, and the road is assured of an enormous tonnage by a 25-year contract, which the board of directors of the company have authorized to be made with the Carnegie Company to handle their raw and finished material. The Pittsburg, Shenango & Lake Erie have re-elected the old officers, Col. Samuel B. Dick being, as before, president.

The Indiana State convention of mine-workers, to be held at Terre Haute, Ind., on April 21st, promises to be a turning-point in a critical stage of the Indiana coal industry. If the differences at present existing between the operators and their employees are not adjusted at this meeting, serious trouble is almost certain to result before May 1st. The miners, according to resolutions, passed at their district meeting here in January, will make a demand for a scale of 66c. per ton, which is claimed by them would be on a differential with the existing Ohio scale. The operators, on the contrary, claim that the men will have to come down to the scale at Grape Creek, Ill., which is but 52c. With a breach like this existing, it is hard to predict what the result will be. The Grape Creek mines are direct competitors in the Chicago market of the Indiana mines, situated upon a north and south railroad. In addition to all this, the Indiana snippers come under the provisions of the interstate commerce act, while Grape Creek operators do not, and hence they are able to get their coal transmitted much cheaper. The Indiana miners for these reasons have been actively engaged of late in efforts to get their Grape Creek colaborers more thoroughly organized and to secure an advance in the scale. It is difficult to tell as yet, whether or not this movement will prove a success. The operators are acquainted with the scheme and are attempting to discharge all employees as rapidly as they join the union. J. Smith Talley, president of the operators' association, says that he and a committee of operators will consent to meeting with a like committee from the miners upon their coming convention, and will do all in their power to avert a conflict. He also says that a raise for Indiana miners is simply out of the question now, and that if any change is made in the scale it will be to lower it. Many operators in the bituminous regions, he claims, have given their men work on a 60c. scale the past winter more from philanthropic motives than from any hope of financial gain for themselves.

KANSAS.

CHEROKEE COUNTY.

(From Our Special Correspondent.)

PING & Co.—This mine is located on the Shelby lease and they are drifting at 85 ft. on a large face of decimated zinc ore in hard ground and no water, and last week they turned in 30 tons of crushed ore.

NEWTON & EDMINSTON.—This mine is located on the Shelby lease and they are drifting at 70 ft. on a large face of lead and jacked dirt in shooting ground. Last week they turned in 92,370 lbs. of crushed ore, 9,910 lbs. of free ore and 48,080 lbs. of lead.

SPARKS, COOPER & Co.—On the Shelby lease Sparks, Cooper & Co. are drifting at 80 ft. on a large face of lead and zinc ore in shooting grounds. Last week they turned in 114,889 lbs. of zinc ore and 44,740 lbs. of lead.

MASTIN SAND.—Elder & Rush have been sinking to catch a lower run of ore, and are down 100 ft. Adams & Co. in sinking went through 36 ft. of good pay dirt, and are still going down to water. Last week they sold 15,870 lbs. of lead and 23 tons of crush ore. At the Maud S. mine they are drifting at 100 ft. on a large face of zinc ore in open ground and turn in every week over 18 tons of free ore and several tons of crush ore. At the Last Chance mine they are drifting at 95 ft. on a large face of lead and zinc ore in open ground, and last week sold 25 tons of crush ore, 6 tons of free and 6,000 lbs. of lead. C. W. Warren & Co. are drifting at 95 ft. in a large face of ore in open ground, and sold 75 tons of zinc ore and 20,000 lbs. of lead.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 10.

Statement of shipments of anthracite coal (approximate) in tons of 2,240 lbs. for the week ending April 4th 1896, compared with the corresponding period last year.

Table with 3 columns: 1896 Week, 1896 Year, 1895 Year. Row: Pennsylvania Railroad. Values: 50,634, 910,920, 1,067,618.

PRODUCTION OF BITUMINOUS COAL, in tons of 2,000 lbs. for week ending April 4th, and for years from January 1st, 1890 and 1895:

Table with 3 columns: 1896 Week, 1896 Year, 1895 Year. Rows: Shipped East and North; Allegheny, Pa.; Barclay, Pa.; Beech Creek, Pa.; Broad Top, Pa.; Clearfield, Pa.; Cumberland, Md.; Kanawha, W. Va.; Phila. & Erie; Pocahontas Flat Top; Totals. Values range from 47,654 to 5,425,279.

Table with 3 columns: 1896 Week, 1896 Year, 1895 Year. Rows: Shipped West; Monongahela, Pa.; Pittsburg, Pa.; Westmoreland, Pa.; Totals. Values range from 18,071 to 1,473,895.

Grand totals ... 537,070 6,856,197 6,869,169

Production of coke on line of Pennsylvania Railroad for the week ending April 4th, 1896, and year from January 1st, 1896, in tons of 2,000 lbs.: Week, 85,663 tons; year, 1,256,641; to corresponding date in 1895, 1,588,900 tons.

Anthracite.

The usual spring dullness prevails in the anthracite market. New business has continued to be of a hand-to-mouth nature, most of the orders placed being small or barely enough to tide dealers over the next few weeks. With the opening of navigation the Hudson River trade has been increasing. Buyers in that section are pretty bare of stocks, and until the middle of May the bulk of the new business will probably be done up the river. The East does not usually begin to take coal until that time.

In spite of the dullness the tone of the market is encouragingly firm. Good coals are steadily held at the circular and as the poorer grades are difficult to sell at any price just now, the list prices are really the fairest quotations. They are \$3.60 for stove, \$3.35 for egg and chestnut, and \$3.10 for broken, all net on board.

There was some discussion in the trade this week concerning a report which came from Wilkes-Barre, to the effect that an operator there had made an experimental shipment of anthracite to Germany. Since the late Franklin B. Gowen sent Mr. E. A. Quintard to Europe for the Reading, this "foreign market for anthracite" item turns up periodically. Not long ago a committee was appointed by the Anthracite Coal Operators' Association to investigate the practicability of exporting anthracite. The committee studied the subject thoroughly, even going to the trouble of securing and analyzing samples of Welsh anthracite, a possible competitor, and reported adversely. Some years ago we believe that Coxe Bros. sent some anthracite to London, and from time to time inquiries are received from abroad. The principal operators, individuals and companies, working in and about Wilkes-Barre were interviewed and denied all knowledge of the shipment.

NOTES OF THE WEEK.

A special despatch from Pottsville, Pa., states that there was an explosion of gas in the Lytle Colliery, near Minersville, on April 9th, by which two men were frightfully burned, one of them, it is believed, fatally.

It is officially announced that Linderman & Skeer, who have operated the Stockton Collieries on a lease for many years, will retire at the end of this month. In pursuance of an order issued by the Philadelphia courts appraisers appointed by the land owners and operators began the work of appraising the improvements placed on the property, and this work will occupy the remainder of the month. The improvements, it is estimated, will exceed \$500,000. The mines have been worked for many years, and the underground openings are very extensive, but there still remains much unmined coal. Who will succeed the present operators is not yet known, but it is believed that the Lehigh Valley Coal Company will take charge.

Bituminous.

The shipments of soft coal during the past week do not show the falling off that had been anticipated, though, of course, they are not as heavy as during the preceding week. Quite a number of orders were received by shippers before April 1st, which could not be filled in time, and these are now being shipped. Outside of this business the market is dull, and what few orders are coming in at the advanced prices are insignificant in comparison to what were placed before the first. As we stated last week this is to be expected, as it will take some time for consumers to become accustomed to the new rates, and also to use up the stocks which they took pains to replenish during the closing days of last month. Probably nearly all the orders sent in before March 31st have now been shipped, with the exception of some yearly contracts which do not expire until next month or in June. These also will be out of the way soon, and then the true strength of the "combination" will be seen.

Rumors of contracts below the new prices and of breaks in the agreement have been prevalent this week, but when traced to the original sources have failed to be confirmed. As far as can be learned, the agreement among the soft coal producers is being kept. The chief disseminators of rumors to the contrary are some of the sales agents and middlemen who come into direct contact with consumers. The latter are naturally eager to "bear" the market and spread reports accordingly.

Shipments from tide this week have been pretty evenly distributed between points east of Cape Cod, Sound ports and New York harbor.

We hear of very few contracts being on the market, practically but two or three large ones, like the Long Island Railroad and the New York & New Haven. Arent these many conflicting rumors are afloat, and it is impossible at this writing to learn the truth about them.

The all-rail trade continues steady. The advances in the price of coal have been quite generally offset by the decrease in all-rail freight rates to which we alluded in our last report.

Transportation from mines to tide has improved as a result of the decreased demand and no complaints are made. The same applies to the car supply.

Vessels are in better supply and rates have declined during the week. The lighter draught vessels have begun to come out of winter quarters and from now on the supply will steadily increase. We quote vessel rates as follows from Philadelphia: To Boston, Salem, and Portland, 75c.; Providence, New Haven, New Bedford, Bridgeport and other Sound ports, 65c.;

Portsmouth, 75@80c.; Wareham, 85c.; Lynn, 85c.; Newburyport, 90c.; Dover, \$1.20 and towage; Saco, \$1.10 and towage; Bath, 90@95c., Gardiner, 90@95c. Rates from Newport News are 5c. and from Norfolk and Baltimore 10c. higher.

The "Association" prices remain as follows: F.o.b. Philadelphia, Norfolk and Newport News, \$2.35; Baltimore, \$2.28; New York Harbor shipping ports, \$2.80; alongside New York Harbor, \$3. There is a 15c. differential in favor of Clearfield and Beech Creek coals.

NOTES OF THE WEEK.

Coal receipts at San Francisco in March were 123,040 tons; for the three months ending March 31st they were 334,610 tons, a decrease of 1,840 tons, or 0.6%, as compared with the corresponding period in 1895. The receipts this year were from the following sources: Eastern (anthracite and Cumberland), 3,700 tons; Oregon and Washington, 102,869 tons; British Columbia, 130,586 tons; Australia, 52,027 tons; Great Britain, 49,423 tons. The statement does not include the coal from the Monte Diablo mines in California.

Buffalo, N. Y. April 9.

(From Our Special Correspondent.)

The anthracite coal trade is dull and without any change in quotations.

Bituminous coal is also dull and to the surprise of every one no variation is reported in quotations. The low rates at which the big contract for the Grand Trunk Railway of Canada as well as for the contract for the Buffalo Water Works were accepted appears to have demoralized the market. The Bell, Lewis & Yates Company has the bulk of the Grand Trunk Railway contract at price not stated, but said to be as low as that of last year. Mr. Mark Packard, of this city, got the Water Works contract for 30,000 net ton runs of mine delivered at \$1.56 2/3 per net ton.

The opening of navigation will be late this year; the reports from upper lake ports are anything but encouraging for early resumption of freighting by water. The indications are that the opening rate on coal per net ton, free on and off, to Lake Michigan ports will be 40c., and to Lake Superior ports 30c.

On April 2d, at Albany, the Senate passed by a unanimous vote of 40 the Anti-Coal-Trust Bill, allowing the Attorney-General to begin action to prevent coal monopolies in the State of New York. An important amendment has been made to the agreement of the Joint Traffic Association, which distinctly specifies in Section 2 of Article 2, that coal, coke, iron ore, mill clinder, limestone and petroleum, crude or refined, shall not be included in the traffic subject to the Association.

Messrs. Frank Williams & Co., are rebuilding their coal docks at this port.

The Lehigh Valley docks are being cleared of the iron ore lying there; it is being transferred to cars.

It is reported that the restriction of the anthracite coal output has placed the market in a strong condition and a healthy trade is prognosticated from this time forward.

Chicago. April 8.

(From Our Special Correspondent.)

Through the assistance of a good friend, the weather, the Chicago coal market has been somewhat improved and the tonnage placed a quarter more than the preceding week. April weather so far has been cold, and on two days snow has fallen to a limited extent. Business now being transacted is mainly of a small character, and no contracts of any size apparently are being placed. A certain amount of coal is being delivered on old contracts. Retailers have done a better business, the cold weather having assisted them materially. New prices on hard coal will shortly be fixed, and it is not expected that any great increase will be made.

The bituminous coal market has been slightly better and a few dealers have had quite a fair week's business. Railroad rates are now beginning to bob up, and it is said that there will be a repetition of last year's coal carrying rate war among those roads carrying bituminous coals to Chicago. Prices on soft coal are unsettled. The block coal operators of Indiana met at Brazil on Friday last for the purpose of discussing the mining situation and to appoint a committee to meet miners' committee for the purpose of formulating a mining scale for the ensuing year. Steps were also taken in the formation of a pool of the block coal operators, the object being to stop the cutting of rates in the Chicago market.

Pittsburg. April 9.

(From Our Special Correspondent.)

Coal.—At the time of our last report the water was too high for coal shipping purposes; it is now in good boating order. The present shipments will exceed 7,000,000 bu., destined principally for the Southern markets. Morgantown, W. Va., coal operators in the Fairmont region increased the wages of miners and mine workers 8% on Saturday. There is now a good demand for coal, but more for coke; all the companies are making extensive improvements in their plants. When the coal trade is referred to another condition of interest in the labor world becomes apparent; unfortunately uniformity in the Pittsburg district is not yet in sight. Many of the operators and most of the miners express themselves as confident that the required 95% of the operators can be induced to sign the agreement to pay 70c. in the Pittsburg district by the end of the present month, when the time of the present agree-

ment will expire. The operators are succeeding in getting the various firms into line gradually, and the signatures are coming in a manner that is proving very satisfactory. The adoption of the 70c. rate and the settlement finally of the vexatious question of uniformity therefore seems in sight.

Connellsville Coke.—The manufacturers are beginning to look forward to an improvement in their business, due to the steel pool, though there is little definite yet to be heard about starting up of ovens. The number in blast now is variously estimated at from 50% to 65%. A number of blast furnaces which have been out for several months are reported to be getting ready to resume, and this will make an increased demand for coke. The officials of the Frick Company, who control 75% of the ovens in the region, take a very hopeful view of the matter. The week's summary shows 12,010 ovens in blast with 5,350 idle; during the week 175 ovens were blown out, and 16 ovens were fired up. The H. C. Frick Company blew out altogether 140 ovens; other parties blew out 49 ovens. The Rainey ovens are now all in blast that are possible to operate and are making six full days a week. Production of the region, 104,100 tons, as against 117,058 the previous week; decrease, 12,958 tons. In the running order 4,557 ovens make six days, 5,870 ovens five days and 1,740 ovens four days, an average of 5.23 days. The shipment of coke from the region amounted to 6,747 cars; week's decrease, 29 cars. Coke shipments for the week: To Pittsburg, 2,081 cars; to points East, 1,090 cars; to points West, 3,576 cars; total, 6,747 cars.

The following table shows coke production and shipments for the past quarter:

	Production, Tons.	Shipments, Tons.
January.....	519,414	489,769
February.....	617,812	580,679
March.....	453,896	422,898
Total.....	1,591,122	1,563,346

Shanghai, China.

Feb. 28.

(Special Report of Wheelock & Co.)

Coal.—Stocks of Japan coal continue to increase owing to large imports, while there is nothing doing among natives beyond a few insignificant transactions. A small quantity of Mike dust has changed hands at 3.25 taels per ton. Cardiff is dull with no inquiry, except in very small lots to consumers. American anthracite is quiet. There was an arrival of about 1,100 tons of Sydney Wollongong. Quotations are as follows per ton: American anthracite, 9.00 taels; Welsh Cardiff, 10.50 taels; Australian Wollongong, 9.50 taels. For Japanese coal we quote 5.75 taels for Takasima lump, 4.25 taels for Namazuta lump, and 3.00@3.25 taels per ton for other sorts.

Kerosene Oil.—There has been nothing done of any importance, owing to the native holidays having intervened since last writing under this heading. We hear of April cargo Devoo's having been sold at "Tea Shop" at 1.61 taels per case, but beyond this there is little to report except the arrival of 60,000 cases of this oil, thus increasing our stocks which now are 203,204 cases American, 56,585 cases Russian, and 5,000 cases Langkat. We quote per case: For American, Devoo's, 1.67 taels; Russian, Batoum, 1.61 taels, Batoum bulk, 1.55 taels; Langkat, 1.60 taels.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 10, 1896

Fig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan., '95.	From Jan., '96.
	April 12, 1895.	April 10, 1896.		
Anthracite.	34 20,097	44 20,250	311,299	477,818
Coke.....	119 132,360	139 170,370	2,061,284	2,456,769
Charcoal...	18 3,859	13 5,200	64,953	75,240
Totals ...	171 156,316	196 195,820	2,437,536	3,009,857

The announcement of the formation of the steel pool and the anticipation of higher prices started a rush of buyers, but it lasted only a day or two, and second thoughts proved somewhat more conservative. The excitement quickly subsided, and business fell back again to nearly its normal level. With one or two exceptions our local reports show some increase in business, but a generally quiet feeling and a disposition to wait for developments, rather than to increase stocks of raw material.

The steel pool is, of course, the chief topic of discussion this week, and while there is a disposition to say as little about it as possible, the general features of the organization are known. It is understood that each mill in the pool has its allotment, and any one exceeding its percentage will pay \$2 per ton on the excess, these payments forming a fund from which those works which have not shipped their full quota will receive a rebate. The pool will have headquarters in Pittsburg, and will be managed by a board consisting of a president, vice-president and five representatives of different districts. The officers named so far are S. L. Burt, president; W. E. Reis, vice-president; W. L. King, secretary and treasurer. The companies which have joined the Association are as follows: Bethlehem Iron Company, South Bethlehem, Pa.; Pennsylvania Steel Company, of Steelton, Pa.; Maryland Steel Company, Sparrows Point, Md.; Lackawanna Iron

& Steel Company, Scranton, Pa.; Cambria Iron Company, Johnstown, Pa.; Carnegie Steel Company, Limited, Pittsburg, Pa.; Jones & Laughlins, Limited, Pittsburg, Pa.; Hainsworth Steel Company, Pittsburg, Pa.; National Tube Works Company, McKeesport, Pa.; Shenango Valley Steel Company, New Castle, Pa.; Wheeling Steel Works, Wheeling, W. Va.; Riverside Iron Works, Wheeling, W. Va.; Bellaire Steel Company, Bellaire, O.; Junction Iron and Steel Company, Mingo Junction, O.; Ashland Steel Company, Ashland, Ky.; King Gilbert & Warner, Columbus, O.; Ohio Steel Company, Youngstown, O.; Cleveland Rolling Mill Company, Cleveland, O.; Johnson Company, Lorain, O.; Otis Steel Company, Cleveland, O.; Union Steel Company, Alexandria, Ind. It is understood that the Illinois Steel Company will work in harmony with the pool, but cannot join it formally on account of the stringent anti-trust law of Illinois.

It will be seen that the organization covers the trade pretty thoroughly, and that the few firms outside of it have not a production large enough to seriously threaten its operations. The prices for billets fixed for the present are on the basis of \$30.25 per ton at Pittsburg. The tidewater prices are \$21.50 at Philadelphia and \$21.75 New York, and the Chicago quotation is \$21.25.

The question is, what policy will the pool follow, now that it has the trade completely in its hands? Will it cultivate business by maintaining reasonable prices, or will it maintain a high quotation as the rail association does? The fact that the same parties are leaders in both pools would indicate an adoption of the latter plan.

In last week's issue we spoke briefly of what we believe is the mistaken policy in forming a trust of this kind at the present time. Undoubtedly the pool can control the trade for a time, and can exact additional profits up to a certain limit with but little trouble. It is strongly organized and will probably hold together well. It can keep the smaller concerns under its control and foster or crush them at will. The inevitable result will be, however, a deepening of the already dangerous feeling against trusts and monopolies, which may have very unpleasant consequences, which the managers do not now anticipate. A restriction of trade and a decrease in its volume is another consequence which will follow, to the injury of all concerned.

Already the industries which depend on purchased billets are protesting. The tin-plate manufacturers, the makers of cotton ties and others understand their position and are making their complaints heard.

The wire-rod manufacturers were to meet in Cleveland this week to form a pool for the purpose of regulating prices in accordance with the quotations for billets. Nothing was done, however, and the meeting was adjourned till next week.

At the meeting of the Bar Iron Association in Cincinnati plans for a reorganization were presented, but no final action was taken.

NOTES OF THE WEEK.

It is reported that the Maryland Steel Company has contracted for 50,000 tons of iron ore from Newfoundland.

A Pittsburg despatch says that the contract has been let for the erection of the largest by-product coke plant in the United States to be located at McKeesport, adjoining the National Tube Works. The capital to be invested will be about \$1,000,000, which is furnished by the Union Gas Company, of Philadelphia. Forty acres of land has been leased near the tube works, and it is intended to erect 120 Otto-Hoffman by-product coke ovens on this property.

New York. April 10.

The local market is rather quiet, and there is some hesitation as to the future. Business is not active enough at present to warrant the increase in prices which seems to be demanded by the general situation, and there is a feeling that higher quotations may check the small orders which make up so large a share of the business here.

The expressed intention of the steel pool to cut all brokers and middlemen out of the trade is calling out a good deal of comment. Many question the possibility, and naturally there is rather an unpleasant feeling over the matter among those concerned.

Pig Iron.—Sales have been on a moderate scale only, and there has been little variation in prices. It is reported that several Alabama furnaces have decided to withdraw from the provisional agreement lately made and to look for business on their own account. If this should be confirmed a lower range of prices may be expected, as some anxiety to sell is manifest.

We quote for Northern brands as follows: No. 1 foundry, \$12.75@13.25; No. 2, foundry, \$12@12.50; gas forge, \$11.25@11.75. For Southern iron prices are: No. 1 foundry, \$11.75@12.25; No. 2 foundry, \$11.25@11.75; No. 1 soft, \$11.50@12; No. 2 soft, \$11@11.50; forge, \$10@10.50. All prices are for tide-water delivery.

Cast-Iron Pipe.—Nearly all the large summer contracts are out of the way, but a number of small orders are still on the market, and business is rather brisk.

Spiegeleisen and Ferro-Manganese.—No business has been done and we continue to quote nom-

inally \$10@20 per ton for spiegeleisen and \$47@ \$47.50 for ferro.

Steel Billets and Rods.—The quotations fixed by the pool is \$21.75 per ton, New York, but there has been no rush to buy. Rods are quoted \$27@27.50, with few sales.

Merchant Iron and Steel.—The market is not very active. Prices are unchanged. We quote for common bars, 1"15@1"25c.; refined bars, 1"25@1"50c.; soft steel bars, 1"30@1"40c. Other quotations are as follows: Open hearth machinery steel, 1"50@1"60c.; steel hoops, 1"50@1"60c.; steel axles, 1"65@1"80c.; links and pins, 1"65@1"80c.; tire steel, 1"85@2c.; spring steel, 2"10@2"25c. Rivets are 2"20@2"30c. for steel, and 3@3"30c. for iron.

Plates.—Business is quiet and prices about the same. Universal mill plates are 1"45@1"55c. For steel plates we quote: Tank, 1"45@1"55c.; boiler shell, 1"55@1"65c.; good flange, 1"80@1"95c.; fire-box, 2"10@2"50c. Charcoal iron plates are 2"20@2"30c. for shell, 2"70@2"80c. for flange, and 3"20@3"30c. for firebox.

Structural Iron and Steel.—Business continues good. Small orders come in freely and several large contracts are under discussion. In prices there is no change. We quote for angles, 1"45@1"55c.; channels, 1"60@1"75c.; tees, 1"65@1"75c.; beams (up to 15-in.), 1"65@1"75c. for large lots and 1"90@2"10c. for small orders.

Steel Rails and Rail Fastenings.—Rails are unchanged at \$28 per ton at mill, or \$28.75 at tide-water for standard sections. Girder and street rails are \$28@32 per ton at mill, according to section. No new business is noted here.

Rail fastenings are quiet and unchanged. Quotations are: For fish and angle-plates, 1"25@1"35c.; spikes, 1"65@1"80c.; bolts, 1"95@2"05c. for square nuts, and 2"05@2"15c. for hexagon nuts.

Scrap Iron.—Foundry scrap is rather scarce again and good lots are wanted. We quote \$9@11 per ton according to size and quality of lots. Some old car wheels have been sold at \$13.50, New York delivery.

The imports of specie from Mexico at San Francisco, principally by rail, for the quarter ending March 31st, compare as follows:

	1895.	1896.
Silver dollars.....	\$735,336	\$3,064,019
Silver bullion.....	11,031	270,115
Gold bullion.....	177,661	164,117
Total.....	\$924,027	\$3,497,251

The heavy imports of dollars last year is quite noteworthy, the total being the largest for any quarter for a long time. During the previous quarter, the last quarter of 1895, there was received \$2,946,212 in this coin, making \$8,185,058 for the calendar year, 1895, against \$4,326,392 for 1894.

Chicago. April 8.

(From Our Special Correspondent.) Business in iron in this market during the week just over has been a little more satisfactory than for some time past. A number of lines show improvement and some decided gains. The buying of rods and billets appears to have commenced for a certainty, orders having been booked for 20,000 tons of rods and 7,000 tons of billets. The rod and billet market has assumed a decided strength, billets selling now at \$20.50 and rods at \$25.50. Work is being pushed on the elevated loop and the Wabash avenue and Fifth avenue extensions will soon be completed.

Pig Iron.—Sales of pig iron during the week have footed up a larger total than the preceding week, a fair estimate would place aggregate sales at 7,000 tons. There is more of an inquiry, and it is of a character that would indicate business. Southern furnaces through the influence of lower prices have been doing a good business here for some time, but it is now expected that agreement among the Southern furnaces will raise the prices, and maintain them on a par with Northern iron. Northern iron sales have been confined from carload to 100 ton lots, one sale reported of 1,000 tons. Quotations are: Lake Superior charcoal, \$13.50@14; local coke foundry No. 1, \$12.50@13; local coke foundry No. 2, \$12@12.50; local coke foundry No. 3, \$11@12; local Scotch foundry, No. 1, \$12.50@13; local Scotch foundry, No. 2, \$12@12.50; local Scotch foundry, No. 3, \$11@12; Southern coke, No. 1, \$12.35@12.85; Southern coke, No. 2, \$11.60@11.85; Southern coke, No. 3, \$11.35@11.60; Southern, No. 1, soft, \$11.60@11.85; Southern, No. 2, soft, \$11.35@11.60; Southern silveries, No. 1, \$11.85@12.35; Southern silveries, No. 2, \$11.60@11.85; Jackson County silveries, \$14.50@16; Ohio silveries, No. 1, \$15@15.50; Ohio silveries, No. 2, \$14.50@15; Ohio strong softeners, \$15@15.50; Alabama car-wheel, \$16.85@17.35; malleable Bessemer, \$13; coke Bessemer, \$13@14.

Bar Iron.—There is no firmness in the bar iron market and business has not improved. Only a small tonnage was placed and at prices too low to suit the mills. Quotations are 1"25c. on common iron.

Structural Material.—Business remains about as last week. There is some prospect of an early betterment in conditions as there will be in the market soon some heavy bridge and building work. Beams and channels, 1"65@1"70c. Plates, 1"60c.; angles, 1"55@1"60c.; tees, 1"70c.

Steel Rails.—There is a better demand for rails. The inquiry is large. Rails are now quoted \$29.50 and up according to specification.

Billets and Rods.—About 7,500 tons of billets were sold from this market during the past week, and a good part was at the increased price of \$20.50 per ton Chicago. In rods the market has been brisk, nearly 20,000 tons having been sold. Prospects are very bright in both lines and a large amount of business is expected. Rods are now quoted \$25.50.

Old Rails and Wheels.—But few sales of either old iron rails or wheels were made, the market for both lines being very slow. Old iron rails are quoted about \$14, and old wheels \$13@13.50.

Cleveland, O. April 9.

(From Our Special Correspondent.)

Iron Ore.—The ore men this week made final announcement of the prices for Bessemer grades, the prices to continue throughout the season of 1896. As stated two weeks ago they are based on a price of \$4 for Norrie, a standard Gogebic Bessemer, which is an advance of \$1.10 over the prices established a year ago. But there is not a uniform advance of \$1.10 on all grades of ore. Thus the price of the Iron Mountain ore of the Mesabi range is fixed at \$3.35, which is an advance of \$1 over the price at which this product sold a year ago. Prices were established by taking into consideration not only the chemical analyses of the various ores, including the percentage of moisture, but all other known conditions which would affect their market value.

As thus established the prices of the Bessemers range from \$4.90 for some old range grades especially low in phosphorus, down to \$3.35 for the ores the percentage of phosphorus in which runs up to 0'05. The prices agreed upon this year, however, include also ores that run up as high as 0'17 in phosphorus, and the price of those high phosphorus grades scaled down as low as \$3.05.

In the Vermilion range high grade soft ores like the Chandler and Pioneer sell for \$4.25, while the Minnesota, a hard ore in the same range is rated at \$4.55. In the Gogebic, Norrie and Tilden are scheduled at \$4, Ashland at \$4.10 and Aurora at \$4.15. The specular ore of the Republic mines in the Marquette range is fixed at \$4.55. Of the Menominee range ores, the price of Chapin is \$3.65. Among the Mesabis, Franklin is listed at \$3.75, Biwabik, at \$3.65, Mountain Iron, at \$3.35. The price of all these ores is for delivery at Lake Erie ports.

Since the prices have been announced no large contracts for the ores have yet been reported. Some small lots are sold and on Wednesday, this week, representatives of several of the largest consumers of Bessemer were in Cleveland talking up transactions with the ore sales agents. It is thought that heavy contracts will be closed within a few days.

Producers of non-Bessemer ores have held several conferences here during the past week in reference to prices for the season. No results have yet been reached. Unless the price of foundry and forge irons advance, it is claimed that the market for these ores this year will be restricted, in view of the aggressiveness of the Southern products and the higher cost of raw material to the Northern furnacemen. The increase in the cost of production of iron ore is the same for the non-Bessemer as for the Bessemer producer.

An agreement between the ore and the vesselmen in regard to carrying charges is still in the hazy future. Neither shipper nor carrier is trying to close contracts. Some carriers are willing to close at \$1.10, others want more. The shippers are making no offers, but \$1 would be paid.

Pig Iron.—The pig iron market is firmer in tone, and prices are slightly better than a week ago. Small lots of Bessemer have been sold this week on a basis of \$13.75 Cleveland. There is a better inquiry for foundry irons, but prices have not responded. Ohio Scotch is quoted \$12.50, No. 1, and \$12, No. 2; Northern strong, \$13, No. 1, and \$12.50, No. 2. Lake Superior charcoal is selling moderately at \$13.75@14.50.

Pittsburg. April 9.

(From Our Special Correspondent.)

Raw Iron and Steel.—Business during the week was very active, particularly as regards iron and steel. The heavy advance in billets caused a similar movement in pig iron and a very active demand; last week's sales were the largest since last fall. The situation in other respects has undergone no particular change; there is a continued complaint of slow collections and credits are closely scrutinized. Traders generally pursue the policy of providing for near wants without extending operations to any extent into the future; the effect of this conservative method of business is trying upon manufacturers whose products in some lines are accumulating, while distributors are gradually reducing stocks to the replenishing point, and as a consequence the tendency to curtail output is still a feature of several industries.

Iron and steel interests have been chiefly concerned in the outcome of the movement to combine the crude steel makers; this has been followed by a material advance in iron and products generally. There has been increased activity in the Western markets, and while production generally exceeds the present rate of consumption there is a steadier and more hopeful feeling throughout the trade in anticipation of an expanding outlet during the next few weeks.

The new combination clearly means one thing, and that is that iron ore prices will not be reduced, and probably that coke prices will not be changed; some time will be required for the trade to settle down; there is no question, however, as to the

amount of work in prospect, and every day the requirements assume more definite shape.

Foundry pig iron, of course, is not affected by the developments in the steel market, but still a firmer tone is manifested.

One of the greatest problems is that presented by John J. J. as regards the tin-plate manufacturers. These demand concessions as to the price of their foundation requirements; they declare they cannot face foreign competition with the price of the steel; they want it uniform with that generally established by the association.

Bessemer pig, highest point touched \$13.85; Pittsburgh Valley furnaces holding out for \$13, with sales at \$12.85. Steel billet prices range from \$19.85 to \$20.25. Gray forge, \$11 to \$11.35. Foundries unchanged.

Table with columns for Coke Smelted, Lake and Native Ore, Bessemer, Pits, Gray Forge, Charcoal, Blooms, Billets and Slabs at Mill, and Philadelphia. Prices listed in various units like tons and cash.

Philadelphia, April 10. (From Our Special Correspondent.)

Pig Iron.—Within two or three days there has been a general scramble for iron, mostly at prices made as options within a recent period.

Steel Billets.—The disturbing influences are seen in trade circles. Very little material has been bought. While to all appearances the combination can and will do all it has undertaken, there are those who think the moderate consumptive requirements will strain the new agreement.

Merchant Bars.—Steel bars have been selling well this week at 1 1/2 to 1 5/8. Iron is firmer but not notably higher. A better general demand is now expected both in local and outside markets.

Skelp.—Some sheared iron sold this week. The quoted figures are \$1 40.

Sheet Iron.—There has been a brisk demand in all lines of sheet iron this week. Galvanized has been attracting special attention and some big contracts have been placed lately.

Merchant Steel.—All kinds of merchant steel are doing much better since April 1st, and particularly since the billet surprise of a few days ago. Prices are perceptibly firmer, and shaded quotations in a small way are withdrawn.

Pipes and Tubes.—The week has developed a better demand for pipes and tubes for all ordinary uses. Shop work is picking up.

Plate and Tank.—The manufacturers and their agents have been bringing arguments to bear on prospective buyers, growing out of the billet incident, to hurry up the placing of contracts, but no business has been done of moment, and buyers of large lots could get in at current quotations, which range from 1 1/4 to 1 1/2 up.

Structural Material.—The Phoenix Iron Company captured a large order that will take between 1,100 and 1,200 tons for seashore construction requirements. Other small orders have dropped in. The outlook is quite bright.

Steel Rails.—Eastern mills have secured but little new business.

Old Rails.—Old iron rails are held at \$15.

Scrap.—Railroad scrap brings from \$14 to \$15.

METAL MARKET.

NEW YORK, Friday Evening, April 10, 1896.

Gold and Silver.

Prices of Silver per Ounce Troy.

Table showing prices of silver per ounce Troy for April, with columns for London, N. Y. Cts., and Value of bill in \$.

Owing to the Easter holidays trading with London has been much lighter and with narrow market the price receded to 31 1/2 d. The announcement of a demand for a considerable amount for the French mint stiffened the price to 31 3/4 d., at which price the demand was satisfied and the market closes weaker.

Gold and Silver Exports and Imports, New York. For the week ending April 10th, 1896, and for years from January 1st, 1896, 1895, 1894, 1893 and 1892:

Table of Gold and Silver Exports and Imports, New York, with columns for Gold, Silver, Total Excess, and various months.

Of the gold exported \$900,000 went to Germany, \$18,444 to London, and the balance to the West Indies; of the silver \$1,780 went to Germany, and \$796,400 to London. The gold imported came chiefly from the West Indies, and the silver from South America.

Gold and Silver Exports and Imports.

At all United States ports, February, 1896, and years from January 1st, 1896 and 1895:

Table of Gold and Silver Exports and Imports at all United States ports, with columns for Specie and bullion, In ores, and Total excess.

These figures are furnished by the Bureau of Statistics of the Treasury Department and include the exports and imports at all United States ports.

Average Monthly Price of Silver

in New York and London, per ounce Troy, from January 1st, 1896, and for corresponding months, 1895 and 1894.

Table of Average Monthly Price of Silver, with columns for Month, London, New York, and years 1896, 1895, 1894.

The London price is per standard ounce .925 fine; the New York price is per fine ounce, or for pure silver.

A clerical error occurred in the table giving the average price of silver in New York for the month of February, 1896, which the types made 69 3/4c., when it should have been 67 1/2c. per fine oz., the correct figure, which will now be found in the table. We take the utmost care to get and to give correct quotations for all the metals; all the more so because we know that many contracts are made not only in this country but also in Canada and Mexico,

in which it is specified that the quotations of the Engineering and Mining Journal shall be taken as conclusive as to prices.

FINANCIAL NOTES OF THE WEEK.

The week has been uneventful in financial circles, and the fact that \$1,300,000 of gold have been exported to Europe has had no effect upon the market. The rate for time loans is decidedly firm, and with a hardening tendency, which leads bankers to believe that there will be very little disposition to withdraw money in bullion or any other shape from this market.

Some interest was evinced in banking, broking and commercial circles generally in the bill for the adoption of the metric system, favorably reported to the House by Mr. Stone, chairman of the Committee on Weights and Measures. On the question of ordering the bill to a third reading, the vote was 119 to 116, showing a small majority in favor of the bill. Afterward the vote was reconsidered by 143 to 99 and the bill recommitted, from which we infer that it has small chance of becoming law at this session.

The statement of the United States Treasury on Thursday, April 9th, shows balances in excess of outstanding certificates as below, comparison being made with the corresponding day of last week:

Table of United States Treasury statement, with columns for Gold, Silver, Legal tenders, Treasury notes, and Changes.

Government deposits with national banks on the same date amounted to \$25,889,779, a decrease of \$1,185,152 during the week.

Total United States Treasury notes issued under act of July 14th, 1890, in general circulation and in the Treasury, \$135,926,280. Against these are held in the Treasury 14,498,590 coined standard silver dollars, and silver bullion purchased at a cost of \$121,517,600, making a total of \$135,926,280.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending April 4th, gives the following totals, comparisons being made with the corresponding weeks in 1895 and 1894:

Table of New York banks statement, with columns for Loans and discounts, Deposits, Circulation, Specie, Legal tenders, and Total reserve.

Changes for the week this year were increases of \$228,500 in loans, \$38,500 in circulation, and \$319,700 in specie; decreases of \$419,800 in deposits, \$1,546,100 in legal tenders, and \$1,141,450 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 of Specie Holdings of leading banks, with columns for Bank Name, Gold, Silver, and Total.

The return for the Associated Banks of New York is of date April 4th; all the others are of

date April 9th, except the Bank of Italy, which is dated March 10th, and the Bank of Russia, whose return is dated March 1st-13th.

Shipments of silver from London to the East for the year up to March 26th are reported by Messrs. Pixley & Abell's circular as below:

Table with columns: 1895, 1896, Changes. Rows: India, China, The Straits, Totals.

Arrivals for the week this year were £248,000 in bar silver from New York, £22,000 from the West Indies; £26,000 in Mexican dollars from New York; a total of £296,000.

While the demand for Indian exchange has been better so far as amount is concerned, and all of the 60 lakhs of Council bills offered in London having been taken, prices were lower, and the average rate at which the bills were sold was 14 3/4d. per rupee.

Domestic and Foreign Coins.

The following are the latest market quotations for the leading foreign coins:

Table with columns: Bid, Asked. Rows: Mexican dollars, Peruvian soles and Chilean pesos, Victoria sovereigns, Twenty francs, Twenty marks, Spanish 25 pesetas.

Other Metals.

Copper.—The market has been rather dull, and hardly any business has been doing; quotations are more or less nominal, and with no pressure to sell they show only a small variation downward.

Advices from Europe again report a very large consumptive demand, and a scarcity of both fine copper and g. m. b.'s for spot delivery.

Tin.—There have been some better inquiries from consumers, and, although London has declined somewhat, prices here have not given way correspondingly.

The London market shows a decline for the week of about £1, the closing prices to-day being £59 7s. 6d. @ £59 10s. for spot and £60 @ £60 5s. for three months prompt.

Imports of tin at San Francisco during the month of February amounted to 130 tons (of 2,240 lbs.).

Lead was rather firm in the beginning of the week, and prices advanced to 3 7/8 @ 3 10; but since then Western lead has been offered more freely, and prices declined to 3 @ 3 05c., with buyers at the former figure.

The imports of lead at all United States ports in February are reported by the Bureau of Statistics, Treasury Department at 5,919 tons (of 2,240 lbs.).

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull, and the latest sales were made on a basis of 2 7/8 for Missouri brands, and 2 80 for argentiferous.

Spelter is also somewhat lower, and we have to reduce prices to 4 1/2 @ 4 15 New York. There is little offering, but the demand is rather light.

The Western spelter combination continues to hold together, although the course of business has not been favorable. The sales of spelter continue below the production, although only about 60% of the smelting capacity controlled by the combination is at work.

In contrast with this, the London market remains very firm, good ordinaries being quoted £15 10s. and specials £15 12s. 6d.

Antimony is lifeless, without any alteration. Cookson's 7 1/2c., Hallett's 6 1/2c., U. S. Star 7c.

Nickel.—Demand is good and the prices are unchanged. We quote 35 1/2 @ 38c. per lb. for small orders, and 34 @ 35c. for ton lots.

Platinum.—Prices are steady and unchanged and we quote \$13 @ \$14.50 per oz. New York London quotations are 49 @ 51s. per oz.

For chemical ware, best hammered metal, Messrs. Eimer & Amend, New York, furnish the following quotation, the prices given being respectively for orders of over 250 grams; for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 48c. 49c. and 50c. per gram.

Quicksilver.—Prices are \$37.50 per flask. New York. The London quotations are £6 17s. 6d. per flask; from second hands £6 16s. 3d. @ £6 16s. 6d. is named.

Imports and Exports of Metals.

Table with columns: New York, Week, Apr. 1, Year, 1896. Rows: Aluminum, Antimony, Brass, Chrome, Copper, Iron, Lead, Nickel, Steel, Tin, Zinc.

* Metal Exchange Reports. † Week ending April 9.

Table with columns: Baltimore, Week, Apr. 3, Year, 1896. Rows: Bismuth, Copper, Iron, Lead, Nickel, Steel, Tin, Zinc.

** From our special correspondent. † Week ending April 9.

Table with columns: Philadelphia, Week, Apr. 3, Year, 1896. Rows: Antimony, Copper, Iron, Manganese, Spiegeleisen, Tin, Tin and black plates.

†† From our special correspondent.

Average Monthly Prices of Metals

In New York since January 1st, 1896, and for the corresponding period in 1895, 1894, 1893 and 1892, in cents per pound, were:

Table with columns: Month, 1896, 1895, 1894, 1893, 1892. Rows: Copper, Tin, Lead, Spelter.

The Minor Metals.—Quotations for these metals are given in the table below, the prices being for New York delivery:

Table with columns: Metal, Price. Rows: Aluminum, Bismuth, Phosphorus, Platinum, Tungsten, Tungstic acid, Ferro-tungsten.

The variations in price are chiefly on size of order.

CHEMICALS AND MINERALS.

New York, Friday Evening, April 10.

Heavy Chemicals.—This market has continued very quiet. Caustic soda was dull and featureless, with prices unchanged.

Acids.—This market has continued steady although not particularly active. The current consumption demand is fair, and prices remain unchanged.

Brimetone.—We quote for shipments, best unmixed seconds, \$15.50 @ \$15.75. Thirds are 25c. less. Spot or nearby is \$16 for seconds.

Fertilizing Chemicals.—The fertilizer market has remained quiet during the past week. The unsatisfactory weather of late has tended to delay orders from Northern consumers.

Sulphate of Potash: 90-95%, New York and Boston, \$1.90 1/2; Philadelphia, Baltimore and Norfolk, \$1.9c.; Southern ports, \$2.

Double Manure Salts: 48-53%, New York and Boston, \$1.01; Philadelphia, Baltimore and Norfolk, \$1.02; Southern ports, \$1.03 1/2.

Muriate of Potash.—New prices for muriate are New York and Boston, 1.75c.; Philadelphia, Baltimore and Norfolk, 1.76 1/2c.; New Orleans, 1.78 1/2c., for 80% (basis of 80%), in lots 25 tons and upward.

Kalnit.—Quotations for 1896 are as follows: New York, Boston, Philadelphia and Baltimore, \$8.55 per ton; Norfolk, \$8.90, and New Orleans, \$9.05 per ton, for 25 tons and upward.

Nitrate of Soda.—Spot, \$1.70; to arrive, \$1.75 @ \$1.85.

STOCK QUOTATIONS.

BOSTON, MASS. Table with columns for Name of Company, Location, Par value, and dates from Apr. 3 to Apr. 9. Includes companies like Allouez, Arnold, Atlantic, etc.

NEW YORK. Table with columns for Name of Company, Location, Par value, and dates from April 4 to April 10. Includes companies like Adams, Ajax, Alamo, etc.

INDUSTRIAL COAL AND COAL RAILROAD. Table with columns for Name of Company, Par value, and dates from April 4 to April 10. Includes companies like East. & Ont., Ches. & Ont., etc.

Table with columns for Name of Company, Location, Par value, and dates from April 4 to April 10. Includes companies like Adams, Ajax, Alamo, etc.

COLORADO SPRINGS, COLO. Table with columns for Name of Company, Par value, and dates from Mar. 31 to April 10. Includes companies like Ajax, Alamo, Au'ric, etc.

ST. LOUIS, MO., STOCKS. Table with columns for Name of Company, Company's Office, Par Value, Bid, Asked, Last Dividend. Includes Central Lead, Con. Coal, etc.

BALTIMORE, MD. Table with columns for Name of Company, Location, Par value, Bid, Asked. Includes Balt. M. & S., Conrad Hill, etc.

MISCELLANEOUS SECURITIES. Table with columns for Name of Company, Location, Par Value, Bid, Ask. Includes American Coal, Chateaugay Ore & Iron, etc.

* Official quotations Boston Stock Exchange. * Holiday. Total sales, 31,733. * Official quotations N. Y. Stock Exchange. Total shares sold, 59,172. * Official quotations Con. Stock & Petroleum Exchange. Total sales, 17,300. * Official telegraphic quotations, San Francisco Stock Exchange. * Official quotations Baltimore Stock Exchange. * Official quotations and sales Colo. Springs Mg. Stock Assoc. * Board of Trade Exchange.

LONDON. March 28.

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Last dividend, Quotations. Lists various mining and industrial companies from America, Alaska, Idaho, Montana, Colorado, etc.

DENVER, COLO.

Table with columns: NAME OF COMPANY, Par value, Mar. 30, Mar. 31, Apr. 1, Apr. 2, Apr. 3, Apr. 4, Sales. Lists companies like Addie C., Agate, Amity, Anaconda, etc.

PARIS. Week ending March 27.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Divs. last year, Prices. Lists companies like Acieries de Crenot., Anzin, Boleo, Bruay, etc.

PHILADELPHIA, PA.

Table with columns: NAME OF COMPANY, Location, Par value, April 2, April 3, April 4, April 6, April 7, April 8, Sales. Lists companies like Acety. L.H. & P., Bethlehem Iron, Cambria Iron, etc.

MEXICO. Week ending April 2.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Opening, Closing. Lists companies like Amistad y Concordia, Anguillas, Arevalo y Anexas, etc.

SALT LAKE CITY, UTAH. Week ending April 4.

Table with columns: Name of Company, Par value, Bld., Asked, Actual selling price, Name of Company, Par value, Bld., Asked, Actual selling price. Lists companies like Ajax, Alliance, Am. Nat. Gas, etc.

PITTSBURG, PA. Week ending April 8.

Table with columns: NAME OF COMPANY, Location, Par value, Bid., Ask., Selling price, NAME OF COMPANY, Location, Par value, Bid., Ask., Selling price. Lists companies like Mansfield, N.Y. & C. Gas Co., etc.

VALPARAISO, CHILE. Fortnight, Feb. 28.

Table with columns: NAME OF COMPANY, Capital, Share value, Last Dividend, Prices. Lists companies like Arturo Prat, Caracoles, Descub. de Huantajaya, etc.

HELENA, MONT. Week ending Mar. 31.

Table with columns: NAME OF COMPANY, Location, Company's office, Par value, Bid., Asked, Shares sold, Price, Date. Lists companies like Am. Dev. & M. Co., Bald Butte, Bi-Metallic, etc.

SHANGHAI, CHINA. Feb. 28.

Table with columns: NAME OF COMPANY, Country, No. of shares, Par. Paid up, Last dividend, Price. Lists companies like Jelebu Mfg. & Trad., Funjong Mfg. Co., Ltd., etc.

DULUTH, MINN. Week ending April 4.

Table with columns: NAME OF COMPANY, Par value, Bid., Asked, NAME OF COMPANY, Par value, Bid., Asked. Lists companies like Adams Iron, Biwabik, Cincinnati Iron, etc.

NOTE.—In most Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Prices are in Mexican dollars.

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

* Official quotations Philadelphia Stock Exchange. *Holiday. Total sales, 3,477.

* Official quotations Pittsburg Stock Exchange.

* Special Report of Samuel K. Davis. Total shares sold, 72,500.

* Special Report of J. P. Bissett & Co. The prices quoted are in Shanghai

* Special Report of S. E. Ealith.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

G. Gold. S. Silver. L. Lead. C. Copper. B. Borax. * Non-assessable. + The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. † Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends and the Cons. Virginia \$42,390,000. Note.—Corrections to this table are made monthly. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills
Bostonmann, Louis F.
Bullock, M. C., Mfg. Co.
Atlantic Mining Co.
Clayton Air Compressor Works.
Fraser & Chalmers.
Ingersoll-Sergeant Drill Co.
(See Diamond Drills)
Aluminum Bronze
Fairbanks Co.
Amalgamators
Bucyrus Steam Shovel & Dredge Co.
Fraser & Chalmers.
Amalgam Plates.
Western Plating and Mfg. Co.
Anti-Friction Metals
Besley, Chas. H., & Co.
Chester Steel Cast. Co.
Architects and Builders
Berlin Iron Bridge Co.
Pittsburg Bridge Co.
Pollock, Wm. B. & Co.
Assayers' and Chemists' Supplies
Alnsworth, Wm.
Baker & Adamson.
Baker & Co.
Becker, Christian.
Bullock & Crenshaw.
Denver Fire Clay Co.
Eimer & Amend.
Henry Hill Chem. Co.
Penn Sm. & Ref. Wks.
Penna. Salt Mfg. Co.
Roessler & Hasslacher Chemical Co.
Sargent, E. H., & Co.
Soivay Process Co.
Taylor, John, & Co.
Troemer, Henry.
Western Chemical Co.

Gas and Rock Drills
American Metal Co.
James & Shakspeare.
Kearsage Mfg. Co.
Lambert's Wharf. Co.
Lewisohn Bros.
Orford Copper Co.
Osceola Con. Mfg. Co.
Pass, C., & Son, Ltd.
Penn Salt Co.
Phelps, Dodge & Co.
Tamarack Mfg. Co.
Tamarack, Jr., Mfg. Co.
Vivian, Younger & Bond.
Machinery, Milling and Other Machinery
Allis, Edw. P., & Co.
Bacon, E. C.
Bickett Fdy. & Mch. Co.
Besley, Chas. H., & Co.
Blake, T. A.
Bostonman, L. F.
Boston Ore Mach'y Co.
Bradley Pulverizer Co.
Buckeye Engine Co.
Bullock, M. C., Mfg. Co.
Caldwell, H. W., & Co.
Card Electric Co.
Carp'ter, Geo. B., & Co.
Channon, H. Co.
Colorado Iron Works.
Connersville Blower Co.
Crandall & Huff.
Crook, W. A., & Bros. Co.
Davis-Colby Ore R. Co.
Denver Eng. Wks. Co.
Ellison, Wm., & Son.
Engelbach Ma. Mfg. Co.
Field & Goetzman.
Fraser & Chalmers.
Hammond, Mfg. Co.
Hendrie & Bolthoff Mfg. Co.
Ingersoll-Sergeant Drill Co.
Jeffrey Mfg. Co.
Joseph, W., & Sons, Ltd.
Manganese Steel.
Taylor Iron & Steel Co.
Locke, Blackett & Co.
Mathison Sm'ting Co.
Matthiessen & Hegeler Co.
Metals and Metal Co.
Am. Zinc-Lead Co.
Baker & Co.
Bath, Henry & Son.
Besley, Chas. H., & Co.
Bridgeport Copper Co.
Elliott's Metal Co., Ltd.
Eureka Co.
Foster, Blackett & Wilson.
James & Shakspeare.
Johnson, Matthey & Co.
Lambert's Wharf. Co.
Lawson Bros.
Metal and Ore Processors
Amer. Zinc Lead Co.
Bullock, M. C., Mfg. Co.
Bridgeport Copper Co.
Canadian Copper Co.
Denver Eng. Wks. Co.
Elliott's Metal Co., Ltd.
Foster, Blackett & Wilson.
Fraser & Chalmers.
General Gold Extraction Co.
Kendall, Gold & Silver Extraction Co.
Mine Cars
Crandall & Huff.
Denver Eng. Wks. Co.
Hendrie & Bolthoff Mfg. Co.
Hunt, C. W., Co.
Newsonville Foundry & Machine Co.
Sheffield Car Co.
(See Machinery)
Mines, Mill and Smelters Supplies.
Carpenter, Geo. B., & Co.
Crandall & Huff.
Denver Eng. Wks. Co.
Gates Iron Works.
Park & Wilkinson.
Roessler & Hasslacher Chemical Co.
Stieren, William E.
(See Machinery.)
Mining and Land Companies
Atlantic Mfg. Co.
Arizona Copper Co.
Boston & West. Mfg. Co.
Butte & Boston Mfg. Co.
Clark Land & Mines Co.
Copper Queen Mfg. Co.
Nickel
Canadian Copper Co.
Ore Cars
Trux Mfg. Co.
Ore Roasters
Brown, Horace F.
Cumm, F. D., & Sons Co.
Davis-Colby Ore Roaster Co.
Ore Testing Works
Hunt, F. F.
Ledoux & Co.
Montana Ore Purchasing Co.
Packing and Pipe Coverings
Brandt, Randolph.
Jenkins Bros.
Hine & Robertson.
Corrosive Metals
Aitchison, R., Perf. Metal Co.
Fraser & Chalmers.
Harrington & King Perforating Co.
Peroxide of Sodium.
Roessler & Hasslacher Chemical Co.
Phosphor-Bronze
Phosphor-Bronze Smelting Co.
Pile Drivers
Bucyrus Steam Shovel and Dredge Co.
Ingersoll-Sergeant Drill Co.
Pipes
Pollock, Wm. B., & Co.
Saker & Co.
Johnson, Matthey & Co.
Powder
Atlantic Dynamite Co.
Aqua Powder Co.
Ingersoll-Sergeant Drill Co.
Pressure Blowers
Connersville Blower Co.
Pressure Regulators
D'Este & Seeley, (Curtis).
Purifications
American Fertilizer.
Arms & Explosives.
Australian Mfg. Stand.
Bullionist.
Bullery Guardian.
Denver Republican.
Economic Mining.
El Minero Mexicano.
Electric Plant & Electrical Industry
Hooker Steam Pump Works.
Jeansville Iron Wks.
Stillwell-Bierce & Smith-Valle Co.
Pumps
Blake, Geo. F., Mfg. Co.
Cameron, A. S., steam Pump Works.
Denver Eng. Wks. Co.

General Dealers and Producers.
American Metal Co.
James & Shakspeare.
Kearsage Mfg. Co.
Lambert's Wharf. Co.
Lewisohn Bros.
Orford Copper Co.
Osceola Con. Mfg. Co.
Pass, C., & Son, Ltd.
Penn Salt Co.
Phelps, Dodge & Co.
Tamarack Mfg. Co.
Tamarack, Jr., Mfg. Co.
Vivian, Younger & Bond.
Machinery, Milling and Other Machinery
Allis, Edw. P., & Co.
Bacon, E. C.
Bickett Fdy. & Mch. Co.
Besley, Chas. H., & Co.
Blake, T. A.
Bostonman, L. F.
Boston Ore Mach'y Co.
Bradley Pulverizer Co.
Buckeye Engine Co.
Bullock, M. C., Mfg. Co.
Caldwell, H. W., & Co.
Card Electric Co.
Carp'ter, Geo. B., & Co.
Channon, H. Co.
Colorado Iron Works.
Connersville Blower Co.
Crandall & Huff.
Crook, W. A., & Bros. Co.
Davis-Colby Ore R. Co.
Denver Eng. Wks. Co.
Ellison, Wm., & Son.
Engelbach Ma. Mfg. Co.
Field & Goetzman.
Fraser & Chalmers.
Hammond, Mfg. Co.
Hendrie & Bolthoff Mfg. Co.
Ingersoll-Sergeant Drill Co.
Jeffrey Mfg. Co.
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Taylor Iron & Steel Co.
Locke, Blackett & Co.
Mathison Sm'ting Co.
Matthiessen & Hegeler Co.
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Baker & Co.
Bath, Henry & Son.
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Bridgeport Copper Co.
Elliott's Metal Co., Ltd.
Eureka Co.
Foster, Blackett & Wilson.
James & Shakspeare.
Johnson, Matthey & Co.
Lambert's Wharf. Co.
Lawson Bros.
Metal and Ore Processors
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Bullock, M. C., Mfg. Co.
Bridgeport Copper Co.
Canadian Copper Co.
Denver Eng. Wks. Co.
Elliott's Metal Co., Ltd.
Foster, Blackett & Wilson.
Fraser & Chalmers.
General Gold Extraction Co.
Kendall, Gold & Silver Extraction Co.
Mine Cars
Crandall & Huff.
Denver Eng. Wks. Co.
Hendrie & Bolthoff Mfg. Co.
Hunt, C. W., Co.
Newsonville Foundry & Machine Co.
Sheffield Car Co.
(See Machinery)
Mines, Mill and Smelters Supplies.
Carpenter, Geo. B., & Co.
Crandall & Huff.
Denver Eng. Wks. Co.
Gates Iron Works.
Park & Wilkinson.
Roessler & Hasslacher Chemical Co.
Stieren, William E.
(See Machinery.)
Mining and Land Companies
Atlantic Mfg. Co.
Arizona Copper Co.
Boston & West. Mfg. Co.
Butte & Boston Mfg. Co.
Clark Land & Mines Co.
Copper Queen Mfg. Co.
Nickel
Canadian Copper Co.
Ore Cars
Trux Mfg. Co.
Ore Roasters
Brown, Horace F.
Cumm, F. D., & Sons Co.
Davis-Colby Ore Roaster Co.
Ore Testing Works
Hunt, F. F.
Ledoux & Co.
Montana Ore Purchasing Co.
Packing and Pipe Coverings
Brandt, Randolph.
Jenkins Bros.
Hine & Robertson.
Corrosive Metals
Aitchison, R., Perf. Metal Co.
Fraser & Chalmers.
Harrington & King Perforating Co.
Peroxide of Sodium.
Roessler & Hasslacher Chemical Co.
Phosphor-Bronze
Phosphor-Bronze Smelting Co.
Pile Drivers
Bucyrus Steam Shovel and Dredge Co.
Ingersoll-Sergeant Drill Co.
Pipes
Pollock, Wm. B., & Co.
Saker & Co.
Johnson, Matthey & Co.
Powder
Atlantic Dynamite Co.
Aqua Powder Co.
Ingersoll-Sergeant Drill Co.
Pressure Blowers
Connersville Blower Co.
Pressure Regulators
D'Este & Seeley, (Curtis).
Purifications
American Fertilizer.
Arms & Explosives.
Australian Mfg. Stand.
Bullionist.
Bullery Guardian.
Denver Republican.
Economic Mining.
El Minero Mexicano.
Electric Plant & Electrical Industry
Hooker Steam Pump Works.
Jeansville Iron Wks.
Stillwell-Bierce & Smith-Valle Co.
Pumps
Blake, Geo. F., Mfg. Co.
Cameron, A. S., steam Pump Works.
Denver Eng. Wks. Co.

Fraser & Chalmers.
Tod, Wm., & Co.
Goulds Mfg. Co.
Worthington, Henry
Quarrying Machines
Bostonman, L. F.
Ingersoll-Sergeant Drill Co.
Rand Drill Co.
Sullivan Machinery Co.
Quicksilver
Eureka Co.
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Denver & Rio Grande R. R.
Denver, Leadville & Gunnison Ry.
Florence & Cripple Creek R. R.
Midland R. R. of Kentucky.
Rio Grande Southern R. R.
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D'Este & Seeley, (Curtis).
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Orford Copper Co.
Bullock, M. C., Mfg. Co.
Penn. Salt Mfg. Co.
Bridgeport Copper Co.
Penn. Smelting and Refining Works.
Elliott's Metal Co., Ltd.
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Phosphor-Bronze Smelting Co.
Mathison Smelting Co.
Smelt. Co.
State Ore Sampling Co.
W. A. & R. N. Swenson Mfg. Co.
Steam Traps.
D'Este & Seeley, (Curtis).
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Chester Steel Cast. Co.
Chestnut Steel Cast. Co.
Crandall & Huff.
Crescent Steel Co.
Gibson, A. F., & Sons Co.
Moore, B. L., & Sons Co.
Pierce & Miller Eng'g.
Robinson & Orr.
(See Metal Dealers).
Pollock, Wm. L. & Co.
Scaife, Wm. B., & Son.
Taylor Iron & Steel Co.
Jesseop Wm. & Sons Ltd.
Walker Mfg. Co.
Williams Mfg. Co.
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Okonite Co., Ltd., The.
Temperature Regulators
D'Este & Seeley, (Curtis).
Testing Laboratories
Fairbanks Co.
Teels
Besley, Chas. H., & Co.
Pratt & Whitney Co.
Tubes
Besley, Chas. H., & Co.
Pollock, Wm. L. & Co.
Williams Bros.
Tubing-Rubber
New York Belting and Packing Co., Ltd.
Turbine Water-Wheels
Stillwell-Bierce & Smith-Valle Co.
Typewriters.
Wyckoff, Beasman & Benedict.
Valves
D'Este & Seeley Co.
Fairbanks Co.
Eddy Valve Co.
Jenkins Bros.
Ventilators
Bullock, M. C., Mfg. Co.
Tod, Wm., & Co.
Fraser & Chalmers.
Vulcanite Emery Wheels
New York Belting and Packing Co., Ltd.
Water-Wheels
Girard Water Wheel Co.
Lefel, James, & Co.
Stillwell-Bierce & Smith-Valle Co.
Well Drilling Machinery
Bostonman, L. F.
Sullivan Machinery Co.
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Chester Steel Cast. Co.
Sneflint & Co.
Taylor Iron & Steel Co.
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Wire Cloth
Aitchison, R., Perf. Metal Co.
Barnum, E. T.
Harrington & King Perforating Co.
Wire Rope & Wire
Besley, Chas. H., & Co.
Hunt, C. W., Co.
Broderick & Bascom.
Lescene, A., & Sons
Rope Co.
Rope Co.
California Wire Wks.
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R. B. & Co.
Carpenter, G. B., & Co.
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Carpenter Steel Co.
Ropeways Syndicate.
Channon, H. Co.
Trenton Iron Co.
Cooper Hewitt & Co.
Wire Rope Tramway
Brown Hoist. & Conv.
Hunt, C. W., Co.
Mach. Co.
Roebing, J. A., Son & Co.
California Wire Wks.
Colorado Iron Works.
Ropeways Synd., Lt.
Denver Eng. Wks. Co.
Fraser & Chalmers.
Vulcan Iron Works.

advertising out in the wrong direction—missed the Engineering and Mining Journal.

POSITIONS VACANT.

FREE ADVERTISING

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

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

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

1447--WANTED--FOR A GOLD MINE in Georgia, competent assistant foreman; also nine miners experienced in the use of power drills as head men; chance for family without children to take charge of boarding house for 40 men; references required; state wages expected for steady work. Address GOLD STAR, ENGINEERING AND MINING JOURNAL.

1448 WANTED.—A CHEMIST WELL UP the manufacture and analysis of salts. State age, experience and salary expected. Address SODIUM, ENGINEERING AND MINING JOURNAL.

1449 WANTED—ASSAYER AND CHEMIST at gold mine using cyanide process. Have references and experience. Address C. N., ENGINEERING AND MINING JOURNAL.

1450 CHEMIST WANTED FOR A VIRGINIA Furnace Works. Must work very accurate and be able to give proof of his ability. A good position for a good man. Address E. J. S., ENGINEERING AND MINING JOURNAL.

1451 WANTED — A REVERBERATORY furnace foreman, one who understands the Welsh methods of copper smelting and refining to go to the West. Address COPPER BOTTOMS, ENGINEERING AND MINING JOURNAL.

1452 WANTED — AN ACTIVE, AMBITIOUS, young Mining Engineer to act as Assistant in California, British Columbia, and perhaps South Africa. Good recommendations required. Address ACTIVE, ENGINEERING AND MINING JOURNAL.

1453 WANTED A COMPETENT MAN TO take charge of sulphuric, nitric and muriatic acid departments; state age and experience. Address MODERN, ENGINEERING AND MINING JOURNAL.

SITUATIONS WANTED.

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

MINING AND MECHANICAL ENGINEER, who has made a specialty of the construction and operation of cyanide and chlorination mills, thoroughly familiar with best modern practice, will accept position as superintendent of works, or with large mining machinery manufacturers, where such knowledge will be of advantage, can bring full line of plans and details. First-class references. Address C. and C., 206 Boston Building, Denver, Colo. No. 17,382, April 18.

MINING ENGINEER—GRADUATED FROM Columbia School of Mines, would like position of assistant superintendent, in charge of mines or reduction works. Address L. H. B., ENGINEERING AND MINING JOURNAL. No. 17,377, April 18.

MINING ENGINEER (AGE 25) DESIRES engagement as assistant manager, chemist, assayer, or other suitable employment with mine or smelter after May 1st. Expert accountant. Address P., ENGINEERING AND MINING JOURNAL. No. 17,385, April 25.

CHEMICAL ENGINEER AND MANAGER, American, with long and successful experience above with large manufacturing concerns, will shortly be disengaged. Is a technical graduate and has an excellent record as a pushing organizer, developer and manager of manufacturing processes. Good executive and mechanical ability. Excellent references. Address A. X., ENGINEERING AND MINING JOURNAL. No. 17,349, May 2.

COMPETENT ASSAYER DESIRES SITUATION, Graduate Missouri School of Mines, '87. Can take charge of sampling works or assist mine manager. Address O. L., Denver office ENGINEERING AND MINING JOURNAL, 206 Boston Building, Denver, Colo. No. 17,386, April 25.

EXPERIENCED COPPER METALLURGIST is open for engagement. Economic manager, and well-versed in all latest improvements. Speaks Spanish fluently and would go to Mexico. Best references. Address COBRE, ENGINEERING AND MINING JOURNAL. No. 17,380, April 18.

WANTED.—POSITION AS MANAGER OF gold mine or assayer. British Columbia preferred. Best of references. Address H. K. WALTON, Box 47, Central City, Colo. No. 17,384, April 18.

A COMPETENT SUPERINTENDENT OF fertilizer and acid works, desiring a change of location, would like to correspond with some manufacturer wanting such service. Best references. Address PHOSPHATE, ENGINEERING AND MINING JOURNAL. No. 17,390, May 2.

A COMPETENT ASSAYER AND CHEMIST of high grade technical school desires a position in a steel furnace or mine laboratory. Best of references and recommendations can be furnished. Has had practical experience. Address M. M. S., ENGINEERING AND MINING JOURNAL. No. 7,391, April 25.

METALLURGIST AND MINING ENGINEER open for engagement. Specialties, successful operation of mines and metallurgical plants, development of properties, erection of plants and management for dividends. Address MODERN METHODS, ENGINEERING AND MINING JOURNAL. No. 17,392, April 18.

POSITION WANTED AS ASSAYER AND ASSISTANT by young graduate who is at present employed in Colorado gold mine. Considerable practical experience, and has studied abroad. Can survey, keep books and is familiar with cyanide process. Speaks French and some Spanish. Best of references. Address I. S., ENGINEERING AND MINING JOURNAL. No. 17,383, May 2.

CHEMIST AND ENGINEER (C. E. YALE, 1891), experience in field and office, taken degree Ph. D. in chemistry this June, wishes permanent location. Best references as to ability and energy. Address B. W. McF., 420 Temple Street, New Haven, Conn. No. 17,39, May 2.

Contracts Open.

NOTICE TO CONTRACTORS.

THE ENGLEWOOD SEWERAGE COMPANY OF ENGLEWOOD, N. J., will receive Sealed Proposals until April 24th, 1896, for the construction of an outlet sewer, sixteen (16") inches in diameter.

About 1,000 linear feet to be of cast iron pipe and about 2,500 linear feet to be of stone ware pipe.

Plans may be examined and specifications obtained at the office of J. H. Serviss, C. E., in Englewood, and specifications may be obtained from the undersigned at 195 Broadway, New York.

Proposals should be endorsed "Proposal for Outlet Sewer."

The Company reserves the right to reject all bids. THE ENGLEWOOD SEWERAGE CO., by R. H. ROCHESER, President.

April 6, 1896.

PROPOSALS FOR TUNNEL.

The Iron Mountain Company will receive bids for the building or running tunnel at their mine in Missoula County, Montana, up to May 10th, 1896, dimension 6 by 7 ft., length 5,600 ft., specification and condition will be furnished upon application at the office of the equired company at Helena, Montana.

R. S. HALE, President.

TREASURY DEPARTMENT, Office, Supervising Architect, Washington, D. C., April 3d, 1896.—Sealed proposals will be received at this office until 2 o'clock, p. m., on the first day of May, 1896, and opened immediately thereafter, for all the labor and materials required for the interior finish of the U. S. Court House, Post Office and Custom House at Sioux City, Ia., in accordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Sioux City, Ia. Each bid must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any or all bids, and to waive any defect or informality in any bid should it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposal for the Interior Finish of the U. S. Court House, Post Office and Custom House at Sioux City, Ia.," and addressed to WM. MARTIN AIKEN, Supervising Architect. Orig.

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., April 11th, 1896.—Sealed proposals will be received at this office until 2 o'clock, p. m., on the 7th day of May, 1896, and opened immediately thereafter, for all the labor and materials and fixing in place complete the low pressure, return circulation, steam heating and ventilating apparatus required for the United States Post Office building at Fort Worth, Texas, in accordance with the drawings and specification, copies of which may be had at this office or the office of the Superintendent at Fort Worth, Texas. Each bid must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid, should it be deemed in the interest of the Government to do so. All proposals received after the time stated for opening will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposal for the Heating and Ventilating Apparatus, etc., for the United States Post Office building at Fort Worth, Tex.," and addressed to WM. MARTIN AIKEN, Supervising Architect. Orig.

BRIDGE.—Bids will be received at my office, in Hawkinsville, Ga., until the 6th day of May, 1896, for furnishing material and placing iron or steel viaducts to west side approaches to river bridge, at Hawkinsville, in lieu of present wooden structure. Total length of said approaches is about four hundred (400) feet. Bids are asked on two hundred (200) feet of same, with privilege of whole length. The right to reject any or all bids is reserved. For further particulars address me at Hawkinsville, Ga. P. T. McGRUFF, Ordinary, Pulaski County, Ga.

NOTICE TO CONTRACTORS—City of Boston, Boston Transit Commission.—Sealed bids for building Section 6 of the subway in Tremont street, from Park street to Scollay square, in accordance with the form of contract and specifications to be furnished by the Commission, will be received at its office, 20 Beacon street, Boston, Mass., until 12 o'clock M., of Thursday, May 7, 1896. The section is in a crowded street in the heart of the city, street railway tracks traverse it lengthwise and there are numerous important buildings on each side. It is intended that most of the work shall be done by tunneling, and little of the surface can be occupied during the day. The section is approximately 1,355 ft. long. The subway from Scollay square to Hamilton place, a distance of about 1,035 ft., will consist of masonry side walls and a masonry arch springing therefrom, spanning two tracks. From thence to the junction with the work already built in front of Park street church, there will be two single-track subways, of construction similar to that of the two-track portion—each being about 50 ft. long. The inner dimensions of these subways will be approximately as follows: Two track, 28 ft. in height from invert, 23-ft. span; easierly single track, 16 ft. in height from invert and 13-ft. span; westerly single track, 16 ft. in height from invert and 15 ft. span. The depth from the surface of the street to the bottom of the subway is approximately from 2 to 35 ft. Some other items are estimated to be as follows: 28,000 cu. yds. of earth excavation; 125 tons iron and steel, furnished by the commission, to be set in place; 10,800 cu. yds. concrete and brick masonry.

Plans can be seen and specifications and forms of contract can be obtained at 21 Beacon street, fifth floor. A bond will be required for the faithful performance of the contract in a sum of 20 per cent. of the amount. The commission reserves the right to reject any and all bids. GEORGE G. CROCKER, Chairman; CHARLES H. DALTON, THOMAS J. GARGAN, GEORGE F. SWAI, ALBERT C. BURRAGE, Boston Transit Commission; HOWARD A. CAPSON, Chief Engineer; R. LEIGHTON BEAL, Secretary.

WATER-WORKS.—Sealed proposals will be received by the Mayor and City Council of Eufaula, Ala., until April 23d, 1896, for constructing a system of water works, and for furnishing the materials for the same. Works will embrace approximately 10 1/2 miles of pipe, stand-pipe, and other appurtenances. Plans and specifications will be on file, and may be seen at the office of the City Clerk, and copies of specifications, forms, etc., may be obtained from the City Clerk after March 20th, 1896.

PIPE SEWERS.—Sealed proposals will be received by the Mayor and City Council of Eufaula, Ala., until April 23, 1896, for constructing pipe sewers and for furnishing sewer pipe (separate bids). Extent of proposed work is 7 1/2 miles of pipe sewers from six (6) to eighteen (18) inch in diameter. Plans and specifications will be on file at the office of the City Clerk, and copies of specifications, forms, etc., may be obtained from the City Clerk, after March 20, 1896.

PUMPING ENGINE.—Office Board of Trustees of Water-Works, Sandusky, O.—Sealed proposals will be received at the office of this Board, in the city of Sandusky, O., until the 1st day of May, 1896, for remodeling a 3,000-gal. pumping engine now in the pumping station of the water-works of said city, according to specifications therefor, which are on file in the office of said Board. All proposals must be on blanks which may be obtained at the office of the said Board. Each bid must be accompanied by a certified check, drawn to the order of the Secretary of said Water-Works, in the sum of \$30, as security that if the bid is accepted a contract will be entered into. The right is reserved to reject any or all bids. P. J. CROSEN, President; ADAM KOLB, O. DEHNEL, Trustees; C. A. JUDSON, Superintendent.

THE ENGINEERING AND MINING JOURNAL

ADVERTISING RATES. (NONPAREIL MEASUREMENT.)

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GOLD MINES FOR SALE.

WE have some splendid propositions for you on dividend paying gold mines in Cripple Creek and Gilpin County districts. Investigate.

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For full particulars address
CHARLES D. POSTON, Phoenix, Arizona.

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One 9 x 14 cylinder Porter Locomotive, with saddle tank, six 28-in. drivers, coal burner, 38-in. gauge, steam brake; weight 11½ tons. Immediate delivery in Western Pennsylvania.

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Also a small car of light T Rails for relaying.

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One 5-foot Combination Grinding Amalgamating Pan and 3 ft. Settler complete with countershafts, pulleys, gears, bolts, collars, pillow blocks and 194 feet 10-inch 4-ply belting, Frazer & Chrysler make. Used less than 60 hours. Rock Crusher. Address J. A. C., 815 Lumber Exchange, Minneapolis, Minn.

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Owing to death of proprietor, **LABORATORY** having an established reputation.

For further particulars address
JOHN H. WESTENHOFF,

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FOR SALE.

Horizontal Tubular Boilers, with full fronts and castings: 1, 48 x 14, 1 42 x 16, 1 42 x 12, 1 36 x 12. One 8 x 12 and one 10 x 12 slide valve engines. One 5¼ x 7 upright engine. Worthington Pumps: 1 7¼ x 8½ x 6, 1 5¼ x 3¼ x 5, 1 12 x 7 x 10, 1 10 x 7 x 10, 1 12 x 8½ x 10, 1 10 x 16 x 8½ x 10, 1 8 x 7½ x 6. 1 Miller Elevator Engine. Tanks of all sizes. Pipe, Fittings and Valves. All above second hand, but in A1 condition.
THE JOHN DAVIS CO.,
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THE MUTUAL LIFE INSURANCE CO. OF NEW YORK.

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Insures every approved description of **Life and Endowment Policies** on terms as favorable as those of any other company.
Cash Assets, \$204,638,783.96.

Auction of Wallace & Sons' Copper and Brass Rolling Mills, Etc., at Ansonia, Conn.

To close a Trust, the real estate, buildings, machinery, plant, tools, material and shares of stock of **WALLACE & SONS**, will be sold by auction at their office in Ansonia, at noon on Thursday, May 14th, 1896, unless previously disposed of at private sale.

The property includes Brass and Copper Wire Mills, Brass and Copper Rolling Mills, Casting Shop, Lamp and Burner Shops, Pin, Rivet and Chain Machinery, with auxiliary Shops and Buildings, and all now running.

The property also embraces: 1 double tenement, 2-story and extension, on Pleasant St.; 1 double tenement, 2-story, on Fourth St., all at Ansonia; about 74 acres woodland in Newton; about 61½ acres woodland in Ansonia; about 12 acres woodland in Seymour. Also the following shares of stock, viz.: 8,000 shares Parrot Silver & Copper Co. stock; 240 shares American Fish Hook Co. stock

The manufacturing plant and land and buildings connected with it will be sold in one lot, if started at a bid to be fixed at the sale, which will be less than one-half the value recently appraised by Messrs. Brooker and Plume. Otherwise in lots as per Catalogue.

TERMS: 10 per cent. cash or acceptable cheques at sale and remainder upon delivery of deeds within 30 days. Possession to be retained until delivery of deeds and as much longer as may be necessary to complete existing contracts, if purchaser at the sale does not elect to assume them.

Catalogues of the property in detail may be had by addressing Wallace & Sons, 29 Chambers St., New York.

The Trustees reserve the right to sell all or any part of the property at private sale before the auction.
ROBERT M. THOMPSON,
HENRY E. JACOB,
ROBERT T. PAINE, 2d, Trustees.

DIVIDENDS.

GOLD COIN MINES COMPANY,
Central City, Gilpin County, Colorado.
(Office 44 Pine Street.)

NEW YORK, April 10, 1896.
A dividend of **ONE AND ONE-HALF PER CENT.** has this day been declared upon the capital stock of this company, payable at its office, No. 44 Pine Street, New York, on April 30th, 1896, to the stockholders of record of April 20th, 1896. Transfer books will be closed on the 20th inst. and reopened May 1.
D. C. CHOATE, Secretary.

HOMESTAKE MINING COMPANY,

MILLS BUILDING, 15 Broad Street,
NEW YORK, April 15, 1896
DIVIDEND NO. 213
The regular monthly dividend, **TWENTY-FIVE (25) CENTS PER SHARE**, has been declared for March, payable at the office of the company, San Francisco, or at the transfer agency in New York, on the 25th inst. Transfer books close on the 20th inst.
LOUNSBERY & CO., Transfer Agents.

SABELLA GOLD MINING COMPANY,

COLORADO SPRINGS, COLO., April 15th, 1896.
DIVIDEND NO. 3.

A dividend of **ONE CENT** per share (\$22,500) has been declared, payable April 25th, 1896, to stockholders of record, April 17th, 1896.

The transfer books will be closed April 17th, 1896, at 3:00 p. m., and will be reopened on the morning of April 27th.

PERCY HAGERMAN, V.-P. and Treasurer.

ONTARIO SILVER MINING CO.,

MILLS BUILDING, 15 Broad St.,
NEW YORK, April 17th, 1896.
DIVIDEND NO. 201.

A dividend of **TEN (10) CENTS PER SHARE** has been declared payable at the office of the company, San Francisco, or at the transfer agency in New York, on the 30th inst.

Transfer books close on the 25th inst.

LOUNSBERY & CO., Transfer Agents.

CONTRACTS OPEN.

Continued from Page 18.

TREASURY DEPARTMENT, office Supervising Architect, Washington, D. C., April 9th, 1896—sealed proposals will be received at this office until 2 o'clock p. m. on the 5th day of May, 1896, and opened immediately thereafter, for all labor and material required for the roof covering, skylight, drain pipes, etc., for the U. S. Post Office, Court House and Custom House building at Milwaukee, Wis., in accordance with the drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Milwaukee, Wis. Each bid must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid, should it be deemed in the interest of the Government to do so. All proposals received after the time stated for opening will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked "Proposal for Roof Covering, Skylight, Drain Pipes, etc., for the U. S. Post Office, Court House and Custom House, Milwaukee, Wis.," and addressed to **WM. MARTIN AITKIN,** Supervising Architect, Orig.

Received Too Late for Classification.

A GRADUATE IN MINING, FROM A leading technical school, desires a position as assistant with a reliable mining or smelting company. Can do all kinds of chemical and engineering work required. Address **S. J. GORMLY,** Socorro, N. Mex. No. 17,396, April 18.

MISCELLANEOUS WANTS.

CHIEF ENGINEER OF LARGE EXPERIENCE in water conservation and irrigation works required to proceed abroad to report on a comprehensive system of works of the above nature. Apply by letter to **FOWLER & BAKER,** 2 Queen Square Place, Westminster, S. W., London, Eng.

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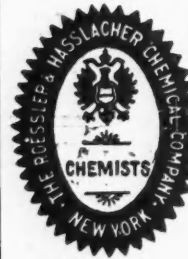
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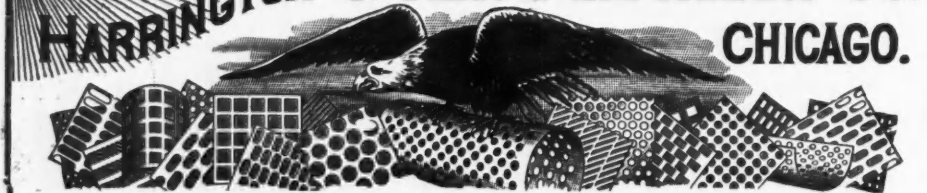
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