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THE DIRECTORS of the Amalgamated Copper Company held their postponed meeting on April 17, and declared a dividend of $\frac{1}{2}$ of one per cent on the stock for the first quarter of 1902; which compares with 1 per cent for the fourth quarter of 1901; $1\frac{1}{2}$ per cent for the third quarter, and 2 per cent for each quarterly period from the formation of the company in 1899 up to the end of June, 1901. That any dividend would be declared at all had been doubted; and it is really hard for an outsider to see on what the payment is based. Investors in this company must take what they get, however; for it would be hard to devise a more complete blind pool than the Amalgamated.



THE MINERAL production of Colorado in 1901, as given by Mr. H. A. Lee, the State Commissioner of Mines, on another page, shows that there was some falling off in the output of gold, silver and lead, as compared with the record made in 1900. To the causes for these changes we have heretofore referred. There was, however, some gain in copper, and large increases in iron and coal; while the sale of zinc ores continued to afford an outlet for a product which was formerly considered of little value. The total showing is a good one, and indicates that no serious reduction in Colorado's great mineral output is to be anticipated.



THE PASSING of the mine mule is gradual, but seems to be steadily progressing. At frequent intervals we have to record the substitution of mechanical power for the mule, whose use in coal mining was once almost universal. The latest instance we find in the report of the Consolidation Coal Company for 1901, in which mention is made of the introduction of compressed air locomotives in the Hoffman Mine in the Cumberland District. Two of these machines, which were put at work last year, have proved so successful that the company has decided to add more of them to its equipment, and to use them for all haulage in the mine.



SOME OF OUR Sudbury correspondents take exception to the statement made in the article in our last issue on the Nickel Combination, in which we said that there are other areas or deposits of nickel ore in that district besides those already controlled by the combination and by other companies operating there. They claim that these areas are in fact much larger than those already controlled and operated by the different companies, and that there is every opportunity for the organization of a new company which might become a very large producer if based upon those lines. Possibly our statement was somewhat too guarded; we are aware that the areas claimed to be nickel bearing outside of those already worked at Sudbury are very large, but it must be remembered that the value of much of this property has not yet been ascertained. The only work done has been surface prospecting and it is not too safe to assume their value from such indications as have been already found. We will admit, however, that there are opportunities presented in Ontario for any enterprising concern which may wish to enter into competition with the Nickel Trust, and we hope that some of these, at any rate, may be developed into mines before long, to the profit of their owners and the district.

SOME RECENT discouraging reports regarding Stratton's Independence Mine, followed by a passing of the regular dividend by the Portland Company, have given rise to rumors as to the general stability of Cripple Creek veins that do not seem to be justified by actual conditions. Already the public has received their warning that, owing to its location on the outer rim of the main eruptive area, the Independence might look for a depletion of values to the south, and a general trend of the ore-shoot toward the north lessened the likelihood of a continuance of values with perpendicular depth in the main shaft. In a word, the ore does not exist to the south of the main shaft in any promising quantity, and its decrease with depth in the main workings was due to logical causes.

In striking contrast to the Independence, but as a renewed evidence of the traditional sensitiveness of capital, is the anxiety occasioned by the passing of the dividend by the Portland Company. This act on the part of the directors appears to be founded on sensible and conservative business reasons. The new mill, the final cost of which will be in the neighborhood of \$700,000, will demand for its final payment during the next three months, at least one-half this sum, and furthermore, by the treatment of its own ores a large monthly saving is counted on, and for these reasons, and these alone, a large reserve is considered desirable and a decrease in output both wise and commendable.



THE CESSATION of work on the Newhouse Tunnel at Idaho Springs, Colorado, a description of which is given in another column, has given rise to many conjectures as to the cause of its abandonment. At present the only reason apparent is the failure of mines on the line of the tunnel to enter into satisfactory drainage and transportation contracts, and it is believed that when they learn that the tunnel management is in earnest, a better understanding will be effected.

It cannot be denied that the abandonment of the tunnel at its present stage would be disastrous to many interests, and it is hoped that a sober second thought will result in active co-operation, and a continuance of the work now so well in hand. At the present time the tunnel has penetrated the mountain over 13,000 feet, and its objective point is about as much farther.

Of the numerous veins encountered only those of the Sun & Moon, the Gem and the Bertha are being worked through the tunnel, and the greatest and most promising veins are still beyond. These include the Saratoga, in Russel Gulch, and the California, at Nevadaville.

During last month the tunnel made its greatest record of 285 feet, or over 9 feet a day, representing the removal daily of 729 cubic feet, or about 60 tons of hard rock. It is estimated that the cost of the tunnel up to the present time has been over \$500,000.



COPPER PRODUCTION in the United States, as reported by Mr. John Stanton, who acts as statistician for the companies, showed a decided gain in March, the total of 24,035 long tons for the month being 3,704 tons greater than in February, and 651 tons more than in March, 1901. Only 300 tons of the increase in February was from the outside sources,

and the statement indicates that the reporting mines—including all the important mines in the country—are not restricting their production. For the quarter ending March 31, the total output—63,321 long tons—was less than that of last year by 3,482 tons, or 5.7 per cent, owing to the large decreases shown in January and February. The foreign reporting mines, on the other hand, showed an increase for the quarter of 3,762 tons, showing that the principal European mines are forcing rather than curtailing their output.

The remarkable feature of the statement is found in the exports from the United States, which were 20,097 tons in March and for the quarter 51,232 tons, or considerably more than twice those of the first quarter of 1901, when the total was only 23,274 tons. Last year the copper exports were only 34.7 per cent of the production, while this year they were 80.9 per cent. Comment on these exports is difficult, however, since it is impossible to tell what proportion of the metal was shipped to meet sales and contracts, or how much was sent abroad for speculative purposes and to affect the statistics and the market.



THE REPORT of the Tamarack Mining Company for 1901 does not make any better showing than that of the Osceola, upon which we recently commented. The company turned out last year 18,000,052 pounds of copper, which cost it—including construction, which is fairly chargeable to expenses—11.67 cents per pound. The percentage of copper in the rock mined and stamped has fallen below that of previous years, and the recovery last year was only 1.435 per cent, or 28.7 pounds to the ton. With the mine management there is no reason to find fault, and it is to be noted that there was a substantial decrease in milling costs last year.

The financial statement is the part of the report which the stockholders will be likely to criticise. The Tamarack—under the same management as the Osceola—followed the same policy in disposing of its copper, with the result that the average price realized was only 14.22 cents per pound, or from 1.5 to 2 cents less than that obtained by the independent companies. The consequence was that the net earnings of the company were only \$526,166, or a little more than \$8 per share—34.8 per cent—on the stock. Notwithstanding this the company paid \$20 a share—80 per cent—coming out with a deficit of \$673,834 at the end of the year. As usual, stockholders had no warning of such a showing, but accepted the dividends as earned.

It looks very much as if there would be things said at the approaching annual meeting; and the protesting stockholders will probably be better prepared than were those of the Osceola at their meeting.



GOLD PRODUCTION IN RUSSIA.

The gold production of Russia during the year 1901, as reported by the official *Gazette* of the Russian Government, was greater than that of the preceding year. The total amount delivered to the Imperial Mints at Irkutsk, Tomsk and Ekaterinburg during the year was 2,361 poods of smelted gold. Of this 1,280 poods came from Eastern Siberia, 359 poods from Western Siberia, 540 poods from the Ural, 142 poods from the private lands of the Czar, and 39 poods were delivered by the Russo-Chinese bank as received from prospectors. The mint value of gold in Russia is 5.05 roubles per zolotnik, which would be equivalent to gold about 916 fine. The total value of this gold was, reduced to fine gold and in American currency, \$23,556,131. In Russia the law requires

that all gold mined shall be delivered to the Imperial mints, and in estimating the production it is customary to add an allowance of at least 10 per cent for gold not so delivered, but concealed or carried out of the country in other ways. Some good authorities consider this allowance too low and intimate that it should be more nearly 15 than 10 per cent; but we have adopted the lower figures as the more conservative. Making this allowance, we find that the total production of gold in Russia in 1901 was 38,992 kilograms—1,253,592 ounces, or \$25,911,744.

In 1900 the total reported was \$23,090,862, showing an increase last year of \$2,820,882. This production places Russia very close to Canada, and leaves the third place among the world's gold producers in 1901 somewhat doubtful.

In estimating this production it is necessary to take the mint receipts, as they are the only available returns. These receipts, however, may not represent the actual production of the year since convoys of gold from the placer mines in the Trans-Baikal or in the Lena Region may not reach the mint at Irkutsk for several months after the gold was actually won. In taking several successive years, however, this would make no difference in the actual totals or in the average for the different years, though it might make a difference in two successive years. The largest increase in 1901 came from Eastern Siberia, in spite of the disturbed condition of affairs in the Amoor country. In the early part of the year little or nothing was done, in consequence of the Chinese troubles, in the placer mines on the South side of the Amoor and on the tributaries of that river coming from Manchuria. Whatever gold was obtained from this source very probably found its way to the Russian mints along with the Siberian gold.



STEEL PRODUCTION IN 1901.

The American Iron and Steel Association has now completed and published the figures for the production of open-hearth steel in the United States during 1901, which shows that the output has more than doubled in four years. The total figures were given in our iron market column last week. To go into further details, the following table gives the production of open-hearth steel ingots and castings, by States, since 1898:

States.	1898.	1899.	1900.	1901.
New England	47,381	57,124	74,522	170,876
N. Y. and N. J.	47,957	61,461	67,361	82,985
Pennsylvania	1,817,521	2,393,811	2,699,502	3,594,763
Ohio	79,886	117,458	130,191	184,943
Illinois	183,103	246,183	285,551	398,522
Other States	54,444	71,279	141,008	224,220
Total	2,230,292	2,947,316	3,398,135	4,656,309

In 1900 our open-hearth steel production for the first time exceeded that of Great Britain, which then amounted to 3,156,050 tons. Great Britain's production in 1900 was the largest in her history. Our open-hearth steel made in 1901 was produced by 90 works in 14 States—Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Tennessee, Alabama, Ohio, Indiana, Illinois, Wisconsin, and Missouri.

In 1900 the production of open-hearth steel by the basic process amounted to 2,545,091 tons, and by the acid process to 853,044 tons. In 1901 3,618,993 tons were made by the basic process and 1,037,316 tons were made by the acid process, as follows, by States:

States.	Basic open-hearth steel.	Acid open-hearth steel.	Total Gross tons.
New England	87,529	83,347	170,876
N. Y. and N. J.	46,805	36,180	82,985
Pennsylvania	2,840,230	754,533	3,594,763
Ohio	120,146	64,797	184,943
Illinois	353,395	45,127	398,522
Other States	170,888	53,332	224,220
Total	3,618,993	1,037,316	4,656,309

Included in the above figures, besides ingots, are castings made direct from the furnace. The total

production of such castings in 1901 amounted to 301,622 gross tons, of which 94,941 tons were made by the basic process and 206,681 tons were made by the acid process. In 1900 the production of open-hearth steel castings amounted to 177,491 tons, of which 42,644 tons were made by the basic process and 134,847 tons by the acid process.

The output of bessemer steel has already been given; and the following table shows the total production of steel in the United States for two years past:

	—1900—		—1901—		Changes.
	Tons	Per cent.	Tons	Per cent.	Tons.
Bessemer (converter)	6,684,770	66.3	8,713,302	65.2	I. 2,028,532
Open-hearth acid	753,044	8.5	1,037,316	7.6	I. 184,272
Open-hearth basic	2,545,091	25.2	3,618,993	27.1	I. 1,073,902
Total open-hearth	3,398,135	33.7	4,656,309	34.8	I. 1,258,174
Total	10,082,905	100.0	13,369,611	100.0	I. 3,286,706

The increase in bessemer steel was 30.3 per cent; in the acid open-hearth, 21.6 per cent; in the basic, 42.2 per cent; in the total open-hearth, 37.0 per cent; and in the total steel output 32.6 per cent. The proportion of basic steel to the total open-hearth production was 77.7 per cent in 1901, against 74.9 per cent in 1900.

To this production must be added that of crucible and special steels, which is, however, comparatively small. In 1900 it was 131,250 tons; for 1901 the total has not been reported, but was probably somewhat greater than in the previous year. Putting it at 150,000 tons, our total output of steels of all kinds in 1901 was 13,519,611 tons, against 10,133,155 tons in 1900.

The production in 1901 was not only the greatest ever made in the United States; it was by far the largest ever made in any country in the world, and was nearly as great as that of Great Britain and Germany combined. It shows once more the increasing tendency to replace wrought iron by steel, to substitute the converter for the puddling furnace; and also to use steel, either as castings or in other forms, where cast iron was formerly considered good enough. This is shown not only in heavier mechanical constructions—as locomotives, steam engines and the like—but in smaller matters, as in the hardware trade, where we find many articles which used to be made of malleable iron, now punched on die-formed from sheet steel.

The statement also shows that the open-hearth process is gaining steadily on the converter; and that this gain is wholly in basic steel. The advance in the basic process will become still more marked as the Southern iron-makers follow in the track marked out at Birmingham, and realize that there is more profit in marketing their produce as finished steel than as raw foundry pig. The basic process is growing fast, and will continue to grow as the supply of bessemer ores becomes more restricted.



WHAT IS THE APEX-RIGHT WORTH?

In recent articles I have shown how it came to pass that the right of a mine-locator to follow his run in depth, without regard to the ownership of the surface overlying it, came to exist in a certain part of this country. Something should be added to that historical exposition, namely, the fact that this right, as it originated among the miners before 1866, and was recognized by the United States statute of that year, differed in an important respect from the "apex-right" of the statute of 1872. It was, indeed, because of this difference, that, in my paper on the subject* read October, 1883, at Troy, N. Y., before the American Institute of Mining Engineers, I called this latter statute "The Law of the Apex," a name which

*Transactions, Vol. XII, p. 387.

has stuck to it ever since, and which was intended to distinguish it, not from the ordinary, immemorial, world-wide and convenient "square location," but from the preceding United States law, which, with equal disregard of surface-ownership, granted a mining right to unlimited distance on the dip of a vein, but did not require as a condition thereof the possession of an "apex" within any given boundaries. The discoverer of a vein at any one point acquired a right to a certain number of feet of its horizontal length, together with the right to mine it to any depth within that distance. Other locators upon the same vein, outside of his claim, acquired for the portions they located, similar rights, in the chronological order of their recorded locations. Neither the original discoverer nor any subsequent locator was required to find the "apex," still less to lay out a surface-tract enclosing it. The discovery might have been made on the side of a mountain, by digging into the hanging-wall of a vein which, continuing upward, had its "apex" far above, somewhere under the snow or the heaps of frost-cracked rock-fragments of the "divide." That made no difference. Whoever found a vein, whether he "got it by the hair," or "had it on the hip," was entitled to the discoverer's mining right as his reward; and the rights of junior locators, subordinate only to his, were held with the same disregard of the "apex," course, dip or surface ownership.

This system, the product of peculiar circumstances and frontier conditions, would have been, perhaps, increasingly difficult to administer in connection with the growth of settled communities, the extension of land surveys, and the increased value of the surface for other and more permanent uses than mining. It is not, in my judgment, by any means certain that the result of letting the system alone would have been worse, on the whole, than that of attempting to reform it has proved to be. However, the attempt was made in the statute of 1872—"the law of the Apex"—which ignored the claim of the discoverer altogether, unless he had discovered the "apex," and had properly included it within the surface boundaries of a duly surveyed and staked location. The first locator of such a claim on the apex can oust a prior locator—even the original discoverer—who has not succeeded in covering the apex.

Curiously enough, this word "apex" was not in use among miners before 1872; it was not in the original draft of the Act of that year; nobody knows who introduced it. The main author of that Act, Senator Stewart, of Nevada, is said to have disclaimed any previous knowledge of it, attributing it to "some college-bred fellow or other on the committee," and declaring that, after the passage of the Act, he was overwhelmed with letters from his mining constituents, inquiring, with more or less picturesque epithets, "What is an apex, anyhow?" That he found it difficult to answer this question is not surprising. The complete answer has been long in coming—from any quarter. It is now thirty years since the law of the apex made its maleficent entry into Federal legislation, and, only a week ago, the United States Supreme Court was listening with solemn indecision to arguments in a case involving the question, not yet authoritatively settled, whether "apex" means the whole of the apex, or only a part of it!

If the old "law of the discovery" bred some confusion, it expressed at least a practicable and comprehensible principle. The substitution of the apex for the discovery produced chaos, without even the excuse of a principle. For the law of the apex not only gave to a locator the mining right upon a lode of which he might not have been the first discoverer, but also similar rights upon all other lodes, happening to "apex" within his location, though neither he nor anybody else had discovered them.

I propose now to inquire briefly what this apex-right, under the present United States law, is really worth, as compared with the ordinary fee at common law, under which all the world (except a few unlucky communities in our West) is mining with absolute certainty of title and total freedom from mining litigation.

So far as the United States Supreme Court has enabled us to make out, the holder of a United States mining patent, provided he has made no mistake in location, and has suffered no wreck through subsequent geological discoveries or new theories of vein-formation, possesses:

A. The ordinary common-law fee simple to the surface and everything under it, except as hereinafter stated.

B. As an addition, the ownership, under "apex-rights," of certain portions of all veins of which his surface location includes the apexes.

C. As a subtraction, he does not own, under his own surface-location, the portions of veins to which some other locator has acquired the "apex-rights" B.

To put the matter in smallest compass, using, to represent the three items just named, the letters at the head of the last three paragraphs, the rights granted by a United States mining patent are $A + B - C$; whereas, under the law as it exists in the greater part of this country and the whole of every other civilized country, this right (either of tenant or of owner) would be simply A.

Now, for a claim, say, 1,500 feet square, as in British Columbia, A is, as a general rule, greater than $A + B - C$, for the reason that C is, as a general rule, greater than B. In other words, the right to go on sinking and hunting for new bonanzas in depth is not so valuable as the right to crosscut at higher levels, in search of ore-bodies on parallel veins or zones. At present, this latter privilege is practically denied. An ore-body in a parallel zone usually has its apex in a location of its own, and belongs under C, to be subtracted from A. Yet the chance of finding such a body, at moderate depth, is, in the vast majority of cases, much greater than the chance of finding additional bonanzas by simply sinking on the dip of a vein which has already contained rich ore-bodies.

The latest theories of ore deposits emphasize this view. But, apart from theory, practical mining engineers noticed long ago the general tendency of our miners to spend much time and money in sinking, and relatively less in cross-cutting. For my part, I think our vicious law is partly to blame for this foolishness. Why should a miner cross-cut through a belt of country-rock, to find an ore-body of which some other fellow, claiming the "apex," can immediately deprive him, and to which, even if there be at the time no such other fellow, he can only establish a title by expensive and tedious determination and location of the apex? I believe that, consciously or unconsciously, under the influence of this consideration, many a mine manager has sunk both his shaft and his capital, rather than explore laterally under an uncertain warrant of title to that which he might find.

After nearly forty years of observation. I do not hesitate to say that I have known very few cases in which I would not have preferred, as an owner, the simple, clear, unattacked and unattackable right A to the obscure, variable, algebraic total $A + B - C$, to which a further term, expressed by a "big, big D," should be added, to represent the cost of finding out that C was more than B, anyhow.

And yet people who profess to know something about mining continue to stand up for their favorite, mystic, negative quantity, $B - C$. Such passionate affection for a balance on the wrong side is hard to understand.

R. W. RAYMOND.

NATIONAL ASSOCIATION OF MANUFACTURERS.

SPECIALLY REPORTED.

During the present week the seventh annual convention of the National Association of Manufacturers was held in the city of Indianapolis, Indiana. The opening meeting on April 15 was held in the Hall of Representatives in the State House, and was called to order by Mr. D. M. Parry of Indianapolis. The address of welcome for the State was made by Mr. W. H. Hart, State Auditor, in the absence from the city of Governor Durbin. The welcome on behalf of the city was extended by Mayor Chas. A. Bookwalter.

After the welcoming addresses and responses thereto were concluded, President Search read his annual report. In presenting his report, Mr. Search alluded to the declining export trade in American manufactured products, and urged upon the members of the association not to allow the present extraordinary demand at home to cause a neglect of foreign markets, lest in times of depression they would find these markets taken by others, and as a consequence have no export outlet for their surplus production. The report also makes a strong plea for reciprocal treaties with foreign countries.

With regard to the proposition to create a new Federal department, Mr. Search expressed gratification at the progress made towards the passage of a bill for the establishment of a department of commerce. Concerning the project for the construction of an Isthmian canal, the report of Mr. Search held that the people cared little which route was chosen, so long as some decisive action by Congress was attained.

The report protests against the eight-hour bill and the anti-injunction bill now before Congress, both of which, Mr. Search declares, gravely concern the interests of the manufacturers of the country and should not be allowed to become laws. The appointment of a permanent committee on Inter-State commerce law is recommended.

For the benefit of visitors to Indianapolis during the convention and for the purpose of illustrating the great mineral resources of the State, State Geologist Blatchley has prepared a fine exhibit which is installed in the post-office room of the House of Representatives. Among the many features of this exhibit is an excellent display of the three kinds of coal which have done so much to add to the material wealth of the State. These grades are bituminous, cannel and what is known as Indiana block coal. There is also shown a fine collection of samples of crude petroleum and the products obtained from it. Other interesting exhibits were made up of hydraulic and portland cement, in the manufacture of which Indiana stands near the head among all the States manufacturing this product. Grindstones from the Berea grit and oilstones from Orange County are arranged in an attractive manner, while the famous oolitic limestones and other building stones for which Indiana is well known are attractively displayed.

Indiana ranks first in the United States in the manufacture of glass products and specimens of glass sand as used in many of the works of the State show that the raw materials for this industry are at hand. Fire-brick, clays and clay products are also extensively exhibited.

The election for the offices of president and secretary for the ensuing year, which was held on Thursday, April 17, was sharply contested, and resulted as follows: President, D. M. Parry, Indianapolis; secretary, Edward H. Sanborn, Philadelphia. Mr. Carhart, of Detroit, Mich., was elected treasurer. They were all made unanimous.

Among those attending the convention were noticed the following gentlemen interested either directly or indirectly in mining or the manufacture of mining machinery and mining supplies:

Mr. J. A. Jeffrey, Jeffrey Mfg. Co., Columbus, O.; Mr. Wm. Townsley, Grasselli Chemical Co., Cleveland, O.; Mr. F. A. Huber, The Marion Steam Shovel Co., Marion, Ind.; Mr. Henry B. Lupton, Oliver Iron & Steel Co., Pittsburg, Pa.; Mr. Philitus W. Gates, Allis-Chalmers Co., Chicago, Ill.; Mr. James Powell, The William Powell Co., Cincinnati, O.; Mr. Theodore C. Search, Philadelphia, Pa.; Mr. Chas. A. Schieren, Chas. Schieren & Co., New York, N. Y.; Mr. W. T. Plummer, Main Belting Co., Philadelphia, Pa.; Mr. Oliver Williams, Bryden Horse Shoe Co., New York, N. Y.; Mr. Fred W. Snow, Ramapo Iron Works, New York, N. Y.; Mr. Coleman Sellers, Jr., Wm. Sellers & Co., Philadelphia, Pa.; Mr. Walter Wood, R. D. Wood & Co., Philadelphia, Pa.; Mr. W. J. Clark, W. J. Clark & Co., Salem, O.; Mr. Frank G. Bolles, Bullock Electric Mfg. Co., Cincinnati, O.; Mr. J. W. Porch, Lukens Iron & Steel Co., New Orleans, La.; Mr. E. H. Hall, Chicago Belting Co., Chicago, Ill.

**THE GEOLOGY OF THE GALIURO MOUNTAINS,
ARIZONA, AND OF THE GOLD-BEARING
LEDGE KNOWN AS GOLD MOUNTAIN.***

By WILLIAM P. BLAKE, Geologist of Arizona.

The attention of geologists and of the mining public is now directed to the geological structure of the Galiuro Mountains, Arizona, of which little has hitherto been known, by the recent discovery of the "gold mountain lode" in its midst. This discovery is another example of the service rendered to geology by the mining prospector, stimulated and aided by enterprising capitalists.

The Galiuro Mountain range occupies a nearly

tween the two uplifts of the Archæan granites, gneiss and schists of the Santa Catalinas and the Graham or Pinaleno Mountains. The peculiar and strongly marked vertical structure may be due to lateral pressure along the course of the break and not to lateral or original horizontal flowing.

In some places the rhyolites are finely lamillar and in others are coarsely orbicular with hollow cysts lined with quartz. Pitchstone and obsidian are also found.

The gold-bearing ledge forms a prominent outcrop standing out sharply above the general level of the adjoining rock, which also weathers into jagged outcrops. It conforms to the structure of the rhyolite

general gold-bearing character is thus established. When discovered by Jack Garden, gold had been traced by placer tests up the creek to this lode and he there found free gold upon the exposed surfaces of the ledge. Subsequent tests by blasting into the lode showed the gold to be present within it, in the substance of the rock. Specimens with free gold upon the surfaces can be had by breaking up the rock.

This gold-bearing lode is novel and unusual in its composition and structure. It differs from any gold-bearing lode I have seen and from any which has been described to my knowledge. While essentially siliceous, it does not have the character of a nor-

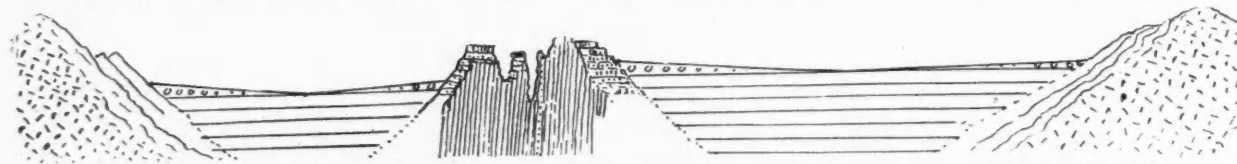


FIG. 1.—DIAGRAMMATIC CROSS-SECTION OF THE GALIURO MOUNTAINS AND THE BORDERING VALLEYS.

central position between the Santa Catalina Mountains on the west and the Graham Mountains on the east. The district is about 50 miles north of Willcox on the Southern Pacific.

The Catalina Range and the Graham Mountains each have a crystalline granitic axis flanked by Archæan gneiss. The Catalinas on the east side have an overlying mass of Arizonian mica schists with superimposed Palæozoic beds in which a Devonian horizon is identified. Palæozoic limestones and quartzites are found at the north end of the Graham Range, but have not yet been recognized upon the line of the accompanying cross-section of the ranges.

The Galiuro Range consists of ancient rhyolites, which I name the "Galiuro rhyolite." The planes of flow instead of being nearly horizontal as usual are vertical over a large area and have a nearly uniform north and northwesterly trend to which the direction of the range and its chief valleys conform.

Over a considerable part of the range the rhyolite crops out in jagged peaks. But this topography is greatly modified by a later fragmentary deposit which covers the rough ancient croppings and fills ancient valleys. There are also horizontal beds of highly crystalline lava and of volcanic tufas and breccias, remnants of which are found in table mountain summits and in detached eroded masses filling some of the ancient valleys in the vertical rhyolites, but now cut through by erosion. These fragmentary deposits consist of the broken up masses of the subjacent rhyolite. The lower beds are formed of large angular masses firmly cemented together, and are seen to advantage along the upper portions of Rattlesnake Creek.

A diagrammatic sketch geological cross-section appended, Fig. 1, will serve to show at a glance the general structure of the Galiuro Range and its relations to the two great valleys of the San Pedro or Quiburis, and the Sulphur Spring Valley. Both of these valleys appear to have been in the condition of lakes or marine estuaries in comparatively recent geological time, and to have been drained by continental elevation.† The deep lacustrine sediments are overlaid near the mountains by the detrital accumulations forming the extended gradual slopes down to the center of the valley.

In the midst of the range there are two or more hard dykes of chocolate colored porphyry. A similar dyke is also found at the base of the range near Kielberg's Camp. With these exceptions and also that of the occurrence of crystalline lava, no crystalline rocks were observed. Neither granite nor limestones were found in place in the Galiuros nor in the detrital accumulations of the valleys.

The rhyolite intrusion may be assumed to have taken place along a longitudinal line or plane of break and faulting following the great syncline be-

and dips with it westwardly at an angle of about 72°. It is cut across at a right angle by a branch of Rattlesnake Creek, the chief feeder of the Araiwaipa, which flows into the San Pedro valley. This natural cross-cut by erosion makes a good exposure of the ledge on both banks of the creek. The face on the south side rises to a height of about 90 feet and is illustrated by Fig. 2.

mal quartz lode. It is not distinctively quartz. It has rather the appearance of a quartzite, being granular in fracture, but not vitreous, though here and there it is traversed by thin veinlets of normal quartz, about 1/8 of an inch thick, but often not thicker than cardboard and of local extent and irregular in direction. These little veins are crystalline, and mineralized with iron pyrites and gold.



FIG. 2.—VIEW, SOUTH FACE OF LODGE, WHERE IT IS CUT BY RATTLESNAKE CREEK.

The ledge is cut also by other canyons north and south of the Rattlesnake section and has been located for miles in both directions.

The gold is found in and about this lode on both sides of Rattlesnake Creek, especially in the loose dirt from the bottom and sides of the croppings. The

The gold becomes free when the grains of pyrite decay, and most of the pyrite, as far as developments have yet been made, is in the decayed oxidized state; the iron is in the form of hematite together with the gold. When the ledge matter is broken along the planes of the thin quartz seams, the cavities left

*Abstract of a report made to the Consolidated Gold Mountain Mining Company, Tucson, Arizona, March, 1902.

†See a paper on Lake Quiburis, an Ancient Pliocene Lake in Arizona, by W. P. Blake, read by invitation at the meeting of the Cordilleran Section of the Geological Society of America, San Francisco, Cal., January, 1902, and published in the February number of the University of Arizona Monthly.

by the pyrite crystals usually contain a grain or two of gold visible to the eye. The general prevalence of hematite from pyrites gives a brilliant red color to most of the outcrops of the ledge and to the adjoining rocks. There is also a large body of quartzose ledge, known as the "blue quartz," in which the coloring matter is partly oxide of manganese.

The prevailing hematitic red color is good evidence of general mineralization; so also is the general presence of gold in the soil around the outcrops.

The prominence above the surface of distinctly harder portions of quartzose rock might be taken as marking the limits of the ledge, but numerous tests show that the mineralization with pyrite and gold extends beyond such limits, but at present it is not possible to define the exact limits of such mineralization.

The evidences favor the conclusion that through the general mass of nearly vertical rhyolitic rock there were planes of fracture or fissure, bordering which there was a permeation of the rock by siliceous gold-bearing solutions accompanied by iron sulphide deposited in the body of the lode, not alone in harder and more prominent quartzose ledges, but in portions of the rhyolites, for some of the higher grade ore retains some of the original structural peculiarities of the rhyolite, but has an excess of quartz. The harder and more distinct outcrops, granular in texture, are without lamination and resemble quartzite rather than quartz or rhyolite.

The general appearance and structure of the lode are best shown by the photographs of its exposure



FIG. 3.—OUTCROP OF LEDGE—THIRTY FEET HIGH.

on both sides of the creek which cuts through it at right angles. Only about one-half of the face of the section of the lode is shown within the limits of the picture, No. 2. The whole front face of the cliff exposed by blasting, measured horizontally, is 168 feet wide. The harder portions of the lode are separated into two approximately parallel bodies by a thin body of rhyolite which retains its lamellar structure. This body of medial rock descends to the platform level on the right or west side of the picture, and beyond it. This rock is said to be found accompanying the lode in a similar position throughout its extent, north and south. The tunnel is cut in the foot-wall of the lower quartzose ledge or foot-wall body. The hanging wall portion above the medial body of rhyolite is irregular in the form and breadth of the croppings as seen in the illustration in the upper righthand corner, but at the level of the platform it appears as a large body of purplish gray quartzose ledge, known to the miners as "blue quartz." It measures about 30 feet in thickness, making with the foot-wall body and the intermediate ground a total thickness of 50 feet.

This blue rock is finely granular, with a prismatic blocky fracture, dull in luster, but under the micro-

scope in thin edges is vitreous and distinctly quartz. The coloring is due, largely, to manganese oxide which coats the seams and often shows in characteristic dendritic forms. Iron protoxide is also present. Under the microscope, small, irregular cavities appear between the siliceous grains and are lined with hematite. The degree of the mineralization is variable. In some places the porous nature of the rock,

been prospected or tested beyond an opening blasted out at the end.

Another plane of mineralization, or third ledge, is found about 250 feet to the eastward of the main face. The ground between is hidden by debris from above and is not known to be gold-bearing.

Numerous tests by panning on the main ledge showed the general occurrence of gold in fine grains.

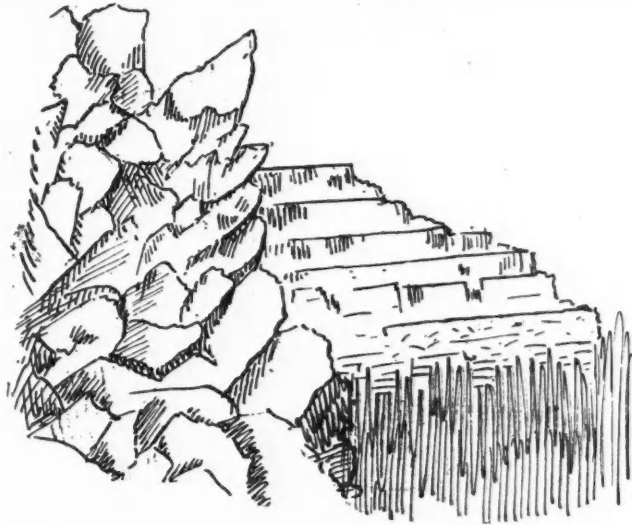


FIG. 4.—SECTION SHOWING CRAG-LIKE OUTCROPS OF LEDGE AND UNCONFORMITY OF RHYOLITE, WITH OVERLYING BRECCIAS AND TUFAS.

and the prevalence of iron oxide in small cavities are distinctly visible to the naked eye. This blue quartz merges into distinct rhyolite on the west, which rock forms the hanging wall of the lode.

A peculiar feature in connection with the ledge at once attracts the attention of the visitor. It is a very distinct columnar structure of the rock of the foot-wall side for a breadth of about 20 feet. This columnar or prismatic form of the rock is shown in the photograph and in the cross-section, Fig. 4. The structure is normal to the dip of the ledge. Traces of similar structure are also found on the other side of the medial plane.

This peculiarity at once suggests a porphyritic or dyke-like character of this rock, but its origin, or nature, is uncertain. The rock is all superficially colored a bright red by a coating of hematite, but is yellowish white within and has here and there crystals of quartz in the magma, justifying the name of quartz porphyry. The structure towards the east side gradually disappears and merges into a body of about 30 feet thickness of coarse-grained rhyolite much permeated with quartz similar to about the

dust and filaments, especially in all the loose soil and dirt around the cliff. The gold is easily detached from its matrix by blasting, and breaking up the ledge, and is found more abundantly in the "fines" than in the coarse rocks as broken out.

The chief object of these tests was not to determine the average value, but rather to ascertain the distribution of the metal and its association. The gold is in close association with the hematite derived from the pyrites.

The results of these preliminary tests were, however, sufficient to show that the whole mass of the ledge, taken together in bulk without sorting or selection, forms what is known amongst miners, as a "low-grade proposition" in which the quantity of ore compensates to a great degree for the comparatively small yield of metal per ton. This view is sustained by the results of assaying different samples taken from time to time by the management and by others.

What the general average is cannot just yet be fairly determined as the work of cross-cutting the ledge is still in progress and large samples must be

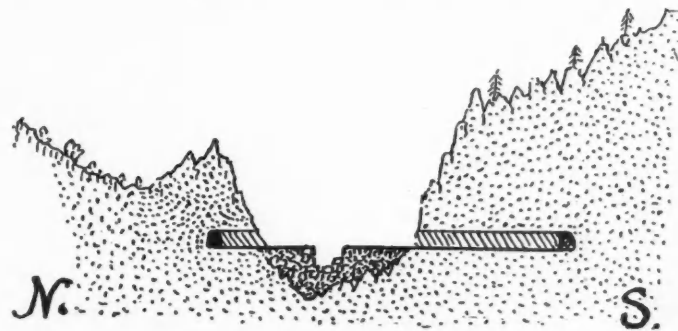


FIG. 5.—SECTION OF LEDGE AT OPENINGS ON RATTLESNAKE CREEK.

same thickness on the hanging wall side of the ledge. The outcrop of the main lode on the north side of the creek is similar in its structure but is not so high or so wide as the exposure on the south side.

On the extreme right or west side, and 50 feet distant from the main ledge, there is a second mineralized ledge some 8 or 10 feet in thickness, called the "Side Issue," where gold occurs. It is not regarded as connected with the main ledge, and has not as yet

blasted out, crushed and averaged, to get a result which would represent what may be expected from milling the ore on a large scale. Mill tests are desirable, but liberal sampling would show the general average nearly as well.

Preliminary tests with a .03 per cent cyanide solution indicate that the ore can be successfully treated with cyanide direct, after crushing, without amalgamation.

PRECIOUS STONES IN THE UNITED STATES, 1901.

The following synopsis of the precious stone industry of the United States for 1901, and the accompanying table, showing the production of precious stones in that year, have been sent to the Division of Mining and Mineral Resources of the United States Geological Survey, by Mr. George F. Kunz, Special Agent in charge of precious stones.

The following table gives the value of production of precious stones in the United States during 1901:

Diamond	\$100
Sapphire	90,000
Ruby	500
Opal	5,000
Beryl (aquamarine, etc.)	1,000
Emerald	15,000
Phenacite	500
Tourmaline	10,000
Peridot	1,000
Quartz, crystal	10,000
Smoky quartz	1,000
Rose quartz	150
Amethyst	500
Prase	2,000
Gold quartz	50
Rutilated quartz	1,000
Dumortierite in quartz	1,000
Tourmalinated quartz	1,000
Agate	1,000
Moss Agate	500
Chrysoprase	1,500
Silicified Wood (silicified and opalized)	7,000
Opal	100
Garnet (almandite)	21,000
Rhodolite	1,000
Garnet (pyrope)	1,000
Topazite	200
Amazon Stone	118,000
Oligoclase	250
Moonstone	3,000
Turquoise	1,000
Utahlite (compact variscite)	3,000
Chlorastrolite	1,000
Mesolite (thomsonite, so called)	100
Prehnite	500
Diopside	3,000
Epidote	100
Pyrite	1,312
Malachite	2,864
Rutile	1,838
Anthracite	2,000
Cathinite (pipestone)	2,000
Fossil Coral	100
Arrow points	500
Total	\$289,050

The principal items of interest concerning precious stones during the year 1901 are as follows:

The yield of sapphires in Fergus County, Montana, was greater this year than in 1900, and two companies are now mining in the region where the blue stones are found. Exploration for the many fancy-colored sapphires has been carried on still further in the Rock Creek region, Granite County, Montana.

The deposit of rhodolite garnet in the Cowee Valley, Macon County, North Carolina, was worked extensively. Mining for dark blue, green, and yellow beryls, for amethysts, and for emerald matrix was carried on in North Carolina.

The tourmaline deposits at Mesa Grande, San Diego County, California, were actively worked, and a new nearby deposit was discovered. The localities described in previous reports of this Survey as producing the golden green chrysoprase have been purchased, or a control of them for a stated period has been acquired, and more or less mining for this mineral has been carried on.

Several new turquoise companies have been formed, so that seven companies are now actively engaged in mining that material, and are placing it on the market, accompanied by their respective trademarks as a guarantee that such stones as may change in color will be exchanged for others. New Mexico is the chief source of the turquoise supply.

The finding of one diamond in Lee County, Georgia, is of interest as coming from a new region.

Epidote crystals, magnificent as regards size and crystallization, have been found in Prince of Wales Island, Alaska.

Emeralds have increased greatly in public favor. The diamond importation has been greater than in any previous year, and at no period have more fine and more very large stones been imported.

The presentation by Mr. Max Braverman of his collection of gems and minerals to the Golden Gate Museum, San Francisco, California, is worthy of note.

Within the last few years, more attention than ever has been paid to the quaint and fanciful cutting

of all precious stones, the diamond included; and whereas, ten years ago, scarcely any other forms than the "brilliant" and the "rose" in diamonds were used, during the last year there has been a great demand for stones that are "pear-shaped," "marquise," "briolette;" also for table-cut stones in all forms—triangular, circular, hexagonal, and in the double rose form also; and a modification of the last form has been patented.

COAL PRODUCTION IN ALABAMA.

The report of Mr. J. De B. Hooper, State mine inspector of Alabama, gives the production of coal in that State in 1901, and the form in which it was marketed, as follows, in short tons:

	Tons.	Per ct.
Lump coal	899,617	10.0
Nut coal	74,078	0.8
Slack	1,091,010	12.2
Run-of-mine	6,905,912	77.0
Total	8,970,617	100.0

The total shows an increase of 697,255 tons, or 8.4 per cent over that reported for 1900.

The production of coal reported for 12 years past has been as follows, in short tons:

1890	4,090,409	1894	4,361,312	1898	6,466,741
1891	4,750,781	1895	5,795,713	1899	7,484,778
1892	5,529,312	1896	5,745,617	1900	8,273,362
1893	5,270,042	1897	5,893,771	1901	8,970,617

The course of production shows how closely coal mining is associated with the iron industry of the State.

The total number of employees reported in 1901, and the number of tons mined per employe, were as follows:

	Number.	Tons mined.
Miners	10,041	893
Inside laborers	2,864	3,132
Outside laborers	1,838	4,881
Total and average	14,743	609

The number of fatal accidents reported in 1901 was 41, an average of 2.78 per 1,000 men employed. This compares with 37 deaths, or 2.59 per 1,000 in the previous year.

Pick mining is general in Alabama. Last year only 10 mines used machines, and in these 81 machines were at work.

The coke report shows that at the close of the year there were 7,086 coke-ovens in the State. The total output was 2,180,625 tons of coke, an increase of 188,064 tons, or 9.4 per cent, over the previous year. The coke produced is practically all used in the local blast furnaces and steel works. About 36 per cent of the coal mined last year was used in making coke.

MINERAL PRODUCTION OF COLORADO.

The report of Mr. Harry A. Lee, Commissioner of Mines of Colorado, has been issued for the year 1901. The statement gives the production of the precious metals, copper and lead as below, compared with that for 1900:

	1900.	1901.	Changes.
Gold, ounces	1,391,487	1,339,112	D. 52,375
Silver, ounces	20,336,712	18,492,563	D. 1,844,149
Copper, pounds	7,826,949	7,872,529	I. 45,580
Lead, pounds	164,274,762	148,111,020	D. 16,163,742

The values, at the average prices of the metals during each year, compare as follows:

	1900.	1901.	Changes.
Gold	\$28,762,036	\$27,679,445	D. \$1,082,591
Silver	12,488,785	10,901,366	D. 1,587,419
Copper	1,293,012	1,303,297	I. 10,285
Lead	7,770,196	6,419,132	D. 1,351,064
Totals	\$50,314,019	\$46,303,240	D. \$4,010,779

The chief producers of gold in order were: El Paso, Gilpin, Lake and San Miguel counties. Those of silver were Lake, Pitkin, Mineral and Ouray. Lake and Ouray counties were the chief producers both of copper and lead.

Zinc.—The mines of the State produced in 1901 ores containing 26,843,731 pounds of zinc, the value of which as metal would be \$1,095,224. About 30 per cent of these ores was shipped to smelters in the United States, and about 70 per cent exported. Of the total, Lake County produced 88 per cent and Mineral County 7.7 per cent.

Iron.—The output of the steel and iron plant of

the Colorado Fuel and Iron Company, located at Pueblo, for the year 1901, is reported as follows, in pounds: Iron ore, 704,737,735; pig iron, 330,364,725; spiegel, 18,923,320; steel rails, 309,092,082; steel plate, 208,557; merchant iron, 67,802,462; castings, 24,897,276; iron pipe, 13,700,702; spikes, bolts, nuts, 21,432,274.

Manganese.—The production of manganiferous iron ores was wholly from Lake County, and aggregated 68,500 long tons, carrying 28 to 30 per cent manganese, 22 to 24 per cent iron, 3 to 4 per cent silica, 0.035 to 0.050 per cent phosphorus, 4 to 10 per cent water. About 65 per cent of the output was shipped to the Illinois Steel Company, Chicago, Ill., and 35 per cent used in Colorado for the manufacture of ferro-manganese and spiegeleisen. A large portion of the manganiferous iron ores shipped during the year was consumed as a flux by the silver-lead smelters, of which no account has been made.

Bismuth.—The bismuth ore production for 1901 amounted to 637,200 pounds, or 318.6 tons. Of this amount Lake County produced 253.6 tons, carrying from 4 to 10 per cent bismuth, and Ouray County 65 tons, carrying from 6 to 12 per cent bismuth. All this ore has associated gold and silver values, for which the producers were paid. The prices paid for the bismuth contents varied from \$8 to \$15 per unit. The demand for this metal appears to be limited, and the producers are little inclined to report or make public the detail of actual production and market conditions. As near as may be determined the 318.6 tons produced yielded an average of \$80 per ton, or \$25,488, less deductions for transportation and treatment charges.

Tungsten.—Boulder County was practically the only producer of tungsten ore during 1901. The production for the year aggregated 65 tons, carrying an average of 60 per cent tungstic acid. The average price received for the ore was \$2.25 per unit, \$135 per ton, or \$8,775 for total production, less cost of transportation and deductions for treatment.

Coal.—The comparative production of coal for two years is reported as follows:

	1900.	1901.	Changes.
Lignite	822,916	699,528	D. 123,388
Semi-bituminous	891,554	724,883	D. 166,671
Bituminous	3,697,020	4,429,419	I. 732,399
Anthracite	59,244	64,580	I. 5,336
Not classified	25,000	60,000	I. 35,000
Total	5,495,734	5,978,410	I. 482,676

The largest production in 1901 was in Las Animas County, 2,609,392 tons. Huerfano, Fremont and Boulder counties followed in order.

In 1901 there were 1,840 coke ovens in the State, and 557,308 tons of coke were made; in 1900 the production was 575,447 tons, showing a decrease of 18,139 tons last year. In 1901 about 14 per cent of the coal output was converted into coke.

Petroleum.—The production of crude petroleum for 1901 amounted to 17,000,000+ gallons, or 404,762 barrels, 42 gallons each. The production of 1901 was limited to what is known as the Florence old-field of Fremont County. This field has been productive for a number of years, and recent developments indicate it not to be so much restricted in extent as has been generally supposed. The close of 1901 marks great interest in the Colorado oil fields. The results attained in California and Texas have led to investigation of local fields. This interest has been intensified by the discovery of a high grade oil with paraffin base at or near Boulder. In all sections of the State where oil croppings have been known to exist for many years, or have been recently discovered, derricks are being erected and wells sunk. There is little doubt that more oil will be discovered, but as a commercial proposition it yet remains to be demonstrated.

COST OF SALT AT ST. LOUIS.—Chemical manufacturers in the vicinity of St. Louis employ generally evaporated salt from Michigan, which is supplied at \$3.90 to \$4.50 per 2,000 pounds, delivered at East St. Louis. Crushed rock salt commands about \$5.00 to \$5.50. Kansas rock salt is hardly obtainable at that price, the freight rate from Hutchinson and vicinity being \$3 per 2,000 pounds.

THE NEW SMELTER AT EL PASO, TEX.

In July, 1901, the El Paso, Texas, plant of the Kansas City Consolidated Smelting and Refining Company was almost completely destroyed by fire. The power plant, blast-furnace building and blast furnaces were entirely destroyed, and portions of the other buildings were badly damaged. The flames were hardly extinguished before steps were taken for the construction of a new, modern, and enlarged plant on the ruins of the old one, and on April 15, 1902, nine months after the destruction of the former plant, the new furnaces were blown in. In rebuilding it was decided to locate the new power house at some distance from the other buildings, and this has been done. The furnaces have all been enlarged, each of the new lead furnaces (of which there are seven) having about 200 tons daily capacity. These and the three large copper furnaces have been located in a new position in order to secure a larger building territory. The entire plant is modern and up to date in every particular. One of the interesting features is the substitution of crude oil as fuel in the boiler and roasting departments. It is intended to use Beaumont petroleum for the generation of power and the roasting of the ores instead of wood, coal, or coke, and it is expected that a considerable economy will be effected by this means.

Power Plant.—The power plant is complete in every respect. It is a duplicate plant in every sense of the word, so that it will never be necessary to shut the works down on account of failure of any one piece of machinery. There are seven boilers, having a total of 1,250 horsepower. The four blowers are unusually large, having a capacity of 30,000 cubic feet of free air per minute. They are direct connected to three tandem compound condensing Corliss engines. No belts are used in this plant except for driving a small blower of 10,000 cubic feet capacity, which will act as a regulator. A large central electric plant has been installed in the power house, consisting of two direct-connected, direct-current generators, mounted on the shafts of two cross-compound condensing Nordberg Corliss engines. The current from these generators is transmitted throughout the plant, operating sampling works, briquetting machinery, pumps, hoists, motor, cars, etc., displacing all of the small steam engines and steam pumps used in the old plant. The power plant is provided with two systems for condensing; one being a large Wheeler surface condenser, the other a Worthington central-elevated jet condenser, the idea being to use the surface condenser during a short period of the year when the water is so bad that it cannot be used in the boilers. During the balance of the year the jet condenser is in service and the surface condenser can be cleaned. The condensed steam from the surface condenser, with the necessary additional water goes back directly to the boilers when the surface condenser is in use. The power house is absolutely fireproof throughout, being of steel and brick with iron and cement floors. It is provided with a traveling crane, and no expense has been spared to make this, as all other parts of the plant, complete in every respect. The main conductors from the generators pass out through a tunnel into a brick and steel lightning arrester house, from which point the various distributing lines go to different parts of the plant.

Blast Furnaces.—There are 7 large lead furnaces, each having a capacity of 200 to 250 tons of charge per day, and 3 large copper furnaces, each having a capacity of 250 to 300 tons per day. All of the furnaces are enclosed in one steel fireproof building, the lead furnaces being at one end and the copper furnaces at the other. Each set of furnaces has its independent flue system and stack. An entirely new system of feeding these furnaces has been devised, consisting of a 6-ton charge car operated by means of a street railroad motor and controller with third-rail system. The charge cars collect their charge at the ore beds, limerock and coke storage, and are run on to 15-ton hydraulic elevators. They are then elevated 38 feet to the top of the furnaces, traveling over them to the charging doors, through

which the loads are dumped directly into the furnaces. This system permits of two men handling about 1,000 tons per day. The same system and cars are used for charging the copper furnaces, except that as these furnaces are much lower than the lead, the charge is dropped into large hoppers, from which it is fed to the copper furnaces by a man on the copper furnace feed floor level.

General.—This plant probably represents the most advanced type and construction of a lead and copper smelter; every effort has been made to make it thoroughly fireproof, and on account of the relays and provisions provided, it is practically impossible for any accident to cause a shut down.

The plant was designed and built by Mr. Cyrus Robinson, the chief engineer of the American Smelting and Refining Company, and Mr. T. S. Austin, the superintendent of the works. Considering the extreme difficulty of obtaining machinery and materials, the completion of the job and getting the smelter into operation at such an early date is considered a record maker in furnace construction.

MINERAL PRODUCTION OF GERMANY.

The advance statement of the Imperial Statistical Bureau for 1901 has been published this year at an unusually early date. The most important production is that of coal, which we give by itself; the others follow in separate tables.

The total production of coal is given as follows, in metric tons:

	1900.	1901.	Changes.
Coal	109,290,237	108,417,029	D. 873,208
Brown coal (lignite) ..	40,498,019	44,211,902	I. 3,713,883
Total	149,788,256	152,628,931	I. 2,840,675

The decrease of 0.9 per cent in coal was accompanied by an increase of 9.2 per cent in brown coal, which was somewhat unexpected.

The production of other minerals is given as below, in metric tons:

	1900.	1901.	Changes.
Iron ore	18,964,294	16,570,258	D. 2,394,036
Zinc ore	639,215	647,496	I. 8,281
Lead ore	148,257	153,340	I. 5,083
Copper ore	747,749	777,339	I. 29,590
Gold and silver ore ..	12,593	11,576	D. 1,017
Cobalt, nickel and bismuth ores	4,495	10,479	I. 5,984
Manganese ore	59,204	56,691	D. 2,513
Pyrites	169,447	157,420	D. 12,027
Asphalt	89,685	90,193	I. 508
Petroleum	50,375	44,095	D. 6,280
Rock-salt	926,563	985,919	I. 59,356
Kainit	1,227,873	1,500,748	I. 272,875
Other potash salts	1,822,758	2,036,326	I. 213,568

The principal features here were the decrease of 12.6 per cent in iron ore, and the increase of 16 per cent in potash salts. Other changes were not important.

The products of reduction works for the year are stated as follows, in metric tons:

	1900.	1901.	Changes.
Copper, ingots	30,929	31,376	I. 447
Black copper, etc.	4,207	305	D. 3,902
Zinc	155,790	166,283	I. 10,493
Lead, pigs, bars, etc.	121,513	123,098	I. 1,585
Litharge	3,088	4,101	I. 1,013
Pig iron	8,494,852	7,835,204	D. 659,648

The decrease in iron has been heretofore referred to. The other metals show small gains, except copper, which decreased slightly, and zinc in which the gain was 6.7 per cent.

The production of refined salt and of various salts, in refined or commercial form, is reported as below, also in metric tons:

	1900.	1901.	Changes.
Salt, common	587,464	578,761	D. 8,703
Potassium chlorate	271,511	282,750	I. 11,239
Glauber salts	90,468	76,065	D. 14,403
Potassium sulphate	30,853	37,394	I. 6,541
Potassium-magnesium sulphate ..	15,368	14,285	D. 1,083
Magnesium sulphate	48,591	46,714	D. 1,877
Aluminum sulphate	44,372	46,807	I. 2,435

The increases in these salts were very much less than that in the crude kainit and other salts mined; a result due to the control of the business by a syndicate, which limits the quantity sold.

NEW EXPLOSIVES IN GREAT BRITAIN.

The British Home Secretary gives notice that he has made an order under Section 6 of the Coal Mines Regulation Act, 1896, the effect of which is to add two new explosives, albonite and arkitite, to the list of "permitted explosives."

THE CROW'S NEST PASS COAL-FIELDS.

By WILLIAM M. BREWER.
GEOGRAPHY.

These coal-fields are located in the southeast corner of British Columbia, and extend in an easterly direction across the boundary between that Province and the Territory of Alberta. For a distance of some 25 miles, Elk River flowing from north to south, parallels the line of strike of the coal measures. This river is a tributary of the Kootenay, into which it empties a few miles south of the town of Fernie, the most important station on the Crow's Nest branch of the Canadian Pacific Railway.

HISTORY.

Although the occurrence of productive coal measures in this portion of the Province was reported on by both Dr. Selwyn and the late Dr. Dawson, Dominion Geologists, about thirty years ago, no attention was paid to these reports until 1887, when a syndicate was formed to prospect. It was composed of the following named Victorians: Col. Baker, Wm. Fernie, P. C. Fernie, V. H. Baker, J. D. Pemberton, F. Bray, J. E. Humphrys and F. W. Aylmur. A party, headed by Mr. Fernie, who had been over much of the country before and had found float coal in the vicinity of the Pass, travelled along Elk Valley in search of the source of this float. During that and subsequent seasons, Mr. Fernie prosecuted his prospecting operations systematically and successfully. He located several workable coal seams, and his syndicate secured a railway charter from the Provincial Government with a bonus attached, conditioned upon certain provisions, of 20,000 acres of land per mile, besides purchasing from the Government direct 11,000 acres. These lands were selected with excellent judgment as will be shown later in this article.

About 1897 the local syndicate made terms with the Canadian Pacific Railway for the building of the Crow's Nest Pass branch on the charter obtained by the syndicate. According to these terms, the Fernie syndicate, which had been succeeded by the Crow's Nest Pass Coal Co., retained all their coal lands besides receiving a substantial cash payment for the charter, and also stipulating that the Canadian Pacific Railway Company, which owned about 3,800 acres of coal lands in the Pass, should not open any collieries for a period of ten years from 1897.

The discovery of the Boundary Creek metalliferous mines with all the possibilities of those extensive self-fluxing ore bodies, proved sufficient incentive, accompanied with the possibilities of the coal-fields, to urge the Canadian Pacific Railway to push the building of their branch vigorously from the main line at Medicine Hat through the Pass westward, across the Columbia River at Robson, thence into the Kettle River Mining District, which is usually designated as the Boundary country. Construction was completed in 1899.

Early in 1901 it became known that large holdings of the stock of the Crow's Nest Pass Coal Company has been acquired by Mr. J. J. Hill, President of the Great Northern Railway Co. About the same time a charter was applied for in both the Dominion and Provincial Parliaments for permission to build a railroad, designated as the Crow's Nest Southern, to connect the coal-fields with the main line of the Great Northern at Jennings, Mont. This charter was granted and to-day the railroad is almost completed, having been built north from Jennings. In connection with this line, or rather to form a connecting link between the coal fields and the Boundary mines, is the railroad known as the Victoria, Vancouver & Eastern. This is also building, and when completed will, because of its exceptionally good average grade, seriously handicap the Canadian Pacific Railway as to haulage between the coal mines and the smelters in the Boundary. Railroad men say that over this new road bed 2,000 tons will form an average train load, while over the Canadian Pacific Railway it is with difficulty that over 500 tons can be hauled per train.

The distance via the Crow's Nest Southern, and Victoria, Vancouver & Eastern to the Boundary mines is greater than via the Canadian Pacific Railway, but the excellent grade of the former more than offsets this extra distance.

GEOLOGY.

The Crow's Nest Pass coal-field covers a triangular shaped area, with the southern angle at its base about 30 miles north of the international boundary, and embraces the territory immediately west and east of the summit of the Rocky Mountains. The portion on the west side is in British Columbia and that on the east side in Alberta Territory. The line of strike of the Cretaceous rocks in which occur the productive Coal Measures is magnetic north. The dip varies from east to west according to the inclination of the strata of the synclinal troughs and anticlinal folds which form the structure of the Cretaceous rocks. A section from the mouth of Coal Creek west of the summit to the Gap east from the summit, according to the late Dr. Dawson, shows the Cretaceous rocks lying unconformably on Carboniferous limestone and forming a series of synclinals and anticlinals, the most westerly synclinal occupying the area between Elk River and Marten Creek; the next easterly between Marten and Michel Creeks, the next from Michel Creek to Crow's Nest Lake. At that point the Cretaceous rocks have been eroded off, and the limestone is laid bare for some distance, flanked on the east side by Cretaceous rocks apparently forming an

the Elk River, viz: Morrissey, near the southern limits of the productive Coal Measures; Coal near the center, and Michel near the northern limits. Except where those creeks traverse the coal fields the western boundary of the Cretaceous rocks which parallels the Elk River is marked by an escarpment or lofty ridge reaching an elevation of about 3,500 to 4,000 feet above the river. A section of this escarpment is referred to in Mr. McEvoy's report, as having been measured by him at a point about three miles north from Morrissey Creek with the following results: "The crest of the spur in which the measured section is included has an average slope of nearly 30 degrees, and afforded the exceptional opportunity of getting an unbroken section of almost 5,000 feet. This measurement shows a total of 4,736 feet, of which 216 feet consist in coal seams of thicknesses varying from one foot to forty-six feet. Of the total coal by far the greater part, 198 feet, occurs in a thickness of measures of 1,847 feet."

Considerable difference in the thickness of the measures, though, exists between a portion of this section and another section at the mines opened on Coal Creek:

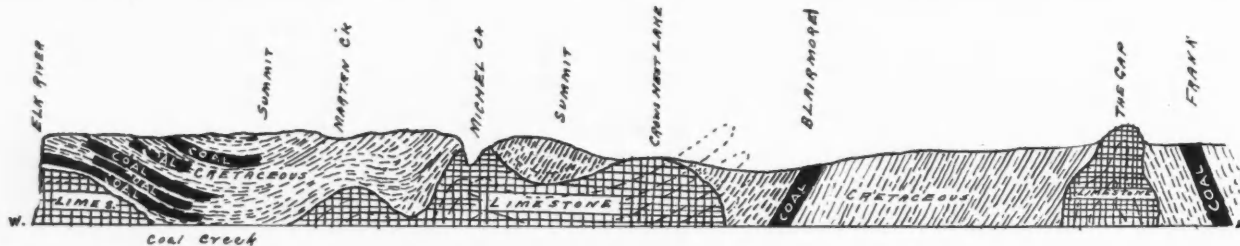
	Near Morrissey.	On Coal Creek.
Coal	10 feet.	10 feet.
Intervening beds.....	140 "	60 "
Coal	36 "	30 "
Intervening beds.....	197 "	42 "
Coal	6 "	6 "

At Michel Creek 16 miles north from the mines on Coal Creek three seams of coal are exposed in

field in British Columbia, so far as the writer could judge from a hurried visit, it would be necessary to bore with diamond drill to locate the coal seams, and sink shafts to work them, thus rendering hoisting necessary and mining costly. The construction of branch roads into the mountains east from Elk River Valley except along one of the three creeks mentioned would also prove a difficult and expensive undertaking.

In fact there is no question but that under existing conditions the Crow's Nest Pass Coal Company can, if it sees fit, dominate the smelting industry in southern British Columbia, besides being in a position to assist very materially in the progress of all industrial enterprises south of the border. More especially will this be the case too when the Crow's Nest Southern Railway connecting the coal-fields with the main line of the Great Northern Railway at Jennings is completed. The grade of that line will permit of the hauling of 2,000 tons of coal or coke to the train load. At the present time coal or coke exported to the States is hauled over the Canadian Pacific Railway to Lethbridge, in Alberta Territory, there transferred to the Alberta Railway and Coal Company and hauled over their narrow gauge railroad to Great Falls, Mont.

Coal Creek Collieries.—The first collieries opened in this field are located about 5 miles up Coal Creek, east of Fernie Station on the Canadian Pacific Crow's Nest branch and at an elevation of about 500 feet above Elk River. There are four open-



GEOLOGICAL SECTION, CROW'S NEST PASS COAL MINES.

anticlinal dipping at angles varying from 45 degrees to 60 degrees towards the west. These conditions exist for about 10 miles, or to the Gap, where the Cretaceous rocks have been eroded and limestone forms a prominent range of low mountains, with Cretaceous rocks again occurring on the easterly side of the mountains, dipping at an angle of about 60° towards the east.

The angle of the dip of the productive Coal Measures on the west side of the summit is much less than on the east side, averaging only about 12 degrees from the horizontal.

The Elk River Valley with its course parallel to the line of strike of the Coal Measures, apparently forms the western boundary of the coal-fields on the western side of the summit of the Rockies. For although the country to the west of the Elk Valley has been prospected for coal, no discoveries have been reported.

During a recent visit the writer walked from Fernie up Coal Creek to the collieries, thus traversing the geological formation. Lateral pressure has apparently tilted the strata to almost vertical positions for a distance of about three miles above the town of Fernie, though the dip gradually becomes much flatter until at the coal outcrops, about 5 miles up, where the collieries are situated, it appears as though the coal seams, of which there are altogether some ten or twelve, lay in a basin, the floor of which, however, is wavy and undulating. These undulations though, are not necessarily faults, but rather a series of folds.

The area of Cretaceous rocks in the vicinity is estimated at about 500 square miles, but because of erosion, large areas of these rocks and Coal Measures have been removed, therefore at the present time the actual area covered is, according to Mr. J. McEvoy of the Canadian Geological Survey, approximately only 230 square miles.

The Cretaceous rocks enclosing the Coal Measures are cross-cut by three creeks, tributaries of

the openings ranging from 15 to 17 feet in thickness the seams exposed by the workings at three ness. There is not yet sufficient evidence to connect points, Morrissey, Coal and Michel Creeks. Mr. McEvoy estimates the available coal supply of the field as follows:

Total area of coal lands 230 square miles, equaling 147,200 acres.

One acre with 100 feet of coal (this thickness being estimated as productive merchantable coal) would yield 153,480 tons of 2,240 pounds.

One hundred and forty-seven thousand two hundred acres would yield 22,595,200,000 tons of 2,240 pounds.

Opportunities for Opening Mines.—Although this coal-field occupies such an extensive area, and the workable seams are so numerous, one feature is particularly noticeable with regard to the opportunities for opening mines. Because of the fact that the outcroppings of the workable coal seams occur on the banks of the creeks referred to some distance east of Elk River Valley, and dip to the east into the mountains, there are only six points at which collieries can be opened on the most economical plan as to cost for equipment, handling the product, and methods of mining. These are on the benches on each side of Coal, Morrissey and Michel creeks, respectively. Earlier in this article the writer referred to the excellent judgment which had been employed in selecting the coal lands owned by the Crow's Nest Pass Coal Company. As a matter of fact, the company controls five of the points referred to as affording the best opportunities for economical mining and shipping.

When the importance of this coal field first became known, the Dominion Government reserved 50,000 acres to be selected at some future time. If it is proposed to open a colliery on any of this land, the portions adjacent to the south bank of Morrissey Creek would appear to possess exceptional value, because at any other point in this coal

ings on three different seams, but that on the lowest seam has not been worked as a mine for several months. Connections have been made between this opening and No. 1 mine so that the former being used merely for ventilation and drainage purposes for No. 1 mine opened on a higher seam in the series. Both of these seams outcrop on the north side of the creek. Nos. 2 and 3 mines are openings on a still higher seam in the series, and which outcrops on the south side of the creek. Both of these openings are on the same seam. Nos. 1 and 2 openings are main tunnels run in on the level, while No. 3 opening is an incline tunnel driven on the dip of the coal. The workings in the coal from Nos. 1 and 2 tunnels are on the level and rise of the seam, but from No. 3 on the dip. No. 1 has been driven 2,500 feet towards the north-west. No. 2 has been driven 4,000 feet towards the southeast. No. 3 has been driven 2,000 feet towards the south.

In No. 2 mine a squeeze occurs 1,800 feet in from the mouth of the tunnel, but this was only local and where the level was driven through it, the coal seam was found in its normal condition on the opposite side.

Eight hundred men were employed in these mines at the time of the writer's visit, 480 being engaged in digging coal. The record production for one day, on two shifts of 8 hours each, is 1,859 tons run-of-mine coal, but when arrangements now pending are perfected, the output should not come below 4,000 tons per day.

System of Mining.—Under the former management these mines were worked in an unsystematic manner, or rather by a system which if it had been continued would have undoubtedly caused serious trouble from caving, sooner or later. This system may be termed "pillar and level." By it tunnels or levels were driven around pillars of coal left standing to support the roof, and judging from an examination of the working plans of the mines but

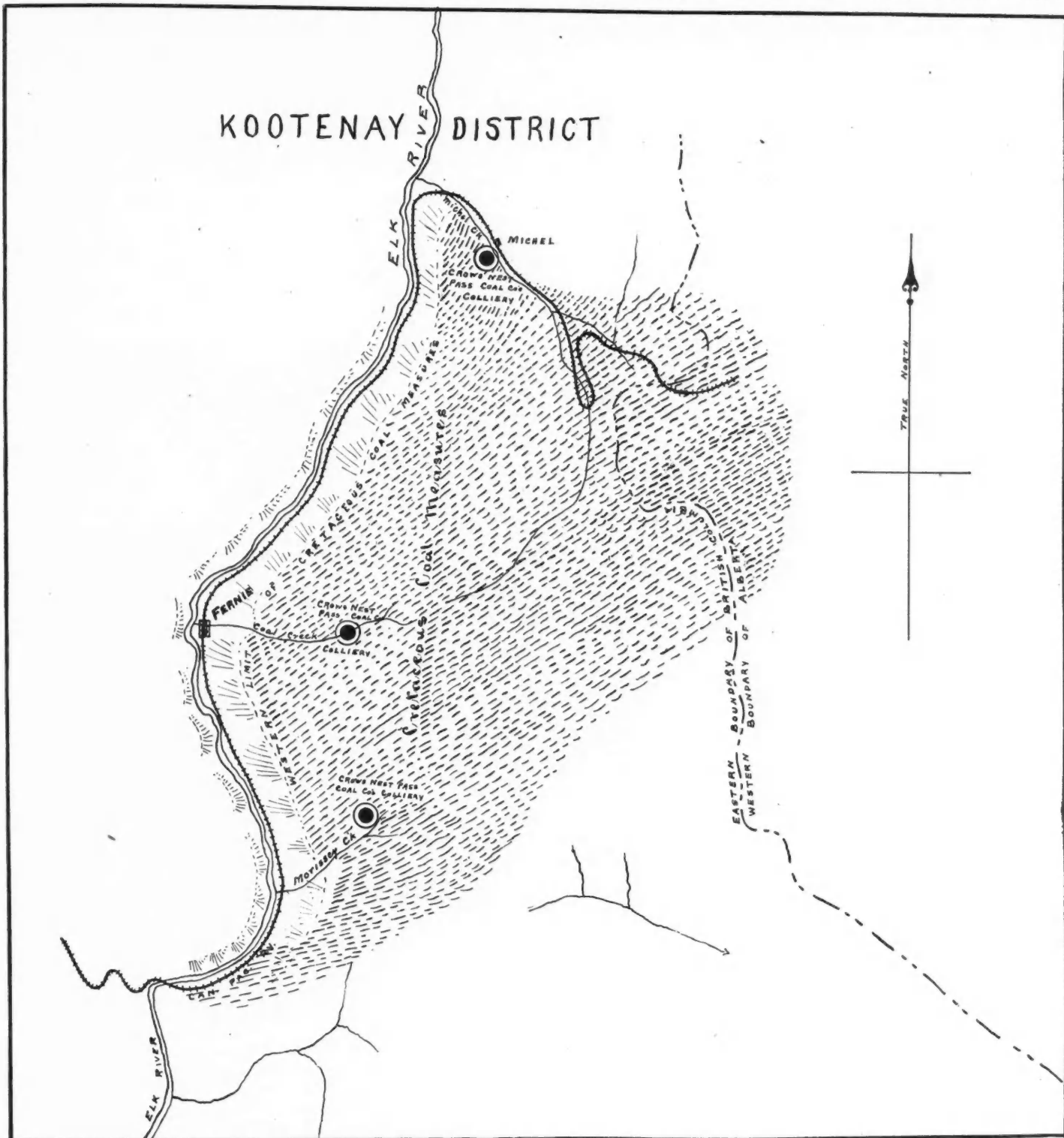
little system was followed as to ventilation, or securing the workings against squeezing or caving. However, Mr. Lewis Stockett, the present manager, has adopted a thoroughly systematic and up-to-date plan for working and ventilating. The

The writer visited the headings in No. 2 mine and found the ventilation good. Much of the coal gives out a sulphurous odor, but this does not materially affect the air.

Quality of Coal.—The following table shows the

carpenter's shop, warehouse, stables, feed sheds, colliery office, electric power house, miner's washing room, machine shops and boiler shed.

The mine haulage might be referred to as being the main and secondary. The former is operated for



MAP OF CROW'S NEST PASS COAL MINES.

"pillar and stall" system of mining is that adopted throughout, and larger fans are to be installed in order to increase the ventilation.

The coal being soft makes dust very rapidly. The mines are gaseous, in consequence of which no open pit lamps are used, every miner being furnished with safety lamps.

Ventilation.—At present Nos. 1, 2 and 3 openings are intakes. No. 1 workings are ventilated by means of a Murphy fan, located near the mouth of the lower tunnel on the north side of the creek which takes the place of an upcast or return airway. The fan house for ventilating Nos. 2 and 3 workings is located above an upcast shaft on the south side of the creek. The fan used is a Wilson, 15 feet in diameter. The quantity of air passing in Nos. 2 and 3 workings is about 125,000 cubic feet per minute.

average grade of the coal (run-of-mine) from Coal, Michel and Morrissey creeks:

Coal Creek.	Moisture.	Volatile matter.	Fixed carbon.	Ash.
No. 1 mine.....	.81	25.71	65.50	7.98
No. 2 mine.....	.87	23.11	70.70	5.32
No. 3 mine.....	.78	24.66	69.83	4.73
Coke.....	.22	1.65	86.90	11.23
Michel Creek.				
No. 4 mine.....	.85	22.55	71.56	5.04
No. 8 mine.....	1.18	16.65	76.19	5.98
Morrissey Creek.....	0.55	18.14	76.91	4.40

Buildings at the Mines.—The buildings at the mines include thirteen semi-detached double-story cottages, accommodating 26 families of employees. Five dollars a month rent is charged, but householders also have supplied them one ton of coal monthly, free of charge. The various buildings connected with the colliery are both commodious and substantially built. They include two fan and engine houses, smith shop, electric locomotive shed,

several thousand feet by an electric locomotive, the latter by means of electrically driven stationary hoists, and horse haulage. The voltage is 220 and the amperage 400. The electrical efficiency is 70-horsepower and is supplied and developed by two fixed motors, each of 35-horsepower, which are geared separately to 24-inch driving wheels, at the ratio of 1 in 5.

The total weight of the locomotive is 20,000 pounds, and with broad-topped rails it has considerable traction force. This trolley system of electric haulage has been in operation for a couple of years, and is entirely satisfactory. Where, however, the grade makes the use of electricity undesirable, wire ropes are used. During twenty-four hours (three shifts) one motor has hauled, on grades of from 2 to 4 per cent against load, fully 900 tons of coal. The average load per trip on the grades mentioned is as fol-

lows: 13 mine cars, net coal, 40,000 pounds; 13 mine cars, net tare, 14,000 pounds; total gross weight per trip, 54,000 pounds.

The following are the dimensions of the motor: Length, 10 feet 6 inches; height, 3 feet 4 inches; width, 4 feet 7 inches; wheel centres, 3 feet 4 inches; gauge, 3 feet; driving wheels, 2 feet diameter; height under frame above rail, 4 inches. The weight of rail is 40 pounds per yard, and the speed attained 8 miles an hour.

Owing to the undulating character of the coal field there are some steep grades, which it is practically impossible to overcome by means of horse haulage. The secondary haulage on these parts is, therefore, operated by means of electrically driven stationary hoists. Horses convey the coal cars from the stalls on the moderate grades to collecting stations on the main levels. This haulage is both convenient and economical, as the thickness of the seams permits the necessary height without the breaking down of the roof. To enable horses to both pull and hold back on grades they are harnessed into shafts, which are attached by a shackle to the end of the coal car.

The main haulage roads are lighted by electric incandescent lamps, 16 candle-power. Owing to the 220 volt pressure, pairs are attached in series. The current is supplied by trolley figure eight wire and bonded rail. In lighting the bridge, loading sheds, sidings, etc., arc lamps of 1,000 candle-power in multiple are in use.

The Coke Ovens.—The coal is brought from the mines to Fernie, either for market or for coking. The cars containing the slack or coking coal are dumped into a huge bin with a capacity of 4,500 tons, erected high enough to, in turn, dump the coal into small cars passing underneath on a line that runs in different branches over the tops of the coking ovens. The cars used in this way to charge the ovens are ordinary coke oven larries, made of steel, and the coal is dropped from their sides into the chimneys of the ovens as they pass along the track.

There are at present 424 ovens actually in operation at Fernie, constructed in three double rows, so that the railway track may run between them on piers constructed for the purpose and facilitate the charging process.

The ovens, which are of the bee-hive style, contain each a charge of about six tons of slack coal, which will produce about from 4 to 4½ tons of coke. The 424 ovens now operating at Fernie produce an average of nearly two tons each per day.

Michel and Morrissey Creeks Collieries.—Although the daily output of coal at the former of these collieries is about 500 tons, the management does not consider it fully equipped or opened, because this output comes from development work which is being done on a large scale with the intention of making the mines produce in the near future a maximum of 4,000 tons of coal per day.

There are 212 bee-hive coke ovens at Michel, equipped after the most modern design for charging and drawing. These had not been in operation up to the time of the writer's visit, but whenever the demand for coke requires it they will be charged and fired.

Except that no coke ovens have been built at the Morrissey Creek colliery the conditions there are somewhat similar to those at Michel Creek, but no output is being made at present. The mines are about the same distance from the Canadian Pacific track as at Coal Creek, but at Morrissey the coal company has built its own branch line, laying steel rails 68 pounds to the yard instead of using a branch of the Canadian Pacific as at Coal Creek.

The branch at Morrissey will connect with the Crow's Nest Southern branch of the Great Northern Railway, when that line is completed into the coal fields.

The equipment being installed at the Morrissey Creek collieries is more modern and up-to-date than any in the Province, and when the machinery plant is complete and the openings now being developed are laid off for the systematic method of mining proposed, the maximum output will be 4,000 tons daily. The area these openings will serve or develop is of

enormous extent. Eventually as work on the main slopes is extended the collieries at the three different creeks will be connected unless some unlooked for complications are encountered in extending the workings.

DRIVING THE NEWHOUSE TUNNEL.

By H. FOSTER BAIN.

In many particulars the Newhouse Tunnel now being driven at Idaho Springs, Colorado, is the most interesting mining tunnel in existence. When completed it will be one of the great tunnels of the world, and one of the greatest pieces of mining work ever undertaken. Starting at Idaho Springs in Clear Creek County at an altitude of 7,543 feet it is a great 12 by 12 cross-cut now extending 12,861 feet to the north and well into Gilpin County. As projected it will eventually extend approximately 5 miles in a direct line, and will terminate under Quartz Hill at Central City some 2,000 feet below the surface. The maximum vertical depth so far attained is 1,710 feet, equivalent to 2,200 feet

an average of 9.2 feet per heading, or 267.6 feet for the month, was made. If this record be kept up through March, the record will be but a trifle less than 300 feet for the month. Already more than 280 feet have been made in single months where the ground was favorable. Better records have been made elsewhere in tunnel driving but in rock of a different character. Here the rock is of such nature that the headings never break beyond the holes. Better time has been made in soft vein matter, as when the great Gem vein was cross-cut, or in blocky porphyry, which breaks out beyond the holes, but for steady cross-cut work in granite-gneiss and schist with the dip away from the heading, the record is one to be proud of. So, day by day, the drills eat their way under the mountain, stopping only for Christmas and the Fourth of July and adding a half a mile to the length of the tunnel each year; to be exact, 2,759½ feet from September 1, 1899, to August 31, 1900, or 2,925 feet last year. This work is done at an actual cost, all expenses included of \$28.80 per foot, or a breaking cost, ex-



FIG. 1.—AT THE BREAST IN NEWHOUSE TUNNEL.

on the prevailing dip of the veins, but the maximum depth to be attained will exceed this. This great bore is owned principally by Englishmen, the parent corporation being the Argo Tunnel and Mining Company of London. The active work is done by the Argo Mining, Drainage, Tunnel and Transportation Company, which, as might be inferred by the name, is a Colorado corporation. The projector of the tunnel, Mr. Samuel Newhouse, is too well known to the JOURNAL readers to need an introduction. The President, Mr. C. C. Parsons of Denver; the Manager, Mr. L. Hanchett of Idaho Springs and the Superintendent, Mr. Silas Knowles, are all quite distinctively American as is the push and energy with which the work is being carried out. In many ways the methods adopted and the results attained are characteristic of the American policy of high pressure work: the policy which buys the most expensive, most efficient machine and then runs it to the utmost of its capacity, and here as elsewhere the results attained are sufficient justification.

When the present management took hold, the best record of footage was in the neighborhood of 160 feet per month. To this, feet have been added until in the shortest month in the year more than 100 feet have been gained on the old record, at a merely nominal increase in cost. In February, 1902,

cluding the cost of permanent track, equipment, etc., of \$21.45 per foot.

The methods adopted are, in some particulars, unique, and much of the extra footage is due to these peculiarities in method. The holes are placed according to the American center cut system except for the addition of a plunger hole at the upper center of the cut. The arrangement of the holes is indicated in the following diagram, the arrows indicating approximately their direction. The back holes *a* look up. The plunger *b* looks down. The cut holes *c* towards the center. The side holes *d* look a little out and up.

The accompanying illustration, Fig. 2, reproduced from a photograph made at the breast, shows how the drilling is done. The drills are used on two columns; two 3-inch Leyner sluggers mounted direct on the columns and drilling the side and cut holes, and one model 5 Water Leyner mounted on an arm and drilling the back and plunger holes. One slugger is started at the bottom and works up while the Water Leyner puts in the back at that side of the drift. The other slugger starts at the top and works down so as to be out of the way by the time it is necessary to move the little drill over to the second column bar.

The drill crew consists of 5 men who go to work

at 7:00 a. m. and stay at work until the drilling is finished. This is somewhere between 4:30 and 7:00 p. m., but ordinarily is about 5:00 p. m. They do not stop at noon but eat their lunches in the drift, one man at a time being relieved by the day shift boss.

At 1:00 p. m. the powder gang, also consisting of 5 men, comes on duty. The head blaster stays outside getting the powder, fuse, etc., ready and goes in ordinarily at about 3:00 p. m. The other four men go in at the beginning of the shift and occupy themselves until the drilling is done in timbering, track laying, putting in water box, etc. They lay the permanent track, which is kept 250 to 300 feet from the face, the mucking track being run up to the drilling platform. The two are 18-inch gauge tracks and are laid with 35-pound rails resting on 4 by 8-inch ties 8 feet long extending across the drift. The water box is 1 by 2 feet in cross section, made of 2 by 12-inch material and carried under and between the rails. It is first put in, then the floor of the drift graded up with rock and dirt, the ties placed, and the rails laid.

When the drill men finish their round of holes they leave at once. The powder gang tears down the machines, covers the bottom of the drift with 5/8 steel plates 6 feet square for a distance of 40 feet back from the face, and fires the first round in the cut. This takes ordinarily about 40 minutes, the holes being fired, of course, by electricity. The cut must ordinarily be fired 2 to 5 times, 60 per cent gelatine powder being used, 8 to 9 stocks for the first round,

1,800 pounds each, are 5 by 3 by 3 1/2 feet, are built on special order and are extra heavy. They are, however, mounted on roller bearings and the 16-horsepower Baldwin-Westinghouse locomotive handles as many as 25 at a time, the grade being 0.33 per cent.

In all there are 32 men employed on company work including blacksmiths, and the men who tram ore and waste for the six mining companies now working through the tunnel.

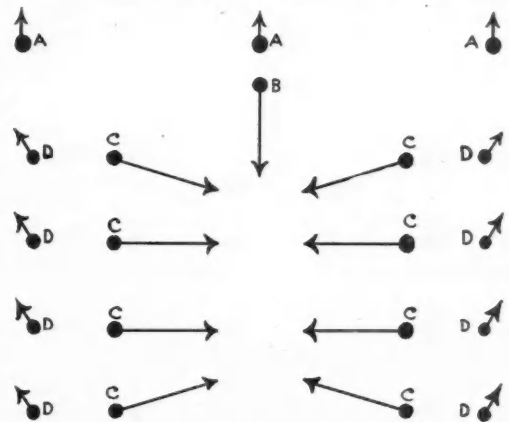
The power plant includes three 80-horsepower boilers of which two are in use at one time; two 16 by 16 two-stage Norwalk Compressors; one 22 by 24 two-stage Norwalk, recently installed; one No. 7 Root blower driven by a direct connected 50-horsepower Atlas engine; and one 30-horsepower high speed engine driving the 20-kilowatt Westinghouse 500-volt generator which furnishes power for the locomotive. The machinery is installed in a neat brick power-house directly on the railway track while the blacksmith shop, changing room, etc., are at the mouth of the tunnel.

The success of the management in driving the tunnel so rapidly is due to three things: (1) High pressure air; (2) the use of the Water Leyner for back holes; (3) the adoption of the premium basis of payments.

For drilling the air is held at 160 pounds pressure. It has been worked up to this, 10 pounds at a time from an initial pressure of 110 pounds. Miners accustomed to a pressure of 60 to 80 pounds have little idea how to handle the high pressure

age went up 20 feet; a gain which has never been lost. There is of course a greater breakage at high pressure than at low, but the cost per foot for breakage is not more. The management keep on hand a full supply of extra parts and every day duplicate drills, extra hose, etc., are sent to the breast on the drill car so that no time is lost when a part does break. Equally significant perhaps, is the fact that on an average some 400 sharp drills are constantly on hand.

The third important element in the rapid and steady progress of the work is the premium basis of payment. A bonus of \$6.00 per foot is paid each month for all ground broken over the 160 feet per month formerly broken. This bonus is divided



PLACING DRILL-HOLES, NEWHOUSE TUNNEL.

among all the men who work at the breast. The drill crew receives \$4.00 divided equally. The blasting crew gets \$0.75, one-third going to the head blaster. The muckers get \$1.25, one-third going to the head trammer. This bonus brings up the wages of the drill crew from \$3 to approximately \$4 per day and increases the wages of the others 37 1/2 cents to 55 cents per day per man; the head blaster and head trammer getting from \$1 to \$1.25 per day in addition to their wages. While this premium now amounts to more than \$500 per month the management considers that the money so invested yields larger returns than that spent in any other direction. The men willingly work hard and when necessary long hours rather than lose a round.

The detailed cost per foot is shown by the following abstract from the Manager's report for the year ending August 31, 1900:

Labor:	
Drill crews and foremen.....	\$3.01
Trammers, blasters and drivers.....	4.34
Blacksmith shop.....	1.03
Engineers.....	1.15
	<hr/>
Ammunition.....	\$9.53
Oil and waste.....	4.55
Coal.....	0.12
Mules, feeding and shoeing.....	3.91
Drill repairs.....	0.32
Premiums.....	0.82
Tools.....	1.87
Timber.....	0.33
Track and material.....	0.16
Track-labor and repairs.....	1.84
Engineering and surveying.....	2.07
Salaries and office expenses.....	0.22
Miscellaneous:	
Legal expense.....	\$0.07
Insurance.....	0.11
Taxes.....	0.12
Minor items.....	0.72
	<hr/>
	1.03

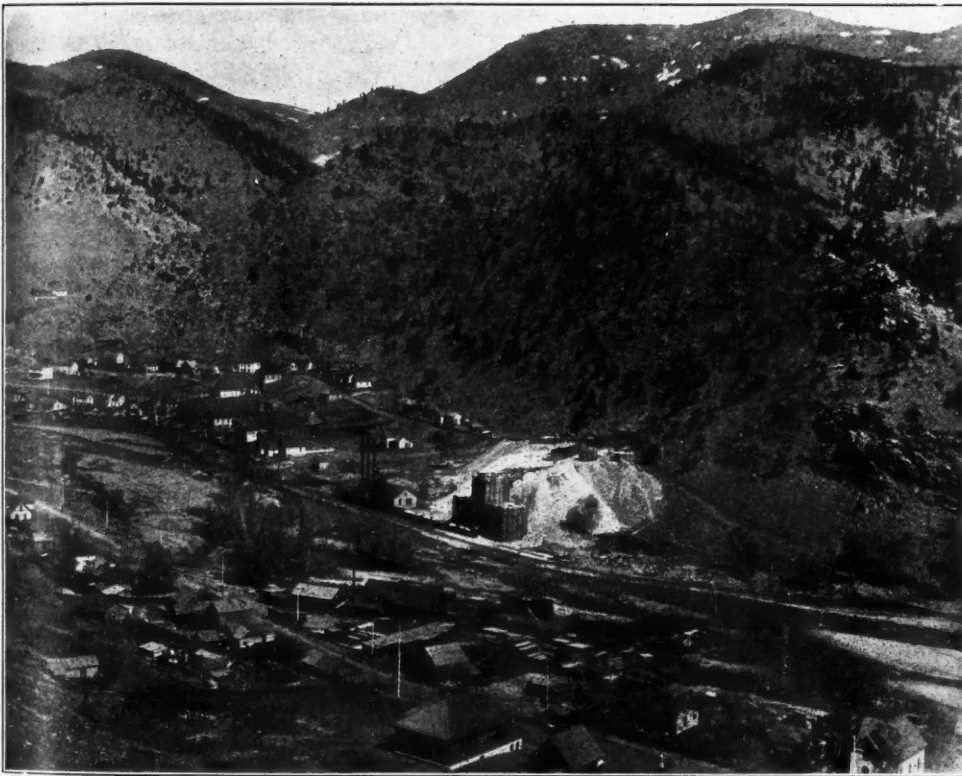


FIG. 2.—POWER-HOUSE, ORE-BINS, ETC., NEWHOUSE TUNNEL.

and in all about 100 pounds of powder being required. The side and backs are fired with 40 per cent powder, it requiring 50 to 70 pounds. The holes are not tamped and the blasting takes 2 1/2 to 3 1/2 hours. During the blasting compressed air at 60 pounds pressure is delivered to the face through an open 4-inch pipe and thus drives the smoke back to where it is taken care of by a 19-inch exhaust air pipe laid between the rails and on the top of the water box.

After the blasting the powder gang cleans up the track ready for the muckers and loads the first train of cars.

At 10:00 p. m. the mucking gang goes to work and the men stay until the dirt is out and the face ready for the drills. This gang consists of six men. The shift boss picks down and three men shovel at a time while two rest. The cars are 35 cubic feet capacity and 45 to 60 are filled per night. They are made up in trains of ten. They weigh

and it has been necessary not only to train the men, accustoming them gradually to using the higher pressure air, but also to reconstruct the drills so that they would stand it. In this work the management has been cordially assisted by Mr. J. Geo. Leyner of Denver, who has patiently changed, strengthened and rebuilt his drills until they are now working steadily at this pressure. The Water Leyner, having hollow steel, will not stand the full pressure in hard ground but must still be choked down. It, however, does its work satisfactorily. The current of water running through the steel and coming around the bit, keeps the latter cool and in temper and removes the debris perfectly. Without the Water Leyner it was found practically impossible to drill 10-foot back holes as is now done daily. Perhaps the best proof of the economy of its use is the fact shown by the records of the company that the month it was introduced, the pressure at the same time being raised 10 pounds, the foot-

Total \$79,478 for driving 2,759 1/2 feet or \$28.80 per foot. The previous year this cost was \$27.74 and the actual breaking cost was \$19.68. The increase was due to the increased cost of supplies and the greater expenses of working in a larger tunnel. In each case the work was done with mules in tramping, the electric locomotive having been installed only recently. It is expected that it will offset the added cost of the longer tunnel if not actually reduce the cost. In considering these figures and the work done it is to be remembered that after all probably the largest factor in the result has been the close and active supervision that the work has had; this, with the liberal co-operation of the general management, which permits the investment of money necessary to carry large stocks of tools and supplies, is enough to fully account for the excellent results.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

PARTIES MUST RELY ON STRENGTH OF THEIR OWN TITLE TO MINING CLAIMS.—Under the laws of the United States (Section 2,326), providing that the party shown to be entitled to possession in a proceeding on an adverse claim to a mining claim may file a certified copy of the judgment roll and obtain a patent to same, proceedings on an adverse claim are held for the purpose of determining which of the parties is entitled to such patent, and hence each must rely on the strength of his own title, and not the weakness of that of his adversary.—*Murray Hill Mining and Milling Company v. Havenor* (66 *Pacific Reporter* 762); Supreme Court of Utah.

DUTY ON SULPHIDE OF ANTIMONY.—The Treasury Department is in receipt of a report that the case of *McKesson & Robbins v. United States* (No. 3,020) was recently decided in the United States Circuit Court for that district adversely to the Government. The merchandise involved consisted of certain "crude sulphide of antimony," which was assessed for duty at 20 per cent ad valorem as a non-enumerated manufactured article under section 6 of the act of July 24, 1897. The importers protested, claiming the merchandise to be entitled to free entry under paragraph 476 of the same act, which provides for "antimony, crude sulphite of."

The court finds that it seems to be admitted upon all sides that the word "sulphite" in the tariff is a misprint for the word "sulphide," as no chemist or expert on either side of the controversy knows of such a substance as "sulphite of antimony;" furthermore, that "sulphide of antimony" is a well-known article of commerce, identical with the merchandise involved in this case, and therefore holds the same to be entitled to free entry as claimed by the importers in their protest.—Circular of Treasury Department, April 7, 1902.

COPPER MATTE AND REGULUS. In a recent appeal of the El Paso Smelting Works from the Collector of Customs at El Paso, Texas, the Board of General Appraisers holds that copper matte is included within the term "copper, regulus of," in paragraph 534, act of July 24, 1897, and as such is entitled to free entry. As the question is one which affects large imports of material, especially from Mexico, we give the decision of the board below, practically in full.

The merchandise the subject of this protest consists of lead contained in certain copper matte. It was assessed for duty at the rate of 1½ cents per pound on the lead contained, under the provisions of paragraph 181 of the act of July 24, 1897, which, so far as pertinent, provides "Lead-bearing ore of all kinds, 1½ cents per pound on the lead contained therein."

The protestants claimed the merchandise to be entitled to free entry as copper regulus under the provisions of paragraph 534 of the same act which classes as free of duty "copper, regulus of, and coarse or black copper, and copper cement."

A further relevant provision (paragraph 182) of the act provides: "Lead dross, lead bullion or base bullion, lead in pigs and bars, lead in any form not specially provided for in this act . . . all the foregoing; 2½ cents per pound."

It is admitted by all parties to the record that the merchandise the subject of this protest is copper matte. A sample offered by the importers was submitted to the chemist in charge at the port of New York, for analysis, and he reported that it consisted of "copper matte containing 47.64 per cent of copper, and 18.43 per cent of lead."

The sole question to be determined is whether or not this merchandise is a lead-bearing ore under the provisions of said paragraph 181, or assimilates thereto, or whether it is properly dutiable as lead in any form not specially provided for in this act,

under paragraph 182, or whether or not it is included within the term regulus of copper, as used in paragraph 534. If copper matte is properly included within the term regulus of copper it is apparent that all issues in this case are disposed of by the solution of the question: Do the words "regulus of copper" under said paragraph 534 extend to and include copper matte? It was so held by this Board in G. A. 3,394 and G. A. 4,308, which latter decision was on appeal affirmed by the United States Circuit Court for the district of the State of Colorado. As that is not a published opinion, we here give it in full:

"This is an appeal from a decision of the Board of General Appraisers on the following facts: A smelting company imported from Mexico certain copper matte and entered it at the port of Pueblo. The surveyor of customs classified it for duty as 'lead-bearing ore.' The smelting company protested against this classification, and this protest was heard by the Board of General Appraisers and decided in favor of the smelter, the board holding that the matte was, in fact, copper regulus, and not lead-bearing ore. There was an appeal taken to this court from that decision.

"Paragraph 181 of the tariff act of July, 1897, makes dutiable lead-bearing ores of all kinds at the rate of 1½ cents per pound on the lead contents thereof. Paragraph 534 of the same act of 1897 puts on the free list copper regulus, and the question submitted is whether this matte is copper regulus. It appears that the copper matte contained about 25 per cent lead and about 34 per cent copper, and that it is not an ore in any strict sense of the term, but is a product of smelting. On the hearing before the Board of General Appraisers the witnesses were unanimous to the effect that as used commercially copper regulus and copper matte mean the same thing. The recent scientific authorities also, as quoted by them, and the recent dictionaries, define copper matte as synonymous with copper regulus. Perhaps a few years ago there was a slight distinction between the two. Copper matte always contains sulphur. When freed of this sulphur it would become copper regulus. But this distinction has been abandoned in recent years and both commercially and scientifically they have been used as synonymous terms. The Government introduced no witnesses before the Board disputing this fact whatsoever.

"In the tariff act of 1883 copper regulus was dutiable. It then became a question as to whether a matte of nickel and copper was a copper regulus under that act, and the Treasury Department held that it was in fact copper regulus and was dutiable under the provisions of this act. After the act of 1894 was passed, copper regulus was put on the free list. The question then arose in the Treasury Department as to whether a matte containing lead and copper, similar to the particular matte here, was copper regulus, and it was held by this same Board of General Appraisers that it was copper regulus and was entitled to be admitted free of duty. This rule was adopted by the Treasury Department and adhered to by them.

"This ruling was of course, or must be presumed to have been, known by Congress when it passed the tariff act of 1897. It has placed on the free list copper regulus in a paragraph in the same words as that of the tariff act of 1894. It must be presumed that it was done in view of the fact that copper matte and copper regulus has been determined to be the same and with the intent that copper matte should be admitted free under the paragraph. In view of the well-settled principle of construction of such acts, any ambiguity or uncertainty is to be resolved in favor of the importer and not of the Government. The decision appealed from must be affirmed."

The court decides that copper matte and copper regulus are synonymous terms, and are specially provided for in paragraph 534 of the free list of the act of July 24, 1897, under the enumeration for copper regulus. This conclusion of the court accords

with the views of eminent authorities upon the subject.

In the volume of the *Mineral Industry* (page 240), by R. P. Rothwell, for 1900, an article by E. Keller, on the elimination of impurities from copper matte, the following language is used:

"In the United States the term matte is applied to any sulphide product obtained by smelting sulphide ores. What in England and Wales is subdivided into coarse metal, blue metal, and white metal is in this country generally described under the class name of copper matte. In a few exceptional instances, lead and nickel must be classed as essential ingredients. Regulus is the term applied to a product obtained by smelting a matte in a reverberatory furnace, the other products being copper bottoms, slag, and flue dust, the copper is still in the form of sulphide."

This decision by the court was acquiesced in by the Government in said Treasury decision 21,291, and the board is not advised of any expression of any court contrary thereto. It purports to and does construe as synonymous the words "copper matte" and "copper regulus" and expressly holds that the term copper regulus as used in said paragraph 534 is intended to and does include all merchandise known in copper matte. In the presence of this authority the board deems the matter concluded, as the conceded fact in the case that the merchandise is copper matte no more than brings it within the purview of said paragraph 534 as construed by the court in the case cited.

ABSTRACTS OF OFFICIAL REPORTS.

Mayflower Mining Company, Michigan.

This company is developing a copper property in the Lake Superior District. Its report covers the year ending December 31, 1901. It shows cash on hand January 1 amounting to \$159,549; receipts for rents and interest, \$4,204; total, \$163,753. Expenses for development work, taxes, interest, etc., were \$47,993, leaving a balance of \$115,760 on December 31.

The directors' report says: "The exploration work at the mine, both on the surface and underground, has been carried along on substantially the same lines as heretofore, and although we cannot say with certainty that any lode of commercial value has yet been found, we still feel that substantial progress is being made. Practically nothing had been hitherto known of the underlying formations of this tract, and hence the work has been necessarily slow, but we find ourselves each season in possession of a better knowledge of the geology of the section and better able to interpret its characteristics.

"The tunnel has shown us that the formations on the eastern part of the property are disorganized, and that as we go west the lodes become more settled and better defined. In our work on the Old Colony property, lying just south of the Mayflower, we believed that a diamond drill cross-section would be of great value in locating certain veins thought to exist east of the Kearsarge lode. A drill was accordingly put in operation there last fall and has already traversed over 3,000 feet toward the east. Judging by the cores obtained, at least three of the lodes thus cut indicate good commercial value, and one seems to be identical with the Mayflower amygdaloid discovered last fall in the north half of Section Eight.

"It is our purpose, therefore, to continue explorations on this amygdaloid in order to test the character of this vein at greater depth and with wider openings than can be secured by a diamond drill, and on that account we are at the moment confining our operations to this point.

"The financial statement shows that work is being carried on at a small outlay and at quite a reduction even from that of the previous year. This, at the present rate of expenditure, leaves a balance in the treasury ample for all work now actually in hand or planned for in the near future."

Tamarack Mining Company, Michigan.

The report of this important copper mining company—the second in amount of its production in the Lake Superior region—covers the year ending December 31, 1901.

The general statement shows assets as follows on December 31: Cash and accounts receivable at Boston, and copper on hand, since sold, \$1,318,892; cash and accounts receivable at mine, \$77,544; supplies on hand at mine, \$295,605; wood and timber lands, \$280,419; Hancock & Calumet Railroad 5 per cent bonds, \$99,000; Mineral Range Railroad stock, \$250,000; Lake Superior Smelting Company stock, \$100,000; total assets, \$2,421,460. The liabilities were: Accounts payable at Boston, including advances on copper, since paid from the sale of same, \$1,656,008; accounts payable at mine, \$225,917; total liabilities, \$1,881,925; leaving a balance of assets December 31, 1901, of \$539,535, as below.

The statement of earnings and expenses for the year is as follows:

	Total.	Per lb. Copper.
Copper sales, interest, etc.....	\$2,627,954	14.60
Cost of mining, smelting, etc.....	\$1,820,548	10.11
Construction expenses.....	281,240	1.56
Total expenses.....	\$2,101,788	11.67
Net earnings.....	\$526,166	2.93
Dividends.....	1,200,000	.....
Deficit for the year.....	\$673,834	.....
Balance of assets, Jan. 1, 1901.....	1,213,369	.....
Balance, Dec. 31, 1901.....	\$539,535	.....

The average receipt per ton of rock stamped was \$4.19; cost, \$3.35; net earnings, \$0.84. The cost of stamping per ton of rock was 24.953 cents, or 5.9 per cent of the total cost. The total rock mined was 773,783 tons; rock stamped, 626,905 tons. The mineral obtained was 29,998,094 pounds, carrying 18,000,852 pounds—60.06 per cent—fine copper. The copper recovery from ore stamped was 1.435 per cent, or 28.7 pounds to the ton.

The total openings during the year were: 9,928 feet, divided as follows: Shaft sinking, 563 feet; drifting on conglomerate, 3,519; drifting on Osceola amygdaloid, 673; cross-cutting, 3,607; sinking winzes, 1,449; incline shaft, 117 feet.

The report of the superintendent, Captain W. E. Parnall, says: "At the mills the year's operation has been without serious interruption. Experiments have been conducted to determine the value of some new apparatus for use in treating the slimes. Several new forms of shaking tables have been given attention and trials, which have resulted in the adoption of the Wilfley table, to be used to dress up the fine mineral coming from the slime tables to a higher percentage. There seems to be a distinct advantage in doing this, and as a consequence we have added during the year seven of these tables. They do the same work that was formerly done by hand labor and give equal or better results with less expense. The cost of stamping—24.953 cents per ton—is a very good result for conglomerate under the conditions prevailing for the past year. The mill has not run near enough to its full capacity to get the best results, owing to a shortage of rock frequently occasioned by shut-downs at No. 2 shaft, which could never be anticipated nor guarded against. This shaft has had a great quantity of its timber replaced at various times during the year, but it cannot be put in good condition without an extended suspension of hoisting. The work we have been able to do in it every week has kept it in operating condition. The same policy will keep it going until a favorable opportunity occurs to give it a general repairing, which we intend to do as soon as the output of rock at No. 5 shaft is sufficient to keep up the supply of rock that we have been treating heretofore.

"It will be noted that the cost per ton treated for 1901 has decreased from that of 1900, although the cost per pound of copper at the mine has increased. It should be hardly necessary to point out that this increased cost per pound has come from the smaller amount of copper contained per ton of rock. There seems to be so much misapprehension as to the true

basis for estimating comparative costs between different companies that I have thought it only proper to draw your attention to the matter."

The directors' report says: "It is with regret that the directors are obliged to submit an unsatisfactory report for the year. This state of affairs has been chiefly brought about by the sudden drop in the price of copper, which found the company with a considerable portion of its product unsold, so that we realized an average of 14.22 cents per pound for our copper. A lower yield of copper from our rock has also contributed to this unsatisfactory result.

"The report shows that there has been distributed during the year to the shareholders from the surplus previously accumulated, between \$6 and \$7 per share, and, in addition, there has been charged against the surplus the amount of \$281,240, which represents new construction and improvements that have not been charged into operating expenses. The condition of the mine, however, is so satisfactory that the directors feel fully warranted in saying that if only a small proportion of the increase in the percentage of copper in the rock which they have reason to expect from No. 5 shaft is realized, it will be a matter of a very short time to restore the surplus to its condition at the beginning of the year 1901.

"While it is, of course, to be regretted that it was impossible to realize for our copper during the year the prevailing high prices of the first six months, it should be borne in mind that had we attempted to force our copper on the market earlier in the year the same result would have occurred which did occur when we instructed our selling agents to sell the balance of our copper later in the year, and that we should have thus lost the benefit of what copper we did sell at high prices. The officers of the company were acting in conformity with the ideas expressed by all the large copper producers in feeling that the decline in demand which set in early in the year was only temporary, and that there was no necessity of forcing copper upon the market. Some of the larger producers, however, after having waited a short time, began without our knowledge to cut prices and force their copper on the market. Feeling that the demand from abroad would increase, and not wishing to unnecessarily demoralize the market, we made no move to follow their example. When, however, we found that the result of our policy of maintaining the price was to permit our competitors to supply the demand at a lower price, and that we were getting no benefit from our action, we took the only course open to us and offered our copper in competition, with the result as has been above stated. While, therefore, it may seem at the first glance that it was a mistaken policy to hold our copper for high prices, it will certainly be seen upon reflection that while, of course, it enabled our competitors to make a better showing temporarily than ourselves, yet in our case we likewise obtained a better revenue for our stockholders than we would have done had we inaugurated a cutting of prices earlier in the year, which would have been necessary had we attempted to force our product on the market.

"The Hancock & Calumet Railroad has been broad gauged, and while this has necessitated on our part considerable expenditure to meet the requirements of heavier loads, it will result in a much more satisfactory service and a somewhat lower cost of transportation."

The depths of the several shafts December 31 were: No. 1 shaft, 3,352 feet; No. 2 shaft, 4,249.5 feet; No. 3 shaft, 4,799 feet; No. 4 shaft, 4,450 feet; No. 5 shaft, 4,938 feet.

Napa Consolidated Quicksilver Mining Company, California.

This company's report for the year ending December 31, 1901, shows receipts from quicksilver (including metal on hand), \$211,753; interest, \$1,110; total, \$212,863. Charges against earnings were: Decrease in supplies, \$2,912; expenses of working, \$136,213; construction and repairs to property, \$8,001; development work, \$23,111; total, \$170,237; leaving a balance of \$42,626 as net earnings for the year. From this dividends amounting to \$40,000 were paid,

leaving a surplus of \$2,626. The surplus at the opening of the year was \$68,121, making a total of \$70,747 carried forward to the current year.

The statement of work done during the year, compared with that for the previous year, is as follows:

	1900.	1901.	Changes.
Drifts run in mine, feet.....	10,170	9,488	D. 682
Ore reduced, tons.....	30,784	33,930	I. 3,146
Quicksilver made, flasks.....	4,550	4,800	I. 250
Quicksilver made, pounds.....	348,075	367,200	I. 19,125
Av. yield of ore, per cent....	0.57	0.54	D. 0.03

The average earnings per ton of ore reduced in 1901 were \$6.27; expenses, \$5.02. The average receipt per flask (76½ pounds) of quicksilver, were \$44.35; costs, including all expenses, \$35.47; net receipts, \$8.88. The company owns 340 acres of mining claims and also 1,560 acres of land at Oat Hill; also reduction works valued at \$94,210.

The report says: "As usual, we have devoted a large amount of work to prospecting and developing new territory, and while we have developed no large ore bodies during the year, we have a number of promising prospects. We have continued our practice of reducing all ores, which will pay as we take them out in course of our development work, whether high or low grade, and as we have opened out so much ground, we have put through the furnaces a large amount of medium or low-grade ores. We are doing extensive development work at different parts of the property with good prospects; notably on No. 3 levels and below, and shall continue to force this work with the expectation of finding larger deposits, such as we have found at times heretofore.

"The mine has held its own during the year very well, and so far as we can see our prospecting should show good results this year. Quicksilver is in good demand, the stock continues light, and prices are firm."

Consolidation Coal Company, Maryland.

This company owns a large coal property in the Cumberland District in Maryland. It also owns and operates the Cumberland & Pennsylvania Railroad, which carries nearly all the coal sent out of the region. The income statement for the year 1901 is as follows:

Earnings, mines and railroad.....	\$3,413,003
Other income.....	121,983
Total.....	\$3,534,986
Expenses, taxes and depreciation.....	2,553,879
Net earnings.....	\$981,107
Interest and sinking funds.....	475,812
Surplus.....	\$505,295

From this surplus dividends amounting to \$205,000, or 2 per cent on the capital stock, were paid, leaving a balance of \$300,295 to profit and loss.

The demand for coal during the year has continued good, and prices have been maintained. There is an increasing demand for Cumberland coal by rail shipments to Chicago and points west. While the company has in previous years made several shipments to the Pacific coast by vessels around Cape Horn, the past year was the first in which there has ever been a shipment of coal to San Francisco by rail from mines east of the Allegheny Mountains. A large portion of the company's trade consists of sales to the United States Government for bunker and coaling stations, and during the past year this has involved shipments of coal through the Suez Canal and around Cape Horn and the Cape of Good Hope.

In October the company sold its Locust Point pier to the Baltimore & Ohio Railroad Company, which has also recently completed at great expense a large pier at Curtis Bay, over which all coal for re-shipment to points outside the Capes will hereafter be dumped.

The company has added to the 22,210 acres of coal land referred to in the last annual report 2,194 acres. This was paid for out of royalty fund and will be carried in that fund until otherwise provided.

Since 1891 the company, acting under the advice of counsel, has refused to pay the taxes assessed upon its gross receipts by the State of Maryland,

contending that the law was unconstitutional. The Maryland Court of Appeals affirmed the validity of these taxes, but thereafter a settlement was effected with the State whereby the accrued interest and prescribed statutory penalties for non-payment were rebated. The amount paid in settlement was \$88,608, which has been charged against the profit and loss account.

The additions, renewals and betterments have put the mining plant in first class condition and will enable the company to meet more satisfactorily the increasing demands for its coal.

Output.—The total output for the year of coal mined by the company was 1,685,384 tons, an increase of 518,574 tons over that of the preceding year and the largest in the history of the company. The coal mined by lessees of the company on royalty amounted to 443,401 tons, making a total of 2,128,785 tons from its property. The production of the whole Cumberland Region for the year was 4,481,503 tons, against 3,368,464 tons in 1900, an increase of 1,113,039 tons, or 33 per cent.

The coal shipments over the Cumberland & Pennsylvania Railroad for the year were as follows:

Delivered to:	1900.	1901.	Change.
Baltimore & Ohio R. R.	1,969,034	2,505,728	I. 536,694
Pennsylvania R. R.	126,615	373,195	I. 246,580
Chesapeake & Ohio Canal.	111,134	193,063	I. 81,929
Local points.	88,124	101,096	I. 12,972
Total.	2,294,907	3,173,082	I. 878,175

The total increase was 38.3 per cent. In maintaining the railroad there were laid 24,378 new cross ties, 5,000 cubic yards of stone ballast and 1,051 tons of 80-pound new steel rails. The road is now equipped with steel bridges on first-class masonry at all points between Cumberland and Lonaconing.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Pacific Coast Electric Transmission Association. Transactions for 1901. San Francisco, Cal.; published for the Association. Pages, 210; illustrated.

Poudres et Explosifs. Dictionnaire des Matieres Explosives. By Dr. J. Daniel. Paris, France; Veuve Ch. Dunod. Pages, 825; illustrated. Price (in New York), \$10.50.

Annual Report of the United States Life-saving Service, 1901. Sumner I. Kimball, General Superintendent. Washington; Government Printing Office. Pages, 480.

The Recognition of the Fourth Dimension. By C. H. Hinton. Washington; published by the Philosophical Society of Washington. Pamphlet, 26 pages; illustrated.

Geological Survey of Canada. Annual Report of the Section of Mines for 1900. Elfric Drew Ingall, Chief of Section. Ottawa, Canada; Public Printer. Pages, 160; with diagrams.

Register of Mines and Minerals, Placer County, California. Prepared under supervision of Lewis E. Ambury, State Mineralogist. San Francisco; issued by the California State Mining Bureau. Pamphlet, 24 pages; with map.

BOOKS REVIEWED.

The Burning of Crude Oil for Steam Purposes, Particularly on Steam Vessels. Bulletin No. 2, California Petroleum Miners' Association. San Francisco; published by the Association. Pamphlet, pages, 32.

This pamphlet contains a brief article on the advantages of liquid fuel over coal for California consumers, with some other matter which is convenient for users or prospective users of oil for fuel purposes to know. Its object is to promote the use of oil for fuel, and it seems well adapted for that purpose.

Review of the World's Commerce. Prepared by the Bureau of Foreign Commerce, State Department. Washington; Government Printing Office. Pages, 232.

This volume contains a number of tables, showing the amount of our commerce with different foreign countries; and also some interesting particulars with regard to trade conditions in those countries and the opportunities for exports to them. It is one of a series which is of much value to exporters and to those who desire to export their products.

Tenth Annual Report of the Bureau of Industrial Statistics of Maryland, 1901. Thomas A. Smith, Chief of Bureau. Baltimore; State Printers. Pages, 256; with map.

This report contains a great deal of information relating to the various industries of Maryland. It treats of labor conditions, strikes, wages and similar matters. The only mineral industry of importance in the State is coal mining in the Cumberland region; and this is briefly dismissed, since it presented no special incidents during the year.

Third Annual Report of the Bureau of Labor Statistics of Illinois on Free Employment Offices. David Ross, Secretary of Bureau, Springfield, Ill.; State printers. Pages, 84.

The free employment offices started by the Labor Bureau of Illinois were intended primarily to meet the conditions following the close of the Columbian Exposition in Chicago, when a large number of laboring men, drawn there by the Exposition, were left without employment. They were an interesting experiment in the labor field. The present report gives details of their operation and the results secured.

Field Columbian Museum. Annual Report of the Director for the Year 1900-1901. Pages, 80; illustrated. *Geological Series, No. 9. The Dinosaur Beds of the Grand River Valley, Colorado.* By Elmer S. Riggs. Pages, 8; illustrated. *Geological Series, No. 10. Morosaurus and Camarosaurus.* By Elmer S. Riggs. Pages, 8; illustrated. Chicago; published by the Museum.

The report covers the working of the Field Columbian Museum in Chicago for the year ending September 30, 1901. It shows what has been done to forward the objects for which the museum was founded; the progress made with the collections, and other particulars of the work. The two bulletins sum up the information obtained by the parties sent out in the interest of the museum during the year, and are of interest to geologists.

Systematic Organization of First Aid Corps for the Treatment of the Injured in Mines. By Hamilton Fish, M. D. Ouray, Colo.; reprinted from the *Denver Mining Reporter*. Pamphlet, pages, 16; illustrated.

The author of this paper has had a great deal of experience in dealing with those injured in the mines of Colorado, and has paid much attention to the subject of the prompt and efficient treatment of such injuries. In the present pamphlet he gives some useful hints as to the methods which can be adapted to systematize "first aid" and to have the mine force always ready to meet emergencies of this kind, which are apt to arise at any time. The paper should be read carefully by mine superintendents and others concerned, and its suggestions can be adapted with much advantage.

First Report of the Geological Survey of Natal and Zululand. By William Anderson, Government Geologist, Pietermaritzburg, Natal; Government Printers. Pages, 138; illustrated.

The geological survey of Natal was begun under the present management in 1898, but work was necessarily postponed for over a year by the war, and its beginning was accompanied by many difficulties. What has been done so far is necessarily of a preliminary nature, mapping out the field for future work.

After a general introduction the report gives a historical sketch of the work done heretofore on the geology of Natal, accompanied by a bibliography. This is followed by special reports on the Reconnaissance Survey of Zululand; on the St. Lucia Coal-field; and on the Lower Tugela District. A scheme for the future working of the survey is appended. From the report it appears that a creditable amount of work has been done under difficult circumstances, and that the prospects are good for the future. The report is illustrated by a number of plates and half-tone reproductions of photographs.

Geological Survey of Georgia. Preliminary Report on the Roads and Road-building Materials of Georgia. By S. W. McCallie, Assistant State Geologist. Atlanta, Ga.; State Printer. Pages, 264; illustrated.

The subject of roads, their proper construction and maintenance, is one that is of great practical interest to the people everywhere, though unfortunately its importance has not been recognized until recent years; and is even now only partially appreciated. It is of especial interest in a State as rich as Georgia, which has a great area of valuable agricultural lands where the people are largely dependent upon the common roads for communication among themselves and for hauling the products of their farms to the railroads. The proper construction of roads and the best use of available supplies of material for making them are topics which a geological survey can well take up as part of the economic side of its work; for here it touches almost everyone in the community.

The successive sections of the report give a brief History of Road Construction and a paper on the Value of Good Roads as preliminary. These are followed by chapters on the Location and Surface Construction of Roads; on Maintenance and Repair; on Road Materials; and on Tools and Machinery used in Highway Construction. This general part takes up 100 pages of the book, and the remainder is devoted to the more special subjects of the Topography of Georgia in its Relation to the Highways; on the Road-building Materials of the State; and on the Roads of Georgia. In addition to the general discussion of road-building materials the report gives a statement by counties, showing what materials are at hand and available in different localities.

It is illustrated by a number of views showing road-making machinery, and also the results of work done in various sections of the State. The report is a thoroughly practical one, and should be of much service to the people of Georgia. It is to be hoped that it will be distributed in some sections of the State where the people have not yet realized the value of good roads and the continuous loss entailed upon them by bad ones.

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

The Olalla Copper Company.

Sir: The New York *Sun* of recent date published about a column on the flotation of the Olalla Copper Company which claims to hold very valuable properties—mineral claims, town-site, smelter site and railway—in the Similkameen District of British Columbia. The capital is stated to be \$8,000,000, and it was stated in the article that the stock would be placed on the New York and Boston exchanges. Prospective purchasers are cautioned to examine very carefully into the statements made by the promoters of this company because Olalla and the company's mineral claims are situated at a considerable distance from railroad transportation. It is the centre of a section of British Columbia which up to date is practically undeveloped except by shallow

prospecting. No transportation facilities other than by stage roads exist, nor is there any likelihood of railroad construction being carried on in the near future. In fact the section is to-day merely one with future possibilities, which will require years to develop. The company itself, unless registered in British Columbia as an extra-provincial company, has no legal status in the Province, and it is not so registered to date. The capitalization is so ridiculously large as to stamp the flotation as an uncertain proposition, to say the least.

An absolutely reliable authority examined the claims last year and only very shallow prospecting work has been done which exposed conditions far from what any mining engineer would consider as making a really good prospect.

WILLIAM M. BREWER.

Victoria, B. C., April 5, 1902.

A Laboratory of Engineering Research.

Sir: I have read with interest the very thoughtfully prepared article in your issue of April 5 on Engineering Research. I am able to state that your suggestion relative to an advisory council of engineers to work with the trustees of the Carnegie Institution has been anticipated and that the executive committee has requested me to arrange for the organization of an advisory committee to consist of the following named members of the profession: Wm. H. Burr, George Gibbs, George S. Morison, Charles P. Steinmetz, and R. H. Thurston.

Messrs. Burr and Morison are now out of the country, the one in Porto Rico, the other in Mexico; but they are expected to return in the latter part of April. We shall then endeavor to effect a prompt organization. Meantime, any suggestions that may come from interested correspondents in any department of engineering, and any statements of fact or reports of investigations in progress, will be welcomed and may be addressed to either member of the Committee in Engineering. They will be given careful consideration as soon as it proves practicable to take up the work.

Large as is the anticipated income of the Carnegie Institution, it is not at all improbable that it will be called for in full and, in any case, its expenditure will require very careful consideration.

R. H. THURSTON.

Ithaca, N. Y., April 8, 1902.

A Uniform Monetary Standard.

Sir: The proposition of "A. C." on page 468 of your issue of April 5, for a Uniform Monetary Standard is attractive, but such a standard would not abolish exchange, as he seems to think, since that is based not on intrinsic value of the coins, but on the relative value of the same amount of money in different places. Money is high where it can earn much, and low elsewhere, and that is what determines this movement on which bankers make their profits. In fact I think they would be the ones who would approve of this suggestion more heartily than any others.

T. J. JOHNSTON.

New York, April 8, 1902.

QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preferences will, of course, always be given to questions submitted by subscribers. Books referred to in this column can be obtained from the Book Department of the ENGINEERING AND MINING JOURNAL.)

Burning Filter-press Cloths.—Can you inform me through the columns of your paper of any chemical or chemicals used on the cloths from a Johnson or Perrin filter press when burning them preparatory to a recovery of values to shorten the time of burning?—P. D.

Answer.—A solution of niter is used on ordinary filtering cloth to hasten its burning. It might be used for the same purpose in cloths from filter-presses. We do not know of any other chemical which is used for this purpose.

Barium Sulphate.—Is there any demand for white barium sulphate, and, if so, by what firms is it purchased?—C. B. W.

Answer.—Barium sulphate is used to a considerable extent as an adulterant in, or substitute for, white lead. The coarser grades are used as a sizing material on canvas, which is used for wrapping cured hams, bacon, etc. The principal buyers are the Page & Krause Manufacturing Company and the J. C. Finck Manufacturing Company, of St. Louis, Mo.; the Arrow Rock Mining and Milling Company, Quincy, Ill.; Dingee, Weinman & Co., of Lynchburg, Va. There is a considerable inquiry also for witherite or barium carbonate, which is sometimes found associated with the sulphate.

Silver in Africa.—Is any considerable amount of silver ore known to exist in any part of Africa?—G. W. S.

Answer.—No large or important silver mines exist in Africa, and no large deposits of silver ore are known to exist. Of course, a large part of the continent has never been thoroughly explored or prospected for minerals, and it is possible that deposits of such ores may be discovered hereafter; but up to the present time Africa is not a silver producer.

Quicksilver in China.—Is there not a demand for quicksilver in China? Is any quicksilver ore mined or any of the metal saved in that country?—Z. T.

Answer.—China is in ordinary times a consumer of quicksilver. Considerable exports to that country have been made from San Francisco; as much as 3,000 flasks in one year having been shipped. It is believed that some is also obtained in China itself, and has been so obtained for a long time past. It is, however, impossible to ascertain the quantity, as there are no records to be obtained. This is the case with all mining operations in Chinese hands. A company, called the Anglo-French Quicksilver Mining Concessions, Limited, began operations some two or three years ago at Kwei-yang, in Kwei-chau Province, and the mines there promised very well. The disturbances following the Boxer outbreak forced the company to discontinue operations, however, but they have recently resumed work.

Briquetting Coal in Illinois.—Can you inform me through your valuable paper if briquetting of coal has ever been tried with success in Illinois? What by-products could be gained from this soft bituminous coal by that process? What is the best book on the subject?—H. C. L.

Answer.—Coal briquettes have been made by a concern in Chicago, but we do not know that it is now at work. There is no especial difficulty in making briquettes from Illinois coal. Their manufacture is entirely practicable and a very good fuel could be made. The difficulty is that briquettes cannot be made to sell at a profit in competition with coal at present prices.

In briquetting the coal is used in its raw state, and is not subjected to heat, as in making coke. It is usually ground or pulverized, where it is not already in dust or slack. There are no by-products which can be saved from the coal as there are in the coke-oven.

A complete account of recent practice in briquetting is given in the *Mineral Industry*, Volume VI. Manufacturers of briquetting machinery, whose addresses are given in our advertising columns, have issued catalogues which give a great deal of information on this subject.

THE McKIM GASKET.

The McKim gasket, manufactured by McCord & Company, Chicago and New York, and illustrated herewith, seems to combine all the necessary requisites of a good gasket. The gasket is constructed of a special packing encased in a soft rolled metal. The ordinary materials used are rubber compound and copper, but the gasket is also made of copper and asbestos, aluminum and asbestos, or any kind of metal or packing which is best for any particular purpose. The construction, which is well

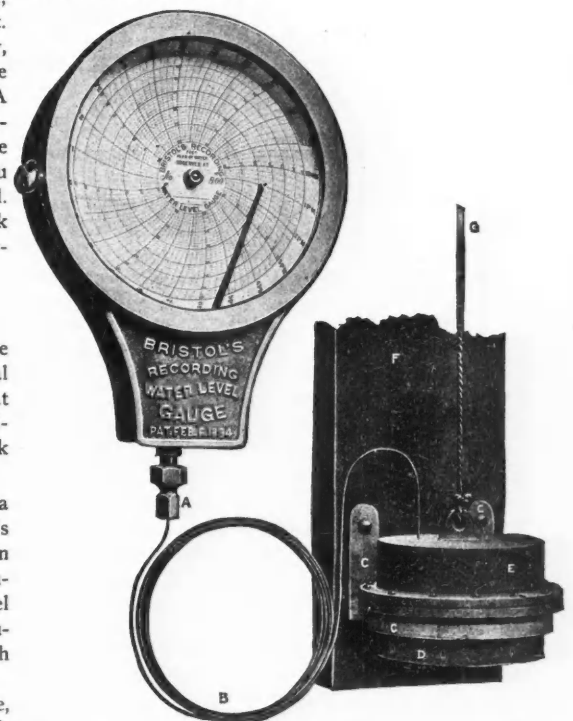


THE McKIM GASKET.

shown in the illustrations, will appeal at once to practical men, as is very easy to see that it combines the strength of the ordinary copper gasket with the elasticity of the packing gasket. It is guaranteed to stand 450 pounds steam pressure and has been tested to 1,100 pounds hydraulic pressure. One great advantage of the gasket is that it can be reapplied a great many times, which makes it especially valuable for manhole and handhole plates for boilers. McCord & Company's catalogue, which will be sent on application, contains testimonials from customers who have used it.

BRISTOL'S RECORDING WATER LEVEL GAUGE.

The Bristol Company of Waterbury, Conn., is placing upon the market an adaptation of its well known recording pressure gauge to an instrument for making a continuous record in ink upon a revolving chart, of the rise or fall of the level of water in a canal, reservoir, well or tank; it can also be used to record variations of sea level.



THE BRISTOL RECORDING WATER LEVEL GAUGE.

The construction and operation of the instrument will be readily understood by reference to the illustration shown herewith. A represents the union joint by which a flexible capillary tube B is connected to the recorder. This connecting tube terminates in the upper portion of the bulb casting E, and when the instrument is in operation it is immersed to a depth at which a record is desired. Between the flanges of the

upper and lower parts of the bulb E and D, a flexible diaphragm (convex downwards) of thin sheet rubber is firmly held, inclosing the proper amount of air for the operation of the instrument. Near the bottom of the lower casting D there are several holes for admitting water, the pressure of which acts upon the lower surface of the diaphragm, producing on the inclosed air a corresponding pressure due to its depth below the surface. The variations of the air pressure thus produced are communicated by means of the capillary tube to the recorder. The chart on the recorder is graduated into feet or inches head of water, or of the liquid which is being measured and it may be adapted to almost any desired range.

The upper casting or air-bulb is provided with an eye for a cable suspension. The air bulb is also shown with a flange resting on a ring bracket C. This bracket is designed to be secured to a plank F, which may be lowered into the water to any desired depth.

The recorder may be located at any convenient point for observation, either above or below the sur-

veyors are used to carry in or out or to spread material. Gravity does it all. It has been found to be practically impossible to spread any substance evenly over a large screen. Wide separators are weak, and they take up four times the room of the Sturtevant constructions. In these the screen box is supported on springs and shaken by a toggle. The toggle has no lifting to do; it has only to shake, and this it does four times for each revolution of the driving pulley, which does not have to run fast, and moves so easily that the power required is estimated to be less than that used by any other screen of large capacity.

The toggle is an ideal vibrator for screens, and besides being simple is scarcely harmed at all by grit. Toggles have the same durability in screens as in the roll-jaw fine crushers made by the same company. In the illustrations Fig. 1 is an outside view, while Fig. 2 shows the construction.

The improvements described have reduced inclined separators to one-fourth their former size, and have given strength and durability to the weak points. By setting the toggle so as to vibrate the box and its screens vertically another advance securing a further

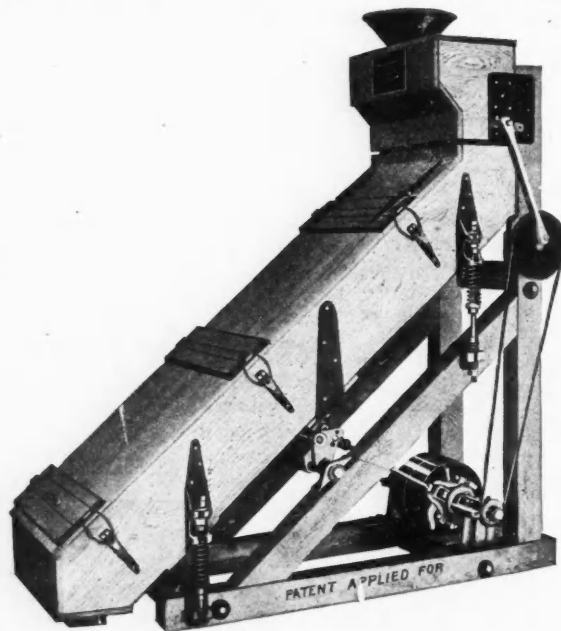


FIG. 1.

THE STURTEVANT TOGGLE SEPARATOR.

face of the liquid to be recorded. The accuracy of the instrument is not affected by the location of the recorder or by the length of the capillary connecting tube. An important advantage that instruments of this form have over those of ordinary type which are operated by floats, is that its continuous performance and accuracy cannot be affected by ice in winter.

THE STURTEVANT TOGGLE SEPARATOR.

Inclined shaking screens, although comparatively new, have, because of their extraordinary capacity nearly displaced all other separating devices within their field of usefulness. Durability has also been an important factor in their adoption. Inclining a screen has much the same practical effect as reducing the size of its meshes, and therefore a comparatively coarse wire on a steeply pitched screen may be used for fine separations. This explains their lasting qualities, as heavy wire cloth is more durable than delicate constructions. Inclined separators are also cheap, because they are ready to run as soon as a belt is attached without any boxing, hopping, or setting up expenses. All these good points have become known and are appreciated.

The Sturtevant Mill Company, of Boston, Mass., has made special studies of screen constructions and effected important improvements in inclined screens. Their separators have four screens (48 square feet in all), placed, and firmly held, one over another, in a strong box 2 feet wide and 6 feet long. Each screen is a substantial construction and easily handled; for it is small. Each receives equal feed, evenly spread over the wire surfaces. One outlet discharges the tailings, another the fines. No con-

increase in the capacity of inclined separators has been attained. It was noticed that an inclined screen vertically shaken throws the material upon it upward in vertical lines. This could then, obviously, only fall back to the point from which it started. Thus no material could pass over the screen while in the air; it could only slide down while on the wire. Thorough screening was thus accomplished, all the surface being used. In other inclined shaking screens the particles are projected in a forward direction, and dropped vertically from the point where the upward movement ceases to a point on the screen considerably below where they started. Thus the material in common screens passes down while in the air and skips much of the screening surface. Vertical vibration requires no theory to explain its practical advantages. It proves itself in considerably increased outputs. All inclined vibratory separators may be clothed with perforations varying anywhere from $\frac{1}{2}$ inch to 200 mesh, as ordered.

A NORWEGIAN IRON MINE RAILROAD.—The railway from Narvik to the Swedish frontier, the construction of which was decided upon in 1898 by the Norwegian Storting, is to be opened for traffic before January 1, 1903, and this line, in conjunction with the railway which is being built on the Swedish side from Gellivara to the frontier, and which is also to be completed by January 1 next, will place the districts around Boden, on the Ofotenfjord, in direct railway communication with the Swedish Northern main line, which is now being extended in the direction of the Finnish frontier. The railroad will serve an important iron mining district.

PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

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

Week Ending April 1, 1902.

696,396. MACHINE FOR PULVERIZING AND SEPARATING LIME.—Colby M. Avery, Chicago, Ill., assignor to the Chisholm, Boyd & White Company, a corporation of Illinois. In a machine for pulverizing lime, an inclined revolving barrel, having a perforate portion near the lower end thereof constituting a screen, and means for supplying steam to said barrel, in combination with a hopper beneath said perforate portion, and a removable head at the lower end of said barrel for permitting the removal of material from said barrel.

696,401. LATERAL ADJUSTER FOR SURVEYING INSTRUMENTS.—Christian L. Berger, Boston, Mass. A lateral adjuster for mining-transits, comprising a guide-plate provided centrally with means for rigidly securing the same on a usual tripod, a side-plate mounted thereon, said two plates being mutually provided with co-operating ways for maintaining accurate direction of movement, a thumb-

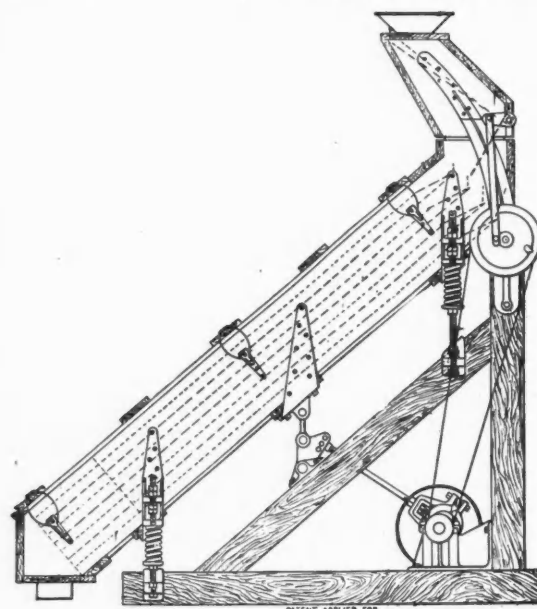


FIG. 2.

screw in engagement with said two plates for accurately moving the top plate on the bottom plate, and means for mounting above said top plate a mining-transit.



696,403

696,403. CAM-FASTENING FOR SHAFTS OF STAMP-MILLS.—Edward A. Blanton, Jr., Wallingford, Pa., assignor to Blanton Patents Syndicate, Limited, London, England. The combination with a shaft, of a curved wedge secured against rotation thereon and having an outer face upon a curve, the radii of which measured from the center of the shaft gradually increase, and a hub with an opening corresponding in part with and bearing on the face of the shaft and in part with and bearing on the entire outer face of the wedge.

696,410. PROCESS OF INDURATING PLASTER-OF-PARIS.—Abram Broodsky, Montreal, Canada. A process of hardening plaster-of-paris, which consists in subjecting the same to boiling alum maintained in a seething state during treatment.

696,420. MECHANICAL STIRRER OR POKER FOR GAS-PRODUCERS.—John W. Dougherty, Steelton, Pa. In a gas-producer, the combination of a square chamber, a stirrer shaft or shaft extending parallel to walls of said chamber, stirrer-arms on said shaft or shafts, which arms extend substantially to said walls and stir substantially the whole of the horizontal cross-section of said chamber, and means for revolving said shaft or shafts.

696,444. CLAM-SHELL BUCKET AND OPERATING MECHANISM.—Frank E. Hulett, Cleveland, Ohio.—In a combined clam-shell bucket and operating mechanism therefor, a frame, a power-transmitting mechanism mounted in said frame, a scoop, a shaft mounted near the center line of said frame, a support rotatably suspended from said shaft and having its lower end secured to the front end of said scoop, a second shaft mounted below the first-mentioned shaft and at a greater distance from the center line of the frame than the first-mentioned shaft, a support rotatably suspended from said last-mentioned shaft and secured at its lower end to the rear end of said

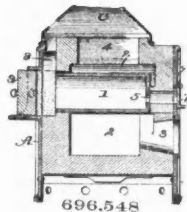
scoop, and means for operatively connecting the power-transmitting mechanism with said scoop.

696,452. AMALGAMATOR.—Ernest J. Kiss, Fort Wayne, Ind. An amalgamating apparatus consisting of a retort arranged over a suitable furnace; a rotatable agitator mounted in said retort; means for feeding the ore into the said retort; an inlet-chute adapted to contain a body of mercury to form a seal to prevent the escape of mercury-fumes from the retort and a water seal closing the outlet of said retort, and in which the mercury-fumes of the said retort are condensed and the amalgamated particles of precious metal are collected.

696,456. RETORT-FURNACE.—David Laird, Forfar, Scotland. In combination a retort, a dome of fire-clay in which the retort is placed, said dome having below the retort an inclined flame-passage, and around the sides and upper part of the retort a space tapering toward the end of the retort, lateral passages communicating between the flame-passage, and the space, a fire-clay bed, below the retort upon which the same rests, said fire-clay bed being supported by the dome, and a burner for liquid hydrocarbon or gas, and air under pressure.

696,469. ART OF TREATING ORES.—Robert McKnight, Philadelphia, Pa. The art of treating ores containing precious metal in a flour-state and also in larger particles, which consists in heating with free access of air and agitation, a mixture of the ore, containing a refractory metalloid and a haloid salt of an alkaline or alkaline-earth metal, until a haloid salt of the precious metal is produced and volatilized and the coarser particles of the precious metal have their surface coatings removed, and the alkaline or alkaline-earth metal unites with the oxygen of the air and with the refractory metalloid, to form a stable oxysalt, collecting the volatilized haloid or oxyhaloid of the precious metals, and treating the cleansed particles by amalgamation.

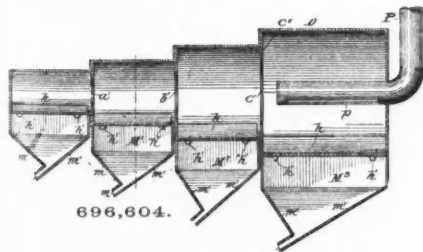
696,504. REGULATING DEVICE FOR AIR-COMPRESSORS.—Henry C. Sergeant, Westfield, N. J., and William Prellwitz, Easton, Pa., assignors to the Ingersoll-Sergeant Drill Company, New York, N. Y., a corporation of West Virginia. The combination with an air-compressor and a motor therefor and the governor and means for controlling said mechanism by the pressure of the air delivered by the compressor.



696,504

696,548. ASSAYING-FURNACE.—Albert C. Calkins, Los Angeles, Cal., assignor to Frederick W. Braun, Los Angeles, Cal. An improved assaying-furnace comprising a combustion-chamber having a main top flue, a muffle arranged horizontally in said chamber and having its front end open, and its rear end provided with an air-inlet and a device for regulating admission of air thereto, means for temporarily closing the front end of the muffle, and a supplemental flue or passage leading up from such end of the muffle.

696,526. GOLD-DREDGE.—Thomas B. Lee, Farmington, N. Mex. A dredge consisting of a tapering tubular body particular in length and provided with an air-hole in one end and with a bit or blade at its opposite end, in combination with cables to move it forwardly, rearwardly and vertically to rotate it on its axis.



696,526

696,604. ORE-CONCENTRATOR.—Albert H. Stebbins, Little Rock, Ark. The combination of a plurality of stationary drums arranged in series and connected end to end, an inlet for introducing ores or the like into the first drum of said series of drums, and means tangential to the drums for introducing a separate or independent blast of air or other fluid into each of said drums to thereby cause the material contained in the drums to travel in circular paths within the same.

696,605. ORE-CONCENTRATOR.—Albert H. Stebbins, Little Rock, Ark.—The combination of a plurality of independent compartments similarly arranged in series, an inlet and central outlet for each of said compartments, a discharge-opening for the concentrates near the bottom of each compartment and a concentrate-box in communication with said discharge-opening, means for introducing a blast of air or other fluid through the inlet of the first compart-

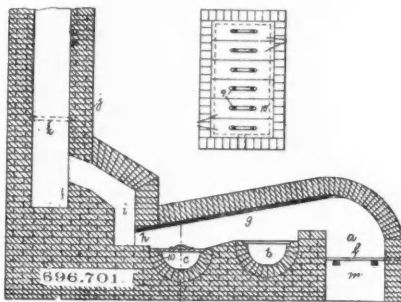
ment of the series and tangential thereto, the inlet of each of the remaining compartments being tangentially arranged and in communication with the central outlet of the next preceding compartment.

696,606. ORE-CONCENTRATOR.—Albert H. Stebbins, Little Rock, Ark. The combination of a funnel-shaped incasement of gradually-increasing cross-sectional area from one end to the other, said incasement being closed at its smaller end, a feed-hopper leading into the funnel-shaped incasement at its smaller end, a fluid-distributing chute tangentially arranged with reference to said incasement and leading into the same, an outlet for the concentrates, located in the wall of the incasement above the lowest portion thereof, and a series of concentrate-boxes in communication with said outlet, whereby as material fed into the incasement at its smaller end is given a spiral or gyratory motion within the incasement and moved toward the larger end thereof, the concentrates or heavier particles are subjected to decreased fluid-currents and pass through the outlet into the concentrate-boxes according to their specific gravity.

696,607. HEATING-FURNACE.—Maximilian M. Suppes and Ralph Crooker, Jr., Elyria, Ohio. In a furnace for heating blooms or other pieces of metal, the combination with a preheating chamber or hearth, and means whereby the blooms or other pieces may be moved along said hearth, of a finishing chamber or hearth situated laterally of the preheating chamber or hearth, and a connection between said chambers or hearths through which the blooms or other pieces may be transferred from the preheating to the finishing chamber or hearth by lateral movement.

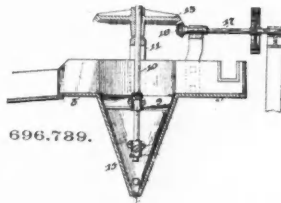
696,628. DISINTEGRATING-MACHINE.—Archibald A. Dickson, Toronto, Canada. The combination of a rotating cylinder, having a series of beaters or breakers pivoted thereto, a hopper, a curved concave grate or screen set eccentrically to the cylinder to form a throat contracting in the direction of the progress and elimination of the material as it is reduced, and a hood or casing extending over the beaters to a point on the same side as the feed.

696,683. CHUTE.—Van Wert B. Johnson, Washington, D. C. Independent chutes having a common receiving-mouth, one of said chutes having an imperforate bottom, the bottom of the other being perforate, and separate means for controlling the passage-way through each chute whereby the material may be passed through either chute and consequently delivered screened or un-screened.



696,701

696,701. FURNACE.—William Wakely, Taunton, Mass. The combination with a combustion-chamber, an outlet therefor, and an intermediate passage downwardly inclined from the combustion-chamber to said outlet, of a plurality of substantially narrow deep basins or receptacles formed in the hearth of the furnace with the basin remote from the combustion-chamber at a lower level than the one adjacent to said combustion-chamber, the said basins being extended transversely of the furnace and separated by a portion of the hearth of substantial thickness and having its surface of such inclination as to direct the flame passing over the lower basin to substantially the longitudinal center of the said basin.



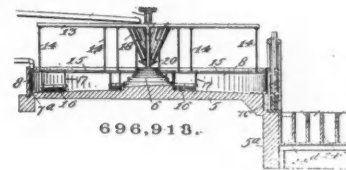
696,789

696,739. ORE-CLASSIFIER.—John Klein, Desloge, Mo., assignor of two-thirds to Paul A. Fusz and Charles D. McLure, St. Louis, Mo. An ore-classifier, consisting of a hopper adapted to receive the mixture containing the ore, an ore-outlet, a sledge-outlet, an agitator within the hopper, gearing for operating the agitator, and a device for automatically stopping the agitator when the hopper contains too much ore.

696,749. GUIDE FOR OIL-WELL-PUMP RODS.—Clark F. Rigby, New Martinsville, W. Va. Means for holding deep-well pumps from rotating, comprising a body having a vertical passage-way, said passage-way being of such form as to prevent rotation of the pump-rod which reciprocates there-through, and tube-impinging springs projecting laterally from said body, said springs being of sufficient strength to resist rotation of the pump-actuating mechanism and pump.

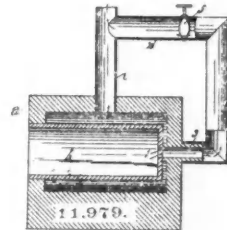
696,841. CULM DRIER AND SEPARATOR.—James W. Perry, Shamokin, Pa. The combination of an inclosing casing, one or more screens in the upper portion of the casing, feeding and discharge chutes co-operating with said screens, a fire-box in the lower portion of the casing, a hopper above the fire-box, a heat-conducting pipe leading from the fire-box to the upper portion of the casing adjacent to the screens, and means for conducting refuse material falling through the screens to said hopper.

696,898. SHALE-ROCK PLOW.—Henry G. Butler, Danville, Ill., assignor of one-half to William Butler, Danville, Ill. A combination plow and crusher, comprising a platform having a continuous under crushing-surface adapted to contact with and by the inherent weight of the platform to crush the plowed material, plow-blades secured to and extending beneath the platform, and means for vertically adjusting the blades.



696,918

696,913. CONCENTRATOR.—William H. Sullivan, Denver, Colo., assignor of forty-nine one-hundredths to Oscar C. Reitze, George T. Reitze and C. B. Richmond, Denver, Colo. In combination, a fixed table having an inclined surface with a fixed trough about the same, deeper at one point than at another, a pair of gates at the deeper part of the trough, said gates being different planes, a pedestal provided with a series of steps, a vertical shaft extending from said pedestal and journaled therein, the stationary frame in which the said shaft is journaled at its upper end, the sweeps connected to the shaft, the drags carried by the sweeps to move over the table, a hopper carried by the sweeps and surrounding the shaft, said hopper directing the material onto the steps of the pedestal, a trough for directing the material to the hopper, and means for driving the shaft.



11,979

Re-issue No. 11,979. ASSAYER'S FURNACE.—John J. Lonergan and Albert C. Calkins, Los Angeles, Cal., assignors, by mesne assignments, to F. W. Braun & Company, Los Angeles, Cal. Original No. 608,883, dated August 8, 1898. An assayer's furnace consisting of a furnace-body, a muffle therein provided with a draft-opening, and draft-inducing means exteriorly of the furnace-body in communication with the draft-opening of the muffle.

GREAT BRITAIN.

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

Week ending March 13, 1902.

3,254 of 1901. ROCK DRILL STAND.—C. Hodkinson and G. Cook, Wigan. Method of fixing rock-boring machines on pit props instead of having a special stand.

3,671 of 1901. BRIQUETTING ORES.—L. Yousbasheff, St. Petersburg, Russia. Use of hydraulic cements as binding material for fine ores.

4,052 of 1901. TESTING FIRING CABLES.—J. T. Stobbs, Stoke-on-Trent. Method of testing firing cables in mines in an atmosphere where naked lights are not allowed.

4,917 of 1901. HEATING FURNACE.—H. D. Hibbard, Plainfield, N. J., U. S. A. Improved furnace for gradually heating articles made of manganese steel, in the process for hardening such.

5,215 of 1901. SUPERPHOSPHATE-MAKING.—R. Burnard, Plymouth. Making alkaline superphosphate by adding quicklime to acid superphosphate.

7,568 of 1901. STEEL-MAKING.—V. S. Fattelay, St. Etienne, France. Method of making steels of great hardness, with 15 per cent of tungsten, titanium, etc.

24,837 of 1901. COKE OVEN LINING.—S. T. Wellman, Cleveland, O., U. S. A. Use of magnesite in manufacturing coke oven bricks.

26,525 of 1901. DRILLING DEEP HOLES.—Davis Calyx Drill Company, New York, U. S. A. In the shot system of drilling deep holes, in rock, using only sufficient head on the water to raise the debris a short distance instead of to the surface, and so not disturbing the shot.

PERSONALS.

Dr. Cabell Whitehead has resigned as chief assayer of the Mint.

Mr. F. C. Dobber is now manager of the Cornucopia Mine, Cornucopia, Ore.

Mr. Victor M. Clement recently returned to Salt Lake, Utah, from Mexico.

Mr. Richard Eames, Jr., is inspecting mining property in Arizona and Mexico.

Mr. G. W. Small has returned to Salt Lake, Utah, from a 5 months' absence in Mexico.

Mr. T. R. Heintz, of Salt Lake, Utah, has been visiting his mining property in Shasta County, Cal.

Mr. Walter Hiley, of the Otto-Hilgenstock Coke Oven Company, London, is on a visit to this country.

Mr. Henry Colbath succeeds Mr. H. W. Fox as superintendent of the Golden Gate Mill, Mercur, Utah.

Mr. Thomas Moffett is now superintendent of the Oregon Monarch Gold Mining Company, at Sumpter, Ore.

Mr. George W. Parsons, who has been on an exploring trip through Nevada recently, has returned to Los Angeles, Cal.

Mr. Benjamin Talbot, formerly of Philadelphia, the inventor of the Talbot continuous process, is in this country.

Mr. B. F. Lewis, of Los Angeles, Cal., has been looking over mining properties in the Searchlight District, Nevada.

Mr. L. Humphrey, of Central City, Colo., has gone to Durango, Mex., to examine some mines for an Eastern syndicate.

Mr. E. W. Bliss, president of the E. W. Bliss Company, of Brooklyn, N. Y., has sailed for an extended trip to Europe.

Mr. J. W. Duntley, president of the Chicago Pneumatic Tool Company, has gone to England. He will be absent about a month.

Mr. Edward V. d'Inwilliers, geologist and mining engineer, has removed his engineering offices in Philadelphia, Pa., to 506 Walnut street.

Mr. Gardner Williams, manager of the De Beers Consolidated diamond mines, South Africa, is now en route to Kimberly from London.

Mr. Charles d'Autremont, Jr., of Duluth, Minn., who has spent several months at Hermosillo, Sonora, Mex., has been in Los Angeles, Cal.

Mr. A. B. Rogers, a prominent mining man of Aspen, Colo., has been making a visit to Gilpin County, where he has mining interests.

Mr. Hudson H. Nicholson, mining engineer, of Denver, Colo., is at present engaged in mine examinations in Northwestern New Mexico.

Mr. Jas. Byrnes, of the Small Hopes Company, who has been on a visit to New Orleans, La., has returned to his home in Leadville, Colo.

Mr. L. W. Tatum, mining engineer, of Chicago, Ill., has been in Bradshaw Mining District, Yavapai County, Ariz., on professional business.

Mr. Charles Wilhelm, manager of the Velardena Mining and Smelting Company, near Torreon, Mex., is to visit the United States on business.

Mr. Chas. Swan, of Danville, Ill., was reappointed, April 1, Commissioner of the Danville District Coal Operators' Association for another year.

Mr. Joseph H. Shockley, mine superintendent of the Four Metals Mining Company of Telluride, Colo., has been in New York City during the past week.

Mr. Fred J. Siebert, of Salt Lake, Utah, has been in Philadelphia, Pa., at the annual meeting of the shareholders of the Tonopah Gold Mining Company.

Mr. C. A. Hopkins, director and treasurer of the Quartette Mining Company, Searchlight, Nev., has returned to Boston, Mass., from Los Angeles, Cal.

Mr. W. A. Hungerford, manager of the Atlas Gold and Arsenic Company, of Hastings, Ontario, Canada, was in Colorado recently examining a mine near Ouray.

Judge A. W. Stone, of Buffalo, N. Y., is in Gilpin County, Colo., visiting the property of the Cashier Gold Mining and Reduction Company, in which he is a stockholder.

Mr. Earl Hanna, chief engineer of the Dominion Iron and Steel Company, Sydney, N. S., has charge of the erection of the blast furnaces of the Union Steel Company at Donora.

Mr. Albert R. Ledoux, of Ledoux & Co., has been elected a member of the New York Metal Exchange. The firm of Ledoux & Co. has been licensed as weighers by the Metal Exchange.

Mr. Albion S. Howe, mining engineer of San Francisco, Cal., has returned to that city after inspecting several mining properties in Southern California in the interests of Eastern and foreign capitalists.

Mr. W. J. Prisk has severed his connection as

manager of the Guffey-Jennings Mine, and superintendent of the Baltimore and Nova Scotia Mining Company at Cariboo, and is now residing at Truro, N. S.

Mr. J. D. Hurley, formerly vice-president and general manager of the Standard Pneumatic Tool Company, has been appointed manager of the Chicago Pneumatic Tool Company, with headquarters at Chicago.

Mr. A. Chester Beatty, representative of Mr. John Hays Hammond, has been spending some time at Leadville, Colo., and rumor has it that he is looking into some important properties with a view to making a purchase.

Mr. W. E. Taylor, of Youngstown, O., who recently retired as general manager of the Republic Iron and Steel Company, is connected with an enterprise which contemplates building a large open-hearth steel plant near Youngstown.

Mr. S. W. Mudd, manager of the Ibox and Small Hopes combinations at Leadville, Colo., is recreating in California. The report that Mr. Mudd will accept the position of manager of the Portland Mine at Cripple Creek is denied.

Mr. A. C. Gary, treasurer of the Lorain Steel Company, has resigned to accept the office of credit manager of the Illinois Steel Company at Chicago, Ill. Mr. Gary is a nephew of Judge Gary of the United States Steel Corporation.

Mr. C. B. Flynn has associated himself with New York City men and has organized a company of \$2,500,000 capital to take over various mining properties in the neighborhood of Parral, Mexico. Development work is now in progress.

Mr. Cyrus Robinson, in addition to his position as chief engineer for the American Smelting and Refining Company has been appointed consulting engineer for the Guggenheim's Exploration Company. Mr. Robinson left New York City April 16, on business for the corporations he represents.

OBITUARY.

William H. Havens, a pioneer machinist of Colorado, died at Denver recently. Mr. Havens was a Canadian by birth, coming to this country in 1863. For some years he followed his trade at Black Hawk, Colo. Twenty years ago he moved to Denver, and with Frank Ebert incorporated the Colorado Iron Works. Four years ago he sold his interest in the company, and established machine works in Idaho Springs. A year ago he retired from business.

Joseph Richards, who died recently at his home in Philadelphia, Pa., was one of the pioneers of the aluminum industry. He was born in Stourbridge, England, in 1840, and was a manufacturing chemist in Oldbury, England, for a number of years. In 1872 he came to America to engage in chemical work. He was superintendent of the Delaware Metal Refinery, Philadelphia, for nearly 30 years, and it was while engaged in refining zinc, lead and tin, about 1884, that he became interested in aluminum and applied and patented the use of aluminum in the galvanizing bath, and also took out patents for an aluminum solder, which bears his name. For this solder he received the "John Scott" medal of the Franklin Institute, an important one of which was a medal for his testing machine for determining the grade of lead-tin-solders. His latest work was in the investigation of aluminum-zinc alloys and manufacturing them for commercial use.

Mr. Richards was a long time an active member of the Franklin Institute of Philadelphia. He served as president of the Metallurgical Section and vice-president of the Chemical and Electrical Sections, and contributed a number of articles to the *Journal* of the Franklin Institute, an important one of which was a paper on "The Utilization of White-Metal Wastes," which embodied much of his 30 years' experience with these metals. Mr. Richards left a widow, a son and two daughters. His son, Dr. Joseph W. Richards, is assistant professor in metallurgy at Lehigh University.

SOCIETIES AND TECHNICAL SCHOOLS.

UNIVERSITY OF CALIFORNIA.—Work has begun on the site of the new mining building. The building is 181 by 225 ft., 3 stories high, and will cost \$500,000. Mrs. Phoebe Hearst is erecting the building as a memorial to her husband.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on April 5 79 members and visitors were present. Messrs. George Lewis Mayer, H. W. Reynolds, Horace E. Setchell and W. L. Wright were elected to active membership, and Messrs. Wm. H. Baker, DeWitt D. Barlow and A. B. Morrison, Jr., to junior membership.

Mr. John Birkinbine presented the communication of the evening upon the "Changes in the Manufacture of Pig-Iron," and illustrated his remarks by a large series of drawings and photographs projected by the

lantern. Pig-iron was first manufactured in Massachusetts in 1645, and after 5 other States had started this business, the first furnace in Pennsylvania was put in blast about 1720. These old furnaces were all located near water-power for operating the bellows which supplied a cold blast, and charcoal was used until 1840, when a prize was awarded to a Pottsville furnace for iron smelted with coal. The old furnaces averaged about 13 ft. bosh by 60 ft. height, with 2 to 4 tuyeres; but these figures have been increased until, in 1901, the Warwick Furnace was built with 21 ft. bosh by 100 ft. height, with 16 tuyeres. The methods of smelting have been so much improved that to-day about 8 times as much iron is made with fewer furnaces in blast than 30 years ago. The progressive methods of mining the iron ore, with data as to amounts, were also described and illustrated. A discussion followed, which was participated in by Messrs. Charles Hewitt, James Christie and Edwin F. Smith.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on April 2, 27 members and 8 visitors were present. Messrs. P. J. Markmann, F. T. Llewellyn, W. H. Getz, C. D. Allan and W. E. Winn were elected to membership.

Mr. Wall was elected treasurer to fill the vacancy caused by the resignation of Mr. G. I. Bouton.

The president then introduced Mr. H. H. Humphrey, who read a paper entitled, "Notes on the Use of Beaumont Oil as Fuel." The oil district is only a few hundred acres in extent and the wells are thickly crowded. The capacity of the wells ranges from 10,000 to 80,000 bbls. per day. If all the wells were allowed to flow at once and the pressure was not diminished, the total flow would be about 7,000,000 bbls. per day. While the oil is of great importance to the Southwest, where coal is scarce and of inferior quality, its use in more remote districts appears to be limited by transportation rates and facilities. The price at St. Louis was recently quoted at \$1.14 per bbl., of which 9c. was for the oil and \$1.05 for the freight. The oil is a smokeless fuel when properly burned. The steam jets used in connection with the burners consume from 3 per cent to 13 per cent of the total steam generated. The present insurance rules require a minimum distance of 50 ft. between an underground tank and the nearest building. Its use in cities would therefore require considerable expense for storage space.

In one plant in Texas for which estimates were made it required oil valued at \$1.39 to equal a ton of coal at \$2.50. At St. Louis the price will have to be reduced to about 60c. per bbl. to compete with coal. Some bids were received for the oil burning equipment of 2 100-h.p. boilers. The prices ranged from \$704 to \$1,525. The price of oil, f. o. b. Dallas, ranged from 45c. to 50c. per bbl. on a year's contract, and the price increased with the length of term of the contract. The best tests show an evaporation of about 15 lbs. of water to 1 of oil.

The paper was discussed by Messrs. Flad, Bausch, Perkins, Johnson and others.

INDUSTRIAL NOTES.

The Telluride Iron Works, of Telluride, Colo., owned and operated by H. M. Sackett, is to be enlarged. A new addition will be built to the foundry.

The American Locomotive Company, from its Pittsburgh, Pa., shops, will shortly make a shipment of 14 locomotives to South Africa, for the Cape Government Railways.

The Gardner Electric Drill and Machinery Company, through its Denver, Colo., office, is reported to have recently secured orders for drills for shipment to Mexico and Australia.

Simonds & Wainwright, mining engineers and metallurgists, have been appointed assayers for the New York Metal Exchange. Francis H. Simonds has been elected a member of the exchange.

The McKiernan Drill Company, of New York City, has just secured from the New Jersey Zinc Company of New York City, for the zinc mines at Franklin Junction, N. J., an order for 2 cross compound condensing corliss air compressors of a capacity of 6,534 cu. ft. free air per minute each, involving a transaction of \$50,000.

The newly-elected board of directors of the Pittsburgh Coal Company has organized as follows: Chairman and president, Francis L. Robbins; vice-president and treasurer, J. D. Nicholson; secretary, F. J. LeMoyné; auditor, J. B. L. Hornberger. A. M. Neep will continue as counsel and the Union Trust Company as transfer agent.

The main building of the American Copper Extraction Company, at Garwood, N. J., was almost entirely destroyed by fire on April 12. The building was 300 ft. deep by 200 ft. long and 2 stories high. Inside of an hour the building and its contents were nearly destroyed. The loss is given as between \$25,000 and \$30,000, and is covered by insurance.

The Mine and Smelter Supply Company, of Denver, Colo., recently shipped a \$40,000 plant to Peru for the Inca Mining Company. The equipment embraces a

30-stamp mill, 8 Wilfley concentrators, boilers, engines and lathes. The machinery is put up in small packages, none of which weigh more than 300 lbs., as the consignment will have to be packed on the backs of llamas into the interior.

The W. A. Jones Foundry and Machine Company, of Chicago, Ill., maker of power transmission machinery, recently sold the Webster Manufacturing Company, of Chicago, a special pulley turning and boring machine, the capacity of which is 54 in. diameter and 30-in. face. These machines are being built regularly for the market, and the company reports a large number of inquiries from all parts of this country as well as Europe.

The entire plant, including furnace, ore mines and rights of the Valentine Iron Company, of Bellefontaine, Pa., has been purchased by the Nittany Iron Company, for \$85,000. The new company is composed of J. W. Gephart, L. T. Munson, Frank Clemson and Archer Brown and William Sampson, of Rogers, Brown & Company. The furnace has been idle some time but will be put in operation as soon as necessary repairs can be made.

The Westinghouse Electric and Machine Company, of Pittsburgh, Pa., is about to ship machinery for installation in the new power station of the Mersey Tunnel Railway, running from Liverpool to Birkenhead under the river Mersey, which road is now being converted from steam to electric power by the British Westinghouse Electric and Manufacturing Company, Limited. The shipment will consist of 2 cross-compound engines of 2,000 h.p. capacity and the same number of 1,200 kw. generators.

At the recent annual meeting of the stockholders of the Pittsburg, Bessemer & Lake Erie Railroad, the directors chosen were: George E. McCague, E. H. Utley, E. H. Gary, Thomas Morrison, Robert A. Franks, T. H. Given, W. W. Blackburn, W. N. Frew, G. W. Keppler, J. T. Odell, D. M. Clemson, D. G. Kerr, Thos. H. Wells, James H. Reed. Mr. Gary and Mr. Keppler are new members. The officers are: President, J. H. Reed; vice-president, J. H. Odell; secretary and treasurer, G. W. Keppler.

The St. Louis & San Francisco Railroad Company states that it now has in operation a new train service, having added "The Meteor" and "The World's Fair Special," to the present express service over its lines. The cars are lit by electricity and the cafe car service in the Southwest is under the management of Mr. Fred. Harvey. The company, otherwise known as the Frisco System, taps the Joplin Region, Missouri, and its lines run from Kansas City and St. Louis, through Missouri, Kansas, Arkansas, Oklahoma and Texas.

The Fulda Tank Works, of San Francisco, Cal., of which John Ainsworth is manager, is filling an order for a complete plant for the new 1,000-ton cyanide mill to be erected at Central City, S. Dak., by the Homestake Mining Company. This order comprises 5 54 by 12 ft. tanks, 2 38 by 10 ft., 4 22 by 18 ft., and 1 30 by 20 ft., besides several smaller tanks. This plant will be equipped with the latest Fulda cyanide tanks and will be quite equal to the larger plant furnished by Manager Ainsworth for the same company in the 1,500-ton mill at Lead 2 years ago.

The F. D. Cummer & Son Company, of Cleveland, O., reports recent sales of its Cummer dryers, as follows: One dryer to the Whitewater Peat Coal Company, Whitewater, Wis., for drying peat; one dryer to the Marquette Cement Manufacturing Company, of La Salle, Ill., for drying coal; one dryer to the British-Westinghouse Electric and Manufacturing Company, Limited, for drying sand at its Manchester, Eng., plant; one portable railroad asphalt paving plant to the Century Construction Company, of New York City.

The Iroquois Machine Company has been organized by W. W. Gibbs, a member of Gibbs-Brower Company, of New York City. The officers are Edwin A. Smith, president, of Providence, R. I.; W. W. Gibbs, vice president and general manager, New York City; Henry C. Babcock, secretary and treasurer, Providence, R. I. The principal office is at 150 Nassau street, New York City. The company will manufacture improved wire-drawing machinery, also a full line of automatic and plain drop hammers, swaging machines, rolling mills, roller bearings and grinding machines. It has purchased the plant and business of the Universal Machine Company at Providence and rented a large building adjacent. The company states that the purchase of this running plant and the addition named will insure to customers prompt filling of orders.

The long distance electric power transmission companies of the Pacific Slope are now reaching far back in the Sierra Nevadas for their water supply, and are utilizing water under extremely high pressures. The latest development in this line is a contract placed with the Abner Doble Company, of San Francisco, by the Bay Counties Power Company of California, for 2 water wheel units of 3,700 h. p. each to operate under an effective head of water of 1,600 ft. These

will be the most powerful single tangential water wheel units ever installed, and will be equaled only by the 5,000 h. p. turbines at Niagara. The 2,000 kw., 240 revolutions per minute generators for these units will be furnished by the Stanley Manufacturing Company, of Pittsfield, Mass., and the main shafts will be made by the Bethlehem Steel Company of high carbon open-hearth annealed oil-tempered nickel steel.

It is stated that details have been arranged at Montreal for the absorption of the Dominion Coal Company by the Dominion Iron and Steel Company. The steel company takes over all the properties and assets of the coal company, guaranteeing the shareholders 8 per cent upon a capitalization of \$20,000,000. The common stock of the coal company now stands at \$15,000,000, but it has some bonds and preferred stock outstanding, and the terms of the lease provide that these bonds and stock shall be retired by the issue to the holders thereof of \$5,000,000 of the common stock of the company at 120, making the total capital stock issue of the coal company upon which the steel company is to pay 8 per cent \$20,000,000. The directors of the steel company also decided to issue \$5,000,000 of new stock and to offer it at 60c. on the dollar pro rata to the present holders of the company's common stock. This issue has been underwritten by a syndicate of Canadian and American capitalists.

Some large electric pumping plants and electric power plants have been ordered from the Denver Engineering Works Company for shipment to Old Mexico; the most recent installation being in the Candelaria Mine, State of Zacatecas. This plant consists of 2 125-h. p. engines, direct-connected to 75-kw. Crocker-Wheeler generators, together with switchboards and regulating apparatus. The manufacture of electric hoists by the Denver Engineering Works Company, to displace steam and other hoisting apparatus in the Utah-Colorado coal fields, has resulted in a growing demand. Two 135-h.p. single-drum electric hoists, equipped with railway motors and controllers for a 500-volt circuit, were recently shipped to Castle Gate, Utah. These hoists will be installed by the Utah Fuel Company, which now has in successful operation a number of electric hoists built by the Denver Company, one of which is of the double-drum type, 135-h.p. capacity, and is operating on an incline, hauling cars at a high rate of speed for a distance of over a mile.

The annual excursion of students of locomotive engineering of the Massachusetts Institute of Technology was made to the Baldwin Locomotive Works, Philadelphia, with Prof. Lanza on April 15. The party looked over the Broad street works and made a short trip in the 20,000th locomotive recently completed by the Baldwin Works. This engine is supplied with the Vaucrain compound cylinder, but has 4 connecting rods, one high and one low 180 deg. apart, and the other two rods each 90 deg. from the first two. This arrangement necessitates an axle with cranks in between the frame. The engine seemed to be very smooth running though there was no chance for very great speed. Upon the return of the party to Mr. Vaucrain's office he gave a detailed and interesting talk on the company's system in training its men, especially apprentices for the shops and other departments of the works. He spoke of the need of young men of ability and the great opportunity for such in great industrial plants. He advised young men to go into large works for there they will get no false ideas and being lost in the multitude can only rise by their own worth.

TRADE CATALOGUES.

Catalogue No. 2, a 16-page pamphlet issued by the American Tube Oil Burner Company, of San Francisco, Cal., gives information about economical methods of burning crude oil under a boiler and points out the merits of the American crude oil burner.

The Chas. Munson Belting Company, of Chicago, Ill., is sending out samples of a material called "Dermaglutine," made of rawhide, that the company makes into pinions. The company states its specialty is cutting gears of all kinds to order at short notice.

Some circulars sent out recently by the Joseph Dixon Crucible Company, of Jersey City, N. J., show buildings, bridges and viaducts painted with Dixon's silica graphite paint. This paint is recommended as a protective coating for iron and steel exposed to salt air, sulphur fumes, etc.

Lundell fan motors are described in a 24-page pamphlet issued by the Sprague Electric Company. The merits of the motors are set forth and prices are given of the various sizes and types. The synchronous motors used are expressly designed for driving fans on alternating current circuits. Special attention is called to the self-oiling and self-aligning bearings of the motors.

Eimer & Amend, of New York City, issue a pamphlet of 24 pages calling attention to the latest and most necessary apparatus for fire and chemical as-

saying. The list includes crushers and pulverizers, balances, crucibles, muffles, scorifiers, and furnaces. Particular attention is called to a new short beam assay balance, said to be sensitive to 1-400 mg. with a carrying capacity of 10 grams. The list price of this balance is \$125. A portable analytical balance with aluminum beam, all bearings of agate, a carrying capacity of 500 grams and sensitive to 1-10 mg. is listed at \$65.

Catalogue B, an 86-page pamphlet issued by J. Geo. Leyner, of Denver, Colo., describes Leyner compressors in an interesting manner. The pamphlet is neatly illustrated, gives full details of the construction of the essential parts of the compressors and contains tables of efficiencies at various altitudes, the flow of air in pipes, etc. Leyner compressors are of the straight-line type and may be driven by steam engines, directly connected to a water wheel or geared to an electric motor. The compressors are built single-acting or two-stage. In the latter type the air is passed through an inter-cooler of compact design.

Hoppes feed-water purifier and heater is described in detail in a 48-page pamphlet issued by the Hoppes Manufacturing Company, of Springfield, O. The apparatus consists of a cylindrical steel shell within which are a number of trough-shaped trays supported by brackets. These pans are made of thin sheet steel and malleable iron. The feed-water is fed to the top pan and overflowing is exposed in a thin sheet along the under surface of each pan to the direct action of the steam; this heats the water to boiler temperature and precipitates the scale-making ingredients. One of the boiler plants at which these heaters have been installed is at Cape Town, South Africa.

Catalogue No. 23, issued by the Trent Engineering and Machinery Company, of Salt Lake, Utah, describes various types of mining ore cars, skips, buckets, wheels, axles etc., that the company carries in stock, also horse whims. The ore cars are made of steel plate and have self-oiling axles and wheels. Catalogue No. 28 tells about "projectile" and "armor-plate" steels for stamp shoes and dies and rollshells. Catalogue No. 28a gives dimension blanks for mill repairs of roll shells, crusher heads, dies and cams made of these steels. Circular No. 90 gives details of some screening tests made on ore pulverized by the Trent Company's Monadnock mill. Catalogue 100 is about boilers. It gives information about various types of boilers, fuel consumption, economy, etc., and then mentions in detail return tubular boilers, locomotive boilers, marine boilers, Scotch boilers and the Geary water tube boiler. The company carries in stock what it calls the standard stationary boilers for Western mining use, and recommends the use of its improved fireboxes for wood fuel.

GENERAL MINING NEWS.

Pipe Line Returns.—Both the production and consumption of Pennsylvania oil made considerable advances during March, says the *Oil City Derrick*, but another decline in pipe line stocks was registered. In the Buckeye oil fields there was a considerable gain in the pipe line runs with a slight falling off in the shipments, but the net stocks suffered a decline. There are a number of pipe lines in the Ohio fields that do not publish their monthly statistics. For this reason the runs and shipments of Buckeye oil do not afford an accurate exhibit of the real situation in respect to production and consumption, but as the Buckeye Pipe Line cares for at least 80 per cent. of the entire field its statements are generally regarded as supplying the only reliable data. The reduction in the net stocks of Pennsylvania and Lima oil during March was a little in excess of 3,200 bbls. a day.

The March pipe-line runs of Pennsylvania oil show a large gain over February. The stocks of Pennsylvania and Lima oils at the close of March were the smallest on record since April, 1900. The net loss for February was 270,322 bbls.; March, 110,562 bbls.

The average daily runs of Pennsylvania oil during March were 82,605 bbls., a gain of 4,034 bbls. over February. For March a year ago the runs were 92,567 bbls. a day. The shipments of Pennsylvania oil during March were 84,304 bbls. a day. This was 1,699 bbls. a day more than the runs, and a gain of 2,773 bbls. a day over February.

During March the net stocks of Pennsylvania oil decreased 52,666 bbls., while Lima stocks were reduced 57,895 bbls., making the aggregate reduction for the month 110,561 bbls.

The net stocks of Lima oil held by the Buckeye and Indiana pipe lines were down to 17,766,927 bbls. on March 31.

The net stocks of Pennsylvania oil amounted to 8,965,706 bbls. on January 31, and 8,828,230 bbls. on March 31. Adding the net stocks of the Buckeye and other lines handling Lima oil makes a total of 26,500,158 bbls. in iron tanks at the close of March.

The runs of the Buckeye Pipe Line averaged 52,282 bbls. a day in March, an increase of 2,802 bbls. over the February figures. The Buckeye shipments

of Trenton rock oil averaged 60,391 bbls. a day in March, and showed a falling off of 924 bbls. a day, as compared with the February record. The aggregate runs of Pennsylvania and Trenton rock oils averaged 134,887 bbls. a day in March and the shipments, 144,694 bbls.

ALABAMA.

Mineral Production.—J. B. Gibson, secretary of the statistical department of the State Geological Survey, has handed in his report of the State's mineral production for the year ending April 1, as follows: Coal, 8,504,327 tons; coke, 1,992,561 tons; pig iron 1,155,528 tons; brown ore 933,639 tons; total ore, 3,095,406 tons; limestone, 534,061; dolomite, 351,934 tons; building stone, 216,817 cu. ft.; bauxite, 650 tons; ochre, 650,664 tons; lime, 650,664 bbls.; vitrified brick, 7,000,000; refractory brick, 6,730,000; common brick, 50,700.

ARIZONA.

YAVAPAI COUNTY.

United Verde Copper Company.—George A. Treadwell, of Jerome, has brought suit against this company, of which Senator W. A. Clark is the largest stockholder. Treadwell asks that the defendant company and its directors be enjoined from selling or disposing of any of its assets until the judgment of the court has been pronounced. He also asks that a receiver for the company be appointed, and that an accounting be made by the defendants before a referee of the profits of the corporation since December, 1888.

Treadwell alleges he owns 620 shares of stock in the company, now valued at \$186,000. The company was organized under the laws of New York in 1883. In August, 1899, the directors voted to dissolve the corporation and reorganize it under the laws of West Virginia. Since December, 1888, the plaintiff alleges, Senator Clark has held and owned a majority of the stock, and has controlled the corporation.

The suit is being tried in the Supreme Court of New York.

GRAHAM COUNTY.

Arizona Copper Company.—This company states that its production of copper in March was equivalent to 1,414 short tons.

PINAL COUNTY.

Bobtail Mining Company.—This company is working a gold mine near Ray and has a stamp mill running. The company also has a copper property on the southwest slope of Pinal Mountain and is arranging to put in a smelter. Dr. T. F. Force is president of the company.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Fremont Mining Company.—E. C. Purrington, of Amador City, is local superintendent. A large sum has been spent since the company started work. It has sunk 850 ft. on the Fremont and repaired and retimbered 1,200 ft. of the Gover shaft and run a number of levels. At the Gover is a fine steam hoist using oil fuel. The duplex Ingersoll compressor is to be run by a dynamo. The new Fremont hoist 1,600 ft. distant will be run by compressed air; the top of this gallow's frame will be 84 ft. from the collar of the shaft. Work on a new 60-stamp mill will start in May. The ledge worked is large, the quartz at the 600 level of the Fremont being 110 ft. wide.

BUTTE COUNTY.

(From Our Special Correspondent.)

Oroville Dredgers.—There are at present at and near Oroville 14 gold dredgers busy, which cost between \$50,000 and \$60,000 each. Six more are being built and several are in contemplation. The companies which expect to build dredgers shortly are the Leggett-Wilcox Company, Boston & Oroville Company, Oroville Gold Dredging and Exploration Company, Lava Gold Dredging Company, Cherokee Gold Dredging Company and Indiana Gold Dredging Company. Some of these companies already have machines at work. The dredging district comprises about 5,000 acres of the valley of the Feather River adjacent to Oroville. It is only about 4 years since the first successful dredger began work there.

P. B. Steifer Mining Company.—This company is sinking a single compartment shaft 6 by 7 ft. on the old Magalia channel at Magalia. M. V. Steifer is secretary of the company.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Gwin Mine Development Company.—A new hoisting plant with a 110-ft. steel gallow's frame is to be put up at Gwin Mine. Twenty stamps are to be added to the 80 already in the mill. F. F. Thomas is president and general manager, and David McClure is superintendent. The milling and power plants are among the most complete in the State.

Iovca Consolidated.—In this mine, at Rich Gulch, a blind lead has been struck which appears valuable.

Lucky Jim & Golden Treasure Mining Company.—

This company has elected W. K. McMullin, of Modesto, president; E. H. Williams, of Stockton, vice-president, and L. S. Attwood, of Stockton, secretary. On the Lucky Jim Mine, about half a mile from the Gwin Mine, a 400-ft. tunnel is being continued. The company also owns the Golden Treasure Mine near Chinese Camp, Tuolumne County.

Oriole.—On this mine at Angels the shaft is now down 650 ft. Some trouble is experienced with water. A new 6-drill compressor is to be put in. F. E. Dunlap, of Stockton, is manager.

Vorlander.—On this mine at Middle Bar, about 10 miles from Valley Spring, C. M. Burleson, superintendent, the shaft, which was full to the surface, is being unwatered.

Whittle.—At this mine near Angels, owned by the Baltimore Mining Company, E. K. Stevenot superintendent, a 4-ft. vein is cut at 200 ft.

DEL NORTE COUNTY.

(From Our Special Correspondent.)

Canthook Platinum and Gold Mining Company.—This Crescent City company has lately taken up placer ground on the South Fork of Smith River. E. A. Work and Jos. Bagley are interested. The company owns 4 miles of river bed.

ELDORADO COUNTY.

(From Our Special Correspondent.)

Bright Hope.—J. C. Moore is making a test run of ore from this mine at Garden Valley, in a 2-stamp, triple-discharge Tremain mill.

Slate Quarries.—The only slate quarries worked in California are in this county near Kelsey. Recently some of the quarries have changed hands, men with capital having bought interests. The most recent organization is the California Bangor Slate Company, with head offices at Phoenix, Ariz., which owns about 2 miles on the slate belt. The quarry is to be equipped with new and heavy machinery. The directors are H. H. Todd, E. C. Robinson, Fred Sandelin, James B. Merritt and Thos. M. Robinson. At the quarry of the Eureka Company a 500-ft. drainage tunnel is to be run. The California Slate Company, operating near Placerville, F. S. Chadbourne, of San Francisco, manager, has shipped its second car-load of slate since starting work this year. The Eureka Company has shipped 13 carloads since January. Each car-load contains about 80 squares.

FRESNO COUNTY.

(From Our Special Correspondent.)

Fresno Placer Company.—S. L. Hogue, A. E. Snow and associates, of Fresno, are working this claim on Sycamore Creek, near Trimmer. The men are at work on a ditch from Big Creek to Sycamore Creek, a distance of 4 miles. They will have 275 ft. head for hydraulicking.

INYO COUNTY.

(From Our Special Correspondent.)

Inyo Marble Company.—The quarry may be worked again shortly. At present the company is working up the stock lying at Marmol, Nevada, with the mill it has there. Charles E. Anderson, Mills Building, San Francisco, is secretary of the company. This is the largest marble quarry in California, but has been idle for some time.

No Sabo.—Leidy Bros. & Van Vleet, who own this mine, near Laws, have bought the Storey Mill and will run it on ore from their mine. They have been shipping to the Selby Smelting Company.

KERN COUNTY.

(From Our Special Correspondent.)

Mondoro Mining and Milling Company.—The old Polka Dot Mine near Vaughn is now one of the 8 claims of this company. O. P. Smith, of Vaughn, is president and manager. The offices are at 321 Bullard Block, Los Angeles. About 18 men are employed at the mine.

MADERA COUNTY.

(From Our Special Correspondent.)

Flying Dutchman.—This group, at Coarse Gold, has been bonded by J. J. and Mrs. L. Krohn to S. Weil and C. A. Mann, of San Francisco. New machinery is to be put in and the properties developed.

Rez.—In this mine at Grub Gulch, Ward & Day, owners, a fine body of ore has been uncovered.

NEVADA COUNTY.

(From Our Special Correspondent.)

Grass Valley Consolidated Mining Company.—Superintendent Coffin, of this property at Grass Valley, expects to start the mill shortly. Foundations for a 4-drill compressor are to be laid.

Manhattan.—This mine, in Gold Flat District, near Nevada City, owned by Geo. W. Baldwin, has been bonded to F. DuBois and H. J. Griffin, of San Francisco, and a deep shaft will be sunk.

Murchie.—This old mine, owned by the Lone Star Mining Company, is being reopened under bond by J. C. Campbell and others. The tunnel is to be

cleaned and the shaft retimbered. The mine, at one time a large producer, has been idle some years. The milling machinery wanted will depend on developments. There is a small but old mill on the property.

Orleans Consolidated Mining Company.—This property, at Grass Valley, C. A. Brockington, superintendent, is worked on the "stock system," the men getting 3 shares of capital stock and \$1 cash as daily wages. Only development work is done at present, though some bullion is produced by tributers.

Puscheck.—At this mine, near You Bet, belonging to Dr. Puscheck, a 4-stamp mill is being erected.

PLACER COUNTY.

(From Our Special Correspondent.)

Eclipse.—On this mine, at Ophir, sinking is in progress and a larger force will soon be put on.

Gold Blossom.—Work has started at this mine, at Ophir, J. E. Walsh, of Auburn, superintendent. A contract has been let to extend the drift from the new shaft to the old works.

Pioneer.—At this mine, near Towle, E. P. Chittenden, superintendent, 22 men are employed. The shaft has been drained by the upper tunnel. The property is owned by the Pioneer-Lynn Gold Mining Company, of 27 Kilby street, Boston, Mass.

SACRAMENTO COUNTY.

(From Our Special Correspondent.)

Prosperity Gravel Mining Company.—This new company is opening the gravel channel on the Cohn ranch, near Folsom. J. H. Canard is superintendent. The shaft is ready to receive the machinery and buildings are being erected. The claim is in the vicinity of the Blue Ravine and Gray Wing drift mines which have paid handsomely.

SAN BENITO COUNTY.

(From Our Special Correspondent.)

Cerro Bonito.—This quicksilver company, at Pa-noche, is building roads and otherwise preparing for work.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Providence Gold and Copper Company.—The mines are at Goldstone, 25 miles from Blake, in the Providence Mountains. Superintendent Berg is erecting bunk houses, etc., and extending the shafts on several of the claims. There is no mill at the mines as yet.

SHASTA COUNTY.

(From Our Special Correspondent.)

Asbestos.—Emil Holden has 4 asbestos claims at Sims, on the Sacramento River. The "ledge" is said to run from 18 in. to 3½ ft. As a general thing the asbestos found in California is not of good quality, not giving long fibres. These claims have not been developed to any extent.

Mount Shasta Gold Mines Corporation.—The new mill, near Shasta, has started up. It is considered the finest in the county. F. E. Ware is general manager. The company is extending its holdings of copper properties.

Van Devere.—Wm. Menzel has bonded this mine near Copley to Jas. J. Chambers. A heavy flow of water caused the mine to close some years since. The upper levels paid well. A powerful pump will be used.

SIERRA COUNTY.

(From Our Special Correspondent.)

White Bear.—After 3½ years' work running a bed rock tunnel the owners have finally reached the old Port Wine channel, near Downieville, on which the Monte Cristo Mine was located. The principal owners are A. S. MacDonald, of Oakland, and A. N. Lewis and Judge E. A. Belcher, of San Francisco. That part of the channel within the borders of the White Bear ground is about 1½ miles long. The gravel prospects very well.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

New York.—This property, at Fort Jones, is under bond to the Monarch Mining Company. Considerable development work was done last year and a 10-stamp mill has just started on good ore. J. B. Scott is superintendent.

STANISLAUS COUNTY.

(From Our Special Correspondent.)

Wright & Lane.—The new 40-stamp mill at this mine, above Knights Ferry, continues to run steadily on good low-grade ore.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Bedrock Blue Gravel.—At this property at Table Mountain, near Columbia, Chas. L. Lang and the Duchow Bros. are cleaning out the old Virginia tunnel and will raise for the channel. The old channel under Table Mountain has been very productive and much of it is yet unworked. The Springfield Mine has been sold by N. Clark, of Oakdale, to J. W. and

C. L. Woodside and L. F. Triplett and A. L. Horner, of Alameda, for \$18,000.

Cannady Gulch.—This mine, near Columbia, has been sold by Henry Wiggin to J. W. Larson.

Eureka Consolidated.—At this property at Carters, better known as the "Dead Horse," a large shoot of high-grade ore is reported struck in the lower levels. The property belongs to Hayward & Lane, of 532 Market street, San Francisco. E. T. Kane is superintendent.

Harvard Gold Mining Company.—This Boston, Mass., company, of which B. M. Newcomb, of Oat Hill, Napa County, is general manager, and Mr. Gorrie, of Jamestown, local superintendent at Jamestown, has started 30 stamps, and the other 30 will drop as soon as the upraise to shaft No. 1 is completed.

Soulsby.—On this mine at Soulsbyville, Wm. Sharwood, superintendent, arrangements are being made to use oil as fuel.

VENTURA COUNTY.

(From Our Special Correspondent.)

Mount Alamo Mica Company.—The claims of this new company are about 60 miles southwest of Bakersfield, where the main office is. There is a branch office at 36 Geary street, San Francisco. W. Borrow is general agent and Henry Mead superintendent. The claims cover 6 sections of land. It is stated that tests made by Louis Falkenau, of San Francisco, show the mica to be of good character. Machinery has been sent to the ground and mining is to start at once. Others interested in the enterprise are H. B. Richardson, H. F. Anderson, W. L. B. Handysides and E. J. Stratton, of Bakersfield. There are 25 men at work. No mica has thus far been produced in California.

YUBA COUNTY.

(From Our Special Correspondent.)

O'Brien Ranch.—On the 2,000 acres farm of James O'Brien, of Smartsville, there are 2 Keystone drills prospecting the ground, which was recently sold to a company that intends dredging for gold. The soil and gravel is in many places 40 to 50 ft. deep and holes are being sunk to bedrock at 200-ft. intervals. A third drill is shortly to be put on. The richest portions will be worked first. The dredges are not yet built.

COLORADO.

BOULDER COUNTY.

Boulder Oil Wells.—Oil is reported struck in the Alamo well, owned by the Consolidated Oil Company, at a depth of 2,500 ft. The Boulder Oil Company is now selling crude oil in barrels. It is being used for fuel under boilers and for power in gasoline engines. The Boulder-Valmont is down 650 ft. The Atlas, which is on land leased from the Boulder-Valmont, has its derrick up and is putting in machinery. A team of drillers has started at the well of the Citizens' Oil Company. The Searchlight Company has let a contract for the erection of its derrick. The Hygiene Company has its derrick on the Webber farm completed.

CLEAR CREEK COUNTY.

Conqueror.—Active work has started on these properties at North Empire by Milwaukee men.

Gold Fissure.—This property, at North Empire, has opened a large body of smelting and mill ore and has made a contract with the Clear Creek Milling Company to handle 25 tons per day. Shipments have started.

Horseshoe Tunnel.—Work is going forward steadily with two shifts.

Seven-Thirty.—Manager Robeson has decided to continue the Burleigh Tunnel to intersect the Seven-Thirty workings. This tunnel is now 2,600 ft. in length and has cut the vein of the Seven-Thirty, but it will require 1,300 ft. of drifting to get under the shaft and then 290 ft. of an upraise to connect. The work will be pushed.

FREMONT COUNTY.

Mr. A. C. Ridgway, of the Victor Transportation Company, and also of the Short Line Railroad, is at Florence negotiating with the independent coal operators for the output of their mines. The greater part of the output of the Ocean Wave Mine has been contracted for. This mine has been temporarily idle while a tippie is being built.

Bonanza Boy.—Local men interested in this claim in Copper Gulch, northwest of Florence, report that the shaft is down 200 ft. and a big body of water has been struck. Pumps are being installed. Two shifts are at work.

GILPIN COUNTY.

(From Our Special Correspondent.)

Mining Transfers.—Calvin S. Hawk to John P. Miller, $\frac{1}{4}$ interest in J. B. lode, Hawkeye District; C. C. Johnson, to C. M. Miller, the Ben Franklin No. 2 lode, Vermilion District.

Bant.—This property, in Gregory District, has

been purchased for a reported price of \$25,000, by W. A. Garrett and J. H. Johnson, of Holdrege, Neb. They intend erecting a new shaft building and installing new machinery. The deepest workings are only 65 ft. but the property is surrounded by good mines. G. D. Johnstone, of Black Hawk, will be in charge.

Boston & Denver Consolidated Mining and Milling Company.—The west section of 20-rapid drop stamps is handling about 60 tons every 24 hours, and is reported to give satisfactory results. The 6 Woodbury concentrating tables were lowered about 3 ft. and a cement floor built, and another section is now being changed to correspond. The mill is handling part of the product of the Gregory-Bobtail property, under the management of L. H. Stockbridge, Central City.

Charter Oak.—Eastern men have become interested in a lease and bond on this property in Russell District, which will be under the management of E. W. Davis, Central City. The shaft is down 500 ft. and the lessees intend to sink it 200 ft. deeper, and carry on development work on an extended scale.

Clear Creek Mining and Reduction Company.—Berry Bros., of Detroit, Mich., through their manager, Dr. F. Carpenter, of Golden, Colo., have asked for plans and estimates for a 100-ton concentrator at the Saratoga Mine in Russell District, to handle the Saratoga product. The same parties own the pyritic smelter at Golden, which is now handling close to 500 tons of ore per day, a good proportion of which is shipped from Gilpin County. The Saratoga Mine is shipping close to 75 tons per day, which amount can be increased.

Old Town.—This property, in Russell Gulch District, has changed hands, a $\frac{1}{2}$ interest being sold by L. Muther, of Denver, to F. E. Himrod, of New York, for \$50,000. The property, little more than a prospect 2 years ago, has produced \$100,000 in about a year. Daily shipments are made to the Bertha Mill at Idaho Springs. The ores carry good values. G. K. Kimball, Jr., of Idaho Springs, is manager and retains his half interest.

GUNNISON COUNTY.

(From Our Special Correspondent.)

Cortland.—Favorable reports are received from this mine at Ohio City. Regular shipments of high-grade ores are made. In the same district the Pittsburgh-Gunnison Mining and Milling Company is pressing work on the Yukon lode in Boulder Gulch.

Gray Eagle.—This tunnel, in West Mountain, Pitkin District, is now in over 300 ft., and work on this and the West Mountain tunnel, on the opposite slope, is progressing actively.

LAKE COUNTY.

(From Our Special Correspondent.)

Ore Output.—The past week has seen great improvement in the outlook from the agreement of the American Smelting and Refining Company to accept a partial tonnage of the sulphides which were cut off entirely, or greatly curtailed, several months ago. The company has not made any reduction, it is stated, on treatment charges, but simply takes the ore. The mine managers by shipping a large tonnage can make a profit. While shipments increased 300 tons a day, next week another increase is promised from the low grade sulphides of the Ibox Company. The A. M. W. combination resumed shipments from the Wolfstone, Maid and Adams ground through the main A. M. W. shaft, of 250 tons daily. The Ibox Mining Company, which has been shipping only 225 tons a day will, next week, increase its shipments to 400 tons daily. The Small Hopes Company, from its Marian shaft, and the Resurrection Company, from its 2 shafts, could each easily ship 250 tons per day, but as yet neither has announced any arrangement with the smelters.

Keystone Mining Company.—Underground operations on the Rex shaft have temporarily ceased to allow the drainage of the shaft. The water has been lowered to the 200 ft. station and machinery is being put in so that the work can proceed.

Leadville Gold Basin Mining Company.—The annual meeting will be held April 16. Some of the gold ore taken out of the old Big Four Mine is very rich. Local men, headed by J. F. Walsh, E. J. McCarty and others, are at the head of the combination.

Louisville.—Arrangements are being made to resume after a long idleness. This old mine has large iron deposits as well as some good zinciferous material. It was formerly operated by the Smith-Moffat combination, but Arthur Nichols is at the head of the new project.

New Leadville Home Mining Company.—The iron shipments which were curtailed from 250 to 150 tons a day, April 1, will be increased immediately, as the company has received word that the smelters could take more iron. Development will be pushed in the Lake ground.

Ohio & Colorado Smelting Company.—This company owns the New Monarch combination. Manager

Tim Goodwin states that at least 4 furnaces at the new Salida plant will be ready by July 1.

Penn Mining and Leasing Company.—Fifty tons a day of siliceous material are mined.

Progressive Mining and Investing Company.—This company is working under lease and bond on the Cady Mining Company's ground, and has sunk a new 100-ft. shaft from which a drill hole is going down to test the ground.

Reno Mining Company.—This company has a large acreage of virgin territory, and the new shaft is down 395 ft. A new plant of machinery has been ordered.

St. Louis Tunnel.—A number of lessees are working different portions of this ground. It is possible that the company will sink a new shaft on the main vein this summer.

Ten Mile Leasing and Mining Company.—This company has opened at 645 ft. a fine body of iron sulphides carrying galena. Mayor J. F. McDonald, of Leadville, is president of the company.

Walter Scott.—This property is tied up in an estate, but negotiations are on foot for a sale. There is a 20-stamp mill on the ground. Officer & Pursey, of Council Bluffs, Ia., are in possession.

Wilkesbarre.—O'Neill & Co. have secured a 5-years' lease and will resume work in May developing the old vein.

Yak Mining, Milling and Tunnel Company.—A contract has been closed for the extension of the Yak Tunnel into the Ibox territory. This will give the Yak the opening of virgin ground and at the same time furnish drainage for the Ibox.

SAN JUAN COUNTY.

Emeralda.—A new strike of a high grade gold and silver ore is reported on the third level of this mine, in Minnie gulch, owned by Joseph Blizzard of Silverton.

Gold Tunnel and Railway Company.—This company has men working on the Oro tunnel below Silverton, under Fred. E. Schurman. This tunnel is 7 by 9 ft. in the clear. The territory through which this tunnel is pushing ahead comprises the veins of Deer Park and Arrastra Basin, with the terminus in Cunningham Gulch, where it is to connect with the Highland Mary tunnel, of which more than 3,000 ft. are completed. At the Highland Mary end a large power plant was installed for the purpose of running air drills, and it is expected that a water plant will be working on the Oro tunnel as soon as the machinery can be put in. The veins to be opened will be cut at a depth of from 500 to 4,000 ft. The Gold Tunnel and Railway Company now owns all the claims of the old Highland Mary group. The ores extracted have a lead and gray copper base, with good values in gold and silver. A contract was let late last fall for a concentrating mill, 100 tons daily capacity, to be built at the mouth of the tunnel on the Cunningham Gulch side. The Trent Engineering Company, of Salt Lake, is the successful bidder for the work. Work on the mill will start when the wagon road from Howardsville to the mines can be opened.

Royal Mining Company.—This Silverton Company has let a contract to Woods & Hern to drive a cross-cut tunnel 700 ft. to cut the King lode, situated on the south end of Sultan Mountain. A new power plant has recently been installed, and the work is going ahead with air drills. Boarding and bunk houses have been erected near the Denver & Rio Grande railway tracks, on the Animas River, at what is now known as the Royal siding.

SAN MIGUEL COUNTY.

Ophir Consolidated.—W. S. Buckley recently returned from Milwaukee, Wis., where he attended a meeting of the stockholders of this company, of which he is resident manager at Telluride. Thirty stamps will be added to the 20 now used at the company's mill. The new stamps will be 1,050 lbs. Excavating for the addition to the mill has started.

(From Our Special Correspondent.)

Gold Metal Mining and Milling Company.—This company, recently organized to work mines in Prospect Creek Basin, is preparing to begin work by May 1. Sixty ft. remain to be driven on the cross-cut tunnel before the Gold Metal vein will be cut and development can be prosecuted. W. E. Brehmer, of Telluride, is manager.

Liberty Bell Gold Mining Company.—Carpenters have been framing timbers to replace the buildings wrecked by the February snowslide, and the framework is being raised of the upper terminal of the tramway. Much difficulty has been experienced in getting the heavy timbers across the path of the slide on account of the recent thaw. Men are shoveling out the trail and within a few days the mule trains can resume packing lumber. It will be at least 6 weeks before the mine is in operation again. Work on the cross-cut tunnel, at the curve station of the tramway is resumed, and will be pushed. The bodies of 3 men are buried in the slide yet and it may be late summer before the bodies are recovered, as the

snow is at least 50 ft. deep in the gulch. Chas. A. Chase, of Telluride, is resident manager.

Tomboy Gold Mines Company.—This company has secured an option on the Columbia-Menona Mines under a bond and lease for 2 years for \$200,000. The Columbia Mine is parallel with the Argentine vein bought by the Tomboy Company 2 years ago. Work started in the lower tunnel of the Columbia Mine on April 2, and will be pushed. The mine is equipped with a 30-stamp mill, which has been leased by the Tomboy for the past year, a compressor and the usual buildings. The Columbia is owned by New York men, of whom A. Miner Wellman is the heaviest stockholder.

Over 250,000 ft. of lumber has been delivered at Pandora for the new mill to be built at the Argentine Mine, and as soon as the weather permits the work of grading will start.

The company has bought the Cincinnata Mine from the Cincinnata Mining Company, Ltd., of London. The price paid was \$125,000. The Tomboy Company has had a bond and lease on the property for over a year and opened immense ore bodies. The Cincinnata is on the famous Argentine vein, bought by the Tomboy 2 years ago, which has proven one of the richest gold mines in the State. The Tomboy Company now owns and controls practically all the mines developed to any extent in Savage Basin. Manager John Herron, of Telluride, has been exceedingly fortunate in securing this mine and the Argentine Group. At present time it is doubtful if there is any mine in the State with a more brilliant future.

TELLUR COUNTY—CRIPPLE CREEK.

Consolidated Mines.—A large consolidation has been put through by the Woods Investment Company. The deal amounts to \$4,000,000 and embraces all the properties of 8 large mining companies along the line of the United Mines tunnel, now in 9,462 ft. A new company is being incorporated under the laws of Colorado with a capitalization of \$5,000,000, divided into 5,000,000 shares, par value \$1 each. Of this stock 3,994,769 shares have been issued in payment for the properties taken in by the merger.

(From Our Special Correspondent.)

Railroad Connection.—The grading of a switch to be run to the El Paso Mine on Beacon Hill is in progress, and before very long another good mine will be supplied with railroad facilities. At present there are very few mines of any importance in the district that cannot load their ore directly into the cars. The El Paso, however, lies some distance from the railroad. The switch is being run from the Florence and Cripple Creek road and leaves the main track not far from the town of Anaconda.

Mine Consolidation.—The principal properties included are the Consolidated Mines Company, which owns the Wild Horse and other property on Bull Hill; the New Zealand Consolidated Mining Company, with property on Bull Hill; the Battle Mountain Consolidated Gold Mining Company, which owns considerable property on Battle Mountain; the Columbine-Victor Deep Mining and Tunnel Company, which owns a number of claims on Squaw Mountain; the Columbine Gold Mining Company; the Bonanza Queen Gold Mining Company; the Damon Gold Mining Company, with ground on Ironclad Hill, and the United Mines Transportation Company. The proportion which these companies will be interested in the stock of the new company is as follows: Consolidated Mines Company, 1,908,000 shares; New Zealand Consolidated Mining Company, 920,000 shares; Damon Gold Mining Company, 200,000 shares; Columbine Victor Company, 200,000 shares; Battle Mountain Consolidated Gold Mining Company, 485,160 shares; Columbine Gold Mining Company, 29,709 shares; the Bonanza Queen Gold Mining Co., 25,000 shares; United Mines Transportation Company, 226,000 shares, making a total of 3,994,769 shares. The balance of the stock, a little over 1,000,000, will be in the treasury, which will also have about \$200,000 in cash in it by the time the deal is ratified.

Elkton Consolidated Gold Mining Company.—A good deal of adverse criticism has been raised because the Elkton Mine has hardly paid expenses of late, but the condition of the mine is not so bad as it might be. There seems to be no question but that the mine has abundance of good ore in sight, but the heavy flow of water and poor management before the present superintendent took charge has prevented profits. There appears to have been a change for the better and the mine will, undoubtedly, be put on a paying basis again. It is understood that a new pumping plant will soon be installed to handle the water without any difficulty, and allow the lower development work and production to proceed. So far as can be learned, the physical condition of the mine, with the exception of the large flow of water, is very good and the outlook is not discouraging. The company has about \$100,000 in cash in the treasury. Mr. Henry is at present superintendent and George Bernard, of Colorado Springs, is president and general manager.

Independence Consolidated.—Most of the men were laid off for a few days the early part of the week, in order to make some changes, but it is understood most, if not all, of them have been put back again. The property consists of the famous Hull City Placer. It is understood that the showing on the lower levels have been looking very much better of late. The shaft is now down 1,500 ft. R. P. Russel is the manager for the company which has the greater part of the ground under lease.

Portland Gold Mining Company.—One reason for passing the quarterly dividend is that the production has been decreased lately awaiting the completion of the new mill at Colorado City. Another reason for the passing of the dividend is the large expense of building the mill. While the dividend could have been paid, it was deemed best to be conservative. Reports from the mine show it to be in splendid condition, with a large amount of ore in sight. It is understood that a new superintendent will soon be appointed, as R. A. Trevarthen, who has held that position for some time, has tendered his resignation.

Stratton's Independence, Limited.—Considerable work is still in progress despite the discouraging report recently made by the consulting engineer, John Hays Hammond. Considerable ore was extracted during January and February, but it was so low grade that the profits realized were not very great. According to Mr. Hammond's report, the lower levels have so far failed to produce any ore of any great value, though it is understood that there is considerable low-grade ore in sight there. It is understood that an examination is being made by Mr. MacLaren on behalf of some of the minority stockholders, who were not satisfied with Mr. Hammond's report.

Wild Horse.—Considerable work is in progress on the dump and the lessee has a good thing. Most of the dump is handled by washers. Quite a number of other dumps in this neighborhood and in other parts of the district are being leased, and as a general rule pays very well.

IDAHO.

SHOSHONE COUNTY.

Gold Standard Mining Company.—Frank Houle is manager of this company on Pony Gulch, near Delta. There is now a fair run of water. Bedrock has not yet been reached on Pony Gulch, and probably will not be for several days. The prospecting done before work on the hydraulic plant was begun showed that the pay streak reached several feet above bedrock.

Standard-Hecla Consolidated Mining Company.—A consolidation of the Standard and the Hecla Mining companies, owning property on the same ledge at Mace, in the Coeur d'Alenes, is announced. The new company will have a capital, it is said, of \$3,000,000, of which \$2,000,000 will be for the Standard and \$1,000,000 for the Hecla. The new company is to be incorporated under Maine laws. The Standard and the Hecla have been owned by practically the same men and the consolidation is to simplify matters and reduce the trouble and expense of maintaining separate organizations and accounts. The two properties are reported to be working about 200 men. The present capital of each company is \$500,000. The Hecla has been closed since January 1 owing to an arrangement with the American Smelting and Refining Company.

ILLINOIS.

The United States Supreme Court has broadly sustained the validity and constitutionality of the Illinois Mine Inspection law of 1895. All the objections made to it by the Consolidated Coal Company were overruled by the Court, as they had been by the Illinois Supreme Court, and the judgment and decree of that court were affirmed.

INDIANA.

GRANT COUNTY.

(From Our Special Correspondent.)

Oil Shipments.—The shipments for Indiana crude oil for March were very encouraging. The stocks decreased 266,975 bbls. The total shipments amounted to 923,141 bbls., or an average daily of 29,779 bbls. The runs for March show an average per day of 21,169 bbls., an increase over February of 106,908 bbls. The valuation of the March product was \$524,933. The total shipments of Indiana oil for the past 3 months were 2,698,066 bbls., and the runs 1,842,619 bbls. The valuation of the oil is \$1,474,095.

PIKE COUNTY.

(From Our Special Correspondent.)

There is great oil excitement at Petersburg. A gas well was drilled here 4 years ago but abandoned. Recently F. M. Meyers & Co., of Washington, Ind., leased the territory and cleaned out the old well. Oil began to flow, and the flow is increasing. Men have begun leasing land in all parts of the county and derricks are being erected in many places.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

W. S. Bogle Coal Company.—This Chicago company is sinking and opening up the new Andria coal

mines near Sullivan. The company will employ 500 men and invest \$75,000 in the enterprise. Two thousand acres of coal land have been secured by option.

VANDERBURG COUNTY.

(From Our Special Correspondent.)

Ingle Coal Mine Company.—A receiver has been appointed for this company, operating one of the largest mines in Southern Indiana. The First National Bank of Evansville brought the suit for money advanced.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Old Colony.—The exploratory shaft recently started is sinking on the lode, which is several feet wide and shows some copper.

Quincy.—The American Bridge Company, of New York City, has begun work on a new coal shed at the stamp mill site, on Torch Lake. The shed will be erected on the dock constructed last year. It will be 300 by 400 ft., of steel, with corrugated iron roof and storage capacity of 80,000 tons of bituminous coal. The John A. Mead Company will erect 3 coal-boists, each 120 ft. high and traveling on a track 22 ft. wide that runs the entire length of the shed. The boists will be operated by steam power and will handle 300 tons of coal per hour. The Quincy & Torch Lake Railroad, owned by the company, has been extended a mile to the dock and reaches it by a 650-ft. trestle of timber and steel.

Trimountain.—The second head at the Arcadian Mill has begun stamping rock during day shifts, the rock coming mostly from the stockpiles at the mine, where 60,000 tons are stored. A contract for 20 new dwelling houses at the mine and 6 at the mill has been let.

COPPER—KEWENAW COUNTY.

(From Our Special Correspondent.)

Mohawk.—The mill construction has been delayed by non-arrival of the mortars and the plant will not go into commission until August 1. The railroad connecting the mine and mill, constructed last year, will be operated by the Hancock & Calumet Railroad, under contract. A shipment of 100 tons of mohawite has been sent to the smelter at Hackensack Meadows, N. J.

Phoenix.—Forty men are employed grading for the railroad to connect the mine and mill site. Several thousand tons of high-grade stamp rock are stored at the mine and will be treated when the new mill goes into commission.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—The equipment for the electrical tramming system for the Butler tunnel is at the mine and will be installed at once. The American Bridge Company has about completed work on the new steel shaft and rock houses.

Mass.—During March 13,000 tons of rock were stamped which, it is said, yielded about 150 tons of copper. This month the second head is running day shifts and the mill is handling 750 tons of rock daily.

Michigan.—A shipment of 21 tons of mass and barrel copper, taken out in development work, has been sent to the smelters on Portage Lake. The huge mass of native copper recently encountered has been uncovered for 33 ft., and no end found. It is 9 ft. wide and 12 to 18 in. thick.

MINNESOTA.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

M. D. Hull et al. have begun suit to clear title to lands in section 6, T 57, R, 20, where they have recently found some ore of good quality. The suit is directed against the S. Dessau Company, which was assignee of an option on this property a year ago, and abandoned work there after sinking a shaft a short distance. Hull and associates are preparing to open a part of the property and to plat another part as an addition to Hibbing.

Hale.—This property, near Biwabik, is shipping to Two Harbors, and will mine about 100,000 tons this year. It is the property of the Colonial Mining Company under lease.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—The price of zinc ore was cut from \$3 to \$3.50 per ton during the past week and the present price is about the same as paid before the operators began to pool their production. The exact number of miners that are now in this pool cannot be learned, but it is estimated that over 3,500 tons of zinc ore produced last week, and not sold, is controlled by this pool, of which Bud M. Robinson, one of the leading operators, is the head. The representatives of the smelters said a few days ago that

the smelters would make some needed repairs, and shut down several blocks if producers persisted in demanding such high prices for zinc ore. Twenty-seven of the leading producers are rumored to have agreed to shut down their mines and make needed repairs also if the smelters put this proposition into effect. The Missouri & Kansas Zinc Miners' Association has published a notice that it is in no wise concerned in the operators' pool, although the members of the pool are principally association men.

The highest price paid for zinc ore was \$35 per ton for only one lot produced by the Excel Mining Company, near Joplin.

Most of the high-grade ore sold for \$34 and \$34.50 per ton. The ore from the Excel Mine assayed over 65 per cent. Lead ore remained unchanged at \$21.75 per 1,000 lbs. During the corresponding week last year zinc ore brought \$27.50 per ton, and lead ore \$23 per 1,000 lbs.

Following is the turn-in by camps of the Missouri-Kansas District for the week ending April 12:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	1,935,950	541,090	\$42,744
Galena-Empire	1,343,460	213,480	23,080
Cartersville	2,371,260	447,810	42,938
Webb City	564,530	37,710	8,667
Oronogo	394,370	32,790	6,667
Duenweg	234,620	39,040	4,134
Aurora	690,330	36,360	7,973
Carl Junction	422,200	.....	6,333
Carthage	187,500	.....	3,000
Spurgeon	35,910	130,450	3,340
Zincite	262,560	4,750	4,750
Cave Springs	215,730	6,740	3,265
Stotts City	171,520	.....	2,573
Roaring Springs	93,410	1,170	1,196
Reeds	103,770	.....	1,349
Granby	366,000	39,000	3,964
Sarcoxie	87,240	.....	1,134
Sherwood	41,250	.....	660
Total	9,427,610	1,551,210	\$167,796
Total 15 weeks	150,820,470	18,863,040	\$2,493,585

Zinc value for week, \$134,081; lead, \$33,688; zinc value 15 weeks, \$2,086,571; lead, \$407,013.

MONTANA.

BEAVERHEAD COUNTY.

(From Our Special Correspondent.)

Greenwood Mining and Milling Company.—W. R. Grant, manager of the combined concentrator and pneumatic cyanide plant of this company, near Melrose, is installing a belt conveyor for conveying ore to the concentrator from the mine dumps. Belt conveyors are also to be used to carry the material to the cyanide tanks. The Linke Belt Machinery Company, of Chicago, is furnishing the conveyors. The plant was built to handle the low-grade dumps of the Hecla Company, is very complete and the first of its kind to be erected in the State. The company has a contract with the Hecla to work the vast accumulation of low-grade ores on the dumps.

CARBON COUNTY.

(From Our Special Correspondent.)

Rocky Fork Coal Company.—The 400 coal miners in the employ of this company are out on a strike. They object to an order recently issued by State Coal Mine Inspector Welch to the company prohibiting the men being hoisted up the slope to surface at the end of the shift as the practice was considered dangerous. The miners took exception to the order and struck in a body. The slope is something like half a mile long and the miners object to walking the distance after working an 8-hour shift. During the past month their average wage was about \$90. A large number of the miners are Finlanders.

CASCADE COUNTY.

(From Our Special Correspondent.)

Big Seven Mining Company.—The 427,670 shares of this stock, which have been in the keeping of Clerk of the Court Athey for several months, pending the settlement of the Barker Estate, have been ordered turned over to the administratrix, Marcella S. O'Leary, by Judge Leslie.

FERGUS COUNTY.

Kendall Mill.—Work on this plant is progressing nicely and the machinery is expected to be ready for work by May 1.

King-Barnes.—The new shaft at this mine at Kendall is down 50 ft.

Pilgrim.—Edward J. Morrison, of Belding, has bonded this and four other claims near the Kendall Mine from Fred L. Stephens and others. The bond is for \$20,000.

GRANITE COUNTY.

(From Our Special Correspondent.)

Good Hope Mining Company.—The people identified with the Granite-Bi-Metallic have purchased the old Hope silver property and reorganized under this name, with Paul A. Fusz president of both companies. The Hope has the oldest silver mill in the State, erected in 1866, and was in operation almost continuously up to last fall. The ore, hereafter, will be treated in the Bi-Metallic Mill.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Alta.—The old concentrator of this company, which is so closely identified with the Helena & Livingston Smelting Company is being overhauled and repaired, the intention being to operate the plant in place of the Peck-Montana Mill at East Helena, which was destroyed by fire last summer.

King Solomon.—Isaac Morland, the owner of this silver property situated near Clancy, has under consideration the erection of a concentrator at the mine. Recently shipments from the new ore shoot have given returns of \$35 to \$300 per ton from the East Helena Smelter. It is estimated that there are fully 3,000 tons of concentrating ore on the dump.

Montana Verde Copper Company.—This is a recent incorporation under the laws of South Dakota. The capital stock is 2,500,000 shares of \$1 each. The officers are: F. W. Warnock, president; J. E. Rickards, vice-president; W. F. Normandy, secretary and treasurer; Joseph Johnson, general manager. The company owns a group of claims 5 miles from Bernice, 13 quartz and 3 placer claims, with a water-right taken out of a side gulch by a ditch 3/4 of a mile long. The property has been under quiet development for some time. The ore is a low-grade iron-copper sulphide, but the ore body is said to be of immense proportions.

Minah Consolidated Mining Company.—The case of James E. Sites against this company is set for April 22 at Boulder.

LEWIS & CLARKE COUNTY.

(From Our Special Correspondent.)

Montana Mining Company vs. St. Louis Mining and Milling Company.—The apex case between these two companies at Marysville has been before the United States Supreme Court on argument, the presentations being made by T. C. Bach, of Helena; W. E. Cullen, of Spokane; and Charles J. Hughes, of Denver.

MADISON COUNTY.

Kearsarge.—One of the richest strikes of gold ore ever made in the State is reported from this mine at Summit, near Virginia City. R. B. Turner is the general manager of the Kearsarge and Kennett mines. Both are owned by Mr. Millard.

PARK COUNTY.

Bear Gulch Mining Company.—Col. A. C. Jardine, president and manager of this company operating at Jardine, has been in Livingston. At a meeting of the directors held recently at Saint John, N. B., it was decided to make extensive improvements on the property at Jardine. The work will include a 40-stamp mill. New tramways will be constructed and development work on the mines will be pushed. The material for the 40-stamp mill and adjacent buildings has been ordered, and work is to begin immediately.

SILVER BOW COUNTY.

Anaconda Copper Mining Company.—The State Supreme Court has annulled as "wholly in excess of jurisdiction" the order granted by Judge William Clancy, authorizing F. Augustus Heinze to make a survey of the Anaconda and St. Lawrence mines at Butte, owned by this company. The application was made on the ground that the Anaconda Company was trespassing on the vein, which has its apex in the Fairmount claim, owned by Heinze at the time the order was made, but which he has since conveyed to others. The order of survey was made under the Montana law, which allows any person having an interest in any land, lode or mining claim, which is in the possession of another person, to have a survey made for the purpose of ascertaining, enforcing or protecting his rights.

NEW MEXICO.

LINCOLN COUNTY.

Eagle Mining Company.—This company, of Parsons City, it is said, has come into possession of every mining claim, water right and homestead on the Bonito River from Parsons, nearly down to Angus. This action was made necessary by the plans of that company which anticipate the erection of a large cyanide plant for treating low grade ores, and in order to operate this plant would take a large amount of water from the Bonito which when turned back would be poisonous.

SAN MIGUEL COUNTY.

Pioneer Mining and Reduction Company.—Belden C. Pittenger, A. R. Quinley, Thomas E. Blauvelt, Charles P. Hammond, H. Elwyn Blake, John A. Baker, Morris Greenberger, John W. Phillips, Chas. H. Stevenson, Ralph W. Higgins, and W. B. Twitchell, directors, have incorporated this company, with \$200,000 capital to operate and build reduction works in the Tecolote District. Headquarters of the company are at Las Vegas.

OREGON.

BAKER COUNTY.

Flagstaff.—This mine, in the Virtue District, has resumed operations. The mine was opened last fall, a new mill was built and repairs were made. The company lacked money and the mill and leaching plant were not given a fair test. It is stated that money has been provided for paying all back accounts for wages and supplies, and to carry on the work according to the original plans.

PENNSYLVANIA.

ANTHRACITE COAL.

Crystal Run Coal Company.—This company, at Mahanoy City, is sinking a new slope. The breaker will have a capacity of 800 tons daily and will cost \$40,000.

Delaware, Lackawanna & Western.—The pumpmen and engineers at the Woodward, Avondale and Pettebone collieries and the fire fighters at this Jersey Mine Company near Wilkes-Barre did not strike April 12, as ordered by the United Mine Workers. Eight weeks ago the firemen were ordered on what was called the swing shift, working 10 hours on a shift one Sunday and 14 hours on 2 shifts the next. This was accompanied by an increase in wages of 7.5 cents a day. The men were asked to sign a contract for a year. They refused each term of the new rule and were discharged. The Avondale men went out on a sympathy strike. The Pettebone and Woodward men decided to do likewise, but were locked out before they could strike. The company got non-union men to fill the places of the firemen and they have worked since without interference. The fire fighters at the Jersey are all union men, skilled, and get from \$2.50 to \$4 a day. They have worked at the fire for a year, and while keeping it confined to a certain area, cannot make headway against it. On April 15 most of the men at the Jersey Mine quit as did some of the pump men and engineers at the Pettebone and the Avondale.

Lawrence.—This colliery, at Frackville, which was abandoned by the Schaefer estate several weeks ago, has been leased by Superintendent Miller, who will employ 300 men and boys to mine the coal above the water level.

Lehigh Coal and Navigation Company.—This company will sink a new shaft and erect a new breaker at No. 10 mine near Tamaqua. Work on a mile of railway, connecting the Central Railway with the new site has started. The new breaker will have a capacity of 1,500 tons daily.

Philadelphia & Reading Coal and Iron Company.—This company has decided to sink new shafts at Eagle Hill, Phoenix Park, Branch Date and Tamaqua.

BITUMINOUS COAL.

Buffalo, Rochester & Pittsburg Company.—After several days had been spent in conference with Manager Lucien W. Robinson, the delegates representing the 10,000 striking miners in the Beech Creek refused to settle the strike. The men declared that they would not settle unless mules for hauling cars for both ways are granted and the Altoona scale signed.

United Coal Company.—This company has been organized at Pittsburg, Pa., with a capital stock of \$3,000,000. The mines consolidated under the new firm name are the Ella Coal Company, the United Mines Coal Company, the Rich Hill Coal Company, and the Pittsburg & Baltimore Coal Company. The officers are George A. Magoon, president and manager; H. A. Kuhn, vice-president; J. B. Van Waggoner, secretary; James D. O'Neill, treasurer.

Webster Coal and Coke Company.—This company, operating in Westmoreland County, has placed a \$3,000,000 mortgage on its property. During the last year the company has built a large modern plant at Ehrenfield and has improved and consolidated its many concerns. It is understood the \$3,000,000 loan is to provide funds for other improvements and extensions projected.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Bear Gulch Mining Company.—Work has been resumed after a shut down of two months. A shaft has started to open the ledge at some depth.

Horseshoe Mining Company.—The cyanide plant has been running two weeks in an experimental way. Work has started on the new 1,000-ton cyanide plant at Pluma. The company continues to ship its high-grade ore to Eastern smelters.

Imperial Mining Company.—This company has purchased the old dump at the Rossiter cyanide plant, estimated at 50,000 tons. It will be treated in the cyanide vats of the Imperial Mill. The dump was formed when the Rossiter plant was first built, and the tailings are said to assay \$3 per ton.

Pennsylvania Mining Company.—A large body of high-grade ore is being developed along Deadwood

Gulch, about 1½ miles west of Lead. The company's headquarters are at Lead.

Wasp No. 2.—The cyanide plant is running again full capacity after a temporary shut down caused by deep snow. The company is shipping some ore to smelters. The cyanide plant is to be enlarged this year and will be able to treat from 150 to 200 tons.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Black Hills Copper Company.—Officers were elected at the annual meeting held in Deadwood on April 8 as follows: J. E. Barnes, president; T. L. Wilkinson, vice president; John Robinson, treasurer; George M. Thresher, secretary. Other directors are George M. Wilkinson, John B. Taylor and Robert Sohlt. All the officers reside at Benton Harbor, Mich., with the exception of Mr. Taylor, the general manager. The company has started the development of the Benedict gold property. A Chilean quartz mill has been purchased and a hoisting plant has been leased of the Harney Peak Tin Mining Company.

British-American Copper Company.—Miners have been engaged to start development. C. A. Bronson is superintendent at Rochford.

National Smelting Company.—Ore is being received at the smelter in Rapid City preparatory to its starting. Several cars have arrived from the Wasp No. 2, the Seim and other mines in Lawrence County, and a shipment will arrive from the Horseshoe as soon as railroad connections are made. The lime for the smelter is quarried west of Rapid City. The furnaces will blow in this month.

TENNESSEE.

MAURY COUNTY.

Howard Phosphate Company and the Ridley Phosphate Company.—These companies, at Mount Pleasant, have sold to the Virginia-Carolina Chemical Company their mining properties, including a large amount of rock already mined. The price paid for these properties is given as \$425,000. The principal owners of the Howard Phosphate Company are J. W. Howard and his son, Will J. Howard, and of the Ridley Phosphate Company, Webb Ridley, W. M. Cheairs, Col. Edward Armstrong, and E. H. Hatcher.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—The settlements for the week ending April 12 are as follows: Bullion, \$50,000; silver-lead ores, \$160,500; auro-cyanides, \$3,800; gold bars, \$13,200.

BEAVER COUNTY.

(From Our Special Correspondent.)

Frisco Shipments.—During the week ending April 12, 9 cars of ore reached the smelters from the Horn Silver Mine.

BOX ELDER COUNTY.

(From Our Special Correspondent.)

Century.—The new 16-stamp mill has started and work is pushed with a force of 27 men. A winze has been sunk 80 ft. from the upper level and is in ore running from \$8 to \$12. P. Madsen has been re-elected president.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—During the week ending April 12, the following shipments went to the smelters at Salt Lake: Carisa, 3 cars ore; Uncle Sam, 4 cars ore; May Day, 2 cars concentrates; South Swansea, 2 cars ore; Bullion Beck, 13 cars ore; Mammoth, 9 cars ore; Lower Mammoth, 3 cars ore.

Mammoth.—In a drift 150 ft. under the old workings of this mine at Tintic a shoot of ore 2 ft. wide is reported that gives high values.

Uncle Sam.—At a meeting of the directors B. F. Saunders was elected to succeed C. E. Allen. Manager Chipman is reported to have said that no shipments were to be made from the main workings owing to present prices, but that occasional shipments would be made from the Humbug claims.

West Morning Glory.—The assessment levied is to be used to purchase a new pump and to sink the shaft.

SALT LAKE COUNTY.

United States.—The contract for the aerial tramway to connect the company's Bingham mines with the railroad has been awarded to Messrs. Diederich & Burke, of Salt Lake, who agree to have the line finished by July 15. The material for the tramway that, in its two sections between the Old Jordan and the depot, will be between 16,000 and 17,000 ft. long, is already beginning to arrive. The line is designed to transport 600 tons of ore during one shift of 10 hours. Work at the big smelter is progressing rapidly and barring unlooked-for delays in the arrival of equipment, it is expected to be turning out bullion before the end of August.

(From Our Special Correspondent.)

Bingham Shipments.—During the week ending April 12, the consignments from the camp were 16 cars, divided as follows: Neptune, 4 cars ore; United States lease, 1 car ore; Ben Butler, 1 car ore; Highland Boy Consolidated, 4 cars ore; Tiewaukee, 1 car ore; Phoenix, 2 cars ore; Red Wing, 1 car ore; New England Mining Company, lease, 2 cars ore.

Highland Boy.—The usual consignment of 3 cars of copper bullion, aggregating 240,000 lbs., was sent east during the week ending April 12.

Yampa.—The property has closed temporarily and it is rumored that the Tintic Mining and Development Company is about to dispose of the ground to the Bingham Consolidated. However, the ground bounded as it is by the Utah Consolidated, will probably go to that company if anywhere.

SUMMIT COUNTY.

Daly-Judge.—It is stated that the big deal by which this company acquires the Anchor Mining Company's property, was negotiated by John J. Daly, O. J. Salisbury and Dr. Allen Fowler, acting in behalf of the Daly-Judge, and Col. E. F. Holmes and other directors of the Anchor, while the first-named operators and Mrs. Mary Judge's representatives appear as principals in the heavy side issue. By the terms of purchase, it is said, the Daly-Judge Company agrees to pay \$4.50 per share for all of the capital stock of the Anchor Company, or a total of \$675,000. Out of this sum the indebtedness of the incorporation is to be discharged.

The holdings of the chief shareholders, amounting to 115,000 of the 150,000 shares, have been turned over to the purchasers, and the balance of the stock will be received on the same basis. In addition, Mrs. Mary Judge has been relieved of her one-fourth interest in the Daly-Judge Company's holdings for a cash consideration of \$77,200, so the entire transaction involves an expenditure of \$752,200.

The Anchor directorate has reorganized. O. J. Salisbury succeeds E. F. Holmes as president. David D. Erwin, F. A. Nims, W. W. Armstrong, Henry Newell and Colonel William M. Ferry resigned as directors, and John J. Daly, Dr. Allen Fowler, M. C. Fox, George W. Lambourne and Mr. Salisbury were chosen in their places. These, with Colonel Holmes, James Farrell, W. V. Rice and W. Mont Ferry constitute the reorganized board, which will continue, most likely till the affairs of the Anchor Company are finally wound up.

The territory of the Daly-Judge Company, it is said, will cover as great an area as the holdings of the Ontario, Daly and Daly-West companies combined. It comprises more than 100 patented claims, and stretches out for 2½ miles along the strike of the mineral zone.

Though the Anchor Company has been in existence since 1885, only a comparatively small part of its territory has been opened. There are nearly 35,000 ft. of openings in the mine and a recent expert report is said to have shown 82,000 tons of ore blocked out. In opening the mine and equipping it with hoisting works, mills, etc., nearly \$1,300,000 has been expended.

Daly-West.—A special meeting of the shareholders of the Daly-West Mining Company is to be held May 5, at Denver, Colo., at which action will be taken on the purchase of the Quincy Mining Company's property. The matters to be discussed are:

First—To amend the articles of incorporation so as to make the capitalization \$3,600,000, represented by 180,000 \$20 shares, full paid and non-assessable, an increase of 30,000 shares.

Second—To consider and approve the action of the board of directors in purchasing from the Quincy Mining Company, all its mining claims and mining property, and agreeing to give in payment 30,000 shares of the capital stock, when such capital stock shall have been increased from 150,000 to 180,000 shares.

(From Our Special Correspondent.)

Park City Shipments.—The shipments for the week ending April 12 were 5,981,500 lbs., divided as follows: Daly-West, 2,026,380 lbs.; Ontario, 1,463,270 lbs.; Quincy, 421,300 lbs.; Anchor, 430,200 lbs.; Silver King 1,640,350 lbs.

Crescent Hill Mining Company.—Suit has been entered by Mr. Herkimer against this company to recover possession of certain patented claims in the Uintah District.

Daly-West.—At a recent meeting of the directors at Denver a dividend of 40c. a share was declared, which will make the amount to be paid \$72,000.

Utah Zinc Company.—It is reported that William Quimby, of Boston, has bought the mill at Park City through Mayne & Leonard, and that he will put the plant in commission at an early date. The mill was erected to treat the zinc ores of the Anchor Mine.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—During the week ending April 12 Ophir Hill shipped 15 cars of concentrates.

Cygnets.—Manager Benton has returned from this Stockton property and reports ore being stoped on the 200 ft. level from a shoot 20 ft. long and 4 ft. thick, that runs about 45 per cent lead and 10 oz. silver to the ton.

Honorine.—The large compressor is reported on the way from Schenectady, N. Y. It is large enough to furnish 50 drills with air.

West Argent.—Salt Lake interests ask for an accounting from Chillicothe, Mo., parties in the Third Judicial District Court. Attempt to defraud is alleged.

WASHINGTON.

Kettle Valley & Republic Railroad.—About 150 brokers and mining men left Spokane on a special train April 11 for Grand Forks, B. C., and were tendered a banquet at Republic on April 12, and another at Grand Forks, B. C., on their return from Republic. The celebration was in honor of the opening of the Kettle Valley & Republic Railroad.

FERRY COUNTY.

(From Our Special Correspondent.)

California.—The ore from this mine will be hauled 7 miles, by freight wagons, to the line of the Washington & Great Northern. The bins at the mine are full.

Flag Hill Gold Mining Company.—A special meeting of stockholders was held at Republic April 7, and a new board elected as follows: Philip Creasor, J. A. Bangs, F. O. Birney, D. F. Hallahan and F. E. Elmendorf; President, Philip Creasor; vice-president, F. O. Birney; secretary and treasurer, J. A. Bangs. Work will be resumed as soon as possible, beginning with a 2 compartment working shaft.

Morning Glory.—This mine is again producing ore, which is assorted in 2 classes, the higher being very rich.

North San Poil Mining Company.—At the annual meeting in Republic, April 7, H. E. Forster, president; J. W. McCann, vice-president; and J. A. Bangs, secretary and treasurer, were elected as a new board of trustees.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

The total gold production in March is reported at 104,727 oz. fine. This makes for the three months ending March 31, a total of 255,872 oz. fine gold, or \$5,288,774. Last year there was no production in the first quarter of the year.

AUSTRALIA.

WESTERN AUSTRALIA.

The gold output in March is reported at 177,506 oz. crude. For the three months ending March 31, the total was 498,356 oz. crude, against 402,040 oz. for the first quarter of 1901; an increase of 96,316 oz., or 23.9 per cent. The total this year was equal to 428,586 oz. fine gold, or \$8,858,873.

CANADA.

BRITISH COLUMBIA—LARDEAU DISTRICT.

Silver Cup.—This mine was recently sold by the Horne-Payne Syndicate to Messrs. W. B. Pool and J. J. Young, owners of the Nettie L., for a sum reported at \$500,000 cash. The new owners will develop the mine on a large scale.

MEXICO.

DURANGO.

(From Our Special Correspondent.)

There were 1,837 mining titles issued by the government during the first half of the current fiscal year. They covered an area of 29,095 hectares of mineral lands, showing an increase of 100 per cent over the same period last year.

Velardena Mining Company.—It is reported that this company will build a new concentrating plant of 500-ton capacity.

SONORA.

(From Our Special Correspondent.)

Greene Consolidated.—The secretary of this company says the shipments of copper matte from the works at La Cananea, in March amounted to 7,845,055 lbs., averaging 46 per cent copper, equivalent to 3,670,105 lbs. fine copper. The company has 5 smelters in operation and the production amounts to about 175 tons of matte per day.

NEW ZEALAND.

Gold Dredging.—During the past few weeks both the Otago and the West Coast dredges have given good returns. The Molyneux River is gradually falling to winter level, and soon the Otago dredges will improve their yields further. During the week ending March 3 the returns from 57 Otago dredges totaled 1,712 ozs., and of 22 West Coast dredges, 556 ozs.

MINING STOCKS.

(Complete quotations will be found on pages 572 and 573 of stocks dealt in at):

New York.	Mexico.	San Francisco.
Boston.	London.	Salt Lake City.
Philadelphia.	Paris.	Spokane.
Colo. Springs.	Toronto.	St. Louis.

New York. April 17.

Another weight has been added to the copper section by a cut in the Anaconda and Amalgamated dividends. This time only 50c. will be paid by Anaconda and 0½ per cent by Amalgamated. Last October \$1.25 was distributed by Anaconda, and in April, 1901, \$2. Since Amalgamated got control of the property dividends have been steadily reduced. Anaconda has paid good dividends on copper that sold below present market prices. In fact, dividends aggregated annually \$2,250,000 to \$3,900,000, whereas the rate for 1902 is on a \$1,200,000 basis. Another discouraging feature is the low market quotation for Anaconda stock—110 per cent, or \$27½ per share. When the last dividend was paid six months ago, the shares sold around \$36, while in April, 1901, prices were about \$50.

Amalgamated shares attract professional operators chiefly, as most outsiders are waiting their chance to sell at any price. Consequently, prices fluctuate systematically, the highest being \$67¼ and the lowest \$63¾. The present 0½ per cent dividend compares with 1 per cent in January and 2 per cent in July, 1901, when the first declaration was made on the increased capital.

On curb the coppers have been dealt in by their chief supporters. White Knob of Idaho rose from \$21½ to \$23½, and Greene Consolidated of Mexico, at \$21¼ to \$21½. Tennessee sold at \$11 to \$11¼, British Columbia, \$9 to \$9½; Montreal & Boston, \$3½ to \$2½, and Union, of North Carolina, \$3½ to \$3¾.

Further sales of Ontario Silver, of Utah, have been made at \$9 to \$9¼.

Standard Consolidated, of California, reappeared on sales at \$3.25 to \$3.35, while Brunswick is higher at 17c.

The Cripple Creek, Colo., shares are slumped, owing to the passing of important regular dividends. Portland sold at \$1.90, the lowest price in some time. The company is completing its new mill, which is expected to be in operation by May 15. Then it is hoped the regular quarterly dividends will be resumed. Elkton is weak at 75c., as it is reported the next quarterly dividend of 4c. per share will be passed. Isabella is unsettled at 23c.

Little is doing in the Comstocks. Consolidated California & Virginia sold at \$1.25.

Auction sales were \$1,000 extended 4½ per cent bond (due 1910) of the Lehigh & Wilkes-Barre Coal Company at 103; 750 shares Empire State-Idaho Mining and Development Company, Idaho, at \$6.25 per share; 9,000 common shares Pride of the Mountains Mining Company at \$5 for lot.

Boston. April 16.

(From Our Special Correspondent.)

A market of specialties is about all that Boston has been having in the mining list. Copper Range Consolidated has again been the feature, making a new price record of \$64. The result for the week, however, is a 50c. advance, the closing to-night being \$59.50, with sales of about 60,000 shares during the week. Trust receipts for Baltic and old Copper Range have been stricken from the unlisted sheet. Bingham Consolidated and United States Mining have come in for a share of the activity of late and Bingham particularly has been well bought. This stock has risen \$4.75 to \$31.50, and closed strong.

Bingham's new converter plant will go into commission next month, and instead of shipping the matte to Butte, as has been the custom, the company will refine its own matte, thus saving freight and smelting charges. Two furnaces are now in commission and two more will shortly be blown in without any extra expense, as the same help can handle four as two. The company has been earning over \$25,000 net per month, but this will be materially increased with its own converter plant and extra furnaces. A large amount of matte is on hand, as shipping was stopped some time ago. United States touched \$21.50, an advance of \$2.25. President Evans has just returned from the property and reports encouragingly. He states that 25,000 shares of the stock have been purchased for Salt Lake account during the past three months.

Tamarack Mining dropped \$10, to \$170, on the appearance of the annual report, closing at \$175 to-day. The result of last year's operating was not unlike the rest of the Bigelow mines. The report is given on another page.

United States Oil has been active, touching \$15.75, with reaction to \$14.75. A deal of some kind is on foot, which, it is said, will greatly enhance the value of the stock. Trinity, which is Lawson's pet, has been active at from \$13.12½ to \$14.50. It is said

that this stock and Arcadian will be made favorites when the time shall come. Calumet & Hecla has weakened \$20 to \$580. A reduction in the dividend is inevitable. Utah has been dull at \$22.75 to \$22.50. This company is said to have earned about \$700,000 net last year, in spite of the sale of its copper at low prices. The Old Dominion's new management intends to be aggressive. Already it has taken the selling of its copper from the United Metals Selling Company. It has been producing about 800,000 pounds of fine copper per month. The Franklin mining management was re-elected at the annual meeting. The company's copper cost an average of 11¼ cents the first three months of the year. The removal of the Pevabic mining suit ought to change the status of the stock in the market.

Fluctuations in Dominion Iron and Steel have been very violent, in fact, so much so that many brokers do not like to incur the risk. It boomed to \$75, fell back to \$65.50, recovered to \$70, and closed \$67.50, against \$63.87½ a week ago. Dominion Coal advanced \$11 to \$146, reacting to \$142. Negotiations are now completed and Dominion Steel will guarantee 8 per cent on Dominion Coal stock. Each company will increase its capital \$5,000,000. The Coal Company will issue the stock at 120, bringing \$6,000,000, with which the \$3,000,000 preferred and \$3,000,000 bonds will be retired. The Steel Company will issue its new stock at \$60. The proceeds will be used to pay off the floating debt of the Coal Company and completing its own works at Sydney.

Colorado Springs. April 10.

(From Our Special Correspondent.)

The passing of the Portland dividend dominated the mining stock market this week. The directors of this company met April 5, and voted to pass the quarterly distribution of profits, and issued a statement to the effect that the prohibitive rates being exacted by the smelter trust, had caused a curtailment of production which made it a matter of economy to suspend the next quarterly payment of \$180,000. The company is completing a \$700,000 chlorination mill at Colorado City, which will receive the mine's entire output after May 15. There will be but little ore sent out from this property until then. This action of the board was a surprise to even the best posted mining men in the city. Portland sold at \$2.30 on the 3d, and was quoted as high as \$2.40 on the 5th. Immediately following the dividend announcement, the stock broke to \$2.10, closing at \$2 a share. It has ranged from the latter figure to \$2.05, at which it sold today. Resumption of dividends is promised as soon as the company is in a position to ship ore to its own mill. The Portland break had a depressing effect upon the market, and the state of prices this week is due in a large measure to the dividend matter.

An internal fight in the Elkton board of directors, coupled with the fact that the mine is still facing a serious water problem, resulted in breaking these shares from 93½ to 78 during the past week. Two of the largest stockholders are striving for the supremacy.

El Paso, which is closely affiliated with Elkton, was weak during the past week, although selling from 48 to 50c. the latter part of last week. There is very little stock, however, being offered at prevailing prices. The mine maintained the exceptionally high average of \$52.40 a ton on all ores mined during the month of March. Vindicator held strong during the week, selling at \$1.10. This company has just declared its regular quarterly 3c. dividend, and announces an additional dividend of 2c. a share, the total disbursement amounting to \$55,000. News that the Isabella Company was again making expenses was received this week, the stock selling up to 26½ from 24¼.

An important consolidation of all of the mines owned and controlled by the Woods Investment Company along the line of the United Mines Transportation tunnel will be announced shortly. The new corporation will have a capital stock of 5,000,000 shares, of which 3,800,000 shares will be issued to the companies included in the merger. A dividend of 1c. a share monthly has been announced. This adds a new dividend payer of considerable importance to Cripple Creek.

Salt Lake City. April 12.

(From Our Special Correspondent.)

The stock market as compared with last week has barely held its own. There were a few exceptions, among which were the Daly-West and one or two lesser lights. The sales of Ajax were very small, but prices dropped off 7c. from the top notch, this week seeing but 28,450 shares change hands as compared with 108,200 last week. Carisa has held steady and higher than last week, marketing 96,000. Consolidated Mercur at closing last week was \$2.03 high, \$1.97 low, and this week's opening saw \$2; but at closing the mark was \$1.82, it having been on the down grade all week, registering lower prices each day. Daly of Park City has dropped 20c. this week.

Daly-West has been on the up-grade; 4,010 shares were exchanged this week, opening at \$42 and closing at \$48 to-day. Lower Mammoth has lowered from \$1.90 to \$1.73 to the close to-day, when the low point was \$1.45. May Day sold 66,510 shares at 38½ to 34½c. South Swansea has been climbing, marketing 15,033 shares, and closing to-day at 52c. Yankee Consolidated moved up a few points and closed at \$2.56 high and \$2.28 low, with sales of 5,300 shares. California dropped 8c., closing to-day at 27c. high, and 22¾c. low. Century of Park Valley has moved up from 27c. at the first of the week to 55c. at closing; sales, 8,650 shares.

San Francisco. April 12.

(From Our Special Correspondent.)

Mining stocks have been fairly steady, with a moderate amount of business. The only feature of the week was a sharp rise in Overman and Caledonia, based on reports of some discoveries in the workings of those mines.

Some quotations noted are: Consolidated California & Virginia, \$1.30 to \$1.35; Ophir, 93c.; Caledonia, 50 to 52c.; Silver Hill, 48 to 50c.; Mexican, 43c.; Overman, 25 to 27c.; Potosi, 16c.; Chollar, 11 to 12c.

In oil stocks a good business was done, and prices were generally well maintained, though there was some decline in the interest shown toward the close of the week.

Some quotations given are: Sterling, \$1.50 to \$1.60; Sovereign, 29 to 30c.; Junction, 19c.; Lion, 7c. The demand for Sterling was the special feature.

London. April 5.

(From Our Special Correspondent.)

The past week has been an extremely dull one in the mining market. Owing to lack of opportunities for speculation the Easter holidays were prolonged and very little has been done. The death of Mr. Rhodes has had very little effect on the market, and even Chartered shares have hardly suffered at all. It is obvious that none of his holdings will be sold out and that his trustees and executors will continue his policy as regards the development of Rhodesia, so there is really no reason why holders should sell out. The Transvaal gold shares keep very quiet, and hardly anything is being done in them. Enormous numbers of holders are waiting for a rise to realize their profits; so, buying for a rise is not a very profitable speculation at present. The West Australian market is also very dull, as everybody is waiting for the final report on Lake View Consols, and speculation in all other shares in that colony is at an end at present. Among British Columbians Le Roi No. 2, is the only one showing any life, and as profits are being made now, the shares are hardening up to par.

Stratton's Independence has been prominently before the market this week owing to the publication

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Canton Placer.....	Cal.	Apr. 23	.....	.....	.01
Chollar.....	Nev. 56	Apr. 23	May 14	.....	.05
Con. Imperial.....	Nev. ..	Apr. 27	May 27	.....	.01
Crown Point.....	Nev. ..	Apr. 9	.....	.....	.05
Eureka Con. Drift.....	Cal. 34	Mar. 31	Apr. 31	.....	.00¼
Int'l Copper.....	Utah 1	Apr. 5	Apr. 30	.....	.00¼
Joe Bowers.....	Utah. ..	May 12	.....	.....	.01
Keystone.....	Cal. ..	Apr. 25	.....	.....	.03
Larkin.....	Cal. 20	Apr. 12	May 5	.....	.02
Little Standard Oil.....	Cal. 3	Apr. 12	May 12	.....	.10
Martha Washington.....	Utah. 9	Apr. 22	May 10	.....	.01
Old Colony & Eureka.....	Utah. 2	Apr. 16	May 2	.....	.00¼
Old Evergreen.....	Utah. 1	Apr. 5	May 3	.....	.03
Ophir.....	Nev. ..	Apr. 14	May 6	.....	.15
Overman.....	Nev. 10	Apr. 8	Apr. 29	.....	.10
Potosi.....	Nev. 62	Apr. 16	May 7	.....	.05
Savage.....	Nev. 106	Apr. 15	May 6	.....	.10
Tanana.....	Cal. 5	Apr. 7	Apr. 29	.....	.10
Tetro.....	Utah 32	Apr. 1	Apr. 28	.....	.01
Tintic.....	Utah. ..	Apr. 10	Apr. 28	.....	.00¼
Tomboy.....	Utah. ..	Apr. 19	May 19	.....	.00¼
Va. Con.....	Cal. 12	May 5	May 28	.....	.02
West Morning Glory.....	Utah. 11	May 15	.....	.....	.01

DIVIDENDS.

Name of Company.	Latest Dividend			Total to Date.
	Date.	Per Share.	Total.	
Anaconda Copper, Mont.....	May 15	.50	600,000	21,450,000
Bartolome Mill, Mexico.....	Apr. 30	.65	1,300	48,700
†Central Oil, W. Va.....	May 1	.25	15,000	97,500
*Esperanza, Mexico.....	Apr. 10	4.30	12,900	972,870
*Gold Coin, Colo.....	Apr. 25	.03	30,000	1,080,000
*Guadalupe Mill, Mexico.....	Apr. 20	1.32	13,200	3,425,850
*Helena, Oregon.....	Apr. 25	.00¼	6,500	144,000
*Homestake, S. D.....	Apr. 25	.25	52,500	11,073,750
Homestake, extra.....	Apr. 25	.25	52,500	.....
Imperial Oil Cal.....	Apr. 7	.20	20,000	80,000
*N.Y. & Hond. Rosario, C. A.....	Apr. 30	.10	15,000	1,730,000
*Pacific Coast Borax, Cal.....	Apr. 28	1.00	19,000	1,065,500
Penna. Steel, pf.....	May 1	3.50	247,500	825,000
*Penoles, Mo.....	Apr. 30	21.50	53,750	1,568,738
†Phila. Gas, com.....	Apr. 21	1.50	221,282	2,028,393
†Pittsburg Coal, pf.....	Apr. 25	1.75	569,000	5,278,168
Quicksilver, pf, Cal.....	May 9	.50	21,500	1,909,911
*Rambler-Cariboo, B. C.....	Apr. 30	.01	12,500	138,000
*San Francisco Mill, Mexico.....	Apr. 30	.85	5,100	254,900
*Sta. Maria Guadalupe.....	May 10	4.30	10,750	336,125
*Standard, Idaho.....	Apr. 25	.05	25,000	2,565,000
*St. Gertrudis, Mex.....	Apr. 25	.21	6,048	2,571,464
Thirty-Three Oil, Cal.....	Apr. 7	.10	10,000	40,000
†Vindicator, Colo.....	Apr. 25	.03	33,000	807,000
Vindicator, extra.....	Apr. 25	.02	22,000	.....

*Monthly. †Quarterly.

of a disheartening cable from Mr. Hammond. It appears that developments at depth are not at all satisfactory. The average content of the ore shipped is also comparatively low, the daily average being often below 1 oz. per ton. The shares have fallen to an extremely low figure, from 5s. to 7s. 6d, being the usual quotation—a figure that compares badly with £3 a year or two ago. In certain quarters here it continues to be alleged that these low shipments and poor reports are devised by the managers for some selfish ulterior motive, but I cannot find a ghost of evidence for believing such statements. There is absolutely no reason for believing that the reports are not genuine.

The Sulphides Reduction (New Process), Limited, the company owning the Ellershausen zinc-lead-sulphide process, has come before the public again appealing for further capital. The present scheme is to reconstruct with a liability of 4s. per £1 share, and to increase the capital slightly by the issue of 12,500 new shares, so that the nominal capital of the new company will be £112,500, and the available working capital, if all the shares are taken up, will be about £25,000. The prospectus does not make it clear as to what is to be done with this money, but the object is to start demonstrating works in this country. This process, which has several times been described in the *ENGINEERING AND MINING JOURNAL*, has had an unfortunate experience in finance, and has never had a real test on a commercial scale. So far it has been merely a gambling counter in the London stock market, and no doubt many people connected with it have made large profits in this way, for a few years ago the £1 shares were selling like hot cakes at £3, while the working of the process was the last thing thought of. Even now the only thing that can be said of the process is that it is an interesting possibility, for not a few eminent metallurgists have expressed to me their scepticism as to its commercial value. It is to be hoped that the money now raised will be really devoted to the testing of the process, and not to some new stock exchange juggling.

COAL TRADE REVIEW.

New York. April 18.
ANTHRACITE.

While the consumption of anthracite has fallen off greatly with the coming of spring, and retail trade is light, the wholesale trade is very active as a result of the 50c. discount for April purchases, and there is a demand for more coal than the mines can possibly ship this month. This demand is most marked among Eastern buyers, yet there is much more activity among buyers in the West than last year. A lot of dealers who then doubted the permanency of the new order of things paid 40 to 50c. per ton for their doubts, and this year are anxious to buy early. A discount of 50c. per ton for April purchases is a strong inducement for a dealer who hasn't the cash to borrow money on the coal he lays in. Such a transaction ought to show a good profit.

The first boats have arrived at the head of the lakes, but the amount of anthracite going forward is small, since there was a fair tonnage still on docks at Duluth and Superior, while bituminous is needed. In Chicago territory wholesalers have had a busy time, and the total amount of coal bought during April will be considerably greater than that bought a year ago. Lake freight rates seem to be on a basis of 30c. from Buffalo to Duluth, and 40c. to Chicago and Milwaukee. Along the lower lakes and in Canadian territory, trade is fairly active. Along the Atlantic seaboard demand is lively, and a heavy tonnage at April prices has been taken.

The prospect of a general strike at the mines have not changed since last week. The high officials of the United Mine Workers seem generally to hold to their conciliatory attitude. If all danger of a strike is not past, at least the prospects of peace are as good as a week ago. There is no doubt that the mining companies if called on to submit to unreasonable demands would make a long hard fight, and it is not at all certain that the miners would win out.

Car supply at the mines, which showed a slight improvement in March, has now fallen off on account of increased shipments, and it is the chief obstacle to the mines getting forward a heavier tonnage to April buyers. The mines that suffered most from the winter floods are getting back to normal conditions, but some of them will not be able to ship heavily for weeks yet.

The steam sizes continue in strong demand at seaboard points. The April prices for free-burning white ash coal f. o. b. New York Harbor shipping ports are: Broken, \$3.75; egg, stove and nut, \$4.

BITUMINOUS.

In the Atlantic seaboard soft coal trade coal is now being sent forward quite freely from the mines and the market is in a fairly easy condition. Car supply

at the mines is fairly good and the time taken for cars to get through from the mines to the shipping ports is nearly down to schedule. The matter of coastwise transportation, however, is bothering shippers, and the available supply of vessels is about covered by contracts. The demand for coal continues large and heavy shipments apparently will be necessary for some time to satisfy it. The demand for the better grades is particularly strong, and in order to get consumers stocked up heavy shipments of these will be necessary after the demand for the poorer grades begins to decline. Contracts for the season continue to be closed slowly, with producers showing no particular anxiety to take them.

The far East is calling for considerable coal and a considerable tonnage is going to that territory. Along Long Island Sound consumers are still short of coal, though a heavy tonnage is being shipped there. At New York Harbor points trade is easy, with most consumers able to get all the coal wanted. The all-rail trade is in very bad shape. The railroads seem to be interfering somewhat with it, and producers have neglected it to get coal to tidewater, in spite of the fact that slightly higher mine prices can be had for all-rail than for tidewater business.

Transportation from the mines is in good shape, cars coming through nearly on schedule time. Car supply at the mines is about 75 per cent of the demand; producers are not sure of this condition continuing, but hope that it may. In the coastwise vessel market, vessels are scarce and in good demand. As a result rates continue at the level of some weeks past, though ordinarily at this time of the year with fair weather prevailing, rates fall. We quote current coastwise freight rates from Philadelphia as follows: Boston, Salem and Portland, 90c.; Providence, New Bedford and Long Island Sound, 75c.; Portsmouth, 95c.; Wareham, Lynn and Saco, \$1; Newburyport, \$1.05.

Birmingham. April 14.

(From Our Special Correspondent.)

The coal production in Alabama during the past two weeks has not been at the usual figures. Water got into several mines and their full capacities have not been enjoyed. The production, however, will be itself again in a few days.

The Sloss-Sheffield Steel and Iron Company will soon remove the convicts, over 500 in number, now worked at Coalburg, to Flat Top Mountain, in Walker County, where new mines are being opened. The new mines will be ready for operation just as soon as the branch railroad being constructed from Littleton on the Southern Railway is completed.

During the past week the Congo Mining Company was organized with \$50,000 capitalization, the object being to mine coal in Jefferson County.

Chicago. April 15.

(From Our Special Correspondent.)

Sales of anthracite coal continue heavy, under the 50c. discount, for the month of April, from the established price of \$6 per ton for all grades. The supply is plentiful. On Sunday, April 13, the first cargo by boat this season arrived at Chicago from Buffalo, the steamer *C. F. Bielman* being the vessel and Coxe Bros. & Co. the consignees. Other vessels are coming in, the opening of lake navigation being in general two weeks ahead of last season and the ordinary record. Milwaukee received its first cargo of anthracite by lake last week. Though vessel-men are dissatisfied with the early opening, it is bringing relief to the Northwest, and is highly satisfactory to local coal interests.

Trade in bituminous coals is slack, as is natural to the season, and new railroad tariffs, together with summer price lists, are still hanging fire. Hocking is plentiful at \$3.25, the track supply that has been causing the price to be as low as \$2.75 for coal on track, having been pretty well cleaned up. Indiana block is quoted at \$2.45; Indiana semi-block, at \$2.10; Clinton lump, \$1.90; Indiana lump, \$1.80; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2@2.10. Smokeless coals are in fair demand at \$3 for run-of-mine, and \$3.25 for lump and egg. The strike at the block coal mines has caused some apprehension as to the supply, but has not affected prices.

Cleveland. April 15.

(From Our Special Correspondent.)

The season of navigation starts out with discouraging prospects for the shippers. The railroads are still short in their supply of cars and motive power for the movement of the product from the mines to the lakes. Shippers had chartered numerous boats upon the promise of the railroads to forward the coal to the lakes freely, and are now seriously embar-

assed in getting the supply. The situation was discouraging at the close of last week, but at the beginning of this, when they expected a better supply, they found themselves confronted with even a greater shortage than last week. The boats owned by the so-called independent companies on the lakes, upon which the shippers depend for the transportation of their material, are now beginning to move quite generally, and are being offered on the market in large numbers. The available tonnage for the movement of the coal is in consequence much in excess of the demand for it, and there is little question as to rates. The basing rates are 35c. to the head of the lakes, and 45c. to Milwaukee. Sales-agents report that sales are being made more slowly than usual in the Northwest, and that some of the contracts will not be closed until the middle of June. Prices remain as made at the recent conference.

Pittsburg. April 17.

(From Our Special Correspondent.)

Coal.—The demand for coal is in excess of production and the capacity at many of the mines is being increased. Miners are scarce and it is said that employment could be given to fully 1,000 additional men. The railroads are doing their best to get cars to the mines but more could be used if available. The Youghiogheny & Ohio Coal Company, a new concern composed of the Osborne-Saeger interests, has opened headquarters in Pittsburg and will handle the rail output of the Monongahela River Consolidated Coal and Coke Company. Frank M. Osborne, former president of the Pittsburg Coal Company, the railroad coal combination, is president of the new company. The principal market, it is said, will be in the northwest. Prices of coal are unusually firm, but no higher than last week. The river coal combine has shipped more coal to the southern markets and has received enough empty craft to keep the mines in steady operation for several months.

A circular was mailed April 17 to the stockholders of the Pittsburg Coal Company, with reference to the special meeting of the stockholders at the Jersey City office, on April 29. The general object of the meeting is to have the stockholders authorize the company to borrow \$6,000,000, and to empower the directors to issue bonds to that amount, payable substantially in equal instalments, so that all of the \$6,000,000 of bonds will mature and be paid by February 1, 1908; and to execute and deliver a mortgage or pledge of certain securities, the corporate stocks of some of the underlying or subsidiary corporations operated by the company, to secure the payment of the bonds. An arrangement has been made with the Union Trust Company of Pittsburg to finance the entire \$6,000,000 issue of bonds at par. The issue will consist of 240 bonds, each for the sum of \$25,000, bearing interest at the rate of 5 per cent. per annum, payable quarterly. New coal lands, purchased since the organization of the company, have cost \$6,192,395. This cost has been paid out of current funds of the company, proceeds of its short term commercial paper, and by the issue of purchase money mortgages maturing at early dates. The purpose of borrowing the \$6,000,000 is to fund the obligations incurred by the purchase of these additional coal lands so that the payment of the cost of the same can be met by installments and through a period of 7 years from February 1, 1902. The exhaustion of coal territory of the company occurring by reason of mining and shipping the coal, has been anticipated for many years in excess of the period through which the payment of the cost of the new coal lands purchased since the organization of the company extends, by the purchase of these new coal lands, a royalty charge of 5c. per ton is reserved from the gross earnings of the company which will be many times in excess of the amount required to pay both the principal and the interest of the \$6,000,000 bonds which the stockholders are now requested to authorize before the original acreage of the company is encroached upon.

Connellsville Coke.—The car supply was not so good last week, but the falling off in shipments did not affect the blast furnaces as all got the full requirement. The anticipated advance has not been announced by the leading producer, but premiums are still paid in many instances for prompt delivery. The *Courier* in its last issue gives the production of coke in the Connellsville region for the previous week at 220,637 tons. The shipments for the week aggregated 11,092 cars distributed as follows: To Pittsburg and river tipples, 4,158 cars; to points west of Pittsburg, 5,037 cars; to points east of Connellsville, 1,897 cars. This was a decrease of 432 cars compared with the shipments of the previous week.

Foreign Coal Trade. April 17.

Export trade continues quiet, though coal is now in free supply at seaboard ports.

Exports of coal from Baltimore during March were 33,162 tons, as against 59,540 tons in the same month last year, showing a falling off of 26,378 tons. Coke

exports were 688 tons, against 1,450 tons in March, 1901. Of the coal shipped this year 10,020 tons went to Mexico, 9,100 tons to Cuba, 6,006 tons to Italy, 1,036 tons to Austria, 3,800 tons to Chile, and 3,200 tons to Colombia.

Messrs Hull, Blyth & Co., of London and Cardiff, report, under date of April 4, that the general tone of the Welsh coal market remains steady, both for Cardiff and Monmouthshire descriptions. Prices are: Best Welsh steam coal, \$3.66@3.78; seconds, \$3.60; thirds, \$3.36; dry coals, \$3.24; best Monmouthshire, \$3.36@3.42; seconds, \$3.06; best small steam coal, \$2.10; seconds, \$1.98; other sorts, \$1.74.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market has been fairly active, and rates remain about unaltered. Some rates quoted from Cardiff are: Marseilles, \$1.35; Genoa, \$1.32; Naples, \$1.32; Singapore, \$2.64; Las Palmas, \$1.56; St. Vincent, \$1.74; Rio Janeiro, \$3.00; Buenos Ayres, \$2.76.

IRON TRADE REVIEW.

New York. April 17.

The business in pig iron and steel billets has been limited chiefly to buying by parties who need early deliveries and have to get them where they can. On such business premiums are paid, according to the necessities of buyers, and it is very difficult to ascertain prices. The nominal quotations are unchanged, but there has been very little business done in long time contracts. It is said that an attempt has been made to buy a large lot of pig iron for speculative purposes, but makers refused to sell.

Business in finished material, especially structural steel, continues very active. It is reported that at least one order for girder rails for an electric road has gone to a German mill, the company being unable to get deliveries here.

Birmingham. April 14.

(From Our Special Correspondent.)

There has been no change in the active pig iron market in Alabama during the past week. The production has been suffering a little on account of the supply of ore and coke, the latter article in particular being rather scarce in this State. It became necessary for some of the furnaces to use imported coke to keep in steady operation while one or two lost several days' work through the shortage. The scarcity of iron ore is being improved rapidly, much common labor being brought into the district and placed at work in the mines. There has been some trouble experienced at the coal mines because of water flooding them, but this is also being corrected.

The furnacemen would be able to get better prices, but are still inclined towards holding the \$12 basis for No. 2 foundry. Premiums are still being given for immediate delivery iron, the price being \$2 above the quoted figures. The following quotations are given: No. 1 foundry, \$12.50; No. 2 foundry, \$12; No. 3 foundry, \$11.50; No. 4 foundry, \$11; gray forge, \$10.50; No. 1 soft, \$12.50; No. 2 soft, \$12. It is not at all improbable if these prices will not be kept up for the balance of the year, the statement being made that much of the production for the year is already being provided for.

The report of the Southern Iron Committee for March shows that the total shipments of all metals from the Southern field aggregated 163,461 tons, of which 147,277 tons were pig iron and steel, and 16,184 tons cast-iron pipe. The shipments during the month of March by districts from the Southern field were as follows in tons:

District.	Pig Iron.	Cast iron pipe.
Anniston	21,001	3,317
Birmingham	77,489	8,194
Nashville	10,355	.....
Sheffield	16,295	.....
Middle-shoro	4,557	.....
Chattanooga	17,580	4,673
Total	147,277	16,184

The export movements were as follows: Pig iron, Anniston, 40 tons; Birmingham, 40 tons; Nashville, 100 tons; total 180 tons. Cast-iron pipe, Anniston, 343 tons, Birmingham, 263 tons; total 606 tons.

The steel shipments from Ensley during the month of March amounted to 3,383 tons, showing a decrease as compared with the previous month.

For the first three months of the year the total shipments of pig iron and steel from the Southern field amounted to 459,357 tons, and of cast-iron pipe 35,231 tons. The first three months' steel shipments aggregated 24,566 tons. In all 711 tons of pig iron were exported and 986 tons of cast-iron pipe. The Birmingham District alone during the first quarter of the year shipped out 245,276 tons of pig iron and steel, and 18,763 tons of cast iron pipe.

Buffalo. April 18.

(Special Report of Rogers, Brown & Co.)

Within the past week the shortage of pig iron in this district has been greatly intensified by the labor troubles in the coke region, which have shut off the supply of fuel from several furnaces and compelled some to shut down temporarily. Coke from other sections, however, is being hurried forward to take the place of the usual supplies, and relief is looked for very soon. This stoppage has of course made quite a break in the volume of pig iron produced. A glance at the situation with foundries shows that they have practically no stocks in their yards and the majority of melters are having a difficult time in obtaining sufficient iron to keep running. There are no indications of conditions appearing which would seem likely in the early future to offer relief for foundries from the hand to mouth system upon which they are compelled to operate. Some foreign iron has been imported, but it is only a drop in the bucket, so to speak, and the freight rates are so high from the coast to interior points that when these are added to the already fancy prices of the foreign metal the quotations are practically prohibitive. Consequently the relief is only felt by consumers located near the coast. Occasional lots of iron offered for early shipment command about whatever prices the holders see fit to ask. There is considerable variation in quotations for late delivery, but those given below are considered a fair average. We quote on the cash basis, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$19; No. 2, \$18.50; Southern soft No. 1, \$19.75; No. 2, \$19.25; Lake Superior charcoal, \$20.50.

Chicago. April 15.

(From Our Special Correspondent.)

Producers of pig iron are beginning to consider the question of contracts for next year, though as yet no agreements have been made for delivery then, except in the case of orders for the last quarter of this year that will run over. This year has seen buying ahead to a greater extent than was ever known before; for this reason furnace proprietors are keeping an anxious eye to windward for storms in the financial or political world, though the sky at present is cloudless. Some furnace proprietors say they have practically no iron to sell for the rest of this year; others claim that they are by no means sold out, but admit that the visible supply for new contracts is getting very scarce. In a few cases orders are being anticipated, with the result that an occasional small lot of immediate delivery iron can be had, at a high premium. Such chances are immediately taken up by eager buyers and are constantly watched for, but they are not numerous. As yet the price of Northern iron has not been advanced, notwithstanding the fact that only the satisfaction of sellers with present conditions seems to prevent its advancing; furnacemen say they are making enough money and are asking only to be left alone. An advance would doubtless check but slightly, if at all, the demand for iron, yet it is apparently being held off because of a feeling by producers that it would be killing the goose that lays the golden egg, to make the trade stand the highest prices it would bear at present.

Northern No. 1 remains at \$19 and Northern No. 2 is 50c. less; Southern is apparently selling for about the same prices; a quotation of to-day, to a buyer, was \$18.50 for No. 1 Southern; nominal quotations are the old one of \$164.15 for No. 1, and \$15.65 for No. 2. Lake Superior charcoal, it is admitted by everybody, has really been sold out for the year; it is quoted at \$22 for small lots.

Coke is coming in more freely, but is not yet plentiful. The increased receipts are of Connellsville coke, which has heretofore been very scarce, but of which a fair supply seems probable soon. West Virginia coke still forms the greater part of that in the Chicago District market. The price, \$5.50, is unchanged.

Cleveland. April 15.

(From Our Special Correspondent.)

Iron Ore.—Shippers of iron ore are beginning to feel that the advantage they expected from the early opening of navigation is not to be so great as supposed. The ore pockets at the head of the lakes are being worked with difficulty; the fleets owned by the ore producing concerns are meeting with numerous disasters, delaying the boats abnormally; and the entrance to the harbors along the south shore of Lake Erie is being effected with great difficulty, due to the prevalence of a strike among the tugmen. The Steel Corporation expected to increase the carrying capacity of its fleet during the season by 1,000,000 tons by the April navigation, but now it is a question whether the April deliveries at lower lake ports will exceed 500,000 tons all told. Boats for wild cargoes are plentiful, but the shippers cannot supply them. The rates of carriage are 75c. from Duluth; 65c. from Marquette, and 55c. from Escanaba, either on contract or wild cargoes. The selling prices of ore remain at

\$4.25 for bessemer old range; \$3.25 for non-bessemer old range and bessemer Mesabi; and \$2.75 on non-bessemer Mesabi.

Pig Iron.—The market is dull because material is scarce. A little foundry iron is to be had on choice contracts entailing second-half deliveries at about \$19 in the Valleys, while No. 2 is bringing \$21 for quick shipment. Basic iron, as far as Cleveland producers are concerned, is off of the market for this year, one stack having sold up its possible production to May 1 next year. The price remains at \$17.50 in the Valleys, although material for quick shipment might command its own price. The bessemer producers have made no more sales, the old price of \$16.50 in the valleys prevailing.

Finished Material.—The demand for structural steel is so brisk that the mills have been compelled to withdraw from the market entirely for this year. One inquiry for 7,000 tons failed to obtain a taker. Some steel-ship orders have been refused because the channels and angles cannot be had here. The prices nominally are the same as have been previously quoted—1.70c. on mill sales, and from 2¼ to 3c. on store sales. The bar market is a little uncertain. Steel bars up to 2-in. are obtainable inside of six weeks, but larger sizes are sold up for an equal number of months. The steel bar quotations are still 1.60c. Pittsburg on bessemer, and 1.70c. Pittsburg on open-hearth. The quotation on bar iron is wavering between 1.70 and 1.80c. Pittsburg, the producers evidently trying to test the market. Sheets have not changed, except that some of the mills are finding it more difficult to make quick shipments than heretofore, but as yet there is no scarcity. Mill sales are made at from 3.10c. to 3.20c. on No. 27, one-pass, cold-rolled, and store sales at from 3.35c. to 3.50c. on No. 27. Plates have been sold up for the entire year, as far as the big mills are concerned, and even the smaller producers do not seem to have any uncovered capacity. The price is still 1.70c., although the quotation is nominal.

Philadelphia. April 17.

(From Our Special Correspondent.)

Pig Iron.—Notwithstanding the rather exciting developments in the iron and steel market during the past week or ten days a good deal of iron is still selling in Eastern and Middle Pennsylvania. The two difficulties in the way of more business are the unwillingness of some makers to sell far ahead and of buyers to pay the prices demanded. For this reason a moderate amount of business has been done. All consumers are endeavoring to obtain as much iron as they can without going to the extreme limits. Bessemer pig is very strong, but we hear of no new transactions. Basic pig is wanted by several concerns and transactions will probably go through this week. Forge iron is in moderate demand at about \$18.50; No. 2 foundry at \$20.50; No. 1 X, \$21.50.

Merchant Bar.—The demand for merchant bar appears to be falling off, but this is probably deceptive, owing to the oversold condition of all mills and the overbought condition of most of the heavy buyers. Quotations are about 1.95@2c. for iron bars and 1.90c. for steel. Manufacturers are endeavoring to postpone negotiations on large orders for autumn, believing that this is the wiser policy for them and for buyers to pursue.

Old Rails.—Old iron rails are quoted at \$26 and would sell at that figure if they could be had.

Scrap.—There is a very urgent demand for choice heavy scrap and \$17 to \$18 is the asking figure, but everything is sold in advance. Choice railroad is quoted as high as \$25.50, and two or three lots went at that price yesterday. Light forge is occasionally to be found at \$17; old car wheels are not in the market, but they are nominally \$18.

Pittsburg. April 16.

(From Our Special Correspondent.)

The feature of the markets this week is the heavy advance in pig iron, all grades having gone up fully \$1 a ton within the past two days. Most of the business done at the increase, however, is for deliveries this side of July 1. There is no particular activity for the second half, buyers evidently having decided to wait until the situation clears up a little before placing orders for extended future delivery. It is impossible to buy iron for speculation, as furnace owners are confining sales as closely as possible to the actual requirements of the steel mills now in operation. This was developed when a middleman endeavored to place a large order for pig iron at a good stiff price. It is reported that a large steel plant in the West that has been idle for several years would again be put in operation if the iron required could be secured. An inquiry for a large tonnage for this purpose, it is said, was not considered. The United States Steel Corporation would take more iron if it could be had. This concern is said to be negotiating for foreign bessemer iron. Southern iron is being held at higher prices, and adding \$4.15 freight puts

it almost on the same level as the product in this district. No deliveries of Southern iron have been received in this market for several weeks. There are no important developments in the impending strike on May 1 of the blast furnace employees. No move has been made by the workers' representatives looking to a conference with a view to compromise. The combines and the independent furnace owners will not concede the demand for a change from two turns to the proposed three-turn system, and unless the men agree to withdraw the demand and accept an advance in wages a strike that will result seriously to the iron and steel industry will likely occur. The steel market is quiet this week, but prices in all lines are firm. There will be no meeting this month of the plate pool, as the situation remains unchanged and there is no desire on the part of the concerns composing it to advance prices. The quotation of 1.80c. for iron bars, it is said, is not being maintained, owing to the refusal of the steel bar makers to put the price above 1.60c. Sales of iron bars are being made at 1.70c. and 1.75c. on desirable orders.

The twenty-seventh annual convention of the Amalgamated Association of Iron, Steel and Tin Workers opened in Wheeling yesterday. It will not be as important as in former years in the matter of arranging wage scales, as they have all been practically settled at preliminary conferences. The Republic Iron and Steel Company was the last combination to secure the concession and on Monday entered into an agreement with the wage committee of the Amalgamated Association to continue the present scale for another year. The current scales with the American Sheet Steel Company and the American Tin Plate Company have been renewed. There is some talk of a protest, on the part of a number of delegates, to these ante-convention conferences. Sufficient opposition will not likely be developed, however, to annul the action taken. The wage committees have been in session for several days and will make a report to the convention, probably this week. The iron workers' scale has proven to be an exceptionally good one, as it is based on the selling price of bar iron, which has advanced considerably since the scale went into effect. The recent increase in price will give the puddlers and finishers the third advance within a year for the months of May and June, and the new rate likely will continue for the balance of the year. The tin-plate workers' scale is the best the organization has ever been able to secure and the only additional demands that are likely to be made will be for the restoration to a union basis of the tin-plate mills lost to the association by the strike settlement.

Pig Iron.—The price of bessemer pig iron has advanced to \$18 and \$19, Valley furnaces, and about 9,000 tons were sold at those prices for delivery through the second and third quarters. A sudden jump in gray forge prices was made this week when 2,000 tons were sold at \$19.25, Pittsburg, for delivery before July 1. No. 2 foundry iron is quoted at \$20 and \$21, Pittsburg, for prompt shipment.

Steel.—The steel market is firm, bessemer billets being quoted at \$32 to \$33. One sale of 1,500 tons was made at \$32 for delivery in the third quarter. There is but little to be had for shipment up to July 1. The Dominion Iron and Steel Company is shipping open-hearth billets from Sidney, C. B., to the United States. Steel bars and tank plates are still quoted at 1.60c.

Sheets.—The sheet market is stronger this week. Protests are still being received on deliveries from independent mills, and it has developed that a number of concerns have sold more than it is possible to deliver. Some mills are behind in deliveries on account of inability to secure steel. The American Sheet Steel Company is making fair deliveries. No. 28 gauge is still quoted at 3.10@3.15c. and galvanized sheets are 70, 10 and 5 per cent off in car-load lots and 70 and 10 per cent off in less than car-load lots.

The American Sheet Steel Company has changed the system of quoting galvanized sheets, and now quotes net prices instead of discounts. The price for No. 28 galvanized is 4.47c. in car-load lots and 4.67c. in less than car-load lots. Other gauges are in proportion. It is likely that the system will be generally adopted. The discounts of 70, 10 and 5 per cent off for car-load lots and 70 and 10 per cent off for less than car-load lots may be continued in some instances until buyers become accustomed to the change.

Ferro-manganese.—The leading producer continues to quote 80 per cent domestic at \$52.50.

New York. April 18.

Pig Iron.—The local market continues strong, with sales limited by inability to get prompt delivery except at substantial premiums. Prices are higher. We quote for tidewater delivery: No. 1X foundry, \$20@ \$20.50; No. 2X, \$19@ \$19.50; No. 2 plain, \$18.50@ \$19; gray forge, \$17.75@ \$18.25. For Southern iron on dock, New York, No. 1 foundry, \$16.75@ \$20; No. 2, \$15.75@ \$18.50; No. 3, \$15.50@ \$17; No. 4, \$14.75@ \$16.50.

Bar Iron and Steel.—Trade is good. We quote

1.70c. for common bars in large lots on dock; refined bars, 1.83c.; soft steel bars, 1.83c.

Plates.—A large Eastern mill has again advanced prices \$2 per ton. Demand continues heavy. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 1.78@1.98c.; flange, 1.88@2.08c.; marine, 1.98@2.18c.; universal, 1.78@1.98c.

Steel Rails.—There is every indication that a considerable tonnage will be imported before the end of the year. Standard sections are still nominally quoted at \$28 at Eastern mills; light rails at \$30@ \$33, according to weight. Prompt delivery commands a good premium.

Structural Material.—Demand shows little falling off in spite of premiums for early delivery. We quote for large lots at tidewater as follows: Beams, 1.90@ 1.95c.; tees, 1.85c.; angles, 1.80c.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 574.)

New York. April 17

Heavy Chemicals.—Business is mostly for forward shipments at practically unchanged prices. For prompt delivery orders are of a retail character. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, 80@82 1/2c. for prompt shipment, and 75@77 1/2c. for forward; caustic soda, high test, \$1.90@ \$1.92 1/2 for early delivery, and \$1.85 @ \$1.87 1/2 for futures; bicarb. soda, ordinary, \$1, and extra, \$3; sal soda, 55c.; chlorate of potash, \$8 @ \$8 1/4 for prompt, and \$7.75 for contracts. For foreign goods we quote per 100 lbs. in New York: Alkali, high test, 90@92 1/2c.; caustic soda, high test, \$2.25; sal soda, 65@67 1/2c.; chlorate of potash, \$10 1/4 @ \$10 3/4; bleaching powder, \$1.60@ \$1.75, according to make and seller.

Acids.—The damaging by fire of the acetic plant at Shadyside, N. J., belonging to the General Chemical Company will not affect the market and prices will continue unchanged. The plant's stock was destroyed but preparations will soon be made to operate in full again. Talk of higher prices for nitrate of soda is reflected in the nitric acid trade, but large manufacturers who have time contracts for raw material are not apprehensive. In fact, they believe prices for nitrate of soda will react eventually. Sulphuric acid is steady. Blue vitriol is strong as the export season is here and supplies are under close control.

Quotations are per 100 lbs. as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Acetic, com'l 28%.....\$1.80	Oxalic com'l.....\$4.60@5.00
Blue Vitriol.....\$4.50@4.62 1/2	Sulphuric, 50 deg., bulk ton.....14.00@16.00
Muriatic, 18 deg.....1.50	Sulphuric, 60 deg.....1.00
Muriatic, 20 deg.....1.62 1/2	Sulphuric, 60 deg., bulk.....18.00@20.00
Muriatic, 22 deg.....1.75	Sulphuric, 66 deg.....1.20
Nitric, 38 deg.....4.00	Sulphuric, 66 deg., bulk.....21.00@23.00
Nitric, 38 deg.....4.25	
Nitric, 40 deg.....4.50	
Nitric, 42 deg.....4.87 1/2	

Brimstone.—Interest is lacking, and not even the pretension of easing prices can stimulate buying, as large consumers are well aware that the Sicilian syndicate is wedded to a high-price policy. On spot best unmixed seconds are quoted at \$23.25@ \$23.50 per ton, while shipments are \$22.50. Best thirds are \$2.50 under these prices.

In Sicily prices are higher than last year, notwithstanding the curtailed consumption in some countries. Below we make a comparison of the average f. o. b. prices per ton, ruling in the quarter ending March 31, with the same time last year:

	1901.	1902.	Changes.
Best unmixed seconds.....	\$18.66	\$20.30	I. \$1.64
Best unmixed thirds.....	16.66	17.88	I. 1.22
Average, crude.....	\$17.66	\$19.09	I. \$1.43
Refined block.....	19.88	20.62	I. 0.74
Refined roll.....	21.60	22.82	I. 1.22
Subl. flowers, pure.....	23.48	24.70	I. 1.22
Subl. flowers, current.....	22.52	22.54	I. 0.02
Average, manufactured.....	\$21.87	\$22.67	I. \$0.80
Freight to U. S.....	1.74	2.00	I. 0.26

The advance in price this year is equal to about 8 per cent on crude brimstone, and over 3 per cent on refined or recovered sulphur, making a general average of say 5 per cent. On the other hand ballast freights to the United States are 15 per cent higher than last year, owing to the limited number of vessels carrying fruit and like merchandise to Atlantic ports.

Pyrites.—The market continues firm. This week the Pennsylvania Salt Manufacturing Company imported 5,524 tons copper pyrites at Philadelphia from Spain.

Quotations are f. o. b.: Mineral City, Va., lump ore, \$5 per ton, and fines, 10c. per unit; Charlemont, Mass., lump, \$5, and fines, \$4.75. Spanish pyrites 12@17 1/2c. per unit, New York and other Atlantic ports. Spanish pyrites contain from 40 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Domestic gas liquor is

quoted at \$2.95@ \$3 per 100 lbs. for shipment, while foreign holds at \$3@ \$3.02 1/2.

Nitrate of Soda.—Market continues firm at \$2.35 per 100 lbs. for spot in New York, and \$2.30 in Philadelphia. Futures are quoted at \$2 up, according to position. The steamer *Cacique* with 28,500 bags is due on April 20 at Baltimore. Ocean freights continue easy.

The European statistical position does not compare favorably with last year as will be seen by the statement below which covers the quarter ending March 31:

	1901.	1902.	Changes.
Imports to Europe.....	226,956	297,748	I. 70,790
Exports, Europe.....	350,150	311,780	D. 38,370
Deliveries, Europe.....	448,070	387,790	D. 60,280
Loadings for, April 1.....	80,654	62,140	D. 18,514
Visible supply, April 1.....	556,490	519,370	D. 37,120

Notable decreases this year are 13.5 per cent in deliveries and 6.7 per cent in the visible supply on April 1, which includes stocks held and cargoes afloat.

Phosphates.—Florida shows marked activity in the mining districts, and shipments are multiplying. High grade rock shipments from Fernandina in the quarter ending March 31 were 43,534 long tons, which compares with 48,248 tons last year. The decrease of 4,694 tons this year is due principally to the curtailed consumption in Germany. However, it is expected that April shipments will show an improvement.

In Tennessee the recent storms caused much inconvenience to miners, especially in the Mt. Pleasant District, and have damaged several important plants. It will not be long, however, before repairs are made, and active mining resumed by the disabled companies. Shipments from Pensacola to foreign consumers in the quarter ending March 31 aggregated 18,046 tons, which is somewhat less than last year.

In South Carolina the industry is quiet, though demand for rock is improving.

From abroad advices report the discovery of good phosphate beds at Senegal, in the district of Bakel, in West Africa. Lack of transportation facilities, however, will prevent active working.

We quote phosphate prices below:

Phosphates.	Per ton F. o. b.	C. I. f. Un. Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (77@80%)....	\$7.25@7.50	6 1/4 @ 7d	\$9.75@10.92
*Fla. land pb. (68@73%)....	3.00@3.25	4 3/4 @ 5d	6.65@ 7.00
*Fla. Peace Riv. (58@63%)..	2.25@2.50	4 3/4 @ 5d	6.70@ 6.90
†Tenn. (78@80%) export.....	3.50	6 @ 6 1/2d	9.48@10.27
†Tenn., 78% domestic.....	3.00@3.25	.....	.....
†Tenn., 75% domestic.....	2.75@3.00	.....	.....
†Tenn., 73@74% domestic.....	2.40	.....	.....
†Tenn., 70@72% domestic....	2.10@2.25	.....	.....
†So. Car. land rock.....	3.25	4 1/2 @ 5d	5.67@ 6.30
†So. Car. river rock.....	2.75@3.00	.....	.....
Algerian, rock (63@70%)....	.....	6 @ 6 1/2d	8.04@ 8.70
Algerian, rock (58@63%)....	.....	5 @ 5 1/2d	6.00@ 6.30
Tunis, Gafsa (68@63%)....	.....	5 @ 5 1/2d	6.00@ 6.30

*Fernandina, Brunswick or Savannah. †Mt. Pleasant. †on vessels Ashley River.

METAL MARKET.

New York. Apr. 17.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in March and Year.

Metal	March.		Year.	
	1901.	1902.	1901.	1902.
Gold.				
Exports....	\$490,269	\$4,732,181	\$9,128,240	\$15,323,143
Imports....	2,520,455	2,909,069	8,645,355	5,698,749
Excess. I. \$2,030,186	E. \$2,121,121	E. \$482,855	E. \$9,024,493	
Silver.				
Exports....	\$5,150,186	\$3,329,255	\$14,519,674	\$11,702,653
Imports....	2,706,366	2,296,203	8,085,063	6,469,479
Excess. E. \$2,443,820	E. \$1,033,052	E. \$6,434,581	E. \$5,355,174	

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

Gold and Silver Exports and Imports, New York.

For the week ending April 17, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$51,281	\$81,000	\$49,039	E.	\$62
1902.....	16,419,384	1,014,343	19,057,324	424,332	E. 25,038,663
1901.....	10,818,269	870,054	11,240,138	1,231,218	E. 19,957,135
1900.....	2,385,134	1,201,623	11,777,973	1,313,578	E. 12,247,906

No gold was exported this week; the silver went to London. Imports were principally from the West Indies.

Financial Notes of the Week.

Business continues active, with no special change. There has been a greater degree of activity and excitement on the stock exchanges, due chiefly to special causes. Money is slightly easier, but interest rates on loans are still high. No gold exports are reported for the week. It is said, however, that some £5,000,000 of the new British loan will be placed in New York, which may result in gold shipments a little later.

Exports of merchandise from the United States in March were valued by the Treasury Department at \$106,360,150, which is \$18,113,493 less than in March, 1901. For the nine months of the fiscal year from July 1 to March 31, the statement is as follows:

	1901.	1902.
Exports	\$1,139,668,627	\$1,080,598,263
Imports	599,426,674	678,361,132
Excess, exports	\$540,241,953	\$402,237,131
Excess of exports, silver		16,583,163
Total	\$418,800,294	\$417,918,619
Deduct excess of imports, gold		881,675
Apparent balance		\$417,918,619

The gold and silver movement in detail will be found in the usual place, at the head of this column.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending April 12, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts	\$761,672,400	\$890,956,000	\$900,381,800
Deposits	834,328,500	969,289,200	957,361,400
Circulation	21,028,800	31,479,000	30,920,000
Specie	157,243,500	180,642,100	171,995,800
Legal tenders	62,288,900	69,618,400	71,916,300
Total reserve	\$219,532,400	\$250,280,500	\$243,912,100
Legal requirements	208,582,125	242,322,300	239,340,350
Balance surplus	\$10,950,275	\$7,938,200	\$4,571,750

Changes for the week, this year, were increases of \$1,306,400 in legal tenders and \$1,922,225 in surplus reserve; decreases of \$6,841,600 in loans and discounts, \$7,256,900 in deposits, \$139,900 in circulation, and \$1,258,400 in specie.

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 date last year.

	1901.		1902.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'n	\$180,642,100	\$157,243,500		
England	169,103,395	176,223,310		
France	482,157,600	\$219,114,185	510,339,515	\$220,865,090
Germany	148,850,060	69,395,000	198,320,000	73,350,000
Spain	70,010,000	82,630,000	70,405,000	91,095,000
Netherlands	25,285,500	27,975,000	23,911,000	32,592,500
Belgium	15,100,000	7,880,000	16,160,000	8,800,000
Italy	76,025,000	9,850,000	80,645,000	10,641,500
Russia	371,995,000	34,675,000	367,610,000	41,125,000

The returns of the Associated Banks of New York are of date April 12 and the others April 10 as reported by the Commercial and Financial Chronicle cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports only gold.

The London silver market has been a declining one this week, owing to lower Eastern rates, and absence of India Bank orders. The Chinese banks have also been sellers of silver rather than buyers, due to financing of Chinese indemnity fund. The market closes dull at the decline, with only speculative inquiry.

The United States Assay Office in New York reports receipts of 116,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to April 3 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£2,386,210	£1,974,085	D. £412,125
China	212,375	16,500	D. 195,875
The Straits	48,976	250	D. 48,726
Totals	£2,647,561	£1,990,835	D. £656,726

Arrivals for the week, this year, were £223,000 in bar silver from New York, £8,000 from the West Indies, £8,000 from Chile, and £5,000 from Australia; total, £244,000. Shipments were £136,500 in bar silver to India.

Indian exchange has been fairly firm, with a somewhat better demand in London for Council bills, which were taken at an average of 15.93d. per rupee. The Indian Government returns show that the Treasury has largely increased the gold held in the Circulation Department, mainly by receipts from Australia. Very little silver is being taken for Indian account at present.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$0.43	\$0.45
Peruvian soles and Chilean pesos	.37½	.41½
Victorian sovereigns	4.86	4.88
Twenty francs	3.86	3.88
Twenty marks	4.71	4.85
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

APR.	Silver			Copper			Spelter		
	Sterling Exchange	N. Y. Cts.	London Pence.	Lake Cts. per lb.	Electrolytic per lb.	London £ per ton.	Lead cts.	N. Y. cts.	St. L. cts.
11	4.87½	53½	24½	12 @12¼	11½ @11¾	53½ 28	4.05 @4.10	4.40	4.25
12	4.87½	53½	24½	12 @12¼	11½ @11¾	27¾	4.05 @4.10	4.37½	4.22½
14	4.87½	53½	24½	12 @12¼	11½ @11¾	53½ 27¾	4.05 @4.10	4.37½	4.20
15	4.87½	53½	24½	12 @12¼	11½ @11¾	53½ 27¾	4.05 @4.10	4.37½	4.20
16	4.87½	53½	24½	12 @12¼	11½ @11¾	53½ 27¾	4.05 @4.10	4.40	4.20
17	4.87½	52½	24½	12 @12¼	11½ @11¾	53½ 28¾	4.05 @4.10	4.40	4.20

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes, is usually 0.25c lower than these figures.

Copper.—The demand is improving. The large purchases made early in the year at the low prices are being consumed more rapidly than had been anticipated, and stocks in the hands of manufacturers are again pretty low. There is also a better inquiry from Europe. Producers have freely met the demand, and in consequence prices remain unchanged. We quote Lake copper at 12@12¼c.; electrolytic copper, in cakes, wirebars and ingots at 11½@11¾c., in cathodes at 11½@11¾c.; casting copper at 11½@11¾c.

The foreign market, which closed last week at £53 7s. 6d., opened on Monday 5s. higher, but towards the middle of the week it declined to £52 15s., and on Thursday the closing quotations are cabled as £52 17s. 6d for spot, £52 17s. 6d. for three months.

Statistics for the first half of the current month show a decrease in the visible supplies of 1,100 tons.

Refined and manufactured sorts we quote: English tough, £55 10s.@£56; best selected, £56 10s.; strong sheets, £66 10s.@£67 10s.; India sheets, £65 10s.@£66 10s.; yellow metal, 6@6½d.

Exports of copper from New York, Philadelphia and Baltimore for the week ending April 16, as reported by our special correspondents, are as follows: For Great Britain, 733 tons; Germany, 943; Holland, 1,142; France, 1,285; Italy, 28; Australia, 54; total, 4,185 tons. Imports were 52 tons copper from Mexico.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the producing companies, was as follows, for March and the three months ending March 31, stated in long tons (2,240 lbs.) of fine copper:

	—March—		—3 Months—	
	1901.	1902.	1901.	1902.
U. S. Reporting mines	19,984	20,335	56,963	52,421
U. S., outside sources	3,400	3,700	10,200	10,900
Total, U. S.	23,384	24,035	67,163	63,521
Foreign, reporting mines	7,817	9,979	21,059	24,821
Totals	31,201	33,014	88,222	88,142
Exports, U. S.	6,818	20,097	23,274	51,232

For the three months there was a decrease of 3,842 tons in the United States production, but an increase of 3,762 tons from the foreign reporting mines. United States exports showed an increase this year of 27,958 tons.

Tin.—The market continues to be strong and active. It appears that the production in the Straits Settlements is decreasing, which, coupled with the excellent consumption, makes for higher prices. At the close we quote spot tin at 28¾c.; April, at 28¾c.; May, 28½c.; June, 28¼c.

The London market has been very active, and has advanced steadily. It closed last week at £125 10s. for spot, £123 10s. for three months, and on Monday opened £1 higher. On Wednesday it was up to £127 10s. for spot, £125 15s. for three months, and on Thursday touched £130 for spot, closing at £129 15s. for spot, £126 15s. for three months.

Lead is dull and unchanged. The ruling quotations are 3.97½@4.05c. St. Louis, 4.05@4.10c. New York.

The foreign market is somewhat firmer, Spanish lead being quoted at £11 12s. 5d@£11 15s.; English lead at £11 15s.@£11 17s. 6d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull and very quiet. Missouri soft lead is selling at 3.97½@4c., while argentiferous lead is quoted at 4.05c.

Spelter.—The demand has fallen off somewhat, buyers having covered their immediate wants. Besides, it appears that consumption in some branches has decreased. We quote the market at 4.20c. St. Louis, 4.40c. New York.

The foreign market is somewhat higher, good ordinaries being quoted at £17 17s. 6d., specials at £18.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is considerably easier, the latest sales being on the basis of 4.15c., East St. Louis. The ore producers in the Joplin District have lowered prices on their product, and this has caused an easier feeling.

Antimony is unchanged. We quote Cookson's at 9¾@10c.; Hallett's, 8@8½c.; Hungarian, Italian, Japanese and United States Star at 7¾c.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

There have been no further developments in relation to the new Nickel Combination.

Platinum.—Consumption continues good. Ingot platinum in large lots brings \$19.50 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Quicksilver.—The New York price continues \$48 per flask for large lots, with a slightly higher figure for small orders. In San Francisco quotations are firm at \$47.50@48 for domestic orders, and \$44 for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb.	Aluminum.	Per lb.
No. 1, 99% ingots	33@37c.	Ferro-Tungsten (37%)	28c.
No. 2, 90% ingots	31@34c.	Magnesium	\$2.78
Rolled sheets	4c. up	Manganese (over 90%)	1.00
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	32c.
Nickel-alum	33@39c.	Mangan'e Cop. (30% Mn)	38c.
Bismuth	\$1.50	Molybdenum (Best)	\$1.82
Chromium (over 90%)	1.00	Phosphorus	\$0.82
Copper, red oxide	50c.	American	70c.
Ferro-Molyb'dum (50%)	\$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20%)	\$1.10		

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

Average Prices of Metals per lb., New York.

	Tin.		Lead.		Spelter.	
	1902.	1901.	1902.	1901.	1902.	1901.
January	23.54	26.51	4.000	4.350	4.27	4.18
February	24.07	26.68	4.075	4.350	4.15	4.01
March	26.32	26.03	4.075	4.350	4.28	3.91
April	25.93	27.12	4.350	4.350	4.30	3.98
May	27.85	28.60	4.350	4.350	4.04	4.04
June	26.75	28.60	4.350	4.350	3.99	3.99
July	26.75	26.62	4.350	4.350	3.98	3.98
August	26.31	26.62	4.350	4.350	4.02	4.02
September	26.62	26.62	4.350	4.350	4.08	4.08
October	26.67	26.67	4.350	4.350	4.70	4.70
November	24.36	24.36	4.350	4.350	4.51	4.51
December	26.54	26.54	4.334	4.334	4.08	4.08

Average Prices of Copper.

Month.	—New York—		—London—	
	Electrolytic.	Lake.	Standard.	1901.
January	11.053	16.25	11.322	16.77
February	12.173	16.38	12.378	16.90
March	11.882	16.42	12.188	16.94
April	16.43	16.43	16.34	16.34
May	16.41	16.41	16.94	16.94
June	16.38	16.38	16.90	16.90
July	16.31	16.31	16.81	16.81
August	16.25	16.25	16.50	16.50
September	16.25	16.25	16.54	16.54
October	16.25	16.25	16.60	16.60
November	16.224	16.224	16.33	16.33
December	13.845	13.845	14.36	14.36
Year	16.117	16.117	16.53	16.53

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1902.		1901.		1900.	
	London.	N. Y.	London.	N. Y.	London.	N. Y.
January	25.62	55.56	28.97	62.82	27.30	59.30
February	25.41	55.60	28.13	61.06	27.40	59.76
March	25.00	54.23	27.04	60.63	27.59	59.51
April	27.30	59.29	27.41	59.59	27.41	59.59
May	27.43	59.64	27.56	59.96	27.56	59.96
June	27.42	59.57	27.81	60.42	27.81	60.42
July	26.96	58.46	28.29	61.25	28.29	61.25
August	26.94	58.37	28.13	61.14	28.13	61.14
September	26.95	58.26	28.85	62.63	28.85	62.63
October	26.62	57.59	28.58	63.83	28.58	63.83
November	26.12	56.94	21.06	64.04	21.06	64.04
December	25.46	55.10	23.68	64.14	23.68	64.14
Year	27.11	58.95	28.27	62.33	28.27	62.33

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

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Alamo, Amalgamated, Anaconda, and others with columns for par value, dates (April 10-16), and sales.

*Per cent.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations for New York, listing companies like Am. Agr. Chem., Am. Agr. Chem. pf. U.S., and others.

Total sales, 539,841 shares. * Ex-dividend.

PHILADELPHIA, PA. \$

Table of stock quotations for Philadelphia, PA, listing companies like Am. Alkali, Am. Cement, and others.

Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 9,912 shares.

MEXICO.

Mar. 29.

Table of stock quotations for Mexico, listing companies like Durango, Ca. Min. de Penoles, and others.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Adventure Con., Actona Cons., and others.

Official Quotations Boston Stock Exchange. Total sales, 212,988 shares.

ST. LOUIS, MO.*

Apr. 14.

Table of stock quotations for St. Louis, MO, listing companies like Am.-Nettie, Catherine Lead, and others.

*From our Special Correspondent.

SPOKANE, WASH.*

Apr. 11.

Table of stock quotations for Spokane, Wash., listing companies like American Boy, Pack Tail, and others.

Total sales 149,500 shares. *Reported by Hunner & Harris.

SALT LAKE CITY.*

April 12.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Anchor, Bullion Beck, and others.

*By our Special Correspondent. Total number of shares sold, 480,913.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

Total sales 512,505 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph), listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

MONTREAL, CANADA.

Apr. 14.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, Alamo, Am. Con., etc., with columns for par value, high/low prices, and sales.

LONDON.

Apr. 2.

Table of stock quotations for London, listing companies like Alaska-Treadwell, Anaconda, etc., with columns for authorized capital, par value, last dividend, and quotations.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

PARIS.

Mar. 27.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Anzin, Boleo, etc., with columns for country, product, capital stock, par value, latest dividend, and prices.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, Olive, British Columbia, etc., with columns for par value, high/low prices, and sales.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasives—		Cust. Meas.	Price.	Barium		Cust. Meas.	Price	Graphite—Am. f.o.b. Provi-		Cust. Meas.	Price	Paints and Colors—		Cust. Meas.	Price
Carborundum, f.o.b. Niagara Falls, Powd., F. F. F. F.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.023/4	dence, R. L. lump.	sh. ton		\$8.00	Metallic, brown	sh. ton		\$19.00
Grains	"		.10	Sulphate (Blanc Fixe)	"		.02	Pulverized	"		30.00	Red	"		16.00
Corundum, N. C.	"	.07@.10		Barytes—				German, som. pulv.	lb.	.013/4@.011/2		Ocher, Am. common	"		9.25@10.00
Chester, Mass.	"	.043/4@.05		Am. Crude, No. 1	sh. ton		9.00	Best pulverized	"	.013/4@.02		Best	"		21.25@25.00
Barry's Bay, Ont.	"	.073/4@.091/2		Crude, No. 2	"		8.00	Ceylon, common pulv.	"	.023/4@.031/2		Dutch, washed	lb.		.043/4
Crushed Steel, f.o.b. Pittsburg	"	.051/2		Crude, No. 3	"		7.75	Best pulverized	"	.04@.08		French, washed	"		.013/4@.013/2
Emery, Turkish flour, in kegs	"	.033/2		German, gray	"		14.50	Italian, pulv.	"	.013/4		Orange mineral, Am.	"		.073/4@.073/2
Grains, in kegs	"	.05@.053/2		Snow white	"		17.00	Gypsum—Ground.	sh. ton	8.00@8.50		Foreign, as to make	"		.073/4@.113/4
Naxos flour, in kegs	"	.033/2		Bauxite—Ga. or Ala. mines:				Fertilizer	"	7.00		Paris green, pure, bulk	"		.12@.123/4
Grains, in kegs	"	.05@.053/2		First grade	lg. ton		5.50	Rock	lg. ton	4.00		Red lead, American	"		.053/4@.053/4
Chester flour, in kegs	"	.033/2		Second grade	"		4.75	English and French	"	14.00@16.00		Foreign	"		.063/4@.08
Grains, in kegs	"	.05@.053/2		Bismuth—Subnitrate.	lb.		1.40	Infusorial Earth—Ground.				Turpentine, spirits	gal.		.46 @.463/4
Peeckskill, f.o.b. Easton, Pa., flour, in kegs	"	.013/4		Subcarbonate	"		1.65	American, best	"	20.00		White lead, Am., dry	lb.		.043/4@.043/4
Crude, ex-ship N. Y.: Ab-		.023/2		Bitumen—"B"	"		.033/2	French	"	37.50		American, in oil	"		.053/4@.053/4
bott (Turkey)	lg. ton	26.50@30.00		"A"	"		.05	German	"	40.00		Foreign, in oil	"		.073/4@.093/4
Kuluk (Turkey)	"	22.00@24.00		Bone Ash	"	.023/4@.023/2		Iodine—Crude.	100 lbs	2.45		Zinc, white, Am., ex dry	"		.043/4@.043/4
Naxos (Greek) h. gr.	"	.26.00		Borax	"	.073/4@.073/2		Nitrate	lb.	.05		American, red seal	"		.063/4
Garnet, as per quality	sh. ton	25.00@35.00		Bromine	"	.40		True	"	.01		Green seal	"		.07
Pumice Stone, Am. powd.	lb.	.013/2@.02		Cadmium—Metallic	"	1.40		Oxide, pure copperas col.	"	.05@.10		Foreign, red seal, dry	"		.053/4@.083/4
Italian, powdered	"	.013/2		Calcium—Acetate, gray	"	1.30		Purple-brown	"	.02		Green seal, dry	"		.063/4@.083/4
Lump, per quality	"	.04@.40		"brown	"	.90		Venetian red	"	.01@.013/2					
Rotenstone, ground	"	.023/4@.043/2		Carbide, ton lots f.o.b. Niagara Falls, N. Y. or Jersey City, N. J.	sh. ton	75.00		Scale	"	.01@.03					
Lump, per quality	"	.06@.20		Carbonate, ppt.	lb.	.05		Kaolin—(See Clay, China.)							
Rouge, per quality	"	.10@.30		Chloride	sh. ton	9.00@10.00		Kryolith—(See Cryolite.)							
Steel Emery, f.o.b. Pittsburg	"	.07		Cement—				Brown	"	.073/4@.08					
				Portland, Am., 400 lbs.	bb. l.	1.70@1.90		Nitrate, com'l.	"	.063/4					
				Foreign	"	1.65@2.25		"gran	"	.083/4					
				"Rosendale," 300 lbs.	"	.75		Lime—Com., abt. 250 lbs.	bb. l.	.80					
				Slag cement, imported	"	1.65		Finishing	"	.90					
				Ceresine—				Magnesite—Greece.							
				Orange and Yellow	lb.	.12		Crude (95%)	lg. ton	6.50@7.00					
				White	"	.133/2		Calcined	sh. ton	14.00@15.00					
				Chalk—Lump, bulk	sh. ton	2.75		Bricks	M	170.00					
				Ppt. per quality	lb.	.033/4@.06		Am. Bricks, f.o.b. Pittsburg	"	175.00					
				Chlorine—Liquid	"	.30		Magnesium—							
				Water	"	.10		Carbonate, light, fine pd.	lb.	.05					
				Chrome Ore—				Blocks	"	.07@.03					
				(50% ch.) ex-ship N. Y.	lg. ton	24.75		Chloride, com'l.	"	.013/2					
				Sand, f.o.b. Baltimore	"	33.00		Fused	"	.20					
				Bricks, f.o.b. Pittsburg	M	175.00		Nitrate	"	.60					
				Clay, China—Am. com., ex-				Sulphate	100 lbs.	.75@.95					
				dock, N. Y.	lg. ton	8.00		Manganese—Powdered,							
				Am. best, ex-dock, N. Y.	"	9.00		70@75% binoxide	lb.	.013/4@.011/2					
				English, common	"	12.00		Crude, pow'd.	"	.011/2@.023/4					
				Best grade	"	17.00		75@85% binoxide	"	.023/4@.033/4					
				Fire Clay, ordinary	sh. ton	4.25		85@90% binoxide	"	.033/4@.053/4					
				Best	"	6.00		90@95% binoxide	"	.16@.20					
				Slip Clay	"	5.00		Carbonate	"	.16@.20					
				Coal Tar Pitch	gal.	.08		Chloride	"	.04					
				Cobalt—Carbonate	lb.	1.75		Ore, 50% Foreign	unit	.20@.21					
				Nitrate	"	1.50		Domestic	"	.30					
				Oxide—Black	"	2.20@2.30		Marble—Flour	sh. ton	6.00@7.00					
				Gray	"	2.28@2.40		Mercury—Bichloride	lb.	.77					
				Smalt, blue ordinary	"	.08		Mica—N. Y. gr'nd, coarse	"	.03@.04					
				Best	"	.20		Fine	"	.04@.05					
				Copperas	100 lbs.	.30@.35		Sheets, N. C. 2x4 in.	"	.30					
				Copper—Carbonate	lb.	.18@.19		3x3 in.	"	.80					
				Chloride	"	.25		3x4 in.	"	1.50					
				Nitrate, crystals	"	.35		4x4 in.	"	2.00					
				Oxide, com'l.	"	.19		6x6 in.	"	3.00					
				Cryolite	"	.063/2		Mineral Wool—							
				Explosives—				Slag, ordinary	sh. ton	19.00					
				Blasting powder, A	25 lb. keg	2.65		Selected	"	25.00					
				Blasting powder, B	"	1.40		Rock, ordinary	"	32.00					
				"Rackarock," A	lb.	.25		Selected	"	40.00					
				"Rackarock," B	"	.18		Nickel—Oxide, No. 1	lb.	1.00					
				Judson R. R. powder	"	.10		No. 2	"	.60					
				Dynamite (20% nitro-glycerine)	"	.13		Sulphate	"	.20@.21					
				(30% nitro-glycerine)	"	.14		Oils—Black, reduced 29 gr.:							
				(40% nitro-glycerine)	"	.15		25@30, cold test	gal.	.093/4@.103/4					
				(50% nitro-glycerine)	"	.163/2		15, cold test	"	.103/4@.113/4					
				(60% nitro-glycerine)	"	.18		Zero	"	.113/4@.123/4					
				(75% nitro-glycerine)	"	.21		Summer	"	.093/4@.093/4					
				Glycerine for nitro (32 2-10° Be.)	"	.123/4@.13		Cylinder, dark steam ref.	"	.083/4@.103/4					
				Feldspar—Ground	sh. ton	2.00@9.00		Dark, filtered	"	.113/4@.153/4					
				Flint Pebbles—Danish, Best	lg. ton	14.75		Light filtered	"	.143/4@.173/4					
				French, Best	"	11.75		Extra cold test	"	.213/4@.263/4					
				Fluorspar—				Gasoline, 88@90°	"	.14@.19					
				Am. lump, 1st grade	sh. ton	\$14.40		Naphtha, crude, 68@72°	bb. l.	9.05					
				2d grade	"	13.90		"Stove"	gal.	.12					
				Gravel and crushed, 1st gr.	"	13.40		Linseed, domestic raw	"	.62@.63					
				2d grade	"	12.40		Boiled	"	.65					
				Ground, 1st grade	"	17.90		Calcutta, raw	"	.85					
				2d grade	"	16.50		Ozokerite	lb.	.113/2					
				Foreign, lump	"	8.00@12.00		Paints and Colors—							
				Ground	"	11.50@14.00		Chrome green, common	"	.05					
				Fuller's Earth—Lump	100 lbs.	.75		Pure	"	.16					
				Powdered	"	.85		Yellow, common	"	.103/4					
								Best	"	.25					
								Lampblack, com'l.	"	.043/2					
								Refined	"	.07					
								Litharge, Am. powd.	"	.043/4@.053/4					
								English flake	"	.083/4@.083/4					
								Glassmakers'	"	.073/4@.08					

THE RARE EARTHS.

	Cust. Meas.	Price
Boron—Nitrate	lb.	\$1.50
Calcium—Tungstate (Scheelite)	"	.90
Cerium—Nitrate	"	11.00
Didymium—Nitrate	"	35.00
Erbium—Nitrate	"	40.00
Glucinum—Nitrate	"	20.00
Lanthanum—Nitrate	"	30.00
Lithium—Nitrate	oz.	.60
Strontium—Nitrate	lb.	.063/4@.07
Thorium—Nitrate 49@50%	"	5.00
Uranium—Nitrate	oz.	.25