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THE STOCKS of Lake Superior iron ore on docks at Lake Erie ports on May 1 amounted to 2,848,104 tons, or 201,989 tons less than at the corresponding date last year. By comparison of stocks on December 1 and May 1, it appears that the shipments from the Lake Erie ports to furnaces during the winter were 3,010,469 tons. This brings the total deliveries to furnaces for the year ending May 1 up to 17,215,065 tons, the largest figures on record. The highest previously reached was 15,574,785 tons in 1900. This statement, it must be remembered, includes only the ore passing through Lake Erie ports, and does not take in that shipped by Lake Michigan to the furnaces in the Chicago District.



THE TOTAL production of pig iron in the United States for the four months ending April 30 is estimated by the *Iron Age*, on the basis of the capacity of the active furnaces, at 5,719,208 tons. These figures are usually rather conservative, and we are disposed to put the total a little higher—say 5,750,000 tons, or at the rate of 17,250,000 tons a year. This great output has been made in spite of the drawbacks due to delay in shipping coke and ores during the winter. The weekly capacity of the furnaces now in blast is 352,250 tons, which is at the rate of 18,300,000 tons a year. With the free supply of ores now obtainable and prompt deliveries of fuel, there is no doubt that this rate can be kept up for some time to come; and the demand seems to warrant it.



THE RETURNS of the British Board of Trade for the four months ending April 30 give the shipments of silver from London to the East as in the table below. To the values given by the returns we have added the approximate quantity of the metal at the average prices prevailing for the four months:

	1901.	1902.	Changes.
British East Indies.....	£3,016,372	£2,711,749	D. £304,623
China.....	395,140	16,500	D. 378,640
Japan.....	20,000	.....	D. 20,000
Totals.....	£3,431,512	£2,728,249	D. £703,263
Total ounces.....	29,560,764	26,094,640	D. 3,466,124

The decrease in value this year has been 20.5 per cent; in the approximate quantity of metal 11.7 per cent. It will be seen that the decrease in exports to India has been in values only, not in quantity. The falling off was in the shipments to China which have this year been almost eliminated by the payments of indemnity to the European powers, which have reversed the usual course of trade. Japan, of course, is now practically out of the silver market, as it has been for two years past.



THE NITRATE of soda industry in Chile has been in a prosperous condition since producers settled their differences by combination a little over a year ago. In regulating production to the actual export demand, the combination has succeeded in keeping prices at the highest level on record. With an enormous consumption the profits of the oficinas have been satisfactory, yielding good dividends to stockholders in a number of British corporations. Besides the payment of from 6 to 10 per cent in dividends for the past year, the larger companies

have made liberal provisions for amortization and reserve funds. The outlook for the present year depends largely upon a continued increase in the consumption in the United States and an improvement in the beet sugar industry of Europe. Some nitrate oficinas, however, have already sold a good part of their quota at a profit of about 2 shillings per quintal, and so have an encouraging prospect at least for the present year.



WE HAVE heretofore referred to the Dunderland Iron Ore Company, Limited, which is to use the Edison process in Norway. The company has now made its bow to the London public. It has a capital of £2,000,000 and its object is to treat iron ore deposits in Norway by the Edison magnetic concentrator and to prepare briquettes of ore suitable for the blast furnace. The issue has been subjected to a good deal of criticism here, so the particulars of the company are well known in America. The board of directors is an efficient one and the issue is underwritten, so there is no doubt that the business will go through. The question as to whether the ore can be worked at a profit, and briquettes produced that will stand the weight and heat of the charge, will remain to be settled by experience only, for there is no information available on which to figure out costs, etc. The iron masters of Great Britain are, of course, extremely desirous that new sources of supply of ore should be exploited; and it is to be hoped that they will have more success with the process than has been attained in this country.



FOR THE first time this year—in April—copper production as reported by Mr. John Stanton for the companies shows an increase over the corresponding month last year. The gain is a considerable one, amounting to 2,786 tons for the reporting mines and 400 tons from outside sources. The total of 24,624 tons is greater by 589 tons than the quantity reported in March and by 3,186 tons than that for April of last year. This considerable gain has reduced the falling off for the four months ending April 30 to 656 tons, as compared with the corresponding period in 1901. It is of special importance as showing that there is no longer any considerable restriction in the output and that most of the mines are running at about their normal capacity. The number of new mines which are shipping copper this year is not large and their total production is not of great importance. The resumption of full work at most of the mines indicates that the quantity of copper turned out is going to be, for some time to come, fully up to the standard of last year and possibly a little ahead of it. The United States exports for April were less than the very large figures for March by 3,673 tons, but still reached the large quantity of 16,424 tons. This makes a total for the four months of 67,656 tons of copper sent abroad from this country, which is nearly two and one-half times the quantity reported for the same period last year. It may be safely said that the falling off in April exports was largely due to the elimination of speculative shipments, and that the total represents a legitimate business done in response to the increased buying of copper abroad. The artificial nature of the market recently is shown by the fact that in face of the in-

creased production there has been a gain in prices both in New York and London with a present prospect that the advance will continue.



A NEW STOCK issue of considerable importance in London is the South Wales Electrical Power Distribution Company which has been formed to take over a project for supplying Glamorgan and part of Monmouthshire with electric light and power from central stations at the pit's mouth. This district is the great South Wales coal-field and innumerable works of all kinds are located there. The scheme for distributing power electrically from the pit's mouth instead of transporting the coal to separate furnaces has of course engaged the attention of engineers for many years, but so far there has been no application of it in Great Britain. During the last two years the distribution of power by Mond gas has been brought forward and applied in several places, and a comparison between the gas and electric methods in practice will be interesting. The new company starts with a nominal capital of £750,000 in shares and £250,000 in debentures. Of this amount £450,000 in shares is now being issued and there is no doubt that the money will be readily obtained. It is intended to proceed at first with the building of a plant to supply 30,000 horsepower, but eventually it is probable that the works will be extended to supply 150,000 horsepower. The plan of generating power at the mines and distributing it to the points where it is needed has often been referred to in our columns.



UTILIZING BLAST FURNACE CASES.

The use of blast furnace gas to furnish motive power through the medium of gas engines has heretofore found its development chiefly in Germany and Belgium, although it is claimed that it originated in Great Britain and that a British engineer should have the credit for its first application on a small scale. Recently, however, British iron-masters have been paying much more attention to this source of power and there have been some interesting developments upon this line. Thus, the Clay Cross blast furnace has recently been supplied with a large blowing engine designed by Mr. Thwaite, who made the first application of blast furnace gas in a small engine operating an electric plant at a Yorkshire furnace. The Thwaite-Gardiner engine at Clay Cross is of large size, but shows some new features. The gas engine driving the plant is horizontal and has two cylinders which are both connected to a shaft provided with a crank in the center; the air cylinder is horizontal, the piston being driven by a connecting rod from the crank in the main engine shaft. This engine is expected to develop about 500 horsepower and to deliver 22,000 cubic feet of air per minute at a pressure of 8 pounds. Details of the engine, judging from the descriptions, have been carefully worked out, and there is every reason to believe that it will be operated successfully and with very considerable economy as compared with the steam-blowing engine. The reason given for the arrangement above described is partly that it is more compact, but chiefly that in a blowing cylinder of the size required in this case—6 feet in diameter—there is excessive wear on the lower side of the cylinder and piston rod. The blast furnace at Clay Cross uses as fuel a mixture of coke and coal in the proportion of 4 of coke to 1 of coal. The calculated thermal value of the waste gases, from the furnace, which are to be used in the engine is about 112 British thermal units per cubic foot at 60° F.

Another installation of this kind is to be put up in the works of the Cargo Fleet Iron Company in the

Middlesborough District. In this case, the type of gas engine adopted is the Delamarre-Deboutteville engine which was adopted by the John Cockerill Company at Seraing in Belgium. In this case the type has been modified by placing the two gas cylinders in tandem, one behind the other, instead of placing them side by side and connecting them to a single shaft as in former duplex engines of this class. The air cylinder is placed at one end, its piston being carried on the same rod which passes through the pistons of the gas engine, while the fly-wheel is at the opposite end of the engine, the connecting rod being worked over a cross-head which is also carried on the main piston rod. This engine is rated at about 600 horse-power; the gas cylinders are 1.3 meters in diameter by 1.4 meters stroke, and the air cylinder has a diameter of 1.85 meters. The engine is expected to run at a speed of 80 revolutions per minute in ordinary service, and, at this speed, it can supply about 20,000 cubic feet of air per minute.

The tandem arrangement of the cylinders has only lately been adopted by the Cockerill Company, the first engine of this class having been built for an Austrian furnace. It has operated so successfully that it is probable the company will hereafter use this type in preference to that originally adopted for blowing engines.

The use of large gas motors of this type is a decided novelty in British practice. Those who have advocated the economy of the utilization of blast furnace gas will now have an opportunity to see it fully tested.



THE COLORADO MINE OPERATORS' ASSOCIATION.

We have heretofore noted in our news columns the formation of the Colorado Mine Operators' Association which is intended to include eventually all the mine operators of the State. The organization is not fully completed as yet, but Mr. Arthur Winslow, who is well known both in Missouri and Colorado, has been selected as the president. While this association is intended to cover the whole State, we do not understand that it is proposed to supersede such local societies as are already in existence. On the contrary, the intention is to strengthen the local associations and to provide for the formation of others in districts where none now exists. The State association is to be the representative and agent of the local associations, and the main object in forming it is to provide a central administration which will be able to back the local branches in any action which they may find necessary, and it will at the same time, be able to act promptly and efficiently on questions of importance to all. A mine owners' and operators' society of this kind, it seems to us, has an important field open to it in Colorado, and may be the means of accomplishing much that will be of benefit to the mining industry, if properly managed. Care will be necessary, of course, to avoid interference in purely local matters and also to avoid measures which would tend to make the association oppressive or antagonistic to the miners of the State.

One of the fields in which the central association would be in a position to act promptly and efficiently is that of legislation. This was especially apparent during the recent session of the State Legislature, when important measures were under consideration, especially the amended law with regard to the taxation of mines. This received too little consideration from the mine owners who were chiefly concerned in its operation, for the reason that their attention was not generally called to its provisions until too late. The existence of a central body, which would naturally be on the alert when such

measures were proposed, would have enabled representatives of the mining industry to present the facts clearly to the Legislature and its committees and to aid largely in shaping this important measure. There are other matters which are likely to come before the Legislature at an early date, including the eight-hour law, upon which the representatives of a central association could speak with authority and possibly prevent much injury.

Another point upon which the State Association could doubtless act with benefit to the interests which it represents, is the question of freight rates and smelter rates, which are more or less intimately connected. The Association should, if proper measures are taken, be in possession of full data in regard to the different mining camps and could discuss intelligently the reasons for imposing certain charges and ascertain whether certain districts were discriminated against by the railroads and whether unreasonable treatment charges were made against different ores or different mines. It would also be in a better position to appreciate the reasons governing the action of the smelters than would individual mines or district organizations. By acting as intermediary between mines and smelters or between mines and railroads much good might be done in many cases, and much bad feeling which now exists might be avoided.

By far the most important question to be considered, however, is that of mine labor. We do not understand that Colorado mine owners generally are antagonistic to labor unions as such, nor do we believe that the State Association as their representative should or would take such an attitude. Properly conducted, the miners' union should be an aid rather than an enemy to the operator, besides protecting the interests of the miner. As is well known, however, there are in existence in Colorado, as well as in some other Western States, miners' unions which are anything but reasonable or beneficial to their members or to the mining interest. The character of these associations has been pointed out in our columns from time to time in connection with the Leadville, the Telluride, and other strikes of the past. It does not seem possible that agreement or co-operation with unions of this class can be established and, in the event of a contest, the State Association would have certain advantages which no local organization could possess.

It is to be hoped, however, that the work of the Colorado Mine Owners' Association, in the future, will be mainly of a peaceful kind, and we do not doubt that, in judicious hands, it may be of great service to its members and to the State.



MARKET CONDITIONS.

Iron and Steel.—The iron and steel markets remain in practically unchanged condition. The main incident since our last writing has been the advance of Southern pig iron from the nominal basis of \$12 for No. 2 foundry at Birmingham to \$16. This was announced by the Sloss-Sheffield Company, without notice to other makers. That company claims that it was only recognizing the facts, and that the old price was merely nominal, as premiums were being paid on all iron sold. On the other hand, it may be said that most of the large companies are really out of the market for new business, and that all quotations are nominal.

In finished material the demand for structural steel continues to be pressing. In other lines there are few changes to report.

The British trade returns just received show that in the four months ending April 30 there were 32,407 tons of pig iron exported to the United States, against

8,953 tons in the corresponding period in 1901. Although the comparative increase is large, the total this year is not an important quantity. Exports of steel billets, ingots, etc., to the United States 6,744 tons, against 2,825 tons last year.

Other Metals.—The copper market, while comparatively quiet, shows rather a firm tendency and slight advances of prices may be noted. The market generally seems to be approaching a healthier condition. Consumption in this country continues on a very large scale and in Europe it is apparently improving, as the heavy exports from this country have been to a large extent absorbed by consumers and speculation in the metal is not active at present. The increase in production in April is referred to in another column; it has not affected the market to any extent. It is beginning to be apparent that the greater part of the stocks which overhung the market early in the year have been sold and at least partially consumed. At any rate, they have passed from sellers' into consumers' hands and have thus been distributed instead of being concentrated. Manufacturers, as a rule, are well stocked, but still seem inclined to buy as long as business continues at its present level. In Europe while there is no very important revival of business, electrical and other enterprises which were dropped last year under the combined effect of financial uneasiness and high prices of copper are being brought forward again and are feeling the stimulant effect of the low quotations recently prevailing. Upon the whole there are encouraging signs that the market is working back to a normal condition. It is reported that several of the large producers are sold out for at least two months ahead and possibly longer.

In other metals business continues good. Tin still commands a high price although immediate supplies are rather more plentiful. In lead a good business is being done at current prices and manufacturers generally are taking quantities which indicate that they are busy. For spelter there is also a good consumptive demand and prices continue to show but little change.

Silver prices show some improvement and the tone of the market is better. While the Chinese demand will remain light until the indemnity payments are completed there is an improvement from other sources and especially in Indian purchases. An unusual export of silver is going on at the present time, considerable quantities being shipped to Mexico from this country for coinage. The demand for Mexican dollars for the East had recently left that country with insufficient supplies of silver currency, and in order to procure immediate deliveries the Mexican mints have been forced to buy some silver in this market. While this demand is only temporary, it has still had an effect in improving the current quotations.

Coal.—The Western coal trade continues in very much the same condition as under our last report. It is dependent wholly upon transportation facilities. The railroads are improving a little in their handling of coal, but not much, and there are widespread complaints about delays in the delivery of coal and congestion of cars at junction points. This is especially the case in the lake trade where many vessels have been compelled to go up to Lake Superior light because they could not secure cargoes at the Lake Erie ports without long waiting. This condition is the more detrimental to producers, as there is a heavy demand for coal in the Northwest and stocks at the head of Lake Superior are very light. At Chicago and other large consuming points the demand exceeds the supplies which the railroads are delivering, and consumers suffer as well as producers. A gradual improvement in this trade is promised by some

of the leading companies, but it seems very slow in coming.

The seaboard bituminous coal trade continues active with but little change to report. Some increase in demand is looked for on account of the anthracite strike and the possible shortage of anthracite in the large cities; how much this will amount to depends upon the continuance of the strike, which is referred to elsewhere. Bituminous coal operators generally do not appear to anticipate any extension of the strike beyond the anthracite country.

The anthracite coal trade is, of course, at a standstill and everything depends upon the duration of the strike which is now complete throughout the region. As to this, opinions vary very widely. Rumors are circulated in New York of an immediate coal famine but so far nothing of the kind has been apparent, although retail dealers in the Eastern cities have generally advanced prices.



GOLD MINING IN ECUADOR.

(SPECIAL CORRESPONDENCE.)

The Zaruma Mines at Zaruma are now the only gold quartz mines controlled by American capital in the Republic of Ecuador. These mines are in the district of Zaruma, Province of El Oro, about 60 miles southeast from Guayaquil, in the western cordillera of the Andes, at from 2,500 to 4,000 feet elevation, and about 3° 45' south latitude. The district contains numerous gold-bearing quartz veins, many of which were worked by the Spaniards 100 years ago. The principal veins vary from 1.5 to 6 meters in width. The usual dip of 75° easterly; one system has a course of northeast by southwest, while it is faulted by another with northwest by southeast course. The formation is andesitic.

The ore is mostly blue and white quartz, containing about 10 per cent in sulphides of iron, copper, zinc, and lead. Free gold is occasionally seen. Oxidation occurs very rapidly in the atmosphere. The ores are extracted by two methods, stoping large chambers and filling with surface rock, and stoping small chambers which are left open until convenient filling is had. The latter method has not yet been extensively tried here. It is necessary to employ methods without timber because of the scarcity of that article and its consequent cost. The common timber of this section rots in a few years.

The ores are treated in a usual type 40-stamp mill, stamps of 850 pounds each; the pulp passes over three 5-foot copper plates for outside amalgamation, and thence to steel cyanide vats. Amalgamation secures about 30 per cent, while 80 per cent of the weight of the pulp (the balance being discarded slimes) yields 70 per cent of the gold in the cyanide method. The slimes and water are separated in large dams adjacent to the vats. A 0.075 per cent cyanide solution is used. In the metallurgy of these ores, many features have been encountered which make usual practice of little service. The extraction was for a long time very unsatisfactory.

Freights come from the coast by mules at a cost of \$1 to \$2 per 100 pounds, according to the time of year and class of goods. From January to April the rainy season causes the roads to be very heavy, and travel is difficult.

The wages of a common native laborer are \$0.50 gold, while native miners receive from 50 cents to \$2 per day, by contract system.

There is nothing unusual about the mills, but the metallurgical difficulties so far encountered would fill a letter in themselves. Owing to the difficulties of transportation, etc., construction and development cannot be pushed as is customary in the United States. However, costs do not materially differ from similar propositions in the north, and the greatest difficulties may be overcome by capable management. The climate is healthy, considering its latitude. Malaria is common, but proper care has kept our foreign force comparatively free from it. The nights are always cool enough to require blankets, and the days are not sultry. The temperature ranges from 60° to 90° F.

After considerable time spent in developing, construction, experiments, etc., the mines are now in condition to produce and treat large quantities of ore.

THE CANADIAN MINING INSTITUTE.

It will be remembered that at the annual meeting in Montreal in March last, resolutions were passed authorizing the council to establish local sections or branches of the Institute in different parts of the Dominion. The object of these sections is to establish points in the mining centers where members of the Institute can meet frequently to discuss matters of special concern, and at the same time maintain and increase their interest in the general work of the Institute.

A circular from Secretary B. T. A. Bell, under date of May 19, announces that meetings for the purpose of completing the organization of local sections of the Institute in the various mining centers of the Dominion will be held as follows: Eastern Ontario Section, in the British American Hotel, Kingston, Ont., Monday, June 2. Eastern Townships of Quebec, in the Board of Trade Chambers, Sherbrooke, Que., Tuesday, June 10. Province of Nova Scotia Section, in the Sydney Hotel, Sydney, Cape Breton, Friday, June 13. Province of British Columbia Section, in the city of Nelson, British Columbia Tuesday, September 9.

The organization of sections in other mining districts of the Dominion is under consideration, and will be announced later. At all these meetings an interesting programme of papers will be presented for discussion.

SENTIMENT IN THE IRON TRADE.—Commenting on the new *Directory* of the American Iron and Steel Association, the *Bulletin* of that Association says: "The readers of the *Directory* will scarcely expect to find in its pages any sentimental or poetic phrases, and yet they are there in great numbers. Turning to page 46 we find the following flower names given to the brands of the tinplates manufactured by the Falcon Works, at Niles, Ohio: Tulip, crocus, hyacinth, jonquil, and daisy for charcoal and clover for coke. To its brands for terne plates the same company gives the names: Official seal, cornflower, sweet-brier, holly wood, goldenrod, mayflower, moonflower, starflower, sunflower, and wildflower. The Great Western Works, at Joliet, Illinois, have these brands for tinplates: Moose for charcoal and elk for coke; and for terne plates, duck, drake, and swan. The Morewood Works, at Gas City, Indiana, brands some of their charcoal tinplates Grace and Dorothy. The United States Works, at Demmler, Pennsylvania, give some of their terne plates these patriotic names: U. S. Eagle and U. S. Grant. The Old Dominion Nail Works, at Richmond, Virginia, give some of their terne plate brands a historical and geographical character: Chesapeake, Cherokee, Mohawk, Pawnee, Potomac, Albemarle, Greenbrier, Kanawhat, Rivanna, Indian and York. The old custom of giving feminine names to blast furnaces is fast yielding to more prosaic designations."

OSMIUM FILAMENT FOR LAMPS.—The chief engineer of the company which has to do with the Welsbach patents in England—Mr. Gabriel—recently issued some statements giving the results obtained by lamps with osmium filaments. He gave a curve which showed the variation in watts per candle-power with an osmium lamp for 1,200 hours. It commenced with an efficiency of 1.5 watts, and then fell to about 1.32 watts per candle-power, and kept practically at this value for the rest of its life. The candle-power curve for this lamp showed that it commenced to give about 14½ candle-power, and rose in the course of 300 hours to about 16.8 candle-power; the curve then falls in practically a straight line to 15 candle-power at 1,100 hours. The lamp was used in a 50-volt circuit.

THE PETROLEUM FIELDS OF WYOMING—III.

By WILBUR C. KNIGHT.
THE FIELDS OF UINTA COUNTY.

History.—Captain Stansbury was the first of the early explorers to mention the occurrence of petroleum in the territory now included in Uinta County; but since natural oil was looked upon more as a curiosity than anything else in early times, his brief description did not attract the least attention of the scientific or any other class of people. Numerous other surveyors made notes of this occurrence, chief among which are to be found in the reports of the 40th Parallel and the Hayden surveys, but neither of these made any detailed investigation of this region or paid especial attention to the occurrence of oil.

As soon as the Union Pacific Railroad was completed to this section of the west, there was quite an oil excitement in the vicinity of Hilliard, hundreds of claims were located, and an attempt was made to develop the field. This resulted in drilling a shallow well without finding oil, following which the oil camp at Hilliard was almost abandoned. North of Hilliard Mr. Fiero, who is at the present time a resident of Evanston, prospected in a small way the Carter field. He was quite successful and opened up an oil sandstone near the surface that would produce from six to fifteen barrels per week. This product he sold to the coal companies and to some extent to the Union Pacific Railroad for a period of about six years. Then the property passed into other hands and drilling was attempted; but with no success.

From the year 1875 to 1900 there was an occasional oil excitement; but none of them amounted to anything. Two wells were attempted during this period; but they did not find oil. During the fall of 1900 the Union Pacific Railroad contracted for a well at its new station at Spring Valley, expecting to find a good supply of water for its locomotives. At a depth of 650 feet the drillers found a thin sand that yielded a light paraffin oil. The well was continued to a depth of 1,158 feet and two other sands were reported. The oil from these was much heavier than that from the first sand. At this point the Union Pacific Railroad found that the drilling was near the axis of a fold and that it would be impossible to secure a water supply, so discontinued the drilling. Unfortunately there has never been any official measurement of the amount of oil that the well would produce in a day. I have learned from reliable parties that the oil has risen to within two or three hundred feet of the surface of the well.

This discovery spread like wildfire, and was greatly stimulated by the remarkable quality of the oil. Oil men and speculators rushed in and located all of the Government domain, the claims in some cases being three or more deep. In other instances lands were leased or purchased outright, so that at this time the oil-fields of Uinta County, in accordance with the ordinary acceptance of the term, comprise a section of the county 20 by 50 miles in extent. Early last summer companies commenced to organize and arrange for drilling and before snow fell no less than five rigs were at work and others were being constructed. It has been estimated that before next spring no less than twenty companies will be drilling.

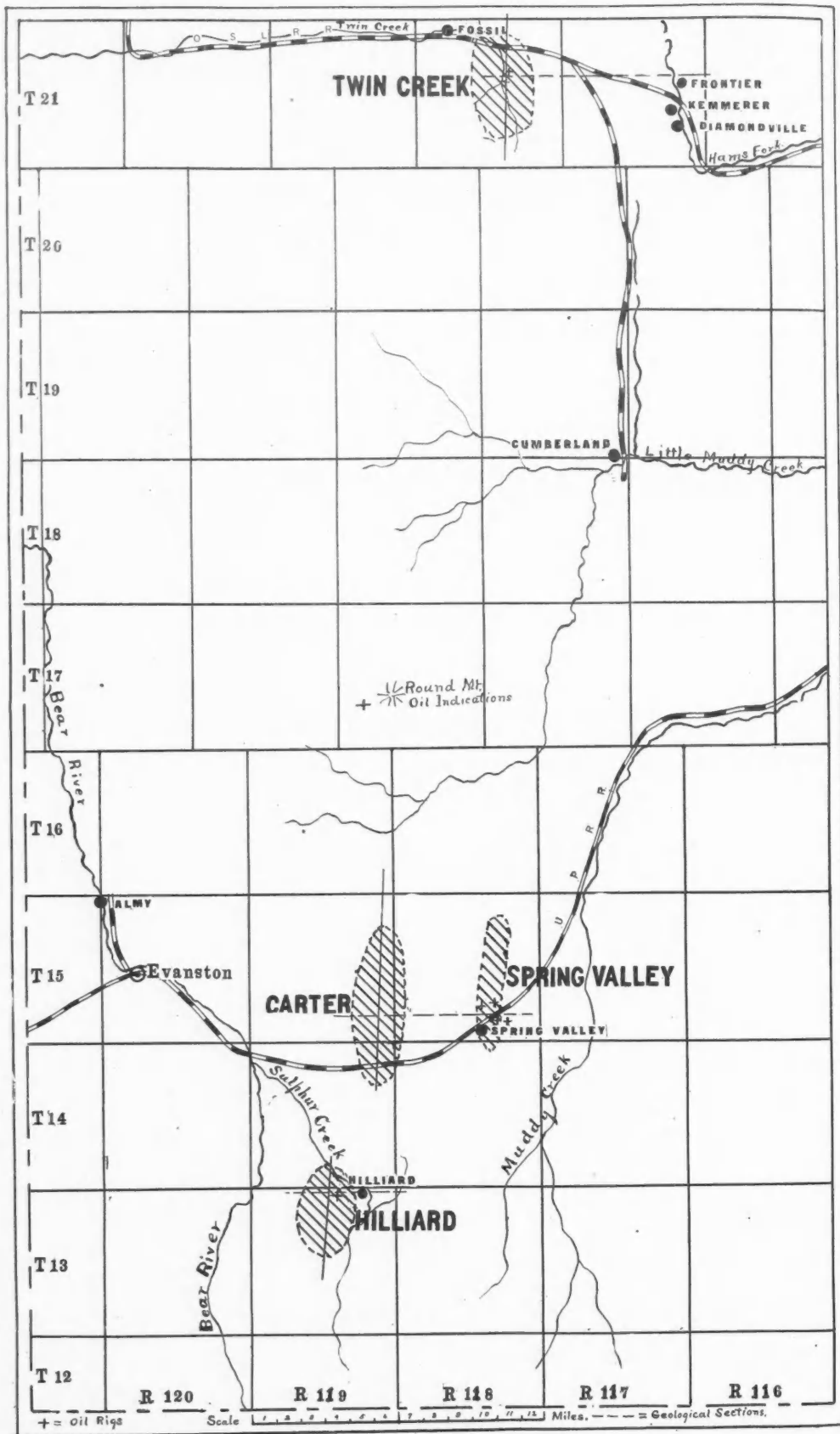
Fortunately many of the companies who have entered this country are experienced oil operators, with first class drillers and they are more than willing to test the field. One of these companies has a capitalization of \$10,000,000 and has upon its board such men as Senator W. A. Clark, Senator S. B. Elkins, Perry S. Heath, E. L. Dohoney and R. C. Kerens, Jr. Besides this, the largest company, there are thirty others in the field and at least one-half of them have purchased rigs and are drilling or preparing to drill.

Topography.—Southern Uinta County presents the same topographical features that one finds throughout Southwestern Wyoming. Bear River passes through the southwestern corner of the county and is an exceptional stream of good size and of pure water. Twin Creek drains into Bear River, and

there are a few other small rivulets that belong to the Salt Lake drainage. All of the remaining streams drain into Green River. Hams Fork is the largest; the others furnishing water only a portion of the year. The divide between the Bear River and Green River drainage is quite high and is composed of a range of rough hills, made by erosion, which are occasionally 1,000 feet above the rugged

stones. Generally speaking, the country is rough and hilly. Valleys are narrow and roadways usually conform to the water courses.

General Geology.—At the time the Rocky Mountains were made, southern Uinta County was closely folded, and no less than three of these folds have been found within the narrow limits of its boundaries and there is possibly a fourth. These extend



OIL FIELDS OF UINTA COUNTY, WYOMING.

and narrow valleys. Although water is scarce and there are but few streams, the surface has been deeply dissected, the soft Tertiary strata offering feeble resistance to water spouts and melted snow. The Aspen tunnel on the Union Pacific Railroad passes through this divide and the greater part of the way is through cretaceous shales and sand-

nearly north and south, veering chiefly to the northeast and southwest. The axis of the eastern fold passes just east of Spring Valley, the middle one near New Aspen, and the third just west of Almy. After these folds were made there was a long period of erosion and they were greatly reduced, so that the exposed rocks along their axes vary from the

Laramie down to some of the groups that are from five to ten thousand feet below it. Upon this exceedingly rough country the Eocene sea formed and commenced to deposit sediment, and before the period was complete the highest point of Cretaceous hills were covered up; in fact it was not an unusual thing for the upper Eocene beds to have a thickness from 1,500 to 2,000 feet above the highest hills of the Mesozoic rocks. When the Eocene sea was drained the present water courses were established, and these have removed the greater portion of the overlying Tertiary beds; but there are enough

bearing formation having a thickness of about 5,000 feet. A good section can be studied at Ham's Hill. The next formation below is composed almost entirely of shales, varying from a drab to gray, with a few bands of sandstone. A few fossils have been reported from this series; but I cannot refer to any that are typical. These shale beds have a thickness of about 5,000 feet, and are exposed from Kemmerer westward to Ham's Hill and also one mile to the north of Hilliard. For this shale formation I propose the name of Hilliard,¹ on account of the great development near that place.

enough to reach the lowest Cretaceous beds. A comparison of the Cretaceous rocks of Eastern and Western Wyoming may fix the position of the newly named groups.

Wyoming Cretaceous.

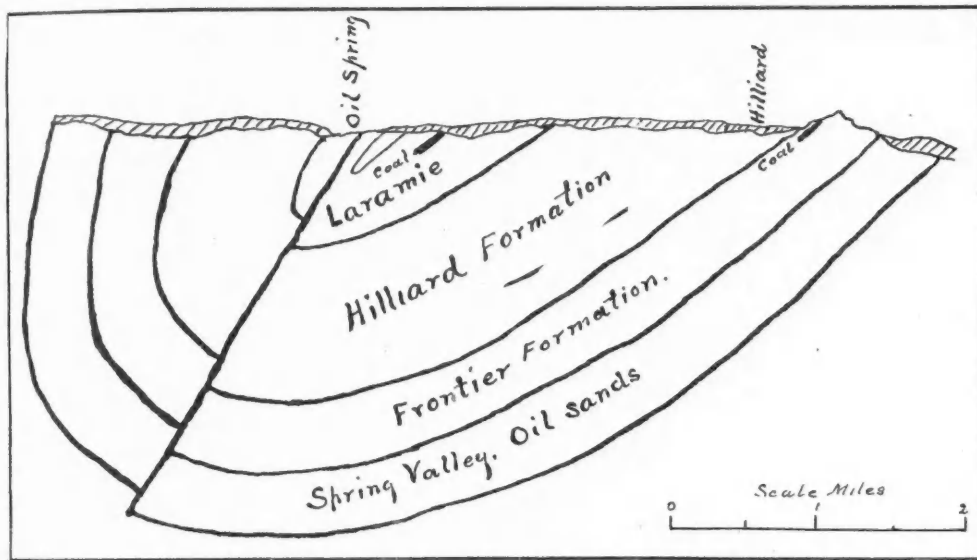
EASTERN WYOMING.	WESTERN WYOMING.
1. Laramie	1. Laramie.
2. Fox Hills.	2. Hilliard.
3. Fort Pierre.	3. Frontier.
4. Niobrara.	4. ?
5. Benton.	5. Benton.
6. Dakota.	6. Bear River.
	7. Dakota.

The oil-fields are four in number and are named as follows: Hilliard, Carter, Spring Valley and Twin Creek. Doubtless others will be added to the list as prospecting continues.

These are the only oil-fields in the State that have railroads passing through them. Fuel is cheap and in many instances can be mined and hauled to the rigs by local coal miners at a very reasonable price. Water is scarce, and is usually hauled for some distance or a pumping plant installed. Supplies are as reasonable as at any point in the mountain country.

Markets.—At the present time oils of all grades are very high. Kerosene is worth 25 cents or more per gallon and gasoline at least 30 cents for the lowest grade and other oils in proportion. With the Union Pacific and the Oregon Short Line railroads already in this country and passing through the oil territory there is ample market for all kinds of oil in the inter-mountain region. The demand would be very much greater were it not for the present prices. The utilization of gasoline for gasoline engines alone would be practiced among mining men if the price could be reduced one-half. Superior lubricants would also find a market as far as the coast and possibly they could be shipped abroad.

The Hilliard Oil Field.—This is located about 12 miles east of Evanston, the county seat of Uinta County, near the old Hilliard station, which until recently was upon the main line of the Union Pacific Railroad; but has been recently left to one side by the construction of the new cut-off. The country is best characterized as a broad valley extending to the southward, along the eastern side of which flows



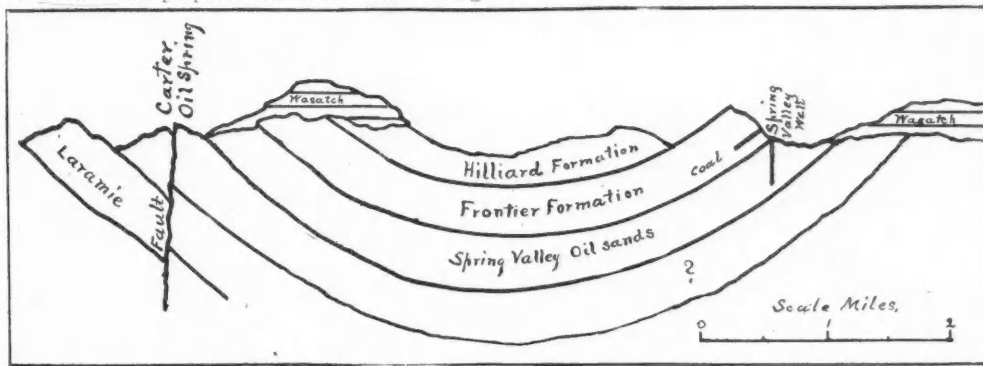
GEOLOGICAL SECTION, EAST AND WEST, THROUGH HILLIARD OIL-FIELD.

remaining to completely hide the structure of the greater portion of southern Uinta County. Occasionally a gulch has been cut deep enough to remove all of the Tertiary, and to cut down into underlying formations. Along the eastern side of the fields there is a very prominent exposure of the Coal Measures that extend in almost a continuous ridge from Kemmerer to Hilliard. Westward from this exposure the structure is somewhat problematic, for it is only now and then that one can see the Cretaceous formations, and it is difficult to trace them from one outcrop to another with any accuracy. Along the western side of the country there is a prominent fold extending from Evanston north for many miles and the eastern limb is well exposed; and near Evanston this is entirely made up of the Laramie Cretaceous, and all of the underlying formations, are covered with Wasatch Tertiary, which makes it impossible to locate the axis of the fold without the aid of the drill.

Besides the folding there has been extensive faulting, and on this account the structure of the exposures has been difficult to interpret, and in many instances has not been satisfactorily deciphered. It will require extensive field work before it will be possible to give an adequate idea of the complications. On this account this is one of the most difficult fields to prospect in the State, and any company intending to drill will do well to get the very best scientific advice available.

There have been no absolute measurements made of the thickness of the various Cretaceous formations in these fields, and there is also a lack in group names to distinguish them. The Cretaceous rocks have a great thickness; possibly 20,000 feet; but with the exception of the identification of the Laramie and the Benton and Bear River formations no other groups have been recognized. Intermediate between Benton and Laramie there are several formations which will have to receive names for this region, since the beds do not correspond to the division of the Cretaceous further eastward. The basal member of the Cretaceous has already been called the Dakota by the 40th Parallel Survey; but whether this term is applicable may be questioned. For convenience, and for the better understanding of the geology of this region I propose the following group names and cite typical localities where they can be studied. The name Laramie is applicable to the upper group of the Cretaceous, and it is a coal

Below the Hilliard there is a sandstone formation in which there is a thick stratum of evenly bedded light brown sandstone. Above and below this there are several seams of coal and there are also beds of clay and shale. The thickness of this formation has not been taken; but it will approximate 2,000 feet. These beds can be absolutely determined by the presence of *Ostrea soliniscus*, a species that is quite narrow and attains a length of ten or more inches. The name Frontier is proposed for these coal bearing



GEOLOGICAL SECTION, EAST AND WEST, THROUGH SPRING VALLEY AND CARTER OIL-FIELDS.

beds, the name being taken from the town Frontier where these beds are well developed. The Frontier formation extends from Kemmerer, Wyoming, north for an unknown distance, and southward to Diamondville, Cumberland, Spring Valley and the old railroad cut just east of Hilliard. The coal found in the Frontier formation is low in moisture and ash, forms a light coke and is the best steam coal found in Wyoming.

Below the Frontier and above the Benton there are other Cretaceous beds, which have not been studied. In the one immediately below the Frontier the oil sandstone occurs at Spring Valley. The Benton shales are typical. There is also the Bear River formation that has been placed between the Benton and the Dakota. In the most of the oil fields in Wyoming, the Dakota sandstones are highly charged with oil; but in this section there are few if any exposures, and as a rule the folds have not been eroded

Sulphur Creek. West of the creek there are several benches, and the largest is known as Hilliard Flat. Northward the valley terminates very abruptly, for there is a huge bluff, marking the eastern boundary of the valley, that bends sharply to the westward just north of Hilliard and, rising to 1,000 feet above the creek, extends to Bear River. Along the eastern side of the valley and across the north end there are exposures of Cretaceous rocks; but the most of the country is covered with nearly horizontal Tertiary, or river wash.

The valley lands are as a rule covered to a considerable depth with river boulders, which obscures the most of the Cretaceous beds that would otherwise be exposed. On this flat there are two oil springs. The one that is locally known as the Brigham Young spring is located about a mile and a half southwest of Hilliard on the west side of a slight gulch. Some years ago there were a few pits dug at this point, and apparently there were arrangements for collecting oil. There has been no recent attempt to develop the spring. Along the bank there is evidence of oil appearing on the surface for a distance of about 100 feet. Oil has come to the surface and

¹ I have described the Hilliard and Frontier formations in a paper entitled "The Coal Fields of Southern Uinta County, Wyo.," which was presented to the Cordilleran section of the G. S. A. at the San Francisco meeting last December; but since this has not been published describe them briefly here.

mingled with the sand and soil until it has formed a hard mass, which has been taken for asphaltum, but which appears to be the heavier parts of oil mixed with impurities. There is one place where oil and water is accumulating at the present time. As the oil reaches the surface it has a greenish cast; but almost immediately becomes a light brown color. There is no evidence of the oil-producing rocks in this vicinity.

Half a mile north of this place there is a second oil spring. This is located in the bottom of a gulch. During the last season a shallow pit was dug and oil collected in it so that it could be secured by the gallon. On the north side of the gulch there are a few strata of sandstone standing at an angle varying from 65° to 70° with a western dip. These bands are Laramie sandstone and only a short distance to the eastward contain typical Laramie fossils. The position of this oil-bearing zone has not been determined. Apparently there is a fault through which the oil escapes; but on account of the country being covered, and no data to work from, it is impossible from a slight investigation to say definitely from what formation the oil comes. This spring is almost due north of the Brigham Young spring, and since the strike of the formation as measured to the eastward is N. 30° E., it is quite certain that the oil comes up through a fault; but from what depth one cannot judge.

The structure of this region, barring the faults, is that of an anticlinal fold. At old Aspen station, which is some six miles east of the spring there is an exposure of typical Benton shales, with a dip slightly to the westward. From this point the rocks are all covered; but upon nearing Hilliard Cut there is a good exposure of Frontier formation, which dips at about 28° to the westward. Overlying this is the Hilliard formation, this being the typical locality. Above this there is an unknown thickness of Laramie coal-bearing beds. The axis of the fold is to the eastward of old Aspen, and apparently the fold is a broad one, with gently inclining limbs. The dip increases to the westward quite rapidly, so that when the coal measures are reached it is already 45°, and only a half mile further it is from 65° to 70°.

The oil comes to the surface through a fault in the Laramie sandstone; but whether the producing zone is in the Laramie will have to be settled when more is known of the field. At the present writing the evidence indicates that the oil sand will be found in the Laramie.

Just east of Hilliard, where the Frontier formation is well exposed, one would not have to drill over 500 or 600 feet to reach the strata that are oil producing at Spring Valley. This oil sandstone is unknown in the Hilliard field; but as at Spring Valley, a well may be all that is necessary to prove its existence. The formation and the structure are identical.

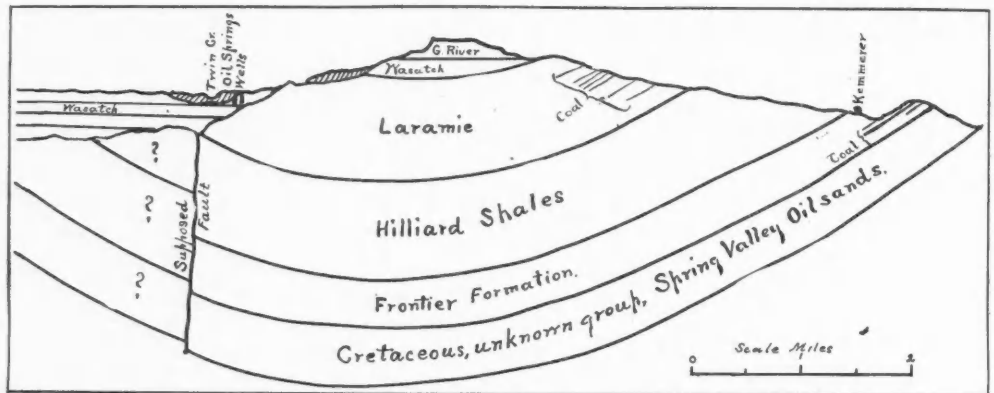
The oil samples secured from the Hilliard field are all taken from springs and do not properly represent the crude. The samples are of a light brown color, very heavy and have a paraffin base. They resemble the oil that has recently been discovered in the wells at Twin Creek, which argues in favor of the Hilliard crude coming from the Laramie. Since the oils resemble each other I refer to the Twin Creek oil analysis made by Professor Slosson as being representative at least of the product from the oil springs at Hilliard.

The Carter Oil Fields.—The oil spring of this field is six miles north of Hilliard, the Union Pacific Railroad passing through the southern end of the field. Since there are no oil indications found in the intervening territory this has been considered an independent field; but may upon development prove to be continuous with the Hilliard, which is separated from this field by a high Tertiary covered divide recently pierced by the Union Pacific Aspen tunnel in which an oil sandstone was found that produced a paraffin oil resembling that taken from the Spring Valley well. This zone is no doubt quite extensive and is the lowest known oil sandstone.

In a general way the surface of this field corresponds to the others of this county; but the erosion has been much greater and consequently there are

larger exposures of Cretaceous rocks. The oil spring is located in a gulch that is a branch of Muddy Creek, which has many tributaries in this region. The main stream has a north and south trend and along the eastern slopes leading to it there are the upturned strata of the Cretaceous extending for several miles and finally disappearing beneath a capping of Tertiary to the southward. This valley has been carved out of a synclinal basin and the rocks are seen dipping at a sharp angle along the eastern slope. A little farther to the east there is evidence of an anticlinal fold, which has been badly faulted, and through this fault the oil is escaping. The rocks exposed along the creek are Laramie Cretaceous and they are also exposed for some distance to the east. At the oil spring the formation is so badly broken and covered with talus that it will be impossible to give the exact structure without extensive and critical work. There are also beds of hardened oil, and a great deal of material resembling asphaltum. Evidently the Laramie

region outside of the structural indications, which no one had ever considered. The eastern of the three folds recognized as passing north and south through Uinta County extends from Kemmerer south to Cumberland and on south to Spring Valley and Hilliard. The axis of this fold is a short distance east of Spring Valley and so far as known is entirely covered with Tertiary. At the coal mine at Spring Valley, operated by the Union Pacific Coal Company, the Frontier formation dips to the west at an angle between 20° and 30°. The Union Pacific well was drilled some distance east of the coal mine, and was started below any of the coal veins. A thin oil sandstone was found at 650 feet, and others between this and 1,158 feet. The lowest one is supposed to be very thick, and to produce oil in paying quantities. Nothing is known of the eastern limb of this fold; but in all probability it will produce the same as the western. It will, however, be more difficult to work since it is entirely covered with Tertiary rocks that are of a soft nature and



GEOLOGICAL SECTION FROM KEMMERER WEST THROUGH TWIN CREEK OIL-FIELD.

formation occurs just below the spring, and it has been suggested by the 40th Parallel Survey and by Ricketts that the fault has brought up Benton shales so that they occupy the same elevation as the Laramie. This suggestion I have been unable to prove or disprove. Judging from the geology further to the south I would suspect that the shale beds exposed just east of the Carter oil springs are quite likely the Hilliard formation; but I am not certain of this for I cannot get any absolute evidence on this point. In this field as in all of the others of this county a careful geological survey is necessary before one could settle points of this kind absolutely.

In drilling for oil it will be necessary to locate the oil bearing sandstone before much development work of importance can be done. This will be a tedious job, and may take a company many months or even a year. When the oil sandstone has been located so that the depth of the wells can be determined, then, and not until then, can any intelligent work be carried on. From what is known at the present writing at least two oil sandstones will be found; but what distance they will be apart can not be estimated. Both of them will furnish paraffin oils; one a light variety, rich in illuminating oils and the other heavy and rich in paraffin. Besides these known oils other oil bearing formations should be found below the Frontier formation which must be oil bearing as it is in the Spring Valley field some three or four miles to the east and across a synclinal valley. Oil taken from the spring was a dark color almost black and had a gravity of 21.5° Baumé. This sample had been exposed for a long time and in no way represents the crude. A second sample taken from the Aspen tunnel had a gravity of 33° Baumé. This crude is an olive green paraffin oil rich in gasolene, kerosene and also containing at least 10 per cent of paraffin scale. One well has been started and there are several other companies preparing to drill.

The Spring Valley Oil-Field.—A little over a year ago the oil well was struck at Spring Valley, which was the first intimation that oil existed in this re-

make drilling difficult. The oil sandstone occurs in a formation below the Frontier. This has not been studied and so far as known there are no exposures to study, and the knowledge we have of it is from the drillers on record. Nearly all of this field is covered with Wasatch Tertiary and in many places this formation varies from 300 to 800 feet in thickness.

The producing territory will be found to parallel the anticlinal fold and also to be quite close to it. The extent north and south cannot be defined, and it may prove to be a continuous oil-field from a point east of Hilliard north to Kemmerer.

In all probability the synclinal basin just west of Spring Valley will supply water, and drillers should keep well up along the fold for fear of drilling too low down to reach the oil producing sandstone. Or it would be better to consider that the water would replace the oil if they drill in the valley. From the present tests no company should look for a gusher unless they puncture lower oil sandstone on the arch than has so far been reached; and on the other hand there may be a very large territory that will produce paying wells. The quality of the oil is such that a small well will be profitable.

It is only right to call the attention of the investors who have gone into this region to the fact that there is a good probability of finding oil sandstones in the formation underlying the known oil zone. In these one will be very likely to penetrate an unbroken arch and consequently tap a zone that would supply a great gas flow as well as a "spouter." Underlying the formations at Spring Valley at a considerable depth is the Dakota formation which is the greatest oil producing horizon yet discovered in the State.

The development in progress at the present writing is quite remarkable. There are three or four wells in progress and one company which is down nearly 2,000 feet, expects to strike the oil sandstone at about 2,500 feet. Long before the winter is gone there should be a test well completed, from which absolute data can be secured as to the production.

The crude oil is a beautiful green color and has a gravity of .8329 (40° Baumé) and flashes at 60° F. It is a paraffin oil that refines chiefly into gasoline, kerosene and paraffin. The crude obtained from the first sandstone found in the Union Pacific well had a gravity of .8176 (42 Baumé) and contained an unusual percentage of gasoline as well as a large amount of kerosene.

The following analysis has been made by Dr. F. Salathe who is chief chemist for the Pennsylvania Oil Company at Casper, and represents the commercial products, except the lubricants that could be made from the stock left after distilling off the light oils.

Crude oil, color olive green, specific gravity at 60° F.—.8329.

The crude flashes at a temperature below 60° F. It consists mainly of paraffin hydrocarbons with small quantity of asphaltic products.

The distillation yields the following percentage in commercial products.

Analysis of Crude Petroleum from Spring Valley, Uinta County, Wyo.

	Per cent.
Naphtha 60° F. (gasoline and benzine).....	27.0
Water white kerosene, 45° Baume, 145° flash, 172° fire test.....	25.5
Signal and headlight, 40° Baume, 300° fire test.....	7.0
Lubricating reduced stock 23.5° Baume.....	49.5
	100.0

The cold test of the crude oil is 58° F. and the amount of crystallized paraffin that was present in the lubricating stock is 18.5 per cent.

The Fossil Oil-Field.—This is the most northern of the fields in Uinta County and is located near the head of Twin Creek, from which the field takes its name. Fossil is the nearest railway station; but the road passes through the field and within about a mile of the present site of the new oil wells. Twin Creek Valley is quite wide and has been cut out of Tertiary rocks, and on either side the bluffs rise to nearly 1,000 feet. On the eastern side of the field there is a high divide that separates the Bear River drainage from the Green River, and extends for many miles north and south. Where the Oregon Short Line Railroad crosses this, the erosive agencies have removed all of the Tertiary rocks. They appear, however, to the northward a short distance away, where the high bluff swings to the westward and passes within about a mile of Fossil station. On the west and south the bluffs are less conspicuous; but are composed of the same kind of Tertiary rocks, the base being the Wasatch and the upper part of the Green River. On account of the valleys, and in most places the hills being covered with Tertiary horizontal formations, this field is a very difficult one to judge. Near Twin Creek and about two miles and a half southeast of Fossil station there are several oil springs, that have furnished a little oil for a great many years.

These are found scattered along a line agreeing with the strike of the underlying Cretaceous rocks, and with them there is a slight flow of sulphur water. All of these springs appear in Tertiary rocks or in wash that has been recently brought in and covers the Tertiary. Along the eastern side of the field and just above the oil springs, there is a slight exposure of Laramie sandstone. There are a few other similar exposures, that have been made by the waters of Twin Creek. These, however, do not have any oil associated with them; but give a clue to the structure of the field. From our present limited knowledge of the geology of this region there is an anticlinal fold, having a north and south trend that crosses the Twin Creek Valley between the location of the oil springs and Fossil Station. The only evidence of this is the occurrence of the Laramie sandstone, in the vicinity of the oil springs, which dips at a slight angle nearly east. At Hams Hill the same formation dips to the west. Westward from the oil springs six miles there is a Jurassic core of an anticlinal exposed, with the strata dipping sharply to the eastward. This indicates that there is a synclinal valley between the western anticline and the one passing through the oil territory. Until there has been a considerable

drilling the axis of the fold within the field cannot be located on account of the deep covering of horizontal Tertiary.

In the vicinity of the oil springs which are located along a north and south line there are several springs of water charged with sulphur; in fact, the sulphur water occurs with the oil. These springs evidently rise through a fault, which can not be measured, nor can any one surmise its extent. On account of this fault, drilling for oil can not have the intelligent guidance that it should have until a well is drilled to the producing sand, which probably exists in the Laramie.

Many years ago a well was started near one of the oil springs and when 250 feet in depth the drillers struck oil, gas, and soft clay. The tools were raised for the night, and when they went to work in the morning they found the derrick house half full of mud. From the casing there was a constant circular mass of clay being forced out with the gas, and this was coiling about in all directions. This caused the company to suspend operation.

Last fall two companies commenced drilling, one with a hydraulic rig and the other with a standard. The hydraulic rig struck oil at a depth of 160 feet in the Wasatch formation, which was evidently fed by a fracture from the main fault. The standard rig also struck oil at about 600 feet in the same formation. In neither case was the strike of sufficient importance to cause the company to suspend drilling and complete a well. The source of the oil must be considered very much deeper.

The limits of this field cannot be approximated at this date. As in the other fields in Uinta County, it will prove to have its greatest diameter north and south and may ultimately prove to be connected with producing territory either to the north or south. This field as well as all of the others of Uinta County is worthy of careful prospecting, and the only question to be solved is that the quantity of oil. The quality in every instance is excellent and in fact surpasses in quality the most of the crude produced to-day. The nature of this oil can best be judged from Prof. Slosson's analysis, which was made on a sample taken from the first well.

Analysis of Twin Creek Oil From 160 Feet Deep.

Color—Brown.	Specific gravity.....	954° C.	Baume 17°
Flash	104° C.		
Boiling point.....	132° C.		
Sp. Gr.	Baume.	Flashing Point.	Burning Point.
1—100 to 255	.862	33°	59° C.
2—255 to 297	.887	28°	87° C.
3—297 to 312	.907	25°	100° C.
4—312 to 350	.911	24°	82° C.
5—350 to 356	.925	22°	.....
6—356 to 361	.918	23°	.....
7—361 to 373	.914	24°	.....
8—373 to 390	.913	24°	.....
9—390 to 396	Solid	15° C.	.....
10—396	A very little.		

The most of these distillates contained paraffin but owing to the small quantity of oil to distil, it was impossible to estimate commercial products.

ELECTRIC POWER IN SOUTH WALES.—

The London *Colliery Guardian* says that the opinion of experts in South Wales as to the extended use of electricity in mines, an opportunity for which will present itself when the South Wales Power Company gets into working order, is doubtful. Already electricity is utilized in many parts of the coal-field for lighting the surface and the bottom of the pit, but as to haulage it is generally conceded that under existing conditions it would not be safe to adopt it beyond the double parting some 300 feet on each side of the pit bottom and well within the lamp station. It is pointed out that no amount of protection of cables could resist their severance by a fall of roof, and the severance of a cable carrying a high pressure of electricity is accompanied by a flame of sufficient degree of heat to ignite gas or indeed fine coal-dust. For pumping purposes the new company's installation may be largely taken advantage of, but beyond this and the other uses indicated above, experienced colliery owners and managers do not think it would be safe to go.

THE PHILADELPHIA MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

SPECIALLY REPORTED.

As briefly noted last week in the report of the meeting of the American Institute of Mining Engineers at Philadelphia, Wednesday, May 14, was set aside for an excursion to the new plant of the Edison Portland Cement Company, at Stewartville, near Philipsburg, New Jersey. The day was an ideal one for such an excursion. A special train provided by the Pennsylvania Railroad left Broad Street station promptly at 8.55 a. m., the hour set, reaching the cement works shortly before noon. The first visit was made to the company's quarry, located 2½ miles from the works and connected therewith by the company's private standard gauge railroad. Although the works are not yet completed, the quarry has been opened and is now ready to supply the cement rock and limestone (which lie directly adjoining each other) as soon as the finishing touches have been put upon the works, which is a matter of only a few weeks. The party remained at the quarry long enough to see a train of skip cars loaded by a steam shovel with rock which had previously been blasted out. From the quarry the party was taken to the works, where upon arrival a delightful luncheon was served in the cement stock house. As time was limited none was wasted in speech making, the only attempt in this line being made by Mr. Birkinbine, who called for an expression of appreciation in three cheers for the cement company and the railroads whose guests the Institute and its friends were for the day. They were given with the usual enthusiasm. The party was then divided into groups, each guided by some of the representatives of the company, and shown over the entire works, several features of which possess particular interest. One of these is the almost entire absence of shafting, the different departments being operated by electric motors. Another interesting feature is the wide territory covered by the works and the number and variety of conveying apparatus with which the different departments are connected. There seems to be a complete exhibition of bucket, screw, scraper and belt conveyors, which taken altogether will aggregate possibly two miles in length, or even a little more.

A third innovation in this plant is the introduction of rotary kilns of a length never before attempted. They are 150 feet long, or 2½ times those now in successful operation in some of the larger cement works. They are 9 feet in diameter, constructed of boiler iron and lined with fire brick. It is claimed that from 10 to 25 per cent of fuel saving will be effected by the use of these kilns. Some parts of the works are ready for work and when such was the case the departments were set in operation for the visitors' entertainment.

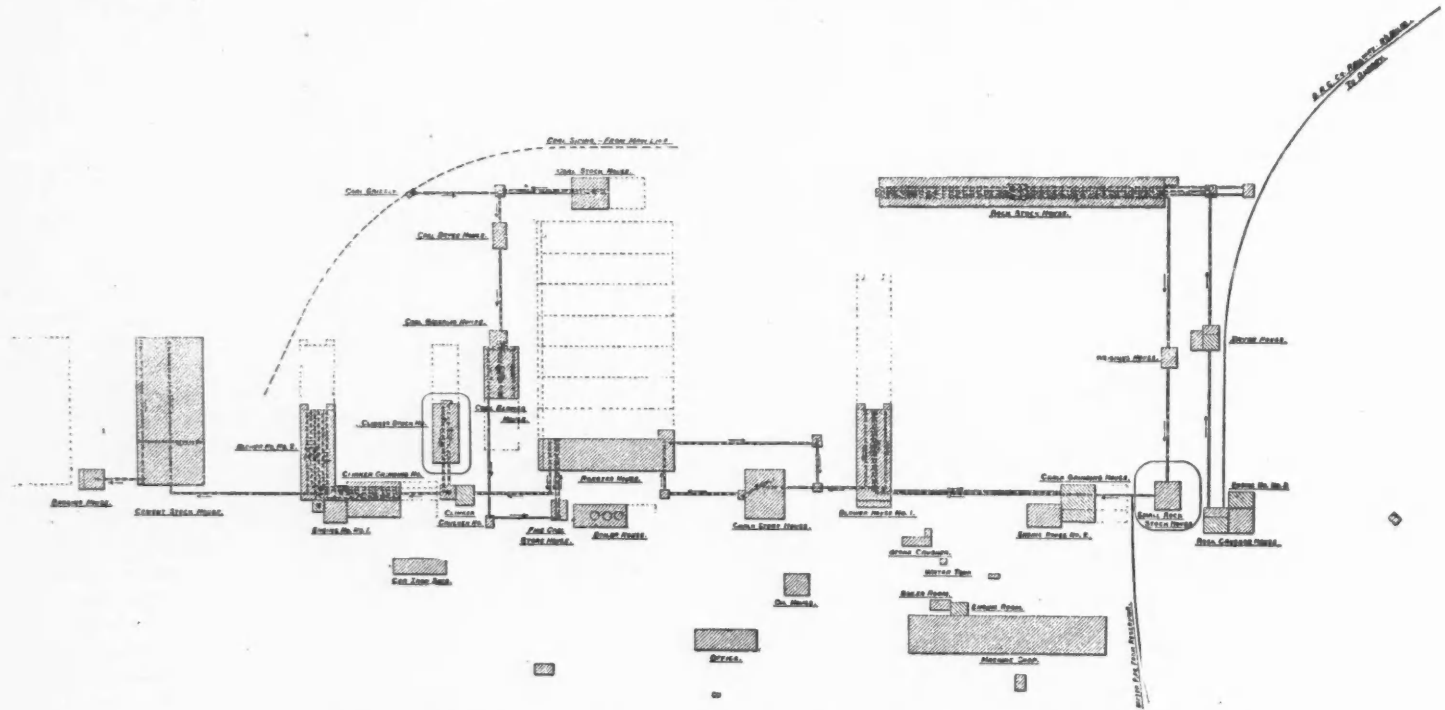
Naturally the first visit in the plant was made to the crushing house where the rock brought from the quarry was run through the rolls. The skip cars are hauled up an incline to the top of the crusher house where by successively passing through three sets of rolls the cement rock is reduced to a size of ½ inch or less. The capacity of the crusher house is 3,000 tons of rock per day. It is equipped with a set of giant rolls 5 feet wide and 5 feet in diameter, and 2 sets of 36-inch rolls. The engine operating the rolls is a vertical cross-compound condensing engine of 500 horsepower. From the crusher house the material is carried by a belt conveyor of Edison design to a dryer house of 3,000 tons per day capacity, and from the dryer house is transported to the rock store house from which it is drawn as desired. As the cement rock is not absolutely uniform in character the stock house is arranged so that the material is drawn from several different places at the same time and as even a mixture as possible obtained by this means. It is all sampled automatically as it passes to the weighing and mixing house where the proper proportion of limerock (determined by analyzing the samples) is added, all of the cement rock being low in lime. The weighing and mixing house

is equipped with two receiving bins with a capacity of 60 tons each and two weighing bins each of 10 tons capacity. From here the mixture is carried by belt conveyors to a small-rock store house of 1,000 tons capacity, from which it is drawn to the chalk grinding house where it is reduced to fine powder. At present this house has an equipment of one set of fine grinding rolls, but others are to be added until a capacity of 5,000 barrels of cement per day is attained. Later it is expected to double this capacity by increasing the size of the house as shown by the dotted lines in the accompanying plan and adding other rolls. The power furnished this house is from a vertical cross-compound condensing engine of 750 horsepower. The pulverized material is now transported to blower house No. 1, where the fine material is separated from the coarse by a blast of air, the former being taken to the chalk store house, and the latter returned to the chalk grinding house for further grinding. The blower house contains at present 16 bins and blowers, but is planned to be increased until a capacity of 10,000 tons per day is secured. The pulverized material is drawn by a

(7) office building and chemical laboratory; (8) machine shops, oil house, corrugated iron shed, etc.

The inspection of the plant occupied the entire time before the hour of departure at half past three. Return to Philadelphia was accomplished by half past six in good time for dinner and the evening session, held in conjunction with the Franklin Institute at the Manufacturers' club. This session was presided over by Mr. F. Lynnwood Garrison, President of the Franklin Institute. It was devoted to the reading and discussion of papers by Mr. Bradley Stoughton, of Columbia University, on the "Development of the Bessemer Process for Small Charges," and by Mr. Robert Job, chemist of the Philadelphia & Reading Railroad Company, on "Steel Rails; Relations between structure and durability." Both of these papers were illustrated by diagrams and lantern slides. Mr. Stoughton's paper brought out an animated discussion participated in by Messrs. Campbell, John F. Wilcox and Dr. Raymond. Mr. Wilcox felt sincerely aggrieved because the author of the paper had recalled dearly purchased experiences which he and his friends had

adjournment of the morning session the members of the Institute and their guests were conveyed by street cars to the University of Pennsylvania where luncheon was served in Houston Hall. After luncheon the final business session of the meeting was held in the lecture or assembly room in the building. Up to this time the meeting had been largely devoted to the iron and steel interests, but the "ferruginous" numbers were now asked to take back seats and allow the discussion of other subjects. This session was opened by Mr. E. V. d'Inville, a member of the council, who introduced Dr. Smith, in charge of the chemical department of the University who welcomed the Institute and described briefly the places of interest that might be visited after the session. The first paper presented was one in pamphlet form by Walter P. Jenney of Salt Lake City on the "Mineral Crest, or the Hydrostatic Level Attained by the Ore-Depositing Solutions in Certain Mining Districts in Great Salt Lake Basin." An abstract of this paper will be published later. It brought out discussions by Dr. Raymond, Prof. S. F. Emmons, and George Otis Smith.



PLAN OF EDISON PORTLAND CEMENT COMPANY'S WORKS AT STEWARTSVILLE, N. J.

screw conveyor from the chalk store house to the roaster. The latter is equipped with 2 rotary kilns each 150 feet long and 9 feet in diameter but as yet of undetermined capacity. The clinker from the roasters is taken by a system of bucket conveyors to the clinker crushing house, from thence to the clinker stock house, and thence to the clinker grinding house. The clinker crusher house contains 2 sets of 36-inch rolls, and has a present capacity of 3,000 tons per day. The clinker house has a storage capacity of 2,500 tons. The clinker grinding house contains at present two sets of fine grinding rolls, but like the chalk grinding house, may be increased to a total capacity of 10,000, power being furnished by a vertical cross-compound condensing engine of 750 horsepower.

The material now passes to blower house No. 2, where it is again separated by air blasts, the fine stuff going to the cement stock house and the coarser returned to the grinders. The stock house has a capacity of 50,000 barrels, although the plans call for double that capacity when required. Other buildings on the grounds are (1) the cement bagging house, containing four bagging and two barreling machines, (2) a coal grizzly, where the coal is dumped from the cars and carried by conveyors to (3) the coal stock house of 400 tons capacity; (4) coal grinding and blower house, present capacity equal to 5,000 barrels of cement per day; (5) fine coal house, capacity of 100 tons; (6) boiler house, with three Climax boilers, each of 500 horsepower;

had with the Clapp-Griffith converters of lamented memory. Mr. Job's paper was an interesting and valuable contribution to the current literature on steel rails in heavy sections, the problems connected with which are attracting the earnest attention of metallurgists, mill men, and railroad officials. It brought out interesting remarks from Mr. James E. York, of New York, who recalled the fact that some of the "John Brown" rails rolled in 1864 after 34 years of service on a main line of railroad were still in use on sidings. He claimed that this endurance was due to the frequent re-heating and slower processes of rolling then practiced and which was now treated with contempt. Dr. Raymond read some notes contributed by Dr. C. B. Dudley and the discussion was enlivened by some historical reminiscences from Mr. William Kent, associate editor of *Engineering News*.

Thursday morning was given up to the presentation in type of two papers by Mr. Wm. R. Webster, of Philadelphia, the first on "Specifications for steel Forgings and Castings" and the second on the "Present Situation as to Specifications for Steel Rails." These were published in last week's issue of *THE ENGINEERING AND MINING JOURNAL*. Mr. Webster spoke briefly calling attention to the principal features of the papers and opened the discussion which was continued by Dr. P. H. Dudley (read from manuscript by Dr. Raymond), Messrs. H. H. Campbell, Robert Job, William Kent, Julian Kennedy and Gus. C. Henning, Prof. Lanza, and Drs. Raymond and C. B. Dudley. Immediately after the

"Gold Mining in McDuffie County, Georgia," was the title of an interesting contribution read by W. H. Fluker, of Tatham, Ga., and was discussed by Prof. Emmons, Dr. Raymond and Mr. Rickard. Mr. Fluker's paper is published elsewhere in this issue. The concluding paper entitled, "Some Principles Controlling the Deposition of Hydro-Carbons," was presented by Mr. George I. Adams, of the United States Geological Survey. Mr. Adams has recently been engaged in the study of petroleum occurrences, particularly in Texas and other Western states, from which he has developed some interesting theories as to the origin, underground transportation and subsequent accumulation in reservoirs of oil and natural gas. In discussing Mr. Adams' paper, Dr. David T. Day referred to what he designated as the migratory nature of the hydro-carbons, particularly in respect to petroleum and the effects that such migration through porous strata had exerted upon the materials. Extended experiments conducted by him on the filtering of petroleum through fullers earth, etc., had led him to the belief that similar action in nature had produced in large measure the different varieties of oil as we find them in different but adjacent localities. Upon the adjournment of the session, an hour or so was spent in an inspection of the buildings, laboratories, etc. of the university, students acting as guides for the several parties as they were made up.

The reception Thursday evening at the Academy of Fine Arts was a brilliant social event. No better

place than the academy for such an occasion could have been selected. The large halls, which, in addition to the paintings and statuary, were beautifully decorated with flowers, bunting and growing plants, easily accommodated the large company present, and there was at no time anything like a crush. An excellent band stationed at the head of the main stairway furnished music during the evening. The next day, Friday, was the last one of the meeting, and was given up to an excursion on the Delaware River. The steamer, with about 350 excursionists, left the Arch street wharf at 10 a. m., and proceeded immediately to the works of the William Cramp & Sons' Engine and Shipbuilding Company, where a number of war vessels, including the new battleship *Maine*, are under construction. From here the steamer proceeded to Washington Park, where an opportunity was afforded to see a haul of shad, and then to partake of a planked shad dinner in the restaurant on the grounds. The next stop was made at the League Island Navy Yard, after which a visit was made to the works of the New York Shipbuilding Company, which, for completeness of detail and arrangement, is conceded to be the finest in the world. Here at one end of a building, over 1,000 feet in length, the raw material in the shape of plates, angles, rods, etc., etc., are received, are manipulated as they travel, always in one direction, until they emerge in a finished vessel, built under cover at the other end. This visit was one of the most, if not the most, instructive and interesting of the meeting, and furnishing a fitting close for the convention. The return to Philadelphia was made shortly after 5 o'clock, when there was a general skurrying to catch homeward-bound trains, and little time was occupied with formal leave-taking.

Following is the list of members and guests registered at headquarters in the Manufacturers' club:

- PHILADELPHIA, PA.
John Birkinbine.
Edward W. Sanborn.
Cyrus Borgner.
Arthur Brock.
George F. Baer.
Theron I. Crane.
George C. Davis.
Edw. V. d'Invilliers.
James M. Dodge.
Theodore N. Ely.
Edgar C. Felton.
F. Lynwood Garrison.
Horace L. Haideman.
Edmund H. McCullough.
Henry G. Morris.
Percival Roberts.
Pedro G. Salom.
Richard H. Sanders.
Henry T. Townsend.
Samuel M. Vaulchain.
John Price Wetherill.
Walter Wood.
Willard C. Hosbach.
H. H. Yard.
Howard W. Du Bois.
N. Lilienberg.
W. M. Stein.
Wm. R. Webster.
R. P. Paterson.
J. Wesley Pullman.
W. W. Lindsay.
Benj. Smith Lyman.
Washington Jones.
William H. Morris.
August A. Miller.
C. A. Bragg.
G. W. Hamilton.
E. C. Lindsay.
A. S. Morris.
Thomas Fisher.
Frank M. Zeller.
Edwin J. Houston.
Wm. A. Ingham.
Charles Schaffer.
De Coursey May.
C. W. Roepper.
Thomas W. Eynon.
L. H. Taylor, Jr.
Wm. G. Niellson.
Amos P. Brown.
Thomas Hobson.
J. E. Haverstick.
S. E. Fairchild, Jr.
G. H. Clamer.
J. D. Darling.
B. N. Bailey.
F. J. Keeley.
Wm. Burnham.
Edward T. Clymer.
S. Bowman Wheeler.
William J. Coane.
W. H. McCallum.
Robert Mitchell.
Fred F. Sharpless.
Walter M. James.
Edward K. Landis.
- ADDINGHAM, PA.
Arthur Henry Eyles.
Edwin Morrison.
- ALLEN TOWN, PA.
Chas. A. Matcham.
George Ormrod.
- ALTOONA, PA.
Chas. B. Dudley.
- BETHLEHEM, PA.
Maunsel White.
- CATASAUQUA, PA.
Edwin Thomas.
H. J. Seaman.
Oliver Williams.
J. M. Fitzgerald.
- CHESTER, PA.
Richard Peters, Jr.
C. Edward Stafford.
- CONSHOHOCKEN, PA.
Jawood Lukens.
- HARRISBURG, PA.
A. J. Dull.
Henry McCormick, Jr.
A. S. McCreath.
Leslie McCreath.
- HAZLETON, PA.
W. S. Ayres.
- HOKENDAUQUA, PA.
Fletcher H. Knight.
- JOHNSTOWN, PA.
George E. Thackray.
- McKEESPORT, PA.
G. C. Crawford.
- PARRYVILLE, PA.
Stanton S. Freeman.
- PITTSBURG, PA.
D. D. Pendleton.
Taylor Alderdice.
Julian Kennedy.
- PORT CARBON, PA.
Robert Allison.
- POTTSTOWN, PA.
Joseph Hartshorne.
Jas. P. Roe.
- PUNXSUTAWNEY, PA.
John McLeavy.
- RADNOR, PA.
Theodore D. Rand.
- READING, PA.
Albert Broden.
- RIEGELSVILLE, PA.
B. F. Fackenthal, Jr.
- SCRANTON, PA.
H. M. Lane.
W. F. Mattes.
Chas. C. Mattes.
Wm. H. Richmond.
- SO. BETHLEHEM, PA.
Dr. T. M. Drown.
Albert Ladd Colby.
M. Alton Richards.
- STEELTON, PA.
Stephen Badlam.
H. H. Campbell.
- NEW YORK CITY.
President E. E. Olcott.
A. H. Fay.
Willard P. Ward.
W. J. Johnston.
William H. Wiley.
W. S. De Camp.
E. J. Schmitz.
George A. White.
G. C. Henning.
Frank S. Witherbee.
Fred J. Miller.
Richard M. Jesup.

- NEW YORK CITY—Continued.
Bradley Stoughton.
Geo. S. Humphrey.
Thos. M. King.
Charles Kirchhoff.
Lucius S. Bigelow.
Theodore Dwight.
Richard G. G. Moldenke.
O. I. Conley.
H. G. Torrey.
Edward W. Parker.
- BROOKLYN.
Dr. R. W. Raymond.
A. Eilers.
- FLATBUSH, N. Y.
James E. York.
- BIRMINGHAM, ALA.
James Bowron.
- SAN FRANCISCO, CAL.
H. A. Keller.
- DENVER, COLO.
T. A. Rickard.
- BRIDGEPORT, CONN.
George E. Somers.
Edwin S. Sperry.
- WASHINGTON, D. C.
H. O. Seabrooke.
George F. Adams.
William Barrett Ridgely.
David T. Day.
A. F. Lucas.
Geo. Otis Smith.
S. F. Emmons.
- TATHAM MINES, GA.
W. H. Fluker.
- INDIANAPOLIS, IND.
D. M. Parry.
- BALTIMORE, MD.
J. H. Lee.
- SPARROWS POINT, MD.
Simon S. Martin.
- WORCESTER, MASS.
George N. Jepson.
A. C. Higgins.
- CARTHAGE, MO.
A. O. Ihseng.
- BOUND BROOK, N. J.
W. J. Taylor.
Knox Taylor.

- BRIDGETON, N. J.
Oberlin Smith.
Percival H. Smith.
- CAMDEN, N. J.
Henry G. Morse.
- HIGH BRIDGE, N. J.
J. M. Sherrerd.
- JERSEY CITY, N. J.
W. S. Hungerford.
John A. Walker.
- LAMBERTVILLE, N. J.
John Lilly.
Torbert Coryell.
- ORANGE, N. J.
Thomas A. Edison.
- PASSAIC, N. J.
William Kent.
- STANHOPE, N. J.
John S. Kennedy.
- TRENTON, N. J.
Edward B. Durham.
- ALBANY, N. Y.
Verplanck Colvin.
- BUFFALO, N. Y.
T. Guilford Smith.
- PORT HENRY, N. Y.
F. E. Bachman.
- SCHENECTADY, N. Y.
J. A. Capp.
- SYRACUSE, N. Y.
Edmund L. French.
- CLEVELAND, O.
John F. Wilcox.
G. F. Knapp.
- PROVIDENCE, R. I.
Stephen Minot Pitman.
- SALT LAKE CITY, UTAH.
A. Raht.
- TOREGA, VA.
Edmund C. Pechin.
- SPOKANE, WASH.
Chester S. Batchelder.
- MILWAUKEE, WIS.
H. E. Smith.
Irving M. Bean.
- CITY OF MEXICO.
W. Hochschild.

Auriferous pyrites occurs in all the veins, particularly below water level. Concentrates assay from \$100 to \$300 per ton. The accompanying minerals usually regarded as indications of gold are iron and copper pyrites, galena and pyromorphite. The quartz is usually clean and the gold coarse. Absence of slimes makes amalgamation and concentration simple and easy. The formation is believed to be entirely different from the Dahlonega District and of more recent age.

Almost from the time of discovery the mines have been profitably worked. There have been some exceptions, but the exceptions have not been sufficient to make McDuffie County different from other mining sections.

In 1833, Griffin purchased the rights of his associates who had up to this time confined their work to placer mining. He erected a stamp mill, the old mortars of which can still be seen. They were rectangular in shape, 10 inches wide, 14 inches deep and 30 inches long. No dies were used and there was no discharge. There were three stamps each consisting of a cast-iron shoe with a square tapering neck 8 inches long. The neck was driven into a hole mortised in the end of a wooden stem 7 feet long and 6 inches square, bound by a heavy iron band.

The cam shaft was a solid piece of wood 26 inches in diameter with blocks for cams mortised into it. The mill was driven by an undershot wheel, the shaft of which was the continuation of the cam shaft.

The mortars were soon displaced by wooden ones provided with a discharge and screen, and having a single cast-iron die, extending the entire length of the mortar. The third step in the development of the stamp mill consisted in digging a hole about four feet deep and filling it with quartz rock and gravel. This formed the bed upon which the ore was fed and stamped. It discharged on one side into a large buddle, and two negro boys with brooms kept it in a state of agitation. The lighter material was washed over the side of the vessel, leaving the heavier in the buddle. This was periodically scraped out and the values were recovered by panning. Griffin is said to have cleared \$80,000 from this mill in one year (1837). The ore was all taken from what is now called the Columbia vein, which is still being profitably worked.

Griffin was accidentally killed in 1842. He left a large fortune to his heirs, who continued to work the mine until 1851, when it was sold to the Columbia Mining Company. It was worked with success until the breaking out of the Civil War, when the machinery, or such part of it as could be used, was confiscated by the Confederate government and the men were pressed into army service.

As a result of the conditions which followed the war, most of the mines have been until recently abandoned. Some, however, have been worked continuously in spite of all difficulties. The Parks Mine was owned and operated by Col. J. Belknap Smith until his death in 1888, and after that by his widow until 1899, when she leased it to a company of western miners. Up to this time no attempt had been made to save anything but the free gold, and fully 50 per cent of the values contained in the sulphides have for 40 years been allowed to flow into the river. The vein upon which this mine was opened varies in width from 2 to 11 feet, and in value from \$10 to \$200 per ton. The property contains 105 acres traversed by numerous other veins, several of which have been worked at a profit to a depth of from 60 to 120 feet. Below this the values are largely contained in sulphides which it did not pay to work for free gold.

The National Mine was another successful property. It was worked by James Frank for free gold to a depth of 50 or 75 feet. Frank made no attempt to concentrate his ore, and when the undecomposed sulphides were encountered the ore was considered worthless and the work then abandoned, to begin again at another place. In 1895 Frank sold out to General Joseph H. Porter, who began development work and the construction of a mill, but died before the mill was completed. In 1897 the property was sold to the Four Oaks Mining Com-

GOLD MINING IN McDUFFIE COUNTY, GEORGIA.*

By W. H. FLUKER.

McDuffie County, once a part of Columbia County, lies in the eastern part of Central Georgia. Wrightsboro, its county seat, now almost forgotten, was one of the principal towns of Georgia before the Revolutionary War. At that early time much of the land, now a part of one of the principal gold bearing sections of the South, was being taken up and used for farm lands. Some of the mining companies can trace their titles back to the original grants of land made by George III in 1771. The discovery of gold in Georgia, however, was not made until 1823. It is credited to two English immigrant miners traveling as peddlers who found quartz rich in gold on what is now known as the 40-acre lot, owned by the Columbia Mining Company. They had no money to buy the land and endeavored to secure the aid of the farmers, but were for several years unsuccessful.

In 1826 Jeremiah Griffin became interested with them, and several rich veins were located. Mr. Griffin was wealthy and purchased about 3,000 acres lying along Little River. Much of this is still virgin land. The gold when found occurs in fissure veins having a strike usually about north 50° east, the general strike of the formation. The belt is about two miles wide and extends from Hancock County on the southwest through Warren, McDuffie and Lincoln counties in Georgia, across the Savannah River into North and South Carolina.

The country rock is usually a hydromica schist, although some of the principal veins lie along the contact between the schist and the granite and gneiss which lie along the northwest side of the belt. The veins are for the most part regular in dip and strike sometimes extending in an almost unbroken line for several miles, though, of course varying from a mere gravel seam to many feet in thickness. The vein matter is hard, massive quartz occurring in the shoots, pitching to the north and continuing downward with uniform thickness as deep as any workings have reached. The veins are separated from the country by a few inches of gouge and frequently show a ribbon or banded structure. It is along the faces formed by the banding that some of the finest specimens of free gold are found, but whether the banding occurs or not the gold is found distributed through the entire vein.

*Read before American Institute of Mining Engineers, Philadelphia.

pany, and two years later passed into the hands of the National Mining Company of Chicago. This company has just about completed a modern 20-stamp mill equipped with one Wilfley and one Bartlett table, both of which are said to give good results. The company has sunk the Brock shaft to a depth 140 feet and drifted about 75 feet on the vein, which at this level is 4 feet wide and said to assay on an average \$21.40 per ton.

Another mine, the Tatlin, has severable profitable years to its credit, but is at present idle, although it is understood that preparations are being made to reopen it on the "Slate" shaft. There is a 10-stamp mill with Wilfley concentrators on the property. The Landers Mine is a new discovery and has only been worked a few months. Two veins from 5 to 18 inches thick have been located on the property. They are said to assay from \$20 to \$30 per ton. No machinery has been erected and none of the ore has been milled.

The Woodall Mine, now shut down on account of litigation, was at the time of closing yielding ore said to be worth \$50 per ton, from a 16-inch vein 100 feet deep.

The "40-acre lot" previously referred to has been the most extensively worked property in Georgia, both before and since the Civil War. It was the place of the original gold discovery in the State and the success of Griffin, Smith and others gives testimony to its richness. Records kept by Col. Smith show that gold to the value of \$2,000,000 has been extracted from this property, which lies slightly northwest of the center of the belt. It is traversed by two vein systems, the Columbia and the Bell. The latter is the farther north and is now being worked by the Columbia Mining Company to a depth of 140 feet. The ore is found to be valuable both in free gold and sulphides, running at present about \$17 per ton free gold, which is 50 per cent of the assay value. The footwall is hydro-mica slate and the hanging wall is gneiss separated from the quartz by from one to three inches of gouge. The footwall is found to contain iron pyrites carrying gold for a distance of 10 feet from the vein. The vein has been drifted on for a distance of 565 feet and shows continuity and uniform values. The Columbia vein lies about 600 feet south of and nearly parallel to the Bell and is the larger of the two. Both walls of this vein are hydro-mica schist, separated from the vein by the usual thickness of gouge. The footwall is regular and unbroken while numerous spur veins branch out from the hanging wall in the direction of the Bell.

This vein varies in thickness from 2 to 20 feet and in values from \$2 to \$100 a ton. An incline shaft has been sunk by the present owners to a depth of 325 feet where the vein is 5 feet thick and assays \$32.20 a ton. Drifts have been run on the vein at several points. One drift at the 175-foot level is 720 feet long and shows a continuous ore body. It is expected to continue the present shaft to a depth of 1,000 feet. A 10-stamp mill with Wilfley concentrators has been running constantly for the past two years on ore yielding \$9.20 a ton. The concentrates have not been treated but are stored at the mine and will probably be shipped to a smelter for treatment. One lot of concentrates sent to the Southern Smelter at Atlanta returned \$82 a ton.

There are numerous other veins and prospects not only in McDuffie, but in Warren and Lincoln counties upon which work on a limited scale has been done with profit. Inexperience and lack of capital are the principal difficulties. When these are overcome McDuffie County will take a place among the important gold mining districts of the country.

PIG IRON IMPORTS IN GREAT BRITAIN.

—Imports of pig iron into Great Britain for the four months ending April 30 were 82,315 tons, of which 4,907 tons were from the United States. For the corresponding period in 1901 the total imports were 43,075 tons, of which 25,411 tons were from the United States.

MINERAL PRODUCTION OF NEWFOUNDLAND.

The report of Mr. James F. Howley, of the Mines Bureau, of Newfoundland, gives the mineral production of the colony for the past year, as shown in the following table:

	1900.	1901.	Changes.
Copper ore, tons.....	70,614	75,348	I. 4,734
Iron ore, tons.....	320,463	738,206	I. 417,743
Iron pyrites, tons.....	.....	7,532	I. 7,532
Building stone, tons.....	500	5,000	I. 4,500
Cobble stone, tons.....	.....	500	I. 500
Granite, tons.....	625	3,240	I. 2,615
Limestone, tons.....	.....	1,300	I. 1,300
Paving stone, blocks.....	.....	140,000	I. 140,000
Slate, tons.....	600	2,000	I. 1,400
Brick, number.....	1,000,000	1,305,000	I. 305,000
Lime, barrels.....	.....	7,800	I. 305,000

In addition to the production shown in the table, an output of 2,755 ounces of gold is reported. Of the copper ore mined in 1901 there were 36,641 tons sent to Great Britain, 35,167 tons to New York, and 540 tons to Pictou, N. S. Of the iron ore, 408,677 tons went to Canada, 213,335 tons to Germany, 76,860 tons to the United States, and 35,830 tons to Great Britain. The pyrites all went to New York. Of the slate, 6,000 squares went to Great Britain.

From the report we take the following notes made by Mr. Howley on the production:

The total value of the output for the year 1901, of the crude materials at the mines and quarries, amounted to the handsome sum of \$1,211,163, being in excess of that of 1900 by \$419,154. The chief factor in bringing about the above result was the large production of iron ore at the Belle Island mines, which reached a total of 738,206 tons, which, estimated at the same number of dollars, only fell short of the entire value of the preceding year's output by \$53,893.

There has also been an increase in the copper ore production. Tilt Cove alone shipped 74,808 tons, as against 66,959 tons in 1900. From Little Bay and Colchester mines there were shipped 440 tons, and from Blo-mi-don mine, York Harbor, 100 tons, bringing the total up to 75,348 tons. So far from the copper production decreasing, it will be seen by reference to former reports that at no time in the history of the enterprise has this large output been exceeded, except in 1899, when it reached 86,957 tons. This was, however, due to the holding over of reserves from former years to await the anticipated rise of copper.

The re-opening of the Pilley's Island pyrites mine by the Newfoundland Exploration Syndicate proves conclusively that this latter mine is by no means exhausted. Mr. C. F. Taylor states that new ore bodies have been struck, and a diamond drill is now at work proving them. About 150 men are at work during the winter taking out ore, and it is expected that two or three cargoes will be ready for shipment in the Spring. One small cargo of pyrites was exported during the season from Little Bay. The large deposit of pyrites near Ramah, Labrador, mentioned in last year's report, has been tested during the Summer. The ore is said to be of excellent quality, averaging about 50 per cent in sulphur, and the mineral belt is said to be of great extent. The principal drawback to successful mining would appear to be the shortness of the shipping season, owing to the presence of floe-ice up to so late a period in the Summer. Another pyrites deposit, from which some fine specimens were procured, is situated on an island in St. John's Bay, west coast of Newfoundland, but no development sufficient to determine the prospective value has as yet taken place.

It is pleasing to be in a position to record the fact that other mineral products, not hitherto looked upon as of much importance, are beginning to attract attention, and in some cases the activity and enterprise displayed in exploiting them is reaping a deserved reward. This is particularly noticeable in the manufacture of brick and slate. There are now four brickyards in operation in Smith's and Random Sounds, the combined output from which the last year reached 1,305,000 bricks, being an increase of 505,000 over the production of 1900. The operations of the Wilton Grove slate quarry in Smith's Sound were actively prosecuted during the year, re-

sulting in a large increase in the manufacture and exportation of roofing slate. The output was about 2,000 tons, equal to 6,000 squares, valued at \$22,500. The slate is made in two sizes, 20 by 10 and 24 by 12. It all went to English markets, the former to Newcastle, the latter to London, where a ready sale at remunerative prices was found for it. This quarry is now a well-established industry. A fine pier is in course of construction along the water front, being filled in with the waste from the slate. Vessels of almost any size can lie alongside within a stone's throw. So far, no attempt has been made to manufacture any of the other articles for which this slate is equally well adapted, but the plant requisite for such purposes is soon to be installed. The slate is of various shades of color, dark purple prevailing, but there is also a band of pale sea-green of beautiful texture. The quarry is of immense proportions, and there is sufficient material in sight at least for generations. Several new deposits have been located within the past season, similar in geological age to that of the Smith's Sound quarry.

In the matter of structural material, such as building stone, granite, etc., the superiority of native stone is beginning to assert itself. During the past season a marked increase is manifest in the quantity quarried and utilized in the general public and other structures in course of erection.

The Reid Newfoundland Company vigorously prosecuted the work at its granite quarry at the Topsails during the greater part of the Summer. Much of the material raised was utilized in bridge construction, and a large amount was dressed for the new station at Riverhead. The company also manufactured 140,000 paving blocks.

It is to be regretted that the result of the boring operations at Parson's Pond for petroleum have not proved as successful as was anticipated. The company prosecuting these tests has gone to great expense. The effort to prove the existence of oil in economic quantity in that region might well form the subject of assistance from the public funds. The establishing beyond question of an oil region in that locality would mean much for that industry in the island, whereas a discontinuance of the attempt at this juncture, though by no means to be looked upon as a complete failure, may have the effect of discouraging further operations, and thereby leave it to be inferred that petroleum is not to be reckoned as among the possible resources of the country. This would not be a justifiable conclusion to arrive at in view of the results already obtained.

Among other minerals which are known to exist, it is believed that chrome ore, manganese ore, arsenical pyrites, lead ore, gypsum, mica and asbestos could be profitably worked. Gold also could be made to show a considerable production. Coal is prominent among the mineral resources of the island, and it is believed that its output will be a steady one before long.

IRON ORE IMPORTS IN GREAT BRITAIN.

—The imports of iron ore into Great Britain for the four months ending April 30 are reported as below, in long tons:

	1901.	1902.	Changes.
Spain	1,430,993	1,711,074	I. 280,081
Other countries.....	256,331	306,955	I. 50,624
Totals	1,687,324	2,018,029	I. 330,705

This shows a very considerable increase; but the comparison is with a poor year.

IRON AND STEEL EXPORTS OF GREAT BRITAIN.—The exports of iron and steel from Great Britain for the four months ending April 30 are valued by the Board of Trade returns as below:

	1901.	1902.	Changes.
Iron and steel....	£8,132,816	£8,595,837	I. £463,021
Machinery	5,803,823	5,626,486	D. 177,337
New ships.....	4,072,928	2,164,168	D. 1,908,760
Totals	£18,009,567	£16,386,491	D. £1,623,076

The total value of mining machinery, included above, was £182,577 this year, being £12,901 less than in the corresponding period last year.

THE NOME AND NORTON BAY REGIONS OF ALASKA.

The United States Geological Survey has issued a report entitled "A Reconnaissance in the Cape Nome and Norton Bay Regions of Alaska in 1900." This volume includes over 200 pages of printed matter with numerous maps and illustrations. It is the result of the field work done by the several parties which worked in the Seward Peninsula during the season of 1900. The first part of the report, "A Reconnaissance of the Cape Nome and Adjacent Gold Fields of Seward Peninsula," is written by Alfred H. Brooks, assisted by George B. Richardson and Arthur James Collier. Twenty pages are devoted to an introduction stating the character of the work, and to a brief summary of the history of the discovery and development of the Seward Peninsula.

The Seward Peninsula is the most western part of the North American continent, and its first exploration by white men was from the west. While the settlements on the Atlantic coast were still in their infancy, Russian traders had pushed their way well across the plains of Siberia. In 1648 Simon Deshnef, a Russian Cossack, discovered Bering Strait, and in 1711 Popoff, another Cossack, visited the straits and brought back rumors of a continent lying beyond. During the succeeding century, through the work of such explorers as Bering, Kotzebue and Cook, the northwest coast of America gradually became better known. At the time of the purchase of the Territory the coastline of the peninsula was fairly well charted and some information of the interior had been obtained. The report under consideration contains the first accurate maps which have been made in the region.

Some 20 pages are devoted to the bed-rock geology of the region, which, as the author states, offers many problems which could not be solved during a hasty reconnaissance. The sedimentary beds are divided into three series, the two lower being probably pre-Cambrian, and the upper, which is the gold-bearing series proper, being Paleozoic and possibly in part Mesozoic. The surfacial deposits of the region are described in some detail, because of their important relation to the placer deposits. The presence of high benches on the mountain slopes is regarded by the author as evidence that an elevation of the region has taken place in comparatively recent times. He concludes, however, that this elevation was of a comparatively local character.

About 100 pages of the report are given to a discussion of the economic geology of the region. The mineral deposits, as far as now known, are all gold placers. A brief summary is included of the development of the region between 1898 and 1900. The estimate of the placer gold output in the Seward Peninsula in 1900 is \$4,726,500. Under regional descriptions are included an account of the occurrence of gold in the various districts of the Seward Peninsula. These are classified under the following headings: Nome region, Cripple and Penny river regions, Sinuk basin, Eldorado basin, Bonanza basin, Solomon basin, Topkok region, Niukluk basin, Kruzgamepa region, Kugruk region, Agiapuk region, Grantley Harbor region, Bluestone region and York region. Of these, the most important is the Nome region proper, which has produced by far the greater part of the gold of the peninsula. The Kugruk and Bluestone regions are briefly described. They are of special interest because they seem to afford great possibilities for future development. In the York region, mention is made of the discovery of stream tin during the course of the field work.

In the summary of the economic geology, attention is called to the fact that there are two distinct gold belts in the region, which lie north and south of the axis of the Kigluak mountains and may be assigned to certain structural features of the region. The writer draws attention to the probability that future discoveries will be made along the strikes of these rocks, which would lie in the northeastern part of the peninsula.

The various types of placer deposits are described and classified, and the source and distribution of the gold discussed. It is shown that the beach deposits are concentrations by wave action of the gold obtained from the tundra gravels; that the high bench deposits are comparable in origin to the Coastal Plain gravels. It is suggested that probably, when more careful explorations have been made, some old beach deposits will be found in the present Coastal Plain.

We quote as follows from the summary:

"In the foregoing an attempt has been made to summarize the existing knowledge of the placer deposits of the southern part of Seward Peninsula. It has been shown that there are a number of different methods of occurrence of gold in the sands and gravels. Some of them, like the creek and beach placers, have been extensively developed; others, like the bench and high bench placers, have hardly been touched; and there are still other groups, like the old beach placers, of whose existence the prospector is hardly aware. It has been shown that the placers are rather widely distributed, the actual discoveries being scattered over an area of from 4,000 to 5,000 square miles. The occurrence of the gold in the bed rock is believed to be due to forces which have acted locally rather than regionally. While there is no affirmative evidence, there seems to be no reason why these conditions should not have occurred in places outside of the area under consideration. It is probable that careful prospecting will show that other creeks in the region carry workable gold deposits. While the very rich creeks, such as have already been developed, are probably exceptional, yet it cannot be assumed that the limits of discovery have been reached within this area, which has been so extensively staked and so little prospected."

This part of the report is concluded by a few notes on the mining methods employed in the region, and some suggestions are made in regard to their improvement. Mr. Collier has contributed a chapter on the climatology of the region, and also some notes on the vegetation. Mr. Barnard, who had charge of the topographic work, describes the methods of survey which were employed. In the appendix is a description of the boundaries of the various recording districts in these gold fields. The report is illustrated by seven plates, including maps and photographs.

The southeastern part of the Seward Peninsula is the subject of a separate paper entitled "A Reconnaissance in the Norton Bay Region," written by W. C. Mendenhall.

The work done by the party, which was in charge of Mr. W. J. Peters, was largely exploratory in character, and included the mapping of the three principal streams of this part of the peninsula. These three rivers, the Fish, the Tubutulik and the Koyuk, rise or southeast to the waters of Norton Bay. Maps near the central part of the peninsula and flow south showing the courses of these streams in detail, and the principal physical features of the section of country through which they flow, accompany the report, which is further illustrated by a geological map, in which the distribution of the different kinds of rocks is indicated, those rocks which may be gold or coal-bearing the subject of special treatment.

At the time when the work was done, no valuable gold deposits, either in placer or vein form, were known in this section. Colors of gold, however, are found in each of the streams studied, and are derived doubtless from rocks outcropping here, which are similar in character and age to those which furnish the rich and well-known placer deposits in the neighborhood of Nome.

Besides the chapters on the geology and economic products of the region, the report treats of the methods by which this modern exploratory work is carried out, of the natives who live in the region studied and their characteristics, of the fish and game and the extent to which they may be relied on as sources of food supply by prospectors and others, and of the routes and means of transportation throughout the section. Several plates of photographs give graphic ideas of the character of the country.

ORE STOCKS ON LAKE ERIE DOCKS.

Official figures, as compiled by the Cleveland *Iron Trade Review*, bear out the statement recently made by that authority that the stocks of iron ore on Lake Erie docks on May 1 would be not far from the amount reported last year at the same time, or about 3,000,000 tons. The exact figure is 2,848,194 gross tons, as against 3,050,183 tons on May 1, 1901. It should be explained that 2,848,194 tons represents the amount of old ore on dock on May 1, deduction being made for the ore brought down and put on dock in April of this year. There was a heavy shipment of ore in April from upper lake docks, but no large amount was put on docks at Lake Erie ports. Much of it was still in transit on May 1, and the greater part of the ore that reached ports below went direct to furnaces. In order that the statistics might tally with those of last year, when no ore was moved in April, the deduction of new ore was made, as stated. The following table shows the stocks on dock on May 1, 1901 and 1902 by ports, with the amount on the same docks on December 1, 1900 and 1901:

Ports.	Close of navigation.		Opening of navigation.	
	Dec. 1, 1900.	Dec. 1, 1901.	May 1, 1901.	May 1, 1902.
Toledo	242,375	254,196	138,453	111,511
Sandusky	95,111	41,384	63,148	37,400
Huron	211,377	231,501	135,047	129,615
Lorain	251,838	195,863	140,562	96,992
Cleveland	1,337,445	1,378,060	806,119	621,865
Fairport	611,717	719,590	306,706	472,325
Ashtabula	1,811,459	1,769,145	1,046,974	924,742
Conneaut	630,514	604,106	69,755	152,891
Erie	480,734	479,718	225,412	223,972
Buffalo	232,100	198,100	118,007	73,861
Total	5,904,670	5,859,663	3,050,183	2,848,194

The total rail shipments from Lake Erie ports to furnaces in the winter of 1901-1902 appear by comparing dock stocks December 1, 1901, and May 1, 1902:

	Gross tons.
On dock, Lake Erie ports, Dec. 1, 1901.....	5,859,663
On dock May 1, 1902.....	2,849,194
By rail to furnaces, winter of 1901-2.....	3,010,469

The shipments to furnaces in the seven months, from May 1 to December 1, 1901, together with the consumption by furnaces at Tonawanda, Buffalo, Cleveland and Lorain, receiving ore direct in their own yards, amounted to 14,204,596 tons. Adding to this the shipments of the past winter—3,010,469 tons, as above—gives a total for the year ending May 1, 1902, of 17,215,065 tons. This is against 14,468,260 tons in the 12 months ending May 1, 1901, and 15,574,785 tons for the 12 months ending May 1, 1900, these being the greatest previous records.

The important fact in the above statistics is that the iron ore trade, even with this heavy consumption, has not materially reduced the amount of ore carried on dock in the past year. It will be conceded that 3,000,000 tons is far more than need be carried in this way, as a safeguard against strikes or tie-ups on the lakes.

THE OLDEST LOCOMOTIVE IN USE.—The London *Colliery Guardian* says: "In 1822 a railway from the Hetton Colliery, Durham, to the Wear was opened for traffic, with five of George Stephenson's engines to work over its length of 8 miles. One of these locomotives has been at work ever since. Very little of the original engine remains, but worn parts have always been replaced by duplicates. It has four wheels, and the two cylinders are placed vertically on the top of the boiler, one above the front pair of wheels and one above the after pair. The piston rods point upwards, and have cross arms, from which four long connecting rods convey the power to the four wheels. In 1822 the engine could drag about 64 tons at 4 miles an hour on the level. To-day it can haul 120 tons at 70 miles an hour. It weighs 15 tons."

From the description the engine seems to be somewhat like the old "crabs" which were built for the Baltimore & Ohio about 1833-35. The last of these engines was in use switching in the Baltimore and Washington yards, about 1865. The difference is characteristic; the British road keeps at work an engine of a type and class discarded here nearly forty years ago.

THE MANUFACTURE OF CYANIDES.*

Increasing interest attaches to the manufacture of cyanides at the present time, mainly from two distinct standpoints, which are the greatly-extended application of the potassium salt in gold mining and the recovery of cyanogen compounds from the spent oxide of gasworks—a material which contains them in varying forms and amounts. Of the use of potassium cyanide in the extraction of gold there is nothing much to say that would have the impress of novelty. It is rather with the preparation of this and other important cyanides that we are concerned today, the amount of attention which manufacturing chemists and gas engineers have of late years given to the subject seeming to denote that some general considerations and remarks on the present position would not be without interest to those whose acquaintance with this particular field of research and industry is academic rather than practical and up-to-date.

Although carbon and nitrogen, the two elements of which cyanogen is composed, do not unite even under the influence of the electric spark, the combination is effected when certain nitrogenous bodies are heated with an alkali. This is the old commercial method, though potassium cyanide can also be formed by passing a current of nitrogen over a heated mixture of carbon and potash. For many years the cyanide of commerce was obtained altogether by the method mentioned above, the raw material commonly used being hoofs, clippings of hides, waste wool, etc., the salt usually made being the ferro-cyanide of potash, this being obtainable pure more easily than is the deliquescent potassium cyanide. As we have indicated above, however, a complete change has come over the cyanide manufacture, and the utilization of the spent oxide of the gasworks is now carried out on the large scale both by firms who buy up the oxide for the purpose and by gas corporations who work up their own oxide. The ferro-cyanide of potassium is the salt commonly made, and up to recently large quantities of this were used for the preparation of potassium cyanide. This procedure has, however, of late undergone a change owing to the manufacture of potassium cyanide from the sulpho-cyanide by a patented process of the United Alkali Company. This process enables the salt to be produced at a cheaper rate, and it is difficult when we look at the current market prices to see how the manufacture from ferro-cyanide can be made to pay. The ferro-cyanide is quoted at 5½d. per pound, and to-day potassium cyanide is down to about 9d. per pound, though it is not long since it was sold at 2s. per pound. At this latter figure the old method of manufacture was right enough, but the margin between 5½d. and 9d. is not great enough to recommend the business as a paying one. Of course, the potassium cyanide is not the only cyanide salt in demand, as the textile industries absorb a good deal of the ferro-cyanide, and prussian blue is a manufacture of importance. It is a point, however, to consider whether the activity now displayed in recovering cyanides from spent oxide may not cause a glut in the market and still further depress the price of the products. Among the gas works now producing crude ferro-cyanide may be mentioned Birmingham and Edinburgh, and one or two of the large tar-distilling concerns are the principal other producers. These latter buy their oxide from the various gas works, the price paid being regulated by the amount of cyanides contained—a figure which is extremely variable. Up to recently this oxide was generally burnt by sulphuric acid makers, the residual oxide of iron being used as an iron ore. Of course, a large amount is still utilized in this way, as it is only that which contains a high percentage of cyanogen that finds a ready sale for anything but acid-making purposes. When the gas company works up its own ammonia for sulphate and makes its own vitriol, it becomes a question as to what is the best policy in disposing of the spent oxide—whether to utilize it as the raw material of the acid manufac-

ture or to sell it to the cyanide makers, if, indeed, it is not worked up for cyanide on the spot. Such questions, however, must be considered in the light of the special circumstances surrounding each case, and no good would be done by attempting to lay down any fixed rule. Where other sulphur compounds can be cheaply obtained, and the spent oxide is rich in cyanides, it would probably pay best to wash the oxide for cyanides or sell it for this purpose, but it is easily conceivable that conditions might exist which would make it more expedient to sacrifice the cyanides and to use the sulphur. The cyanides in the spent oxide do not exist in any simple or single form; they take various shapes, from prussian blue to ammonium sulpho-cyanide, and their determination is not a matter to be undertaken lightly. When the oxide is used for acid-making, the cyanides, in whatever form they exist, are converted by combustion into carbonic acid and free nitrogen, the sulpho-cyanides of course yielding sulphurous acid in addition. Although the purifiers take up a good deal of the cyanogen in the crude gas, yet a certain amount passes into the gasholder; indeed, it has been found that the gas may contain as much as one ounce of hydrocyanic acid per 1,000 cubic feet, a fact which goes a long way to explain the corrosive action of gas upon metals, leather, etc. Methods have been proposed, and to some limited extent adopted, to extract the cyanogen compounds from crude gas by the use of rotary washers placed at the outlet of the tar extractor; but although we are open to correction, we imagine that the amount of cyanide which finds its way into commerce from this source is anything but large compared with that extracted from the spent oxide, or the various special mixtures which are used in place of oxide of iron in the purification of gas.

It will cause no surprise when we say that the details followed by the various manufacturers of yellow prussiate, and of cyanide of potassium, at the present are somewhat jealously guarded as trade secrets, and it is therefore, by no means an easy matter to arrive at any clear knowledge of the existing condition of affairs. It is certain, however, that there is very little chance of many of the patents which have been taken out being worked on the manufacturing scale, and this not only from apprehended difficulties from a technical point of view, but also from the important fact that in many patents which have been taken out it would not be at all an easy thing to prove their validity in a court of law if the claim to novelty were disputed. With regard to recent patents, that of Grossman seems not to deserve the stricture we have just passed, though we are not in a position to say whether the confident predictions of the patentee are being borne out in the results of working. In this patent ammonia forms the nitrogenous material, its interaction with an alkaline sulphide leading to the direct formation of the corresponding alkaline cyanide. A certain amount of cyanogen is always produced during the manufacture of black ash in the Leblanc process; but despite a good many attempts to recover it, none of them have been attended with any degree of success.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—The imports of fuel into Spain for the three months ending March 31 were 555,000 tons of coal and 42,507 tons coke. Imports of metals included 1,329 tons pig iron, 1,133 tons wrought iron and 3,009 tons steel. Exports of mineral are reported by the *Revista Minera* as below, in metric tons:

	1901.	1902.	Changes.
Iron ore.....	1,683,122	1,363,697	D. 319,425
Copper ore.....	216,555	215,826	D. 729
Zinc ore.....	18,641	13,225	D. 5,416
Lead ore.....	799	1,134	I. 335
Pyrites.....	62,922	111,566	I. 48,644
Salt.....	71,259	61,716	D. 9,543

Exports of metals included 11,888 tons pig iron, against 2,053 for the first quarter in 1901; 1,222 tons copper, against 2,554 tons; 605 tons spelter, against 591 tons; 34,719 tons lead, against 29,195 tons last year.

A NOTE ON CUPELS.

By T. LANE CARTER.

A large assortment of cupels, supplied by a comparatively unknown firm, were sent to several of the leading gold mines some weeks ago. To outward appearance the cupels were perfect, large (No. 9), fine-grained, and smooth. All the assayers took it for granted that these cupels were all that was claimed for them, and used them in their work in place of the recognized standard cupels. It was soon noticed that the assay values fell a good deal, causing considerable misgivings.

At the end of a monthly clean-up one of the mines got a plus extraction from the ore. Naturally, the assayer's work was questioned, but when the manager of this mine took some samples to a neighboring mine to be assayed he found them complaining of abnormally low results also. The trouble was eventually proved by our assayer, who made a number of tests with the new brand of cupels for the porosity. At first proof gold was used, with lead foil, and a loss as high as 10 per cent was noted. This lot of cupels, containing the absorbed gold, was then crushed, run down in the pot furnace with litharge, and the gold contents recovered. The bead of gold thus obtained, added to the other, equaled the gold originally taken very nearly, thus proving beyond doubt that the loss was due to absorption, and not to volatilization or spitting. Then tests were made with silver and gold mixed, and, although, the loss was not the same as in the other case, it was considerable. Unfortunately the loss by absorption was not a constant one, and no uniform difference could be relied upon. The use of such cupels for mine samples is not so bad, but it is impossible to use them for assaying samples from the reduction works, where great accuracy is required. Had it been necessary to find the silver contents, as well as the gold, these cupels would have proved worse than ever, especially if the silver contents was high.

After this discovery all the new brand of cupels were discarded and the celebrated "Delune cupels" of France, so long recognized on the Rand as the best, were again employed.

From this experience I should advise assayers to test the porosity of their cupels by finding out the absorption of silver and gold from the cupellation of a known weight of proof silver and gold run down with lead foil. Possibly the test will show them why their assays will not agree when a new style of cupel is used in spite of the greatest care, and why assays are persistently low in spite of all efforts to get normal results.

INCANDESCENT LAMP FILAMENTS.—The *London Engineer* says that composite filaments for incandescent electric lamps are made by Mr. F. de Mare, of Brussels, on somewhat the following lines. He first prepares a core of magnesia, tar, and carbon. Through this filament a current is passed while it is exposed to the air. The consequence is that all the carbon is burnt off, leaving a hard surface of magnesia. The next process is to flash this filament in a hydrocarbon vapor, which results in the deposition of a layer of carbon on the outside of the magnesia. This is said to furnish an exceedingly strong filament, and one which gives a good efficiency.

GOLD IN MADAGASCAR.—News recently received from Madagascar is that placers, said to be very rich in gold, are being worked on the eastern slopes and near the port of Manangary. The gold is in the form of small nuggets, or of dust, taken from the alluvial deposit carried down by two streams from a neighboring mountain. The washing of the gravel is done in a large wooden dish, in which the auriferous earth is placed—a very primitive method, but for the present sufficiently remunerative. The work is mostly done by the natives under direction of Europeans, as they alone can stand the rays of a tropical sun. Already two prospectors have discovered blocks of quartz.

*From *London Engineering*. March 21, 1902.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALY REPORTED.

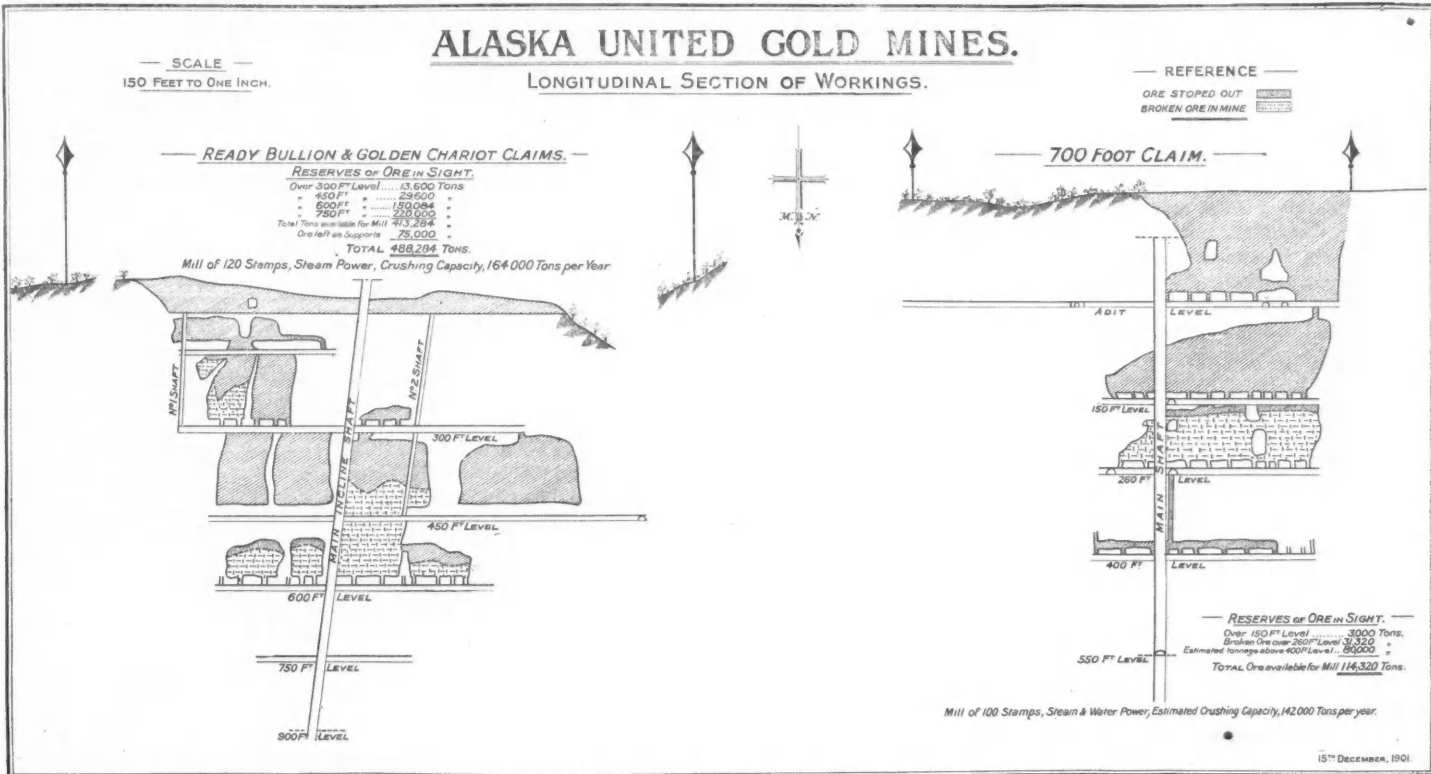
NEGLIGENCE OF USING REASONABLE CARE TO KEEP ENTRIES SAFE.—Where the general manager of a coal mine fails to do that which he knows to be necessary to support the roof of an entry in the mine, a jury will be justified in finding that the company failed to use reasonable care and diligence to keep the entries of its mines safe for the use of its employees.—Coal Valley Mining Company vs. Haywood (98 Appellate Court Reporter, 258); Appellate Court of Illinois.

WHEN RECEIVER WILL NOT BE APPOINTED FOR MINING COMPANY.—In a suit for a dissolution of a mining corporation and the distribution of its assets the amount involved for jurisdictional purpose in the Circuit Court of the United States is the value

of frauds (time being of the essence of the agreement relating to such properties). Where the written memorandum and the oral agreement for the sale of property for mining purposes and the terms are changed by the oral agreement of the parties, the whole thus becomes an oral contract. Where an option, not assignable in terms, to purchase mining property, is given to one who represents himself to be the agent of and acting for a party known to the owner, and to whom he desires to sell, such option is not assignable. Where an owner gives an option to purchase his mines, he may withdraw such option at any time before its acceptance. And, although the person to whom an offer is made may have intended, and even attempted, to accept, still if the acceptance was for any reason imperfect, and not binding, so that no contract was concluded, the power of withdrawal remained unaffected.—Snow v.

broken stems replaced. The average duty was 4.31 tons per stamp per day.

On the 700-foot Claim the total development work was 1,708 feet; this included the sinking of the main shaft 232 feet, the rest of the work being principally in drifts and cross-cuts. The output of ore was 89,840 tons, of which 70 per cent came from the 400-foot level. The average assay of all the ore taken from the mine was \$2.21. The ore blocked out at the close of the year was 114,320 tons. The 100-stamp mill crushed during the year 89,450 tons of ore, making an average of 4.41 tons per stamp per day. The supplies required were 140 shoes, 135 dies and 24 stems. The mill ran only 202 days 18 hours, water-power being used 98 days and 20 hours, and steam-power the balance of the time. This mill was closed down for the greater part of the time from August 15 to the close of the year, the mine not



of the property to be administered; but in the absence of statutory provisions a court of equity has no jurisdiction to decree the dissolution of a corporation and the distribution of its assets among its stockholders at the suit of a minority of such stockholders; and a court of equity will not appoint a receiver for such a corporation at suit of a minority of the stockholders merely because they are not satisfied with the management, nor because of alleged fraud or misconduct of the directors, nor on any ground unless in case of pressing necessity, and where a clear right is shown.—Taylor v. Decatur Mineral & Land Company. (112 Federal Reporter, 449); United States Circuit Court. (Alabama.)

REFUSAL TO PAY INSTALLMENT DUE ENTITLES REVISION OF CONTRACT.—Where a party, after contracting for the purchase of 300 tons of iron, and agreeing to pay "on receipt of each 100 tons," refused to remit on the delivery of 100 tons until they received more ore, as evidence that the contract would be fulfilled by the seller, the latter was relieved from further deliveries; and the buyer could not recoup, in an action for that already delivered for such failure, they having insisted on new terms differing from the original contract.—Leonard v. Johnson Forge Company (50 Atlantic Reporter, 541); Superior Court of Delaware.

CONSTRUCTION OF CONTRACT FOR SALE OF MINE.—Where the written memorandum of an oral contract for the sale of mining property is not certain as to the time when the first payment is to be made, it is insufficient to take the contract out of the statute

Nelson (113 Federal Reporter, 353); United States Circuit Court, District of Nevada.

ABSTRACTS OF OFFICIAL REPORTS.

Alaska United Gold Mining Company.

This company owns two extensive claims, known as the Ready Bullion and the 700-Foot claims on Douglas Island, Alaska, adjoining the properties of the Alaska Treadwell and the Alaska Mexican companies. The mines are comparatively new, operations having been begun in 1899. The capital stock is \$1,000,000, in shares of \$5 each, of which 19,800 shares are still in the treasury.

The report for the year ending December 15, 1901, shows that on the Ready Bullion Mine the total development work done during the year was 2,535 feet, mainly upon the lower levels. This work has shown generally that the ore body continues in value. The ore blocked out at the close of the year was 413,284 tons; in addition there are about 75,000 tons of ore in pillars left as supports around the shaft, between the 300 and the 750 foot levels. A map given in the report, which is reproduced herewith, shows the condition of both this mine and the 700-foot Claim. At the close of the year the ore taken out and sent to mill during the year was 171,642 tons, about 90 per cent of which was obtained below the 450-foot level. The average assay value of a large number of samples was \$2.01 per ton. The mill of 120 stamps ran 330 days during the year, losing only a short time, principally on account of the failure of the coal supply. The new supplies required for the mill during the year were 390 shoes, 385 dies and 248

being sufficiently developed to keep the mill running on ore.

The statement of earnings and expenses is given in the table below:

	Ready Bullion.	700-foot Mine.	
	Amount.	Per ton.	Amount. Per ton.
Gold from mill.....	\$223,475	\$1.3096	\$90,385 \$1.0105
Gold from sulphurets..	107,949	0.6326	43,375 0.4849
Total	\$331,424	\$1.9422	\$123,766 \$1.4954
Mining	\$201,159	\$1.1788	\$109,853 \$1.2281
Milling	71,164	0.4171	33,094 0.3700
Sulphuret expenses...	26,806	0.1571	12,953 0.1448
Gen. expenses at mine.	4,431	0.0260	3,693 0.0413
San Francisco office...	1,516	0.0089	1,263 0.0141
London office.....	292	0.0017	243 0.0027
Consulting engineer....	495	0.0029	413 0.0046
Legal expenses.....	19	0.0001	16 0.0002
Bullion charges.....	2,205	0.0129	839 0.0094
Construction	8,861	0.0519	14,190 0.1586
Total	\$316,948	\$1.8574	\$176,557 \$1.9738
Net or deficit.....	\$14,476	\$0.0848 D.	\$42,797 \$0.4785

The profit and loss account shows receipts of bullion as per statement above, \$465,184. Charges were: Operating costs, as above, \$493,505; interest, \$4,914; coal shortage, \$6,230; total, \$504,649, showing a loss of \$39,465 for the year.

A barge loaded with sulphurets from the Douglas Island mines was wrecked in April, this company's proportion of the loss having been \$7,019.

Nine accidents occurred during the year, eight of them at the 700 Mine, and one at the Ready Bullion Mine. Eighth of the accidents proved fatal. At the 700 Mine five men were killed by an explosion of powder, one was killed by falling rock and one by falling down the shaft. In regard to the above accident at the 700-foot Claim, four men were killed outright by an explosion of powder on October 6, the accident being caused by a miner attempting to open a box of powder with his pick. The other three

accidents were caused by carelessness of the injured parties. At the Ready Bullion Mine, one man was killed by being run over by the mill cars. The accident occurred at 3 a. m., when the party should have been underground at work.

Centennial Mining Company, Michigan.

The report of this company covers the year ending December 31, 1901. The receipts were as follows: Cash on hand, January 1, \$179,734; sales of copper, \$118,959; rents, interest, etc., \$13,031; assessment collected, \$212,415; total, \$524,139. The payments reported are: Mining, \$163,015; surface, milling and general expenses, \$93,619; construction and equipment, \$38,096; fuel and supplies, \$19,211; miscellaneous, \$30,554; total, \$344,495, leaving a balance of \$179,644 on hand at the close of the year.

The development work for the year included 769 feet sunk on shaft A; 616 feet on shaft B; and 2,478 feet drifting and cross-cutting. Shaft A has reached the 17th level, or a depth of about 1,800 feet from the surface. B shaft has been raised 616 feet during the year, and extends practically from the 12th level to within 150 feet of surface. Including the drifting done the past year, there has been opened by levels a total of 7,899 feet on the Kearsarge lode. A small amount of stoping has been done, but there is in reserve over 50,000 cubic fathoms of ground available for this purpose, the larger portion of which it would pay to treat in a modern stamp mill. As the sinking of shaft A has progressed, a perceptible improvement has been noticed from time to time in the character of the lode, according to the superintendent.

The report of President H. F. Fay says: "We have made during the year the necessary investigation for foundations of the new stamp mill at Torch Lake, using a diamond drill to ascertain the position of the bed-rock. The knowledge thus obtained, showing that the foundations would have to be placed on piles, necessitated some alterations in the plans, which have now been completed, and, as adapted to the new conditions, are ready at any time it is thought desirable to begin the erection of the mill. We have delayed its actual construction, as this seemed wise in view of the changes which have occurred in the general situation during the past year. Plans for additional railroad facilities, which had long been under consideration, have but recently taken definite shape. The possibility, also, of securing some other modern mill by rental or purchase, at advantageous terms, has had an important bearing on the question, and warranted, in our opinion, even a further postponement of the outlay which a new mill at this time would involve. Repairs of our mill were so frequent during the past year that it was decided in January of this year that the head must be put upon a new foundation if it was to be continued in use. The directors, therefore, voted to take advantage of the unsettled condition of the copper market, and the installation of our new Nordberg hoist, to stop all operations at the mill.

"As shown by the superintendent's report, the opening work is less than last year, due to the fact that in the 40-acre tract carrying the outcrop and in the narrow neck connecting the main body of the land therewith the drifts both north and south have all been very short. Since the shaft passed the boundary, however, the drifts are growing slowly but steadily longer, and at the 25th level, which we hope to reach by the end of the year, we shall be 1,500 feet down into the mile square of the Old Centennial property, giving a total length of over 2,500 feet on the course of the lode.

"Under the present policy the expenses of the mine are largely reduced. By the installation of the new hoist, construction and equipment account for shaft A will be practically closed. We shall also effect a material saving in discontinuing operations at the old mill during the present unsettled condition of the copper market and devoting our attention, according to our present plan, to sinking the shaft and opening the mine."

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.

Report on Taxation and Draft of Proposed Assessment Act for the Province of British Columbia. By John B. McKilligan. Victoria, B. C.; Public Printer. Pages, 84.

Memoirs of the Geological Survey of India. Volume XXXIII, Part 2. The Gold-fields of Wainad. By H. H. Hayden and F. H. Hatch. Calcutta, India; printed for the Survey. Pages, 72; illustrated.

On the Sensitiveness of the Coherer. Bulletin No. 51, University of Wisconsin. By Edson Ray Wolcott. Madison, Wis.; published by the University. Pages, 20.

Handbook of Technical Analysis. By Dr. Clemens Winkler. Second English Edition, with additions by Dr. George Lunge. London, England; Gurney & Jackson. Pages, 190; illustrated.

BOOKS REVIEWED.

Wonderland, 1902. By Olin D. Wheeler. St. Paul, Minn.; published for the Northern Pacific Railway Company by Charles E. Fee, General Passenger Agent. Pages, 100; illustrated.

This handsome little book describes that part of the Northwest which is tributary to the Northern Pacific Railway. The leading chapter tells the story of mining in Montana, from the early sixties to the present time; there are also chapters on the Northern Cheyenne Indians, the Yellowstone Park, and the Puget Sound country. Several hundred beautiful pictures are artistically arranged in the text. The section on the mines of Montana is very well written, and is an interesting historical sketch.

Traité de Cinématique Théorique. By Prof. H. Sicard. With Notes, by Prof. A. Labrousse. Paris, France; Gauthier-Villars. Pages, 188; with diagrams.

The name of Kinematics was given to the "geometry of motion, considered in its relations to time," by the famous mathematician, Ampere, in an essay published in 1834. It was not, however, definitely acknowledged as a distinct branch of science until the publication of the special treatise of Resal in 1862. The present work is intended to state the principles of Kinematics as briefly and clearly as possible. After a brief general introduction it is divided into five parts, which treat, respectively, of the simple movement of a point, of acceleration, of the geometric study of the motion of a solid, of the analytical study of the motion of a solid, and of the composition of the motions of a solid. The notes, by Prof. Labrousse, treat of the theories of Schönemann and Mannheim, and of the formulas of Olinde-Rodriguez, and of some applications of the principles of the science. The book is severely mathematical, and to read it presupposes knowledge of geometry, calculus and the higher algebra. To students of the higher mathematics it presents a concise statement of fundamental principles and their applications.

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 Fire Assay of Lead. A Combination Method.

SIR:—In the natural striving for improvement on current methods of fire-lead assaying, the following modification has been worked out during the past few months in the course of control work on ores and other products from Northern Idaho. As a rule,

the range in their lead contents, which are in the form of galena, is between 40 and 60 per cent, though the slimes occasionally fall below the former and the highest grade concentrates rise above the latter percentage. Occasional wide variations in the assays led to tests on the slags obtained by the old method, and often the presence of an appreciable quantity of lead was detected. While these variations seemed to be greatest when there had been a failure to collect the shots that may have resulted from the removal of the nails used in the assay, there was also a residue that appeared never to have been reduced, or, if reduced, remained in too minute a state of subdivision throughout the slag to be collected by a fine sieve after powdering. To better the assay seemed then to be both a problem of restoring the reducing conditions in the crucible during its progress and of avoiding the dispersion of shots through the slag at the end of the operation. With the former object in mind, argols and flour not having been found satisfactory, partly perhaps because the organic matter of which they consist does not mix with the charge when thus added, but burns away in bulk, I tried the addition of potassium cyanide. The results were gratifying, both in the greater uniformity and in the higher percentage of lead obtained. In the first place the KCy melts and rapidly diffuses through the assay, accomplishing the object of the restoration of maximum reducing conditions. This is not all, however. A reaction occurs with the alkaline carbonates of the fluxes present, liberating carbonic acid gas, by which the contents of the crucible are kept in motion and all parts of the fused charge are successively and repeatedly brought into contact with the molten lead that has already been reduced, thus more completely collecting the last portions. As might have been anticipated, too, the use of KCy minimizes the dispersion of shots through the slag before pouring by lessening the number of nails required, although it seems not wholly to do away with the need of them. One nail seems to give the best results. More might be necessary with ores carrying more sulphur.

The operation is carried out as follows: About 5 minutes after complete fusion of the charge of ore and fluxes, prepared as usual by the assayer according to his preferences, the cyanide is added, the manner of doing so depending on the form in which it is available. If in lump form, a piece of about 10 grams is dropped into the crucible from a pair of tongs held above it. If in a fine state of division, either a salt spoon is used in place of the tongs, or the crucible is quickly removed from the muffle, a rounded teaspoonful of the cyanide added and the crucible replaced. Care is to be exercised during the time of adding the cyanide to avoid so high a heat that the charge will run over as a result of the evolution of carbonic acid gas. If, therefor, a suitable heat is maintained for about 15 minutes, the crucible will be ready to pour. If poured in much shorter time, the galena will not all have been decomposed, as will appear by small accumulations on the inside of the crucible, which are to be seen just after pouring.

While universal applicability of this combination method has not been demonstrated, its suitability has been abundantly proven for the ores referred to and for enough miscellaneous ores to satisfy me of a considerable range of usefulness for it. As a rule, the KCy seems to increase the fusibility of the charge; but in one or two cases, on low-grade slimes a tendency was noted to the formation of difficultly fusible masses. The remedy in such cases lies in a variation of the original fluxes or in a higher heat. It may be desirable also with ores of varying character to vary the conditions of adding the cyanide.

The lead buttons are soft and malleable, and have not been found to contain more impurities than those obtained by current methods of fire assay, it being especially noteworthy, contrary to what might be supposed on account of the strong reducing power of KCy, that the amount of iron in the buttons is inconsiderable.

Following are characteristic comparative results,

showing among other things how closely duplicate assays generally agree:

Without KCy.	With KCy.	Wet Assay (Molybdate Method.)
44.6	45.5	45.56
49.9	50.4	50.40
55.6	56.2	56.32
57.4	55.62 and 55.51	55.87 and 55.68
56.5	58.27 and 58.0	
56.0	57.56 and 57.45	
60.4	56.44 and 56.76	
52.9	60.85 and 60.92	
49.2	53.57 and 53.55	
45.5	50.23 and 50.19	
46.6	45.9 and 45.88	
45.8	47.2 and 47.22	
48.2	46.53 and 46.32	
45.3	49.04 and 48.98	
45.7	46.12 and 45.95	
	46.18 and 46.27	

The work done in the elaboration of the method leads to the opinion that the failure of current methods of fire assay on ores of this character to check the wet assay is due to not reducing and collecting the last portions of the lead in the charge, rather than to the supposed volatility of lead under the conditions of the fire test.

Obviously in gold and silver assaying, either by the scorification or the crucible method, small quantities of potassium cyanide may be made use of for cleaning the slag where for any reason that is desirable.

OSCAR J. FROST.

Denver, Colo., May 10, 1902.

A Trip to Thunder Mountain.

SIR:—After various vicissitudes and many adventures the writer arrived at the far-famed Thunder Mountain, in Idaho, on April 29, being the first to reach that camp this spring by pack animal.

We went in by Red Rock, Salmon route, leaving Red Rock April 15. We found the roads fair and the service good, but because of the snow on the Continental Divide it took us two days to reach Salmon, 68 miles distant.

We had no difficulty outfitting in Salmon, but did have trouble in getting any one to take us farther, because of the deep snow on the mountain between Salmon and Leesburg, a distance of 14 miles. We finally got a private conveyance, and while other people waited we shoveled on, and by dint of hard work got our animals through the soft snow. From Leesburg to Forney, 29 miles, it is a good road and down-grade most of the way.

At Forney the stage route ends, and one must take a pack animal from there to Thunder Mountain, 80 miles distant. From Forney to Liberty Pole, 24 miles, made a good day's trip; the trail passes through a good grazing country at Three Forks, 6 miles before you reach Liberty Pole.

At Liberty Pole we found outfits which had been waiting for six weeks to get across the snow in Wood Tick Gulch, just beyond.

On April 23 the first pack train got across Wood Tick, and we followed close upon their heels. Twelve miles from Liberty Pole brought us to good grazing ground, on Cache Creek, and from there on up Middle Fork of Salmon River to Marble Creek, 20 miles, was a good trail and good grass for the horses.

Marble Creek was simply awful; the trail crosses and recrosses the creek ninety-one times in 20 miles, and as we waded every foot of the way in the icy water we were well chilled when we reached the snow at the head of the creek, which we did on April 28.

The next day, however, we rode our horses up to Holcombe's cabin, which lies at the base of Thunder Mountain. We found 2 feet of snow here, and after a terribly steep climb of three miles through the snow we reached the summit, only to find the snow still stretching away on every hand; four feet on the level and eight feet deep where it had drifted.

We were thus unable to see any of the rock, except where test pits had been sunk, or where the Dewey operations had been conducted. We found the Dewey Mine to be a tunnel in the side of a little butte or cone of porphyry. The tunnel is perhaps 150 feet below the summit of the cone and has been driven about the same distance into the butte.

At the surface the porphyry is soft or oxidized, and carries free gold, but at a short distance under

the surface the rock becomes harder, the gold loses its free character, and when found at all is more or less base. We made tests ourselves from samples taken from within the tunnel, some pieces coming from the working breast. We also made tests of rock taken from various pits, and in but few could we get a showing of gold.

There is any amount of this porphyry, and if it was all gold-bearing it would be a tremendous thing, but unless new discoveries are made in the future it is a doubtful investment.

We were told that the mill was shut down because of shortage of men and of food. We found ten men boarding at the company cook camp, and only four of them at work, and they were in the mine "up-raising," in the endeavor to find some more of the good oxidized ore. It only takes three men to run a ro-stamp mill; why not put some of the idle men to work?

As to the formation; it is a flow of porphyry, covering the trachyte, andesite and basalt beneath. Probably when deposited it was hundreds of feet thicker and carried small quantities of gold. Gen-

claims lie within the belt embraced by the Dewey end lines when extended? If this is so, the company owns most of the porphyry.

S. H. BROCKUNIER.

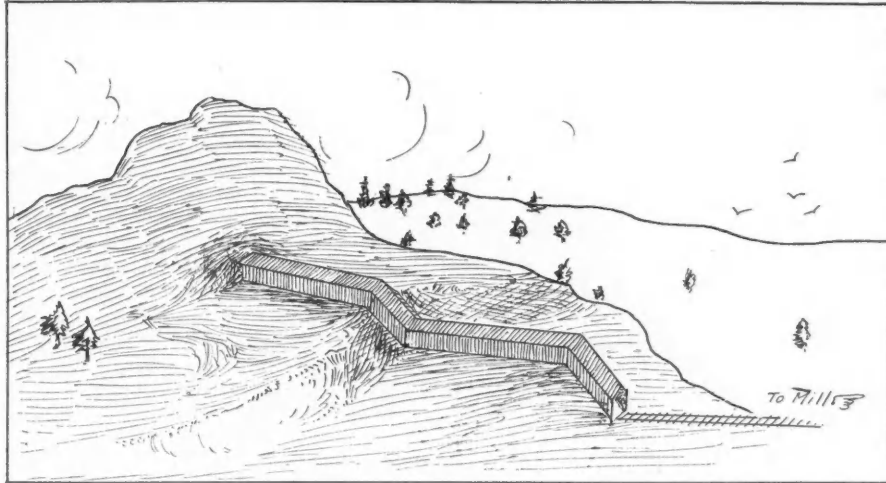
Mackay, Idaho, May 4, 1902.

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. Preference will, of course, always be given to questions submitted by subscribers.)

Nitrate of Soda.—What is the average per cent of NaNO₃ found in crude nitrate of sodium, called caliche in Chili? What is the lowest per cent they can lixiviate and crystalize at a profit?—C. A.

Answer.—The percentage of nitrate of soda found in the caliche of the Chilean nitrate beds varies from 20 to 80 per cent. Accompanying this there are found in the caliche from 10 to 25 per cent sodium



COVERED ENTRANCE TO TUNNEL, DEWEY MINE, THUNDER MOUNTAIN.

erations of weathering has worn away much of the deposit and concentrated the gold on and in the soft oxidized surface of the remaining porphyry.

I do not see how the gold can be found to any great depth, and if the deposits are shallow then the whole thing is a big failure, because no one pretends that it is a high-grade proposition, and if it is low grade there ought to be an immense body of uniform ore in order to make the treatment pay.

We were informed that there was plenty of food to last the force until supplies got in; all they were short on was sugar and tobacco.

Freight costs 25 cents per pound delivered from railroad to mine, and a railroad would be too costly to build. Good wagon roads could be built, but traffic on them would be closed during the winter months.

Unless new discoveries are made, which is highly improbable in the formation of that section, it is reasonable to predict an early death to the boom.

Of course we will hear of rich assays, but if one is submitted the question should be asked, from what depth it came, and if the answer be honest it will be less than 10 feet.

I would advise possible purchasers to have competent engineers or miners examine every claim offered them, and to insist the samples be taken from at least a 30-foot shaft. If the owner of the claim has confidence in his property he will not object to this, as it will not be difficult or costly to sink to that depth. If he has no confidence in his property, neither should the buyer have. Do not allow surface samples to mislead you; throw them out altogether.

Claims have been staked and restaked for 15 miles, but there is plenty of this porphyry left, or was at the time of my visit, for those who want it.

The Dewey group occupies the cone or apex, and the vein is a blanket formation. Do they not own the ore as far as it extends over other claims, if such

chloride, generally about 10 per cent silica, with small percentages of nitrate of potash, sodium sulphate, sulphate of potash and lime, sulphate of magnesia and iodates of potash, iron and alumina. The Chilean operators consider a claim or bed good when it carries from 40 to 45 per cent of nitrate. Below 40 per cent it is considered inferior, and we believe that it is not usual to work beds which contain less than 30 per cent.

Enameled Iron Vessels for Chemical Use.—In your issue of May 10 you refer to enameled iron vessels for chemical works. Can you give me the address of any manufacturer of such ware which is strictly acid-proof?—H. E. M.

Answer.—Enameled iron vessels of all sizes and shapes are made by several firms. Among the principal manufacturers are the Lalance & Grosjean Manufacturing Company, 19 Cliff street, New York, and the Ironclad Manufacturing Company, 2 Cliff street, New York.

Machinery in the Lake Superior Copper Mines.—Can you give me some references on the hoisting and stamp-mill machinery used in the copper mines of the Lake Superior region?—M. F. C.

Answer.—There is nothing special in the hoisting machinery used in the copper mines of the Lake Superior region. As many of the mines are very deep, large hoisting engines with the latest improvements are required. An application to the Allis-Chalmers Company, the Nordberg Company, of Milwaukee, or any other manufacturer of large hoisting machinery will procure you a catalogue showing engines of this class, including some that are used in the large copper mines. For stamping the rock from these mines the steam stamp is universally used. These stamps are constructed somewhat on

the same principle as the steam hammer, and have very large crushing capacity, which is required by the great quantity of rock which has to be pulverized. Some of the firms mentioned above can furnish you with catalogues showing the construction of these steam stamps.

Bonus for Discovery of Tin and Platinum.—Will you kindly tell me in the columns of your journal whether there is a bonus offered by any State or the general Government for the discovery of any commercially paying tin or platinum lode within the United States.—W. G. K.

Answer.—There is no bonus offered by any State Government nor by the Federal Government for the discovery of tin or platinum lodes in the United States. We are aware that there is a common belief in the offer of such a bonus, but it has no foundation in fact.

Bessemer Iron Ores.—Please inform me through your JOURNAL, what constitutes a bessemer iron ore, how high in metallic iron and how low in phosphorus and sulphur must it be. I would also like to know if from 2 to 3 per cent titanitic acid present in the ore would put it out of the bessemer class. Also, if magnetic ores can be bessemer ores.—F. X. P.

Answer.—There is no precise limit as to the percentage of iron which a bessemer ore should carry. The sulphur must be low, and also the phosphorus. The usual limitation is that phosphorus must not exceed 0.045 per cent in an ore carrying 60 per cent iron. If the iron content is less, the phosphorus must, of course, be less in proportion. The presence of titanitic acid would be a very strong objection, and no ore carrying any proportion of that substance could be considered a bessemer ore.

Magnetic ores can be bessemer ores if they fill the requirements as to phosphorus, etc. The Republic and the Champion mines in Michigan have produced large quantities of magnetic ores which were classed as high-grade bessemer ores.

CENTRIFUGAL PUMPS.—Ventilating fans and centrifugal pumps have exactly the same properties, the only difference being in the density of the fluid which passes through them, observes Professor Rateau in a paper abstracted in the London *Colliery Guardian*. Until lately centrifugal fans only afforded pressures or depressions greater than 50 centimeters of water, and those of 60 centimeters were exceptional; but by coupling a well-designed fan with a steam turbine it is possible to obtain 10 times that result with a single wheel and as much as may be desired with several. But a short time ago centrifugal pumps were not expected to lift to a greater height than 12 to 15 meters, but recently some makers have succeeded in obtaining far greater heights, either with a single revolving portion or by means of two or more arranged in series. Indeed, the difficulty is not to obtain great heights, but to obtain them with a good mechanical yield, that is, with a minimum of loss in the appliance itself; and in this case also the steam turbine, while affording means for transmitting great power by a shaft revolving very rapidly, renders easy the raising of water to heights of 200 to 300 meters, and even more, with a single wheel of good mechanical yield. The great progress made in electrical science during the last few years lends much interest to rotary appliances that receive their motion directly from electromotors; and it is thus that electric centrifugal pumps, hitherto used only for slight heights, may now be employed for considerable lifts that would appear to be reserved for piston pumps, as, for instance, in taking off the water of mines from depths of several hundred meters. Electromotors, however, do not generally revolve at sufficiently high speed for such great pressures to be obtained with a single revolving portion, so that it becomes necessary to arrange the latter in series on the same shaft.

FACTS ABOUT CARBONS FOR DIAMOND DRILLS

In prospecting for mineral deposits no other implement is found so useful as the diamond prospecting drill. After its thorough use for test borings, the prospector knows fairly well what results he may expect before he commences his regular milling operations. The diamond drill has led to the discovery of ore deposits at great depths which would never have been reached nor developed had not this modern machine promised returns for the trouble and outlay in reaching it by regular mining.

The main work of the drill is done by a steel bit, hollow in the center, and pointed at the ends with carbons or black diamonds. These carbons have in combination a hardness and toughness such as no other material possesses. Their principal merit as compared with the white diamond lies in the fact that they are without crystalline form and have no such cleavage as the white diamond. The black diamond of good quality will cut a core of whatever material may be encountered, and give the driller an exact record of the different strata penetrated.

Although white diamonds have been found pretty nearly all over the world, these carbons, or black diamonds, are found only in Brazil, where they are gathered in a very primitive way. There are no regular mines, carbons being mostly found in the river beds by the natives, who are not any too industrious. After having made a good find and sold his crop to the agents who travel from one place to the other, ready to buy for cash anything that is offered in the way of carbons, the miner takes a rest and does not start operations again until the dwindling away of his money forces him to resume work. The agents represent dealers in Bahia.

After these purchasing agents have bought what is offered, or rather when their ready cash is exhausted, they return to Bahia, deliver their purchases and start again on another trip. Of these employers or exporters there are not over half a dozen who have sufficient capital to do a large business and to supply the ready money to the agents. The purchasing agents have to buy the goods as they are found, whether they are, of good quality or bad, and the exporter naturally tries to dispose of them as they run, or if he cannot do that, will charge a higher price for the stones of good quality, and sell the inferior goods at a reduced price to dealers who will buy them because they are cheap. These dealers in turn endeavor by coloring and filling to put them in a saleable condition and dispose of them to consumers at a large profit, although underselling dealers who pay considerably higher prices to secure only first class goods. Carbons are very expensive articles, and a consumer is liable to incur great loss by getting a lot of poor stuff. By putting a few inferior stones in a lot of fairly good stones the price of the lot may be reduced by several dollars a carat. Doctored carbons have been made to look so fine that an expert might pass them as first class stones when in reality there was not a genuine carbon among them.

As an example of how even a good judge may be deceived, it may be mentioned that a purchaser who had been buying carbons for years was shown by a dealer a paper containing what appeared to be a lot of first class stones. The buyer became indignant when he was told that as a matter of fact there was not a single genuine carbon in the package, but that all were spurious or imitation stones. So cleverly had they been doctored that it required tests to convince him that he could be so deceived. When inferior stones are put in the drill they go to pieces and time, labor, and money are lost.

Price is, as a rule, a fair indication of the quality of any staple article. The finest grade carbons cost about \$42 per carat, and cannot be bought for less without finding inferior stones among them. Lots of carbons will at times be offered at prices ranging from \$30 to \$40, but this alone should cause the purchaser to look upon them with suspicion, because it does not allow living profit to the importers of genuine stones. As it is difficult for anybody, no matter

how much of an expert he considers himself to be, to judge the quality, or tell a colored from a natural stone (since the coloring process has been developed nearly to perfection), it is advisable to deal only with houses of established reputation, who for self-protection will be obliged to take care of their customers' interests. In all cases where deception is practiced the user is the sufferer.

ACTION OF SEA-WATER ON CEMENT.

London *Engineering* summarizes an important paper on the destruction of Portland cement by sea-water which was contributed by M. Le Chatelier to the proceedings of the congress on the testing of materials of construction which recently met at Budapest. M. Le Chatelier has shown that compounds of aluminum are the constituents of cement most subject to attack by sea-water. The decomposition arises from the action of calcium sulphate on the calcium aluminate of the cement, and the calcium sulphate in itself produced by a reaction between the lime of the mortar and the magnesium sulphate dissolved in the sea-water. The reaction between the sulphate and the aluminates of calcium results in the production of a sulpho-aluminate of lime, which swells considerably; and thus disintegrates the mortar. The disintegration thus arising is the greater, the greater the quantity of alumina in the cement. Thus, with cements containing only 1 to 2 per cent of alumina, it is very slight and often undetectable; whilst with 7 per cent or 8 per cent alumina, the swelling is marked, and the mass is rapidly destroyed. With a view to producing a mortar more stable in sea-water, M. Le Chatelier has investigated the effect of replacing the alumina by other oxides not reacting with calcium sulphate. The substitutes tried have included oxides of iron, cobalt, chromium and magnesium. The cements were prepared by bringing up the mixed ingredients to a temperature of incipient fusion, and then grinding the clinker thus produced. The cements on grinding were gauged with water, and the test-pieces on moulding were allowed to harden under water. The stability of these cements in the presence of Ca_2SO_4 was much superior to that of cements containing Al_2O_3 , the best results being got when Fe_2O_3 was the substitute used. Such a cement, having a composition equivalent to 5 SiO_2 , F_2O_3 , 17 CaO , was found to be not only very stable chemically, but to have at the same time excellent mechanical properties. M. le Chatelier has further observed that cement having but small percentages of lime are less attacked than those with more lime, and an equal percentage of Al_2O_3 , and that additions of puzolana do much to mitigate the chemical action of the sea-water. The resistance of cements to the sea is, however, not altogether a matter of chemical composition, but is dependent also upon the physical characteristics of the concrete: a dense close-grained concrete resisting much better than many porous ones, of better composition from a chemical point of view.

ACCIDENTS IN THE CHEMICAL INDUSTRY.

—In an elaborate paper published recently in *die Chemische Industrie*, Mr. B. Astor states that since 1887 there has been an increase in the percentage of workmen injured in the different branches of the chemical industry. Moreover, the percentage of injured workmen who had to be compensated also increased, so that altogether, with the exception of the explosives industry, the proportion increased from 27 to 42 per cent in 1900. The reason that there is less danger in the explosives industry is the special precaution taken and enhanced knowledge of the substances used in manufacturing. It would seem, in fact, that in the manufacture of explosives is considerably less danger now than making artificial manures or mineral waters, and there is no more danger now than in the manufacture of alkali and acids, or the coal tar industry.

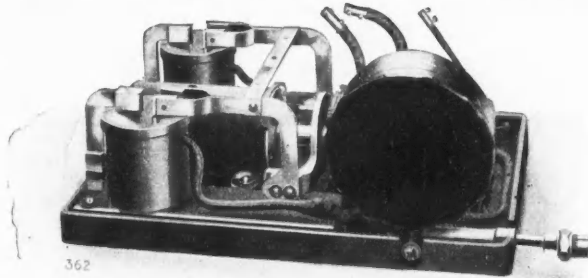
ELECTRICALLY OPERATED AIR COMPRESSORS.

To meet the constantly increasing demand for an electrically driven, simple, compact air compressing unit, the Christensen Engineering Company, Mil-

steel crank shaft. The compressor is a modification of the type H; the water jacketing feature being added to make it suitable for continuous service.

For portable service the Christensen Company

More detailed information regarding these types of compressors may be obtained by sending a request to the Christensen Engineering Company, Milwaukee, for a copy of its catalogue No. 13.



AUTOMATIC GOVERNOR FOR TYPE M COMPRESSOR.

waukee, is manufacturing a complete line of motor-driven compressors ranging in capacity from 7½ to 1,000 cubic feet of free air per minute. The smaller sizes are made for portable as well as stationary service. The type M motor-driven air compressor illustrated herewith, is for stationary continuous service. It is built in capacities from 50 to 1,000 cubic feet of free air per minute.

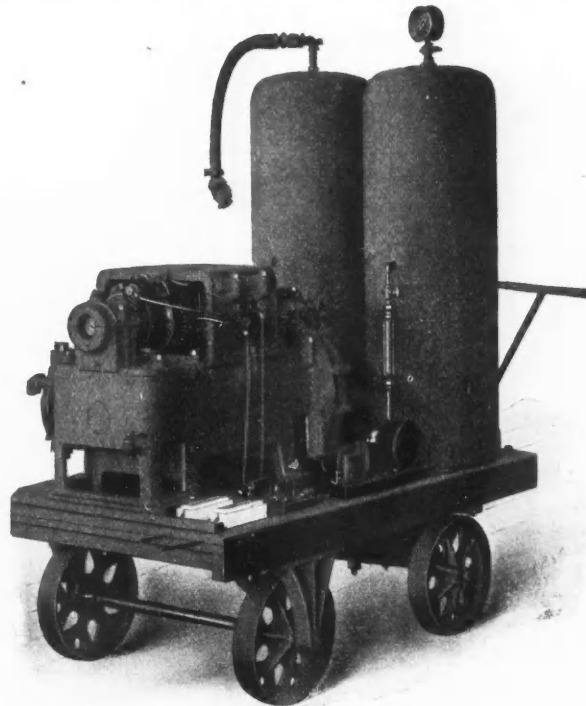
The electric motor and the compressor have been designed to form a compact self contained unit. The air is compressed in the cylinder, shown on the left, by a double acting piston which is operated by means of a connecting rod and steel crank shaft. Both the cylinder and the valve heads are water jacketed throughout. The clearance spaces have been reduced to the lowest practicable limit, thereby correspondingly increasing the economy.

Either an alternating or a continuous current motor may be used. The illustrations herewith show the continuous current multipolar type that the Christensen Company build for this service. The lower frame of the motor is of cast iron, and the field is composed of low carbon cast steel with detachable steel pole pieces.

The design of the motor and compressor is such that every part is easily and quickly accessible. By unscrewing a few bolts the armature and the field coils can be removed or exchanged. The gear, pinion valves or cylinder heads may also be removed without disturbing any other parts. An automatic governor starts and stops the motor compressor at the desired minimum and maximum pressures. All the working parts are easily accessible for inspection and the governor is protected by a cover not shown in the illustration.

A smaller compressor for stationary continuous service is built in capacities from 4 to 35 cubic feet of free air per minute. These are known as type

mount their type H compressor with the automatic governor and air reservoir, on a suitable hand truck which can be easily and quickly moved wherever necessary. This portable outfit, known as type I,



CHRISTENSEN TYPE I PORTABLE AIR COMPRESSOR.

has a field of usefulness wherever pneumatic tools or other compressed air appliances are used and an expensive system of piping is not desirable. The

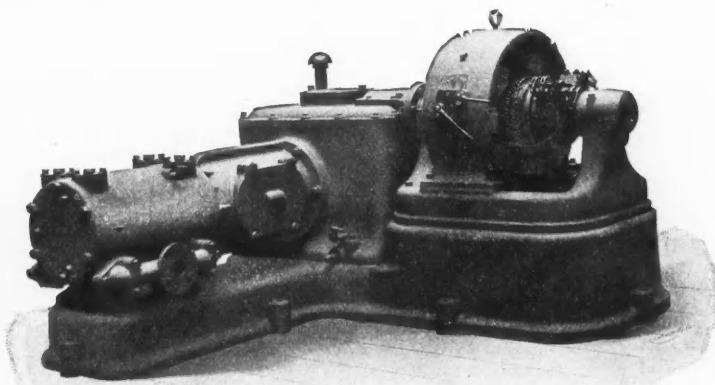
UNITED STATES.

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 May 6, 1902.

699,127. FURNACE FOR ROLLING-MILLS.—Thomas V. Allis, Bridgeport, Conn. A furnace provided with a combustion-chamber located beneath the work-supporting floor; bricks comprising the floor of said chamber constructed with pockets or recesses opening into said combustion-chamber; an opening in one of the side walls of the pockets, and pipes communicating therewith and with a gas supply.

699,132. METHOD OF FEEDING AND HEATING METAL PLATES OR PACKS.—Thomas V. Allis, Bridgeport, Conn. A method of progressively feeding and heating a train of metal plates or packs for reduction which consists in advancing said train in separate sections, each



CHRISTENSEN TYPE M MOTOR-DRIVEN AIR COMPRESSOR.

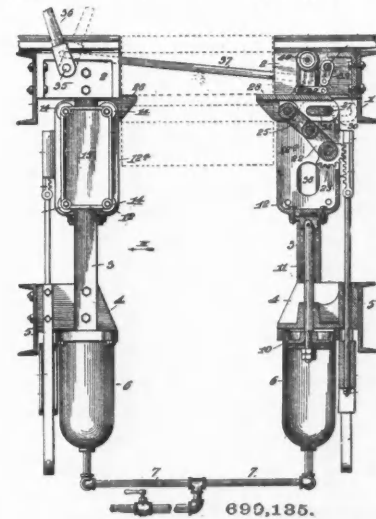
L, and they are similar in design and construction to type M, described above. The motor is mounted directly over the compressor instead of on the side. The compressor has two cylinders which are water jacketed throughout. Each cylinder is provided with a single acting plunger piston which is operated by a connecting rod from a well balanced

compressor is taken to work instead of transmitting the compressed air from a stationary compressor at a distance.

It is also practicable to make the smaller sizes of the type M portable; especially where the truck, upon which the compressor is mounted, is arranged to run on rails.

section containing a plurality of plates or packs, by progressing each section the distance occupied by one plate or pack, and transferring a plate or pack from the forward end of each section to the rear end of the preceding section, and augmenting the degree of heat in said packs or plates during their period of transit.

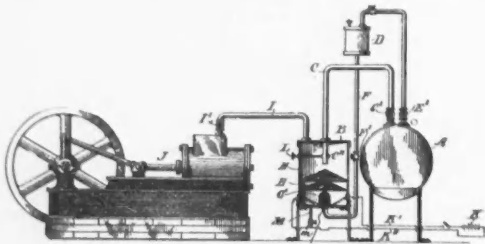
699,135. CHAIR FOR MINE-CAGES.—John O. Bardill, St. Louis, Mo. The combination of dog-carrying means, dogs



swingly connected to said means, means whereby pressure medium is applied to elevate said dog carrying means, and means whereby said dogs are moved from downwardly-inclined positions to horizontal positions.

699,146. **ELECTRIC COMBUSTION-FURNACE.**—William M. Carr, East St. Louis, Ill., assignor to Shickle, Harrison and Howard Iron Company, East St. Louis, Ill. In an electric combustion-furnace, the combination with the combustion-tube, and with its inclosing cylinder, of two wires separate from each other, one of said wires being wound spirally around the end portions of the said cylinder, and the other wire wound spirally around the middle portion of the said cylinder, and means for passing an electric current alternatively through the wire around the said end portions, and through both the said wires simultaneously.

699,156. **COMPRESSED-AIR HEATER.**—Charles B. Duncan, New York, N. Y., assignor to John C. Henderson, New York, N. Y. The combination with a motor adapted to be driven by compressed air of a compressed-air chamber, an



699,156.

expanding-chamber provided with an air-inlet, a burner within the expanding-chamber for heating the air, and wire screens arranged in the expanding-chamber and interposed between the burner and the air-inlet.

699,216. **ALUMINUM ALLOY.**—Ernest Murmann, Vienna, Austria-Hungary. An aluminum alloy consisting of 100 parts of aluminum to 3 to 16 parts of copper to 12 to 32 parts of zinc, the amount of the zinc being twice the amount of copper.

699,278. **CONVEYOR.**—Rolland A. Zwoyer, Portsmouth, R. I. A conveyor comprising buckets provided with a central platform in each bucket, sides extending above and below the said platform, and end projecting from the platform of each bucket and joining the side thereof, rollers journaled to the buckets; linked drive-chains pinned to the buckets, sprocket drive-wheels geared with the linked drive-chains and guide wheels for the latter.

699,282. **PROCESS OF REDUCING METALS AND PRODUCING ALLOYS THEREOF.**—Henry S. Blackmore, Mount Vernon, N. Y. A process of reducing metals, which consists in exposing a composition therefor to be reduced containing metal and two or more non-metallic elements to the action of heat and a metallic carbide the combined elements of which are capable of combining with the electronegative constituents of the compound.

699,288. **AIR COMPRESSOR AND INTERCOOLER.**—William B. Cowles, Cleveland, Ohio. The combination of a heating and cooling tank, a reservoir for compressed air, means for supplying compressed air to said reservoir including a cooling-coil in said tank, and means for carrying off air from said reservoir at a reduced pressure including a heating-coil in said tank.

699,308. **LEAD-PRESS.**—Roderic F. Hall, East Orange, N. J., assignor to Western Electric Company, Chicago, Ill., a corporation of Illinois. The combination with a die-block having a forming-chamber hollowed in the interior thereof, and a die and cam-tube meeting in alignment in said chamber to form a die-opening, a single unobstructed passage being provided in the die-block through which lead may be forced into the said chamber, said passage opening directly upon the body portion of the core at the rear of the die-opening, a raised supporting-tongue extending along the wall of the forming-chamber at a point directly opposite the opening of said passage, said core-tube resting upon and being sustained by said tongue at such point against the pressure of the lead entering the forming-chamber through said passage, means for forcing plastic lead into the forming-chamber through said passage, gas-burners arranged to direct their flames upon the die-block, and adjustable mountings to said burners, whereby the application of the heat to the lead in the forming-chamber may be varied to compensate for variation in pressure at different parts of said chamber.

699,333. **VESSEL FOR THE RECEPTION OF HIGH-PRESSURE GASES.**—Albert Ludwig, Bernburg, Germany. An electric furnace for gases under high pressure, comprising a vessel having a cover, a fastening-strap inclosing the same, wedges adapted to force the parts together, means to hold the vessel and cover centrally within the strap and to allow self-adjustment so that a uniform pressure is transmitted to all portions of the apparatus, and means for producing an electric arc within said vessel.

699,343. **HOISTING BUCKET.**—Almon E. Norris, Cambridge, Mass., assignor to Rawson & Morrison Manufacturing Company, Cambridge, Mass. A hoisting-bucket comprising two bucket-segments pivotally connected together, a head, links connecting the head and segments, a series of sheaves carried on the pivotal connection between said bucket-segments, a corresponding series of sheaves mounted in the head, and an opening and closing chain passing around the

sheaves of said two series, the sheaves of one series having an angular relation to the sheaves of the other series, whereby those portions of the said chain stretching between the sheaves are substantially at right angles to the axis of said sheaves.

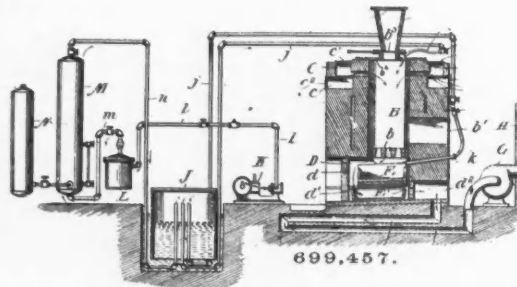
699,353. **APPARATUS FOR THE MANUFACTURE OF CARBURETED-HYDROGEN GAS.**—Burhans Van Steenberg, New York, N. Y.—In an apparatus for generating illuminating-gas, the combination comprising a generating-chamber, oil-nozzles and electric incandescent heaters, a connected steam-superheater and a connected electric steam or water decomposing chamber.

699,355. **BLUE-PRINTING APPARATUS.**—Samuel B. Whinery, Pittsburg, Pa., assignor to the Pittsburg Blue Print Company, a corporation of Pennsylvania. A transparent hollow printing frame, a cover therefor provided with one or more catches, each having two members, composed of spring material, one secured to the cover and the other forming a clasp.

699,415. **ELECTROLYTIC APPARATUS.**—Charles J. Reed, Philadelphia, Pa. In an electrolytic apparatus, a receptacle or compartment containing a body of mercury and a body of decomposable liquid superposed thereon, in combination with one or more electrodes of electronegative material and one or more disk-shaped metal electrodes and means for moving said metal electrodes into and out of said body of mercury within said receptacle or compartment to effect a distribution of mercury over the same.

699,456. **ART OF TREATING ORES.**—Andrew M. Dorr and Joseph Spang, Boston, Mass., assignors to Chemical and Electrical Ore Reducing Company, of West Virginia. A process of producing matte, directly from ores which consists in charging the ore into a suitable chamber, subjecting it there first to a comparatively low heat whereby it is roasted to drive off as far as possible its volatile constituents, and next to a high and smelting heat, discharging the ore as it is smelted into a matte chamber below, and subjecting the matte mass to an intense heat, whereby it is purified and concentrated, supplying a gas rich in oxygen both to the chamber in which the ore is roasted and smelted, and, at the time the metal begins to flow, to the matte chamber, and maintaining a down draft through both chambers.

699,457. **APPARATUS FOR TREATING ORES.**—Andrew M. Dorr and Joseph Spang, Boston, Mass., assignors to Chemical and Electrical Ore Reducing Company of West Virginia. Apparatus comprising a reduction-chamber; a



699,457.

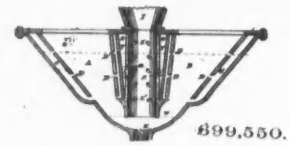
matte-chamber below and communicating with the reduction chamber; means for creating and maintaining a down draft through the reduction and then through the matte-chamber, charcoal-chambers communicating with the upper part of said reduction-chamber; gas-jets located in both the reduction-chamber and the matte-chamber; and a source of supply of gas under pressure having controllable communication with said gas-jets.

699,477. **CONVEYOR BELT ROLLER.**—William E. Bee, Aurora, Ill., assignor to Stephens, Adamson & Co., Aurora, Ill. In combination, an upwardly-extending bracket apertured from its upper end, a bushing fitting in the aperture and spaced from the side wall thereof, a spindle journaled in the bushing, the bushing having passages leading from the space surrounding the same to the spindle, and a roller fixed upon the outer end of the spindle and extending downwardly over the bracket.

699,492. **PROCESS OF FORMING STORAGE-BATTERY PLATES.**—Rufus N. Chamberlain, Depew, N. Y., assignor to Gould Storage Battery Company, New York, N. Y., a corporation of West Virginia. A process of forming lead storage battery plate which consists in forming an oxidized coating on the plate by making it the anode in an electrolytic bath, the electrolyte of which produces an oxidizing chemical reaction upon the anode, whereby a continuous electro-chemical effect takes place, and then shifting the plate thus provided with the oxidized coating into the position of cathode and introducing a new unoxidized plate as anode, whereby the reduction of oxide on the first-named plate serves to diminish the amount of energy required to oxidize the second plate.

699,534. **MANUFACTURE OF BRICKS, TILES OR THE LIKE.**—Arthur J. Keeble, Petersborough, England. A process of manufacturing bricks, tile and the like, by first shaping the article, then coating it with a solution of colloid, such as glue, animal albumen, gelatin, isinglass or equivalent keratinous matters and subsequently drying and firing the same.

699,550. **AMALGAMATOR.**—Jonathan McKelvey, Louisville, Ky., assignor of one-fifth to William H. Stiglitz, Louisville, Ky. The combination with a case having a mercury-holding basin and provided with chambers and having means for



699,550.

admitting water under pressure to said chambers, of a sluice-tube in one of said chambers and an outlet-pipe in another of said chambers, said tube and pipe each having communication with said basin and each having series of openings for the admission thereto of water from their respective chambers.

699,563. **APPARATUS FOR EXTRACTING TAR FROM GAS.**—Pierre Plantinga, Fort Wayne, Ind. The combination with a seal-cup having vertical gas inlet passages, of two or more counterbalanced regulating and tar-extracting drums, connected one within the other, and having walls composed of injecting and impact plates in said cup, one of said gas-inlet passages opening into each drum.

699,570. **AIR-COMPRESSOR.**—George W. Rhine, Altoona, Pa. The combination with a stationary disk, of an annular air-chamber surrounding the disk, an annular casing between the disk and air-chamber, a series of pump-cylinders supported within the casing, a revoluble shaft extending loosely through the disk, wheels fixed upon the shaft on opposite sides of the disk grooved cams secured to the inner sides of the wheels, and pump-pistons provided with rollers adapted to travel within the grooves of the cams.

699,572. **APPARATUS FOR REFINING OIL.**—Emilien Rocca, Marseilles, France. An apparatus for refining oil with the aid of steam, the same comprising a series of connected oil-receivers having an inlet for admitting oil to the receiver at one end of the series and an inlet for admitting steam to the receiver at the other end of the series, each receiver having a perforated plate near its bottom and above the steam-inlet to the receiver whereby the steam is broken up into jets, and having also in it a closed steam-coil for maintaining the temperature of the matter treated.

699,588. **PROCESS OF MAKING ARTIFICIAL STONE.**—Charles W. Stevens, North Harvey, Ill. A process of making artificial stone, which comprises pouring a wet artificial-stone compound into a mold and around a bottomless core-box, said box containing a core of dry sand or similar material, and in withdrawing said core-box, while said compound is still in a flowing condition, in such a manner that said flowing compound will follow the lower ends of said core-box and fill in after it as the same is withdrawn, and in then allowing the stone compound to set.

699,612. **COATING-MACHINE.**—George A. Breeze, Newark, N. J., assignor to the Whitehead & Hoag Company, Newark, N. J., a corporation of New Jersey. In a coating-machine, a supply-tank and coating-roller movable therein, in combination with an adjustable deflector plate or bar for forcing the article to be coated into contact with the roller.

GREAT BRITAIN.

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

Week Ending April 17, 1902.

- 6,169 of 1901. **BLASTING CARTRIDGE.**—W. Kirsanov, Moscow. Blasting cartridges containing an explosive consisting chiefly of potassium chlorate and potassium picrate.
- 6,468 of 1901. **TREATING COAL FOR COKING.**—H. Schwarz, Dombrau, Austria. A method of treating badly coking coal to prepare it for coke making, consisting of submitting it to pressure.
- 6,984 of 1901. **HAND ROCK DRILL.**—G. Burnside, Durham. A hand operated rock drill, capable of being fixed to the wall of coal instead of to a beam or special pillar.
- 10,729 of 1901. **SULPHURIC ACID MAKING.**—Badische Anilin und Soda Fabrik, Rhein, Germany. The use of iron oxide, copper oxide and chromium oxide as substratum for platinum black in the contact process for making sulphuric acid.
- 12,186 of 1901. **LEAD OXIDE MAKING.**—Chemische Fabrik Griesheim Electron, Frankfort on Main, Germany. Making lead oxide into dioxide by mixing with alkali chloride and electrolysis.
- 12,250 of 1901. **CHROMIUM COMPOUNDS.**—Chemische Fabrik Griesheim Electron Frankfort on Main, Germany. Production of chromium compounds and alkali by the electrolysis of salts of alkali with ferro-chrome anode.
- 12,308 of 1901. **REMOVING ANTIMONY FROM ORES.**—J. P. van der Ploeg, The Hague, Holland. Removing antimony from ores by mixing with quicklime and sulphide of calcium, so making a soluble double sulphide of antimony and calcium.
- 25,233 of 1901. **TREATING EXPLOSIVES.**—W. Bate, Hagle. Addition of petroleum jelly to blasting gelatine to minimise the possibility of undue explosion through friction or percussion.

PERSONALS.

Mr. E. D. Leavitt recently visited the Calumet & Hecla Mine, at Calumet, Mich.

Mr. Graham Pope, of Houghton, Mich., has recently returned from Philadelphia, Pa.

Mr. G. A. Pratt has recently returned from Virginia City, Mont., to Minneapolis, Minn.

Mr. C. H. Dunton is now superintendent of the Eureka slate quarry at Placerville, Cal.

Mr. J. Hooper has been appointed mine foreman at the Mammoth Mine at Central City, Colo.

Gen. W. H. Penrose, of Salt Lake, Utah, has gone to Idaho to examine properties for Eastern men.

Mr. H. M. Crowther has returned to Salt Lake, Utah, from a trip to Boston and New York City.

Mr. H. J. DuBois, of New York City, has been making a trip through the Mother Lode region in California.

Mr. H. A. Cohen, of the De La Mar interests in Nevada and California, has returned to Utah from New York City.

Dr. A. E. Kennelly, of Philadelphia, Pa., has been appointed professor of electrical engineering at Harvard University.

Mr. Robert Bell, of Blackfoot, Idaho, has left for Thunder Mountain to examine claims for Philadelphia, Pa., men.

Mr. Thomas Hoatson, chief mining captain of the Calumet & Hecla Mine, at Calumet, Mich., has resigned, to take effect June 1.

Mr. P. G. Dawson, superintendent of the Megunticook Mine at Lake City, Colo., recently returned from a visit to New York City.

Mr. Alexander Agassiz, of Boston, Mass., president of the Calumet & Hecla Company, returned to Boston recently after visiting the mine.

Messrs. S. D. Nicholson and Julius Rodman, two of the best known mining men of Leadville, Colo., are in New York City on a business trip.

Mr. O. C. Tiffany has been appointed superintendent of the Last Chance Gold Mining and Milling Company, operating at Gold Hill, Ore.

Mr. Chas. T. Arkins, of Arkins & Brown, Denver, Colo., has gone to Old Mexico on professional business, and will be gone about 2 months.

Mr. Col. Nick Treweek has returned to Salt Lake, Utah, after an absence of a couple of months in New York City, Boston and Pittsburg.

Mr. O. Townsend, of Cripple Creek, Colo., has been appointed manager of the McKee and Last Chance mines at Cable Cove, Baker County, Ore.

Mr. J. L. Mitchell, manager of the Keystone Gold and Copper Mining Company, after a business visit to Cozad, Neb., has returned to Gilpin County, Colo.

Mr. Frank Monaghan of Needles, Cal., has been appointed a member of the board of trustees of the State Mining Bureau, in place of Mr. W. S. Keyes, resigned.

Mr. L. C. Trent, who went to Tasmania to take charge of the North Mount Lyell Copper Company, has resigned and is at present on his way to the United States.

Mr. Frederick Stanwood, of Boston, Mass., secretary and treasurer of the Copper Range Consolidated Company, has been visiting the property in the Lake Superior copper district.

Mr. R. K. Colcord, superintendent of the United States Assay office at Carson, Nev., has been appointed superintendent of the Consolidated Esmeralda Mines Company, Hawthorne, Nev.

Mr. W. H. Adams is at present in the Virgilina, Va., copper district making his fifth examination of properties of that section. He will also examine two properties in Western North Carolina before his return to New York City.

Mr. Julius Rodman, who has been general agent for the American Smelting & Refining Company, at Leadville, Colo., has just been appointed general manager for the same company at Leadville of their Arkansas Valley plant.

Capt. W. Murdoch Wiley, formerly manager of the Union Copper Mines, of North Carolina, has joined the firm of Redick, Mitchell & Company, 25 Broad St., New York City, as also has Mr. Carl Henrich, the metallurgist.

Dr. Bernhard Mohr, general manager of the Mond Nickel Company, of England, who has been visiting the company's nickel properties in the Sudbury District, Ontario, sailed for home on the *Kaiser Wilhelm* on May 20.

Mr. Frederick F. Sharpless, of New York, who has been for some time past in Salvador, for the Consolidated Mines Selection Company, returned from Salvador last week. He sailed from New York, May 17, for London, where he expects to remain for about a month.

OBITUARY.

John Glover, the inventor of the "Glover" tower, used in acid works, died recently at Newcastle-on-Tyne, Eng., at the age of 85 years.

John W. Cook, a prominent coal operator, died on May 16 at his home in Philadelphia. Mr. Cook was born at Muncy, Pa., in 1839. He went to Bellefonte, Pa., in 1861.

James R. Dickson, an official of the Pennsylvania Coal Company, was killed at the Elmwood washery of the company near Pittston, Pa., on May 20 by being caught in the machinery. He was the son of A. W. Dickson, general manager of the Dickson Milling Company at Scranton.

George E. Rogers died suddenly in New York City last week of cerebral hemorrhage. He was a native of Michigan and for some years past was the Eastern representative of the Detroit White Lead Company, of which his brother is president. Mr. Rogers went to California in 1849, where he was one of the vigilantes. There he amassed a large fortune and lost it in speculation at the time of the phenomenal rise in mining stocks when Savage Mine shares were quoted at 750. Mr. Rogers was about 70 years of age.

SOCIETIES AND TECHNICAL SCHOOLS.

INTERNATIONAL MINING CONGRESS.—Mr. Irwin Mahon, Carlisle, Pa., secretary of this body, has issued a circular announcing that the fifth annual meeting will be held in Butte, Mont., beginning September 1, and continuing until September 5.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.—The Institute issues a pamphlet describing the courses in summer instruction that it offers. These courses replace those heretofore given by individual instructors and include courses in mathematics, mechanical arts, mechanical drawing, modern languages, chemistry, physics, surveying, assaying, mechanical engineering and architecture.

ROSE POLYTECHNIC INSTITUTE.—This technical school, at Terre Haute, Ind., in its catalogue for the current year, states that its course of instruction includes mechanical, electrical and civil engineering, architecture and chemistry, and is based upon drawing, modern languages, mathematics, mechanics, chemistry and shop practice. Each course occupies 4 years. The catalogue describes the equipment of the laboratories and shops, and in considerable detail the various courses. The catalogue also contains a list of the students and graduates.

CLAUSTHAL SCHOOL OF MINES.—This old institution, at Clausthal, Germany, was founded early in the 16th century. The catalogue summarizes the history of the school and points out the advantages of its location in relation to some mining and manufacturing centers. The catalogue also describes the equipment of the school, its courses of instruction, etc. The courses include mathematics, physics, chemistry, mineralogy and geology, mechanical drawing, machine construction, including bridge work, and mining and metallurgy with particular attention to blast furnace work. The total number of foreign students enrolled during the year 1900-1901 was 41.

WORCESTER POLYTECHNIC INSTITUTE.—This institution, at Worcester, Mass., that has earned a well-deserved reputation for the courses it offers in mechanical, civil and electrical engineering and chemistry, states in its last catalogue that it continues to lay stress on laboratory methods of instruction. The school laboratories now include the Salisbury Laboratory of physics, chemistry and electrical engineering, the Washburn shops, the new engineering laboratory, in which ample provision is made for both civil and mechanical engineering, the power laboratory and an important experimental hydraulic plant. The catalogue describes in detail the subjects of instruction, the courses offered and the equipment of the various laboratories and shops. It appears that the total number of students in all departments during the current year is 254. A list of the graduates of the school shows their present occupations.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on May 10 there were present 26 members and 15 visitors. Mr. G. T. Norton was elected to membership. Mr. A. S. Langsdorf read a paper entitled "Commercial Testing of Electrical Machinery." He described the regular and special commercial tests made in the factory on the dynamos, motors, transformers, converters, etc., before shipment. The regular tests included the insulation and load tests. The special tests were generally made to determine the efficiency or other special features which may have been guaranteed in the contracts. Other tests are always made on the first machine of a new design in order to determine the electrical constants and to check the calculations of the engineering department. In testing small machines the current generated is consumed in resistances, generally water rheostats. For large machines the power required for testing in this manner

would be very excessive and some modification of the stray power method is used for economical reasons. The applications of this method to various kinds of apparatus were described.

INDUSTRIAL NOTES.

The Mine and Smelter Supply Company, of Denver, Col., is building a 500-ton smelter for Grand Encampment, Wyo.

The Raymond Brothers Impact Pulverizer Company has moved its Chicago, Ill., offices to 738 Monadnock Building.

The A. Leschen & Sons Rope Company, St. Louis, Mo., is preparing to erect a new factory building, 80 by 365 ft., 2 stories high. A warehouse will also be built, 75 by 150 ft. The 2 buildings will cost fully \$80,000.

The Brown & Sharp Manufacturing Company, of Providence, R. I., has secured an order for some large screw machines for the Tokio, Japan, shipbuilding yards and a number of milling and grinding tools for the Nagasaki Dock Company.

William Hoskins & Company, of Chicago, Ill., have recently made a sale of their furnaces and blow pipes to the National Bureau of Standards, of the Treasury Department, Washington, D. C., for use in studying the conditions of fusion, etc., of various alloys.

The Tokio (Japan) Belting Company's plant is to be equipped with a 200-h. p. engine, to be built by the Atlas Engineering Works, Indianapolis, Ind., and the Laidlaw-Dunn-Jordan end of the International Pump Company is to furnish the condensers, etc.

The Chicago Pneumatic Tool Company, of Chicago, Ill., states that it received as many orders during the first 2 weeks of May as in any entire month since the company started in business. There is a noticeable increase in orders for its pneumatic tools from Germany, France and Great Britain.

The Burt Manufacturing Company, of Akron, O., reports a recent shipment of its Cross oil filters to different cities in the far East, India, China, Japan and the Philippine Islands. Other important shipments recently made by this firm were to England, Austria, Belgium, Mexico and Argentine Republic.

At a recent meeting of the directors of the American Diesel Engine Company, Hugo Reisinger resigned as secretary and treasurer, and Edwin S. Cramp, vice-president of the Cramp Shipbuilding and Engine Company, of Philadelphia, was elected a director. The International Power Company holds the manufacturing right for Diesel engines in the United States, Canada, Great Britain and all her colonies.

The Buffalo Forge Company, of Buffalo, N. Y., reports business brisk. Among the contracts recently awarded to it are mentioned the equipment of the Pennsylvania Steel Company's forge shop, at Philadelphia, Pa., with 20 Buffalo down draft forges and 3 large Buffalo fan system heating plants for the Lake Shore & Michigan Southern Railroad shops at Collinwood, O. The Buffalo Forge Company is to furnish the Seaboard Realty Company, of New York City, 6 120-h. p. engines and 2 95-h. p. engines for an electric lighting plant.

It is announced that the Buffalo & Susquehanna Iron Company will expend \$3,000,000 in building 2 large modern blast furnaces and coke ovens and developing its Lake Superior ore properties and Pennsylvania coal lands. The enterprise is headed by William A. Rogers, of Rogers, Brown & Company, and F. H. and C. W. Goodyear, of Buffalo. The Messrs. Goodyear own the Buffalo & Susquehanna Railroad in Northern Pennsylvania. The road will be built into Buffalo. The site purchased for the iron company comprises 50 acres. Suitable ship canals will be built into it from Lake Erie, enabling the largest ore vessels to unload. Rogers, Brown & Company now have a controlling interest in 23 blast furnaces located along the lakes, in the Lehigh Valley and in the South. The directors of the Buffalo & Susquehanna Iron Company are Wm. A. Rogers, F. H. and C. W. Goodyear and C. W. Bissell, of Buffalo, and Archer Brown, of New York City.

The General Concentrates Company, of New York City has entered into a contract with the Modoc Mining Company, of Chicago, Ill., to remodel a mill at Las Cruces, N. M. This mill was designed originally to treat a galena in a limestone gangue by concentrating tables, but on account of a scarcity of water in that section the company expected to be able to work only 200 days in the year. The mill was about completed when the attention of the officers of the company was called to the Hooper automatic concentrator and operations were suspended while this system was investigated. A test run on 1,000 lbs. of ore over a Hooper concentrator was satisfactory and the Modoc Mining Company, seeing that by installing the Hooper system of dry concentration it would be able to run its mill throughout the year, immediately placed an order to have the wet tables replaced by Hooper concentrators. The crush-

ing machinery—jaw crushers and rolls—which is already at the plant will remain, but new sizing machinery and 7 Hooper pneumatic concentrators will be required.

TRADE CATALOGUES.

The C. W. Hunt Company, of West New Brighton, N. Y., is sending out printed matter calling attention to its coal tubs and manilla hoisting rope. The company states that it has had 30 years' experience in building coal tubs and carries in stock a variety of sizes.

The Brunton patent pocket transit, a pocket instrument designed to take the place of a sighting compass, clinometer, prismatic compass and Locke level is described in Catalogue B issued by William Ainsworth & Sons, of Denver, Colo. The pamphlet shows the manner in which the compass is used for its various purposes and states that over 1,000 of these instruments are in use, the users being in mining camps in all parts of the world.

Bulletin No. 17, issued by the Crocker-Wheeler Company, of Ampere, N. J., describes the company's line of motor-dynamos, dynamotors and dynamos especially adapted to telephone and telegraph requirements. Bulletin 18 describes the electric plant installed by the company at the graphite factory of the Joseph Dixon Crucible Company, in Jersey City, N. J. This plant took the place of 4 separate steam plants. Bulletin No. 20 tells about small multipolar sizes of the company's direct current motors.

The American Spiral Pipe Works, of Chicago, Ill., has issued its 1902 price-list of spiral rivetted pipe and fittings. The company recommends this pipe for water mains, hydraulic mining, irrigation purposes, exhaust steam, smoke stacks, blower pipes and mine and tunnel ventilation. The company claims that the pipe is made of the best annealed steel and is very strong. The protective coating is stated to be manufactured from asphalt and mineral rubber and to be unaffected by acids, earth salts, electrolysis, frost or heat. The pipe fittings are made of wrought and cast iron, galvanized or not as desired.

H. J. Putman & Company, of Minneapolis, Minn., issue a 32-page pamphlet with a striking cover design entitled "Shoe Facts." It describes the Putnam boots and shoes for sportsmen, prospectors and engineers. The pamphlet contains reproductions of testimonial letters from all over the United States and from foreign countries but to any one who has ever worn a pair of these boots such testimonials are unnecessary. The boots and shoes are made of specially tanned leather thoroughly dressed and are light, durable, comfortable and water-proof. For the hard service given footwear in tramping through woods and swamps these boots can be highly recommended. The company also makes moose hide moccasins.

A neatly illustrated 126-page catalogue of pipe-threading machinery is issued by D. Saunders' Sons, of Yonkers, N. Y. The company manufactures special machines for pipe mills, tapping and drilling machines, hand stocks and dies for pipe taps, reamers, tongs, hand pipe cutters, pipe vises, etc. The company states that its largely increased facilities, combined with its experience in this line of manufacture enables it to present a class of tools made from carefully studied designs and intended to meet demands for strong, accurate and durable hand tools and machines having facilities for saving time in adjustment, without liability to get out of order. The company states that, with a few exceptions, all the many tools shown in the catalogue are of its own manufacture and are carefully examined and thoroughly tested before being offered for sale.

Steam hammers, manufactured by Bement, Miles & Company, of Philadelphia, Pa., are described in a handsomely illustrated 72-page pamphlet sent out by the company. The company divides its hammers into 5 classes, which cover all the requirements of modern forge practice. All parts are regularly manufactured on stock sizes and are interchangeable. The company states that its hammers are of such simple construction that they are easily handled by the average smith and claims to have records showing that some have been run from 13 to 15 years with practically no expenditure for repairs. The company manufactures single-frame hammers, having falling parts weighing from 250 to 4,000 lbs.; double-frame hammers rated at from 1,500 to 24,000 lbs.; open-frame hammers rated at from 6,000 to 24,000 lbs.; double-frame tilting hammers rated at 500 to 1,000 pounds, and drop hammers for making all kinds of drop forgings rated at 250 to 2,400 lbs. The pamphlet contains directions for erecting and starting hammers and their proper maintenance.

An unusually complete catalogue of drawing materials and surveying instruments is issued by Eugene Dietzgen Company, of Chicago, New York and San Francisco. The catalogue is an illustrated pamphlet of 346 pages and contains price lists of drawing and cross-section paper, tracing cloths and blueprint paper, appliances for making blue-prints includ-

ing electric light outfits, engineer's field books and a full line of the Gem Union American style drawing instruments. These instruments have as features of merit the Union pivot joint, a screw-thread needle point, an improved shank and clamp socket and a slide catch device for cleaning pens. The Dietzgen Company also carries in stock German instruments of various grades of workmanship which, like the Gem Union instruments, are sold singly or in sets. The catalogue gives prices of boxwood scales and pocket rulers, slide rules, parallel rules, pantographs, protractors, triangles and T-squares, curves, drawing boards and stands, drawing ink, water colors, pencils, etc. The surveying instruments catalogued include tapes and chains, levelling rods, compasses, levels, transits, theodolites, sextants, planimeters, aneroid barometers, and anemometers.

GENERAL MINING NEWS.

Pipe Line Returns.—April shipments of Pennsylvania oil were the largest recorded since October, 1897, and the reduction in the net stocks was nearly 28,000 bbls. a day. This reveals an extraordinary demand for high-grade oil, says the *Oil City Derrick*. At the same time, the Buckeye stocks made a gain of over 14,000 bbls. a day, so that the aggregate decline for both fields was at the rate of a little over 13,000 bbls. a day. At this rate it would require less than 6 years to consume all the oil now on hand in the storage tanks of the various pipe line companies. The runs for April increased about 5,000 bbls. The pipe line runs were the largest of any month since last October. The total pipe line runs of Pennsylvania oil for 1901 amounted to 32,030,063 bbls., or an average per day of 90,219 bbls. The April runs show a falling off of 2,355 bbls. a day from this average and averaged 87,864 bbls. compared with 93,064 in April, 1901. The average daily shipments of Pennsylvania oil for April were 114,910 bbls. a day, a gain of 30,600 bbls. a day over March. The shipments for April, 1901, were 98,473 bbls. a day. In April the Buckeye runs averaged 53,843 bbls. a day, a gain of 1,560 bbls. over March. In 1901 for April, the Buckeye runs averaged 50,683 bbls. a day. The Buckeye shipments for April were the smallest since August, 1900. They averaged 42,985 bbls., and were 11,406 bbls. a day below those of March. The April record of the Pennsylvania and Trenton rock oil fields shows a total average of 141,707 bbls. for the runs, and 157,895 bbls. for the shipments. The stocks of Pennsylvania and Lima oils at the close of April were the smallest on record since July, 1900, the net loss in April being 392,680 bbls. The net loss for January was 204,686 bbls., for February 270,322 bbls., for March 110,562 bbls., and for April 392,680 bbls.

The net stocks of Pennsylvania oil were 7,996,776 bbls. on April 30. These are the smallest on record for the past 6 years. Adding the net stocks of the Buckeye and other lines handling Lima oil makes a total of 26,202,478 bbls. in iron tanks at the close of April. The net stocks of Lima oil held by the Buckeye and Indiana pipe lines were 18,205,702 bbls. on April 30. The April figures show a decline of 831,454 bbls. in the net stocks of Pennsylvania oil, accompanied by an increase of 438,774 in the stocks of Buckeye, making the aggregate decrease for the month, 392,680 bbls.

ARIZONA.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Badger.—Cooper, Van Marter, Prison & Coolege have renewed their lease and bond on this property, near Chloride, and will take out ores for the new smelter. The mine belongs to Thomas Chadwick.

Elkhart.—This Chloride mine, now in the hands of a company holding an option on it, with J. M. Scratton as superintendent, is preparing to start work early in June.

Juno.—The Philadelphia & Arizona Mining Company has 2 men at work 250 ft. northwest of the old shaft who are reported to have found good ore in a new place.

Kay.—At this mine, at Mineral Park, work is being pushed on the lead.

Lucky Boy.—The production of ore at this mine near Chloride is larger than for some time and regular shipments have been resumed. In the breast of the 125-ft. drift from the 350-ft. level a new ore body is reported.

Merrimac.—This mine, near Chloride, which belongs to the Philadelphia & Arizona Mining Company, is preparing to begin work after more than 2 years' idleness. The mine has a 10-stamp mill, also a steam hoist and good pumping plant.

Minnesota.—The body of native and ruby silver opened up on the 350-foot level of this mine at Chloride is holding out. The mine is looking well. The 225-ton concentrator is kept busy.

Pinkham.—The owners of this property have a large body of refractory ore carrying gold, silver and copper. It will be sent to the new smelter.

Sunrise.—The new steam hoist at this Chloride mine will be in operation in a few days. The chief work being done on the mine now is in the last drift from the 250-ft. level, where a body of smelting ore is being broken. John Barry is owner.

Tennessee.—At this mine, at Chloride, the old working shaft is being sunk 200 ft. When sinking started, a month ago, the shaft was over 500 ft. deep. The 200-ton concentrator is kept going day and night.

Tintic.—This mine, one mile south of the Merrimac, and belonging to the same company, will be worked again by or before the middle of the summer. The ores carry gold, and many years ago were worked by rock arrastras.

Vulcan Smelter.—Men are grading for the new 50-ton smelter near the Chloride depot. Ore has already begun to arrive, and a large number of bins are being erected.

CALIFORNIA.

ALAMEDA COUNTY.

(From Our Special Correspondent.)

Oil Storage.—At Alameda Point the Pacific Oil and Transportation Company has finished the foundation for the first oil storage tank of 1,500,000 gal. capacity, and others of the same size are to be built. Fuel oil will be here supplied for vessels and cargoes supplied to Western and Northern Pacific trade. Oil can be brought from the California petroleum fields either by car or vessel, and a pipe line runs from the tanks to Oakland Harbor, where there is deep water.

AMADOR COUNTY.

(From Our Special Correspondent.)

Keystone Consolidated Mining Company.—This property, at Amador City, owned by M. J. McDonald, Mills Building, San Francisco, has run the large mill during April and crushed 5,000 tons of \$4 rock. This low-grade ore is profitable under present conditions. The hoist is run by compressed air, and 6 Rand drills are to be put in. There are large bodies of ore in the levels above the 900-ft. About 100 men are employed.

Lincoln Gold Mining and Development Company.—The shaft on this property, at Sutter Creek, E. C. Voorheis president and manager, has nearly reached a depth of 2,000 ft. At that point a station will be cut, cross-cuts run and drifts started.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Central Hill.—This mine, near Mokelumne Hill, owned by Wm. M. and D. A. Nuner, of San Andreas, is a gravel property, but recently a blind vein of quartz was discovered, which is found to be profitable. The vein is in slate with well-defined walls.

Cunco.—On this claim, at Esmeralda, an arrastra is being built. The vein is of good size.

Marshall Gravel.—This mine at San Andreas will probably soon be started up by the Fort Wayne Mining Company. The mine has been idle for the past 3 years, but was at one time a producer.

Petticoat.—This mine at Railroad Flat, owned by John Rosenfeld's Sons, of San Francisco, is to be started up again.

Sunrise.—This mine at Railroad Flat has closed down temporarily.

Winchester.—This and the Pajaro, Clincher and Alpine mines, near San Andreas, have been bonded to E. L. Burns and J. F. Treat, Jr., of the same place. Satisfactory mill tests have been made.

ELDORADO COUNTY.

(From Our Special Correspondent.)

Josephine.—This mine, near Georgetown, owned by the San Francisco Mining Company, J. M. Nougues, Jr., superintendent, was worked in the early 50's, and was reopened a few years since. Tunnel No. 3 is in 320 ft., No. 4 is in 1,020 ft., and No. 5 is in 600 ft. and is being continued. There is as yet no mill on the property.

Kelliher.—On Otter Creek, near Georgetown J. B. Kelliher has a very large self-shooter on his gravel mine. It has 4 gates 6 by 7 ft., and discharges 23,000 in. of water at a time.

River Hill Mining Company.—On this property at Placerville, Geo. M. Clark superintendent, the tunnel has been run in 700 ft., but over 1,000 ft. more is needed to reach the shaft. It is now stated that work is to be resumed to drain the mine. About 150 ft. more shaft sinking is necessary to reach the tunnel level.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

Sugar Bowl.—This mine, at Hoopa, owned by John and James Douglas, is being worked as a placer.

Water is brought in by a 3-mile ditch from Campbell Creek. The gravel is on a flat, with poor dump.

KERN COUNTY.

(From Our Special Correspondent.)

Baltic.—This mine at Randsburg has a new 10-stamp mill, built at Los Angeles by the Llewellyn Iron Works.

Josephine T. G.—This mine, near Randsburg, has been bought by J. P. Howe, Andrew Kane and R. T. Brackney, who have been working it under bond for the past year. An interest has been bonded to D. & E. Culbert.

Mojave Copper Company.—This company has purchased 30 copper locations near Mojave, and active development is to start shortly.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Stockton Creek.—This mine, near Mariposa, has been leased by James and Wm. Rowland from the Mariposa Commercial and Mining Company. Under this lease they are to run 200 ft. in new ground. The mine was formerly known as the Watson, and was worked as early as 1854, when the ore was crushed in an arastra.

MONTEREY COUNTY.

(From Our Special Correspondent.)

Mother Lode Mining and Milling Company.—This new company has been incorporated, with R. J. Casen, of San Francisco, as president, and W. D. Murray, of Jolon, as vice-president and superintendent. It has acquired the Grizzly and other claims in Los Burros District, where some quartz mining has been done. The Grizzly shaft is now full of water. A mill is contemplated. These claims are in the Coast Range, where no permanent gold quartz mines have as yet been found. At Los Burros, some years since, surface quartz paid for a time, but the veins did not hold out in depth and were abandoned. The company has been organized under the laws of Arizona with unassessable stock, though a recent decision of the courts is to the effect that mining companies operating in California are amenable to the State laws in the matter of assessable stock even if incorporated under laws of other States.

NEVADA COUNTY.

(From Our Special Correspondent.)

Alta California.—This gravel mine, near Grass Valley, has been bought by Chas. E. and Louis Haub, of San Francisco, and Geo. R. Tuttle, of Grass Valley. There are 410 acres, supposed to contain the long lost Alta gravel channel. The mine has been worked in a small way for 15 years, but the new owners intend doing work on an extensive scale.

Baldwin.—This mine, near Grass Valley, is under bond to Gale & DuBois, and as soon as the pipe arrives work will be started.

Gold Tunnel.—The machinery at this mine at Grass Valley, John Eddie superintendent, has been put in place, and the old shaft is to be pumped out at once. Electrical power is used.

Hampton & Gage Company.—This company will shortly erect a mill on its property near Nevada City. W. H. Bray is the superintendent.

Maryland Gold Mining Company.—At the annual meeting in Grass Valley last week the following directors were chosen: S. P. Dorsey, E. M. Taylor, L. V. Dorsey, John Glasson and T. C. Dorsey. S. P. Dorsey has been re-elected president and superintendent, and L. V. Dorsey treasurer and secretary.

Murchie.—This mine at Nevada City, owned by the Lone Star Mining Company, now under bond to J. C. Campbell and others, Mr. Campbell being superintendent, is being reopened. The old drain tunnel is being repaired.

New Hope.—This mine, near Grass Valley, has been bought from Geo. Johnston and L. Erskine by Fred Zeitler and J. J. Jackson.

PLACER COUNTY.

(From Our Special Correspondent.)

Morning Star.—A strike of good gravel is reported in this mine at Iowa Hill. The old lower channel is supposed to have been cut in front. The mine now belongs to Harold T. Power, John McAninch and D. W. Lubeck. It has been a paying property for years.

Pioneer.—This mine, near Towle, has closed down temporarily. Some of the owners are expected out from the East, when arrangements are to be made to work again the property, which has a 20-stamp mill.

Rawhide.—The new mill on this mine, near Towle, is completed. It has 10 stamps. John Patrick is superintendent.

RIVERSIDE COUNTY.

(From Our Special Correspondent.)

Pinon.—This gold mine, 15 miles from Indio, has been bought by W. F. Sherwood, and is worked under contract by F. Reichert and Wm. Hansen. New machinery is to be put in.

Red Cloud.—This company's mines and mill are 33 miles from Salton. E. H. Gould is superintendent, and S. P. Creasinger, of Los Angeles, president. The directors have decided to lay water pipe from Corn Springs to the mill, and will increase the number of concentrators.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

California King Mining Company.—It is currently reported that ex-Senator R. E. Pettigrew, of South Dakota, has purchased the interests of ex-Senator Dorsey in these mines at Pichacho, near the Colorado River.

SHASTA COUNTY.

(From Our Special Correspondent.)

Afterthought.—This company at Round Mountain, Mr. McDermott superintendent, has developed good ore in the Poor Man's Mine.

Donner.—This mine at Round Mountain shows a good vein of ore in the shaft.

Stewart.—At Salt Creek, near Waugh, Samuel Stewart has struck a rich pocket in his quartz claim.

Sybil.—This mine at French Gulch, A. Von Krusze owner, is turning out some high-grade ore. A hoist has been ordered.

Washington.—This old mine at French Gulch, at one time a good producer, is to be started up by a new company, recently organized. John S. Farrier, administrator of the estate of the late John Suter, has arranged matters relating to the title.

SIERRA COUNTY.

(From Our Special Correspondent.)

Alaska.—Operations are to be resumed at this mine, near Pike City. A 6,500-ft. tunnel, from Oregon Creek to tap the ledge 1,500 ft. below present workings, is contemplated. The mine is noted as being exceedingly wet.

Feather Fork Gold Mining Company.—This property, sometimes known as the Thistle shaft, near Gibsonville, has its tunnel in 2,700 ft. C. B. Wingate is general manager, and August Holtz superintendent. Air drills are being used in the tunnel to drain the mine, which was flooded a few years since.

King Gold Mining Company.—The ledge has been struck in the lower tunnel of this quartz mine, near Sierra City. The owners are L. D. Flint, Frank Summerville, Robert Parker and John Hayes, all miners.

Mabel Mertz.—At this mine, near Forest, a new tunnel is to be run under the superintendency of H. B. McCormick.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Thomas R. Dunn, of San Francisco, has bonded from William M. Phillipson the Bowler, Minnie, Powell and Iron King quartz mines near Confidence, with a water right of 4,000 ins. The mines have been worked by tunnels for the past 3 years, but a new company will now develop them on a large scale.

Bluebell.—This mine, near Carters, is to be worked again.

Ohio.—Work at this mine, near Jacksonville, has been resumed under Mr. Chittenden as superintendent.

Confidence Gold Mining and Milling Company.—At this mine at Confidence, R. C. Turner superintendent, Sydney Addison has been making tests of ore preparatory to putting in a cyanide plant.

Duffield.—In this mine at Carters, the Scanavino Bros. and Jos. Roscha have struck rich rock.

El Oro.—In this mine, near Carters, Collins & Johnson have found a vein of fine ore.

Experimental Mining Company.—This company owns the Duleek and other properties near Groveland, and will resume work on them shortly. Andrew McGregor is in charge.

Gladys Gold Mining Company.—This company has purchased the Gladys Mine, near Big Oak Flat, and is developing it.

Harvard.—At this mine at Jamestown, 30 of the 60 stamps are dropping, and 75 men are employed.

Keltz.—At this mine, near Columbia, 15 stamps are dropping and 20 men are employed.

Lady Washington.—This mine at Carters has been bonded by W. H. Martin, of San Francisco, who owns the New Albany Mine, which, it is stated, is to start up again. Mr. Martin has also bonded an extension of the Dead Horse Mine at Carters from Baker Bros. Ballard & Martin were the former part owners of the famous Rawhide Mine, now owned by Capt. Nevills alone.

Longfellow Gold Syndicate, Limited.—This company at Big Oak Flat, A. P. Dron superintendent, owns the Nonpariel Mine, and money has been raised to develop it.

Red Haugh Mining Company.—This company, recently organized in San Francisco, has bought the Red Haugh, Lena Belle, Mayflower, Young America and Iron Cloud mines, with a millsite, etc., near Carters.

The directors are F. J. Carman, J. N. Bradley, S. W. Van Syckel, S. C. Mason and R. V. Ellis, all of San Francisco. The new company is to develop the claims.

YUBA COUNTY.

(From Our Special Correspondent.)

Miller.—On this mine, near Brownsville, 36 men are at work, and the indications are favorable.

Yuba River Dams.—The barriers on the Yuba River, to be constructed jointly by the Federal and State Government, may now be built. The land required for the sites of the dams has been secured by condemnation proceedings, the Emyard property of about 625 acres being the last. The Government has appropriated \$250,000 for the dams, and the State of California has appropriated a like sum. The dams are intended to hold back the mining debris. Contrary to general supposition, the miners will not be allowed to dump debris from the hydraulic mines behind these new dams when finished. Each individual mine will still be compelled to construct and maintain its own dam. The new dams will be constructed by the United States engineers of the California Debris Commission. The appropriations were made some time ago, but it has not been possible to start work, as the lands adjacent and at the sites could not be acquired without condemnation proceedings.

COLORADO.

BOULDER COUNTY.

Boulder Oil Wells.—Oil has been struck in the Boulder Basin well at about 3,120 ft. The Crawford well is down over 1,900 ft. The North Star is down 900 ft. The Martin is resuming drilling after removing the bailer. The Republic No. 2 well is being sunk. Indications of oil are reported at the Blue Jacket. The Carnahan and the Manhattan wells are going down steadily.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

Colorado Specie Payment Company.—A dividend of 2 per cent has been declared, making the third in 6 months. The company is working on 5 lodes from the shaft. The Comstock Mine and Donaldson Mill will be consolidated with the group in case a tax deed is declared void.

Franklin Consolidated.—Efforts have been made to connect this mine with property on the west, but the company will drift on the vein instead of cross-cutting. In driving one level in the Franklin 40 tons of crude ore per day are broken and go to the Wilkie Mill.

John Owen Mining and Milling Company.—At the annual meeting at Idaho Springs the following directors were elected: Lombard Williams, C. S. Baxter and Charles Brewer, of Boston, Mass.; G. T. Williams and H. G. Meadows, of Buffalo, N. Y., and John Owen and R. C. Bonney, of Idaho Springs. A committee was named to negotiate for a sale of the property, it being understood that a consolidation with 2 other big mines is under way.

Marshall-Russell Gold Mining, Milling and Tunnel Company.—At the annual meeting, held at Empire, the following officers were elected: W. C. Marshall, president and manager, of Empire, Colo.; Ralston Russell, vice president; O. N. Mariburg, secretary, and W. G. Davis, treasurer. The company has just installed a complete plant of machinery and will drive the tunnel to the north with machine drills.

Sun & Moon Mining and Milling Company.—At the annual meeting at Idaho Springs. Reports showed a production of \$159,000 of ore for the year, with a profit of about \$50,000. Among the heavier expenses were drifting in the Newhouse tunnel, putting in a new hoist, new air compressor and pumps, and enlarging the shaft house and building ore bins. The company is in a very prosperous condition.

GILPIN COUNTY.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—J. W. Hatfield to the Gilpin & Cripple Creek Mining and Tunnel Company, the Superior, Doctor and Ground Hog lodes, Phoenix District; Carl Hedman to C. Edman, the Ingeburg lode, Gregory District; J. W. Baldwin to J. C. Nelson, half-interest Klondyke and Texas lodes, Russell District; J. N. Brothers to J. N. Peterson, the Shottburg lode, Gregory District.

Carcassonne Gold Mining Company.—A lease and bond has been secured on the Detrich lode in Russell District and active work is to be carried on. H. E. Corn, Russell Gulch, is manager.

Cashier Gold Mining and Recovery Company.—Enough mill ores are shipped to keep 20 stamps dropping, the ores bringing average values. The smelting ores run from over \$100 for first class, the second class going from \$80 to \$100 per ton, and a third class is now being shipped to the Golden Smelter, ranging from \$20 to \$28 per ton. The April production of smelting ores was 111 tons. This will be increased. B. L. Campbell, Central City, is manager.

Chase.—New York parties have become interested

in this property in Russell District and arrangements are under way to take out the water and sink the main shaft, now 500 ft. deep. Leasers have taken out ore running as high as \$150 per ton. W. Couch, Central City, is in charge.

Derigo.—Eastern parties have purchased this property in Hawkeye District for \$35,000, part cash, the balance to be paid in 60 days. The property consists of 6 claims, and the principal work has been by a tunnel; the ore is free milling, running better than 4 ozs. gold per cord.

Gunnell Gold Mining and Milling Company.—Preparations are under way for sinking the Grand Army shaft from 1,240 ft. to 1,400 ft., and connections will be made with the Gunnell shaft. Nearly 100 men are at work, the daily shipments averaging from 50 to 75 tons. Frank C. Young, Central City, is manager.

Kansas-Burroughs Consolidated Mining Company.—The April production was 278 cords, or 2,535 tons, a daily average of 85 tons. Most of this went to the stamp mills, but of late increased shipments have been made to the Golden Smelter, the returns from which have been satisfactory. An average force of between 100 and 125 men is employed, with P. McCann, Central City, as manager.

Keystone Gold and Copper Company.—Nebraska parties forming this company have taken up their lease and option on the Klondyke group in Russell District and are preparing to install machinery. J. L. Mitchell, Central City, is manager.

Mida Mining Company.—Nebraska parties are interested in the Russell Hill Mine. Besides the smelting ores a 4-ft. crevice of milling ore has been opened.

Miners' Ore Sampling Company.—A 5 and a 35-h.p. gasolene engine are to be installed at the new works at Black Hawk, the machinery to be of Fairbanks, Morse & Company's make. The plant is to be automatic in every detail. D. H. Allen, Black Hawk, will be in charge.

Phoenix District.—Iowa parties are figuring on a 10-stamp rapid-drop mill on their property near Rollinsville. The company is known as the Blue Grass Mining and Milling Company, with offices at Rollinsville.

Sylvania Gold Mines Corporation.—At the annual stockholders' meeting, held in the company's office, 334 Cooper Block, Denver, the directors elected were F. F. Graves, B. E. Lake and Lewis A. Rice, of Denver; Dr. George McElveen, Trimountain, Mich.; and Charles E. Shepherd, Minneapolis, Minn. The property is situated on Quartz Hill.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Ore Production.—Shipments the past week have averaged 2,400 tons daily. The Greenback has finished sinking and will soon add 200 tons a day to the tonnage. The Ibox has increased its output.

Leadville Zinc Shipments.—Another increase in zinc shipments is made by a daily tonnage just started to the Mineral Point Zinc Company, and also to the South Chicago Zinc Works.

Diamond Gold Mining Company.—At a depth of over 1,000 ft. this company is drifting to strike the Resurrection ore shoot. New machinery has been added. The company is financed in Philadelphia, and the shaft was sunk from the surface. A large amount of money has been expended to date, but no ore has yet been encountered. Frank Brooks is manager.

Evalyn Mining Company.—The work of sinking the new shaft from the upper to the lower levels, a total depth of 1,200 ft., has been completed and drifts are to be started from this point to tap the sulphide shoot.

Forest City Leasing Company.—The new strike in No. 2 shaft Forest City has been followed 20 ft. and shows a 2-ft. streak that is improving.

Fryer Hill Mines Company.—Carpenters, machinists and surface men to the number of 100 men are getting ready for pumping and mining. The 150 acres will be drained through the old El Paso shaft and the pumps will be going within 30 days.

Grafton.—This Poverty Flat property is shipping from a large siliceous body. It has opened an enormous manganiferous shoot which has no market at present.

Greenback Mining Company.—The shaft was carried down from the immense iron sulphide shoot opened up at 1,300 ft. to 1,350 ft., where a station is being cut for a 1,100-gal. compound pump. Drifting in this lower territory will then begin, while shipments will continue from the upper levels. Later the shaft will be carried to 1,500 ft.

Hap Hazard Mining Company.—A new and large plant of machinery is in place on the new shaft and cross-cutting is being done in order to reach the vein.

Home Extension Mining Company.—Reports from Boston are to the effect that \$50,000 in bonds have been taken by Boston people. Leadville has subscribed for \$12,000. An effort will be made to resume very soon. Officers just elected are T. W. Shape-

leigh, Boston, president; C. K. Dunbar, treasurer, and A. A. Wyman, secretary.

Little Louise.—Eastern capitalists have bought up all the old stock of this company owning a large virgin acreage in English Gulch, and extensive work has started. Prof. Lindeman represents the company.

Midas.—Retimbering and other repair work has been completed. New development work shows greater strength of the iron shoot, and shipments average 200 tons a day.

Morocco Mining Company.—The company has temporarily ceased work on its A. V. shaft, due to present inability to obtain a lease from the city on the streets and alleys of its ground.

New Jersey Gold-Copper Reduction Company.—This company has a lease on the old Harrison Reduction Works dump owned by the St. Louis Smelting and Refining Company. New York and Philadelphia people are interested, headed by J. A. Jeannotte as president and C. A. Miller as vice-president here. One furnace has been ordered, and is being put in place.

Occidental Development Company.—Under the direction of E. B. Pelton, of Granite, Colo., this company is conducting important operations on the old Belle of Granite Mine. The shaft is 400 ft. deep, and the property is developed by 5 levels, in which over 2,000 ft. of drifting has been done. The pay streak runs from 4 to 8 in., and the ore runs as high as 7 oz. gold and 8 oz. silver. Twenty-five tons per month of the high-grade material are shipped.

Printer Boy Mining Company.—The New York owners are settling up their debts and promise re-umpment. They are pumping and holding the water at the 200-ft. level.

Rialto Mining Company.—Financial difficulties by this Boston and Colorado combination still hold off mining operations. The pumps will be kept going, however, by the Small Hopes people and surrounding mines to save their ground from being flooded.

Small Hopes Mining Company.—Lessees are shipping from the Boreel, Emmet, Forest City and other parts of this territory, while from the R. A. M. shaft the company has increased to 75 tons a day of sulphides.

Twin Peaks Mining Company.—This is a new Twin Lakes concern formed by Jos. Dixon, of Philadelphia, to operate a large acreage in Twin Peaks section. Interested with Mr. Dixon are W. J. Merrill, J. H. Danenhower and W. G. Merrill, all of Philadelphia.

Valley Leasing Company.—This is a new company, financed in Springfield, Mass. A large plant of new machinery has just been placed. Sinking will start as soon as J. W. Deane returns from the East. The company is after the New Monarch ore shoot.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

The State road from Pandora to Bridal Veil Basin is again under construction. It is hoped that the road will be completed this year. The road will open up one of the greatest mining districts in San Miguel County. The basin is practically undeveloped, but has veins that are large and well defined. The bad trails have prevented much attention being paid to the district.

Butterfly-Terrible.—Work on the mill cross-cut tunnel at Ophir is progressing rapidly, and about 9 ft. per day are driven. The tunnel will be completed before winter.

Deadwood Tunnel.—About 60 tons of ore from the famous Nevada vein at Ophir will be shipped to the Suffolk Mill for a test, to determine the kind of machinery necessary for saving the values. The ore shows free gold, and it is reported that a mill will be constructed at the tunnel.

North Star.—Andrew Emerson and John Smith, leasers on this Ophir mine, will soon ship 4 cars of high-grade ore. At present they are driving a lower cross-cut tunnel.

Tomboy Gold Mines Company.—The new blacksmith shop at the Argentine tunnel, near Telluride, is ready for use. J. W. McKie, who has the contract for the construction of the new mill and the bunk and boarding house, has carpenters framing timbers.

TELLER COUNTY—CRIPPLE CREEK.

Blue Bird.—The management will shortly commence straightening the upper lifts of the shaft. When this is completed a more powerful hoisting plant will be installed. Considerable prospecting goes on in the lower levels, but very little ore is marketed.

Golden Cycle Company.—It is stated that the new ore body recently cut in the 900-ft. level of the Legal Tender shaft has been drifted on 75 ft. The production is being maintained at about 110 tons a day.

Last Stake Gold Mining and Leasing Company.—This company, operating the Last Stake claim of the American Consolidated Company adjoining the Gold Coin at Victor, has decided to replace the present machinery with a new equipment. A 1,000-ft. 50-h. p. steam hoist will be installed and the 232-ft. shaft im-

mediately sunk to 580 ft. The company is cross-cutting at 230 ft.

United Mines Company.—This consolidation of the Wood Investment Company's holdings is capitalized at \$5,000,000. The concerns that are combined are themselves consolidations of many smaller ones. The companies that form the United Mines Company are:

Name.	Authorized Capital.	Issued Capital.
Consolidated Mines Company.....	\$ 2,500,000	\$ 1,908,000
New Zealand Consolidated Mines Company	1,000,000	920,000
Diamond Gold Mining Company.....	2,000,000	2,000,000
Columbine Victor Deep Mining and Tunnel Company	2,000,000	2,000,000
Battle Mountain Consolidated Gold Mining Company	2,500,000	2,425,000
Columbine Gold Mines Company.....	1,000,000	889,300
Bonanza Queen Gold Mining Company.....	1,250,000	1,250,000
Total	\$12,250,000	\$11,494,100

The directors are: Warren Woods, F. M. Woods, H. E. Woods, J. M. Allen and Frank E. Brooks. The offices of the new company will be at Colorado Springs.

The consolidation makes the United Mines Company one of the largest mining concerns in Colorado. Some of the companies have been heard of before, but the Diamond, the Bonanza and the New Zealand are new concerns.

Vindicator.—The No. 2 workings, at Victor, from surface to the 600-ft. level, have been leased to a former superintendent of the company who is already prospecting with a small force of miners. The lower workings are connected with the levels of the main shaft, and are being operated on company account. During the absence of Manager Campbell in Europe the mine is in charge of Superintendent Holden.

GEORGIA.

LUMPKIN COUNTY.

Etowah Gold Mining Company.—This company has been organized to buy and operate the Auraria Mine, for several years past owned by H. D. Jacquish. There is a 20-stamp mill on the property and a good water-power. The officers are: President, T. M. Keyser, New York; treasurer, Edward Riegelmann, New York; secretary, A. Welles Stump, New York; manager, H. D. Jacquish, Auraria.

IDAHO.

CUSTER COUNTY.

(From Our Special Correspondent.)

White Knob Copper Company.—S. F. Boyd, a director of the company, has taken charge of the properties at Mackay, vice Wayne Darlington resigned. The new 600-ton smelter is completed and has been turned over by the Allis-Chalmers Company. The 12-mile electric railway connecting the smelter with the mine will be finished within a few days, and it is expected that the smelter can be blown in about June 10.

A new 12-drill compressor plant is ready to start at the mine. The labor trouble has been settled, the men have all gone back to work, and the future of this big enterprise seems bright.

It is estimated that the mines are in shape to keep the smelter supplied constantly for 2 years with 600 tons of ore a day that will yield an average value of about 4 per cent copper and \$3 gold and silver per ton. The plant has 2 300-ton blast furnaces of latest design. So far as mine development has extended the ores are carbonates and oxides, and can be reduced to base bullion at one operation. Good lime and iron fluxes can be mined with the ore in sufficient quantities, and it is estimated that copper bullion can be produced 2c. per lb. cheaper than at the Montana smelters.

Under Mr. Boyd J. D. Audley Smith will be metallurgist; George B. Milliken, mine manager; F. W. Fink, consulting engineer; A. L. Leycock, electrical engineer.

IDAHO COUNTY.

Buffalo Hump District.—July 1 will see 4 stamp mills in operation, according to a local paper, giving employment to over 200 miners. The early fall will see the capacity of all the present mills increased and several more properties being worked.

Cracker Jack.—Manager Stevens is installing the machinery for the 5-stamp mill at Hump, and expects to have the mill running by June 1. The property is a stock company composed of Claude Flint, Rufus Hawley and W. A. Stevens as the principal stockholders. Last fall they sold a third interest to W. A. Stevens and others in consideration of a certain amount of development work and the installation of a 5-stamp mill.

Wise Boy.—At this Hump mine the management is installing the 50-h. p. boiler, so as to have the power to start the sawmill for getting out mill timber. Manager Kelly is pushing the lower crosscut tunnel with 3 8-hour shifts.

INDIANA.

CASS COUNTY.

(From Our Special Correspondent.)

Independent Coke and Coal Mining Company.—

This company, of Logansport, has been incorporated. Capital stock, \$10,000, to be increased. The directors are: T. S. Kernes, G. H. Lynas, C. C. Torr and T. W. Torr. This company will mine and sell coal.

MIAMI COUNTY.

(From Our Special Correspondent.)

New Oil Fields.—At Amboy, this county, great excitement prevails on account of petroleum being discovered in quantity. Within a few days 5,000 acres of land have been leased, and arrangements are being made for drilling on a big scale. Operators from Indiana and Ohio are gathering in the field.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Calumet & Hecla.—The openings in the ground tributary to the Red Jacket shaft are being extended rapidly. The shaft is now shipping to the mills 600 tons daily, with 2 compartments hoisting rock.

Champion.—The depths of the shafts are as follows: B, 635 ft.; C, 600 ft.; D, 715 ft., and E, 850 ft. Sinking is in progress in B, C, and E shafts. The mine is shipping 225 tons of rock per day.

Construction work on the new stamp mill and boiler house is completed and 5 boilers are installed in the boiler house.

Copper Range Railroad.—This railroad has secured a right of way from the Calumet & Hecla Company over its lands for the extension from Houghton to Calumet. The steel rails for the 20 miles of new road have been ordered from the Cambria Steel Company.

Mayflower.—The exploratory shaft at this property is down 265 ft. and sinking continues. The drift to the south at No. 1 level is in a considerable distance.

Old Colony.—Sinking a new shaft at this property, northeast of the Calumet & Hecla Mine, has started. Men are stripping the overburden. The shaft will strike the lode cut by the diamond drill at 250 ft.

Oscoda.—The Kearsarge mines are shipping nearly 1,500 tons of rock daily, 850 tons of which come from the North Kearsarge branch.

Tamarack.—The 29th level cross-cut from No. 5 shaft to No. 2 shaft has been holed through. The cross-cut is 700 ft. long and will greatly improve the air circulation in No. 5.

Timountain.—Preparations are under way for sinking 2 new shafts to be known as Nos. 4 and 5. The exact site for the shafts has not been determined but they will be located north of the ground already opened. No. 1 shaft is sinking to the 9th level, and Nos. 2 and 3 to the 6th level. The 3 shafts are connected at the first 2 levels. The openings in the bottom of No. 3 shaft are reported very rich, and 8 drills are opening up new ground. Excavation for the foundation for the new mine office is under way. At No. 1 shaft the foundation for the new hoist, which is now on the ground, is about completed. About 450 men are employed.

Winona.—The 6th level drift south from No. 2 shaft encountered the lode at a distance of 360 ft. Stopping has started at the 3rd and 4th levels and it is proposed to open sufficient ground to furnish 15,000 tons of rock for a mill test. The 2nd level drift, south, is in 1,250 ft., 3rd level 1,390 ft., and the 4th level drift 1,570 ft.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Allouez.—The water in the old workings on the conglomerate lode is down to the 16th level. Pumping will continue until the mine is drained.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—The Allis-Chalmers Company is rushing the installation of the machinery at the stamp mill. The washing machinery for 2 heads is installed and work on the first head is under way.

Mass.—A shipment of 27 tons of mass and barrel copper was recently sent to the Quincy Smelter. Last week an 8-ton mass was encountered in the lower levels.

IRON—MENOMINEE RANGE.

West Penn.—The timber shaft at this mine, at Vulcan, caught fire recently, causing all work to stop. The fire is now reported under control.

MINNESOTA.

(From Our Special Correspondent.)

There has been much delay to ore traffic the past week on account of lack of cars at the mines, particularly to those shipping via the Eastern Minnesota road. This road will have a lot of new steel cars of 100,000 lbs. capacity June 1.

The Duluth & Iron Range road is figuring on the purchase of 600 to 700 of these large cars, probably 112,000 lbs., for next year, and retiring a lot of the oldest wood cars.

There has been no change in lake freights, but the leading interest could easily force the carrying rate to 65 or 70c. if it desired. There are more boats than cargoes.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Explorations in T. 58, R. 19, Sections 15, 16 and 17.—The Eastern Minnesota road has 3 drills working in section 17, on the southwest ¼ of the northeast ¼, and is in good ore, the extent of which has not been determined. In section 16, adjoining D. E. Woodbridge has 3 drills at work, and is finding some ore. In the southwest ¼ of the southwest ¼ of section 9, adjoining the Woodbridge explorations to the north, R. Whiteside has a drill working. East of him, in 9, Hale and others have a drill, but have been unsuccessful so far. The northwest ¼ of the northwest ¼ of section 15 has been taken for exploration. The forty, directly south of this, is leased to the Minnesota Iron Company. In the northeast of section 16 Wanless & Congdon have drills working, but their results are unsatisfactory as yet. The southeast ¼ of the northwest ¼ and the south ½ of the northeast ¼ of section 15, the Eastern Minnesota has taken under a lease from Whiteside and the Rouchelau-Ray Iron Land Company, on the basis of 25c. and 50,000 tons. There have been shown here about 1,500,000 tons of ore. The same parties have taken the 3 forties in the south ½ of 15, adjoining.

Fayal.—This mine is employing 800 men, and is shipping 300 carloads of ore, or 10,000 tons, daily to docks from open pit, stock pits and shafts 1, 2 and 3. Many improvements are being made about the mine, including a large assay office, at which all ore shipped to Two Harbors will be analyzed.

Fay Exploration Company.—One shaft is down 115 ft., 25 ft. in ore. The second is down 45 ft., and is troubled by water. Hoisting plants are in, and ore will be shipped in 2 months. Some sales have been made for this year's delivery. Exploration on both properties continues, as well as on the Webb, adjoining, and with some success, it is claimed.

Jordan.—An engine house and other buildings are going up; a compressor and other machinery from an old mine on the Menominee Range have been shipped, and will be installed immediately, and a steam shovel is uncovering the ore for a milling pit. An incline shaft is going down and a railroad is building in from the main line of the Eastern Minnesota road. The mine will be shipping late in the summer.

Mesabi Chief.—This old mine has been optioned to the Eastern Minnesota road at a price of \$65,000 for the 25c. State lease, and is being explored. It lies in the s. w. ¼ of 23 T. 57 R. 22. It has been explored several times but unsuccessfully.

Minnesota Iron Company.—This company, at its Burt Mine, at Hibbing, is employing 200 men in the stripping, and a shovel is working day and night. In order to reach the Burt a cut had to be made through the Day, out of which 80,000 yards of earth are to be moved; half of this is done. Room for a second shovel is being cut. Winston & Dear are doing this work on contract. The Minnesota Iron Company has an option, it is said, for the southwest ¼ of the northwest ¼ of section 15, T. 58, R. 19, and will explore there. Ore has been found on both sides.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Edith Mining Company.—This company, operating on 4 lots of the Continental land at Joplin, has started a 100-ton mill which was brought from Galena.

Lennox Mining Company.—This company, on the Missouri lead and zinc land, has removed a 100-ton mill to its No. 3 mine and begun operations on the 110-ft. level. This ground was worked before by another company, but only the cream of the ore was taken out.

Superior.—This mine, on the Leonard land, has just started a new 100-ton mill with sand jig and sludge basins. The mine is averaging better than 10 tons of ore per shift.

Joplin Ore Market.—The sale of the Imperial and Royal Blue ores, followed by the sale of the King Jack ore, was the final clean up of the ores that had been accumulated by the recent producers' pool. It is generally conceded that the pool did raise the price of ore from \$28 on a basis of 60 per cent to \$30 for the same ore and maintained that price for a month, although there was no corresponding advance in the price of spelter. It is rumored that the last of the pool ore sold for \$31 on a 60 per cent basis. The Excel, a 64 per cent ore, which has been selling for \$34 a ton to the Lanyon Company, was sold last week to the Edgar Company, and there is little doubt but that the price was raised. The Sphinx ore, which assays 63.8 per cent, sold for \$34. All the mines are running on full time and a great production is expected the coming week. Last year, for the corresponding week, the shipment was less by 2,046,310 lbs. of zinc and 236,970 lbs. of lead, and the value

was less by \$57,986. For the corresponding first 20 weeks of last year the shipment was less by 5,358,470 lbs. of zinc and 171,140 lbs. of lead. The sales for the week were greater than the average of either this year or last year.

Following are the shipments of both lead and zinc ores from the various producing camps for the week ending May 17:

	Zinc, Lbs.	Lead, Lbs.	Value.
Joplin	3,055,970	432,620	\$58,352
Galena	1,259,020	170,110	21,511
Aurora	901,300	6,720	11,820
Carterville	1,293,600	292,450	25,264
Spurgeon	476,200	72,630	6,378
Webb City	1,023,490	72,370	16,450
Oronogo	338,390	5,930	5,124
Prosperity	531,050	153,490	11,015
Cave Springs	17,840	24,280	5,308
Duenweg	773,140	68,700	12,739
Zincite	286,450	11,870	4,814
Carthage	94,790	.....	1,517
Neck City	636,150	.....	10,815
Stotts City	222,800	.....	3,565
Granby	280,000	31,800	3,425
Carl Junction	125,210	.....	2,003
Sherwood	39,850	15,920	932
Pioneer	60,000	.....	840

Total 11,715,250 1,351,240 \$201,872
Total 20 weeks 206,877,010 25,351,960 3,439,761

Zinc value for week, \$171,586; lead, \$30,286; zinc value, 20 weeks, \$2,889,566; lead, \$549,194.

Thomas Hill, of Prosperity, who recently sold the Mount Ararat Mine, has just purchased 40 acres from S. E. Carter for \$4,000, and has secured options on the Hancock 80 acres at \$125 per acre, and 80 acres of S. E. Carter at \$125. All this land lies between the Pleasant Valley and South Carthage mines and is unprospected. Prospecting will begin at once.

MONTANA.

BROADWATER COUNTY.

(From Our Special Correspondent.)

Toston.—The shaft on this property, 14 miles west of Toston, is down 100 ft.; 14 ft. of copper ore averaging 10 per cent is said to show at the bottom. The ore is chalcopryrite. The property is under bond to Butte people who are preparing to sink 100 ft. deeper. This is a new district that has come into prominence through this strike. W. E. Edwards is in charge.

CARBON COUNTY.

(From Our Special Correspondent.)

Butcher Creek Oil Field.—A small flow of oil is coming from the Cruze well. Other wells will be started shortly.

Grove Creek Canal Company.—H. H. Heald, Frank S. Dunham and W. E. Reno, of Red Lodge, are the incorporators. The capital stock is \$25,000. The company will take water from the Clark's Fork River for mining and irrigating purposes.

FERGUS COUNTY.

Kendall Company.—The 350-ton cyanide mill at Kendall is in operation. The plant includes electrical and pumping machinery on Warm Spring Creek, 6 miles from the mine, a pipe line to conduct the water to the mill, and a cyanide mill.

The main mill building is 180 by 55 ft., and contains rock crushers, 12 150-ton leaching tanks, sump tanks, gold tanks, etc. Some 550,000 ft. of lumber were used in the construction of the mill.

The company owns 10 claims. A 200-ft. shaft has been sunk on the Leaking claim, and at that depth extensive drifting has been done on the ore. Cross-cuts have shown the ore body in places to be as much as 125 ft. wide. Ore is being hoisted from the 200-ft. level during development and will be sent to the mill.

An open cut has been quarried, directly back of the mill, from which a working tunnel has been run on the 100-ft. level from which the surface has been reached by an upraise, and a chute constructed, through which ore is dropped. The tunnel is 750 ft. long.

Most of the development work at present is on the 200-ft. level. A drift from the shaft runs southwest some 400 ft., and is reported all in ore which cross-cuts show to average 90 ft. in width. A drift to the southeast has been run 100 ft.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Elkhorn.—Owing to the closing of the East Helena Smelter unwatering the deep workings is abandoned and the pumps have been drawn.

Little Nell.—J. E. Heward has secured a lease and bond on this Lump Gulch property from Dr. Head, the owner. The ore is a complex silver blend and used to ship about 150 oz. silver per ton.

LEWIS & CLARKE COUNTY.

Montana Mining Company, Limited.—This company owns the old Drumlummon Mine at Marysville. The April report states that the output for that month was: Gold, 1,080 oz.; silver, 4,760 oz., obtained from 2,250 tons of ore crushed by the 40-stamp mill, and from 6,477 tons of tailings from the dams. The estimated realizable value of the produce of crushing is \$11,100, and of tailings, \$13,100, a total of \$24,200. The treatment of 6,477 tons of tailings cost \$7,600,

and the total expenses were \$19,400, leaving an estimated profit of \$4,800. The 40-stamp mill was employed 28 days. The tailings plant resumed operations on April 12.

The cyanide plant for the Lucky Girl Mine that the company recently acquired, is on the road to Edgemont, Nev.

(From Our Special Correspondent.)

United Smelting and Refining Company.—A statement filed with the Secretary of State says the company has sold its holdings in Montana to the American Smelting and Refining Company. The statement says that the company is not doing business in Montana any longer and that its assets in the State consist of about \$50,000 in cash, notes, etc. There are no liabilities.

MADISON COUNTY.

(From Our Special Correspondent.)

Boss Tweed & Clipper.—This property was acquired some months ago by A. C. Burrage, of Boston. For some reason all work on both the mines and the 100-stamp mill has stopped. What the trouble is no one here seems to know.

Madison Power Company.—This power company, whose headquarters are at Norris, reports that it has contracts for power for the following points: Butte is getting 1,200 h. p. at present; Pony is to take 300 h. p.; the Red Bluff Mine has contracted for 100 h. p.; the Madisonian Mine is to have 150 h. p.; the last mine is owned by Z. T. Leiter, of Chicago, and is under the management of E. H. Trerise, of Norris.

Red Bluff.—This property at Red Bluff, under the management of Mr. Austin, has the machinery on the ground for a 100-ton concentrator. It is the intention to build the mill before taking the water from the shaft. A pumping plant with a capacity of fully 1,000 gals. will be necessary to unwater the mine. It is the intention to use power from the Madison Power Company for both mine and mill.

Sure Shot Placer Mining Company.—Articles of incorporation for this company have been filed with the Secretary of State. The work will be on South Meadow Creek not far from Washington Bar. Alex. Mackel, T. G. Heinze and Burt G. Alley, of Butte, are the trustees. The capital stock is \$60,000.

SILVER BOW COUNTY.

Minnie Healy.—Counsel for the Amalgamated Copper Company and the Boston & Montana Company have applied to the Supreme Court for an injunction restraining F. Augustus Heinze and the Montana Ore Purchasing Company from operating this mine, pending the appeal in the suit of the case. The court set the application for hearing on May 20. In 2 affidavits made by employes of the Amalgamated Company allegations were made to the effect that Mr. Heinze's men, since the operation of the Minnie Healy Mine last June, had blown up the slopes in the 800-ft. level, and it is intimated that this was done to destroy evidence as to the amount of ore abstracted.

NORTH CAROLINA.

ROWAN COUNTY.

(From Our Special Correspondent.)

Gold Hill Copper Company.—The owners of the old Gold Hill mines are putting things in operation. They have a 10-stamp mill and concentrator at work and are down 600 ft. in the Randolph shaft. Walter Newman, of 25 Broad street, New York City, is directing the work.

Union Copper Company.—This company has again blown in its smelter and is turning out a good grade of matte. The new manager, Mr. J. A. Taylor, of Denver, Colo., has made several important changes whereby production is cheapened.

OREGON.

BAKER COUNTY.

Badger.—The 2 5-ton boilers for this group of claims in the Susanville district will be placed in position soon. Ten stamps have been shipped to the mine from Sumpter. The mill, when completed, will have a capacity of 30 stamps. The property was purchased about 3 months ago by Mr. Bradley for the Bunker Hill & Sullivan Company. The pay streak of the Badger is reported as 1 to 10 ft. wide.

Oregon Development Company.—Everett Brown, of Penn Yann, Pa., is the manager of this company's properties, the Cracker-Oregon claims, on Big Cracker Creek, near Sumpter. The property consists of 2 patented claims recently purchased of Messrs. Taber and Janney. There are 300-ft. of tunnels on the Cracker. A 60-ft. shaft has been sunk on the Oregon. Open cuts reveal the ledge for a long distance. Manager Brown says he expects to have a 5-stamp mill on the property before fall.

(From Our Special Correspondent.)

Beason.—These placers on Big Creek, near Sumpter, have been sold to C. A. Linnberger and Warren Faul, of Memphis, Mo.

Golconda.—A strike of \$1,000 ore is reported in this mine at Sumpter in a winze on the 200-ft. level.

North Pole.—This mine, in the Cracker Creek District, has been developing a body of high-grade ore by a tunnel on the 1,100-ft. level. A shipment of 10 tons of concentrates to the Everett Smelter is reported to have given very high returns. The development has been altogether by tunnel. The property is equipped with a 10-stamp mill, concentrators and a roasting and cyaniding plant. An aerial tramway, 1½ miles long, connects the mill and mine.

Spring Gap.—C. R. Aldrin, of Spokane, Wash., has purchased this group of claims, near Sumpter, and will erect a mill.

JOSEPHINE COUNTY.

Oregon & California Gold Fields, Limited.—This company, of which G. J. Coles, of New York City, is president, controls the Eureka Mine near Grant's Pass. Machinery for the property is being hauled in. Walter de Varila is superintendent.

Lowell.—The owners of these copper mines near Waldo have bought a 30-ton Vulcan smelter, which has arrived at Grant's Pass. The owners are Eureka, Cal., men, and have incorporated as the Mountain Copper Company. They expect to have the smelter running by June 1.

Waldo Smelting and Mining Company.—This property is near the California line, 3 miles southeast of Waldo. The stockholders include Bond V. Thomas, of New York City; John Garth, of Milwaukee, Wis., and Spencer Penrose, of Colorado Springs, Colo. The officers are James O'B. Gunn, president; Charles L. Tutt, vice-president; Spencer Penrose, secretary and treasurer, and T. Wain-Morgan Draper, general manager. The company is capitalized at \$3,000,000 in \$100 shares, and controls 560 acres of land on the east fork of Illinois River. It is now building roads, erecting a sawmill and preparing for work on a large scale. The company is sinking a shaft now down 125 ft., said to show some very rich copper ore, mostly black oxides.

LANE COUNTY.

Calapooia Mining and Tunnel Company.—This company is being incorporated with a capital of \$3,000,000 by an eastern syndicate headed by P. J. Jennings, to develop a group of 21 claims near the Musick Mine in Bohemia District. The company proposes to drive a tunnel 7,000 ft. long from the head of Champion Basin. The company also proposes to erect a power plant on Row River about 16 miles from the terminus of the projected Cottage Grove-Bohemia Railroad.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Black Hills Porcelain Clay and Marble Company.—The company has 150 tons of mica ready for shipment. A shipment was made 2 months ago. The company is going to work its marble and lithograph stone this year, and a sawing plant is to be installed. Chas. E. Nason is superintendent and William Collier is in charge of the work.

LAWRENCE COUNTY.

Deadwood Terra Mining Company.—A circular issued from this company's office in New York City, states that at a special meeting of the stockholders, on April 21, it was voted that the corporation be dissolved. Pursuant thereto, proceedings have been had to legally accomplish the dissolution. The assets of the company have been reduced to cash and all its obligations and indebtedness discharged, and there now remains available for distribution among the stockholders, in proportion to their respective holdings, the sum of \$221,000, which will entitle each stockholder to receive for each share of stock held by him the sum of \$1.105, which amount the transfer agents, Messrs. Lounsbury & Company, will pay upon each share of stock upon delivery and surrender of the certificates of stock to them at their office, No. 15 Broad street, New York City.

(From Our Special Correspondent.)

Deer Lick Gold Mining Company.—Work has been resumed on Iron Creek after a several weeks' shutdown on account of deep snow. The company is opening low grade cyaniding ore.

Homestake Mining Company.—The new Ellison hoist will be running in June. It has been over 5 years building, and is by far the most complete in the Black Hills. The machinery was manufactured by the Union Iron Works, of San Francisco, Cal.

Horseshoe Mining Company.—The milling ore is said to average \$6.30 per ton. The company is shipping heavily to the Denver smelters and to the National Smelter at Rapid City.

Hidden Fortune Gold Mining Company.—The headquarters of the company are to be removed from Lead to Deadwood. T. J. Steele, the superintendent, has the ground broken for a mill at Deadwood.

Imperial Mining Company.—The first clean-up has been made at the new cyanide plant in Deadwood. W. B. Milliken, builder of the plant, has signed a contract

to operate it 2 years. The company is receiving some custom ore from the Horseshoe Company.

Pennsylvania Gold Mining Company.—A 14-ft. vein of ore is reported on this property in Rutabaga Gulch, 1 mile west of Lead. William S. Koker is manager.

Spanish R.—Conners Brothers, owners of Spearfish, have resumed sinking.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Copper Cliff Mining Company.—A special stockholders' meeting is called for June 12 in Chicago, Ill., to amend the by-laws. The company is working claims on Little Rapid Creek. Several shipments of graphite have been made.

Dolcode and Tea.—The Walton Mining Company, composed of Black Hills and Missouri men, has purchased these 2 groups, near Hill City. George Bain, of Hill City, and A. K. Gardner, of Rapid City, are local officers. The Dolcode was a producer for several years.

Grantz Gold Mining Company.—A shaft has started, and hoisting machinery is expected. The company will sink 300 ft.

Long Mill.—F. H. Long's electro-cyanide plant at Mystic has started on custom ore. It was enlarged last year and improvements added.

National Smelting Company.—The new 500-ton smelter at Rapid City is running at full capacity. The ore is supplied by several mines in Lawrence County. The plant has a dust flue 450 ft. long, built up the side of the hill to the stack, and containing a series of chambers. The flue is 12 ft. in the clear each way. The slag is granulated for the dump.

Ohio-Deadwood Gold Mining Company.—The company is preparing to patent its 475 acres of mining ground.

Tycoon Mining Company.—The 10-stamp mill at Keystone has started. It formerly belonged to Ingram & McEachron and was used for custom work. The Tycoon Company has remodeled it and added concentrating tables. An air compressor has been put in the mill for working drills in the mine, connection being made with a 1,600-ft. pipe line. The company owns the Ranger group of claims.

TENNESSEE.

ANDERSON COUNTY.

(From Our Special Correspondent.)

Fraterville.—An explosion of gas in this mine of the Coal Creek Coal Company at Coal Creek at 7:20 o'clock on May 19 caused the loss of 205 lives. The bodies are being recovered with considerable difficulty, but it is probable that all will be gotten out. No explanations of the cause of the disaster have been given, as the mine has never been considered very gaseous. It is likely that the explosion was due to dust as well as gas.

The Fraterville Mine is owned by the Coal Creek Coal Company, of which Major E. C. Camp is president and general manager. It is the oldest mine in the Coal Creek District, having been opened in 1870. A large area has been developed and worked.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—During the week ending May 17 the banks at Salt Lake report settlement on ores, bullion, gold bars and cyanides as follows: Gold bars, \$82,000; gold, silver, lead and copper ores, \$149,300; bullion, \$45,400; auro-cyanides, \$4,400.

BEAVER COUNTY.

(From Our Special Correspondent.)

Smelter for Beaver County.—Col. Farrish has just left for Denver, Colo., and will return later. His report says that the development of the county's copper resources has been retarded by the long railroad haul and, until within a year or two, by the refusal of the smelters at Salt Lake to handle ores at reasonable prices. The Majestic, Imperial and other groups of mines can be made accessible to a mill or reduction works at Milford by railroads or tramways with easy grades. Water power that will provide 2,000-h.p. is estimated as available, and a tonnage of 1,000 tons of ore per day should offer no difficulties. The cost of mining, reduction and marketing charges should approximate \$5 per ton for crude ore. The two railroads now in course of construction, the Oregon Short Line and the Clark road, will open up a great mineral-bearing country which will be tributary to the proposed works.

Estella.—W. H. Penrose reports affairs at this mine, about 1½ miles below the Harrington and Hickory group, in satisfactory condition. A 25-h.p. hoisting plant has dropped the shaft in the 7-ft. vein to a body of ore carrying gold and copper.

Horn Silver.—For the week ending May 17 the mine shipped to smelters 4 cars of ore.

IRON COUNTY.

(From Our Special Correspondent.)

Johnny.—Manager Dooley, of this mine, at State-line, has gone to Salt Lake City to inspect the plans of a new mill. As soon as the company has given its approval of the plans grading will start. The plant is to have a capacity of 30 tons daily at first.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—During the week ending May 17 the mines shipped to the samplers in Salt Lake 34 cars, as follows: Eagle and Blue Bell, 4 cars ore; Carisa, 1 car ore; Yankee Consolidated, 12 cars ore; Mammoth, 10 cars ore; Bullion Beck, 5 cars ore; Lower Mammoth, 2 cars ore.

Fish Springs Shipments.—During the week ending May 17 the Galena and Utah each shipped a car of ore.

Low Grade Ore Rates.—The agitation of the last two months over freight rates and smelter charges for low-grade ores has resulted in a reduction of both. On June 1 the tariff on all ores of the value of \$15 or less between loading stations at Tintic and the furnaces of the valley smelters will be reduced to \$1.50 per ton, and on ultra iron \$1.25. On the former this gives a reduction of about 40 per cent, on the latter of about 38 per cent. At about the same time the Bingham Consolidated Smelter offers a reduction in working charges of from \$1 to \$1.50 per ton. T. R. Jones, district manager for the American Smelting and Refining Company, states that the furnace schedule now shows a reduction in the working charges on ores to which the modified tariff applies of from \$1 to \$3 per ton, while a reduction of \$4 has been made in favor of the more desirable. The action of the smelters and the railroad has given an added stimulus to activity in the various camps that will be affected.

Grand Central vs. Mammoth.—It is stated that Judge Marioneaux, of the District Court at Nephi has denied the Mammoth's motion for a new trial. The Grand Central now has a suit in the Federal Court in Salt Lake to quiet title and the Mammoth has begun a similar proceeding in the District Court of Utah.

Star Consolidated.—It is reported that control of the property at Tintic is to pass to D. H. Peery, W. F. Snyder and their associates. The rumored consolidation with neighboring properties is said to be entirely without foundation.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—During the week ending May 17 the following consignments went to the Salt Lake samplers: Columbia, 1 car ore; Ben Butler, 2 cars ore; Yosemite, 1 car ore.

Bingham Consolidated.—The company shipped to the refiner in Perth Amboy, N. J., during the week, a consignment of about 200,000 lbs., or 3 cars. The actual value of the bullion cannot be had at present. The management is producing an average of 40 to 45 tons of bullion daily.

Utah Consolidated.—For the week ending May 17 the company shipped 4 cars of copper bullion, approximately 240,000 lbs., to Eastern refineries.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending May 17 the shipments are divided as follows: Daly-West, 2,421,980 lbs. ore; Ontario, 1,110,030 ore; Anchor, 214,250 lbs.

Anchor Mining Company.—A final payment of approximately \$300,000 has been made at the National Bank of Park City by J. J. Daly, of the Daly-Judge Company. The latter company is reported to have \$200,000 in its treasury.

California Mining Company.—W. W. Armstrong, Cashier of the National Bank of Park City, has begun suits to recover \$30,000, with interest of \$1,166, and \$7,931, with interest, for money advanced. An attorney's fee of \$1,200 is also demanded, making a total judgment asked of \$39,397. The bill also asks the appointment of a receiver.

Mackintosh Sampler.—A large up-to-date sampler, complete in all departments, is contemplated by the management through the executor, Charles Read. It is understood that contracts for the work will be let in a few months.

Putnam Mining Company.—Mrs. Phoebe A. Hearst and James B. Haggin have entered suit in the District Court to annul the conveyance of this company's property to the Quincy Mining Company and the subsequent conveyance to the Daly West Mining Company. They ask 7 per cent of all the moneys earned by the Quincy Company, including the \$1,200,000, which is said to have been paid in dividends, and the \$200,000, which remained in the treasury when the transfer was made to the Daly-West; that a decree be entered in their favor for .06586 part of the stock received or to be received by the Quincy Mining Com-

pany, with interest, less \$3,194, that has been received. The defendants named are the Putnam Mining Company, Quincy Mining Company, W. M. Ferry, Henrietta McLaughlin, W. W. Armstrong, J. T. Claseby, J. Farrell, W. V. Rice, D. D. Erwin, H. Newell, David Keith, and Walter Scott. The complaint alleges intent to defraud on the part of the principals concerned.

Quincy Mining Company.—This property has been formally turned over to the Daly-West. The property embraces 28 claims, part of which are in Summit County, part in Wasatch.

Silver King.—A regular dividend of \$100,000 for May has been distributed; this makes the total dividends to date \$5,150,000.

Zinc Plant.—A. L. Dickeman, mining engineer, of Colorado, representing the Boston purchasers of the Mayne & Linnard zinc plant, has arrived and will take complete charge. It is understood that the new owners intend to add many improvements for treating zinc ores and tailings.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—Shipments to smelters during the week ending May 17 were as follows: Utah Queen, 4 cars ore; East Honerine, 1 car ore; Ophir Hill, 10 cars concentrates.

Vulcan.—M. H. Walker and Chas. H. Scheu have taken this group at Stockton, the price being in the neighborhood of \$35,000. The property is said to contain extensions of the Honerine and St. Patrick veins. The retiring Boston and Philadelphia owners acquired it many years ago, but suspended work. The group consists of 5 locations with fractions, and the present workings will be but 200 ft. from the Honerine.

WASHINGTON.

PIERCE COUNTY.

Carbon Hill Coal Company.—The mines of this company at Carbonado have shut down and will not be operated again until a new battery of 75 coke ovens is completed, and hereafter the output of the mines will probably be exclusively coke. The cause for the change of the output is found in the change by the Southern Pacific Railroad Company from coal for steaming to oil. The Southern Pacific colliers, which have been carrying the coal from Tacoma to California points, have been laid off.

WYOMING.

CARBON COUNTY.

Boston-Wyoming Smelter.—A contract to increase the capacity of this plant at Encampment from 100 tons daily to 500 tons daily has been let to the Mine and Smelter Supply Company of Denver, Colo. The step is taken in anticipation of the completion of the tramway to connect the smelter with the Ferris-Haggerty Mine, near Battle Lake.

LARAMIE COUNTY.

(From Our Special Correspondent.)

Pearl District.—Reports from this district near the Wyoming line, indicate favorable conditions, especially in the Coldwater and Mount Zirkel mines. It is said that J. B. Drew, of the State Line Copper Mines Company, located near the Coldwater, has uncovered some good copper ore.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

Robinson Gold Mining Company.—This company's detailed statement for March shows that 649 ft. development work were done and 11,045 tons rock hoisted, of which 2,940 tons were sorted out as waste. The mill crushed 8,305 tons of ore, with 60 stamps, the gold saved being 5,405 oz. There were 5,841 tons of tailings treated by cyanide, 1,721 oz. gold being saved. Concentrates treated by chlorination gave 889 oz. The total gold saved was 8,015 oz., or 0.97 oz. per ton crushed. The total revenue was £34,730; expenses, £24,762; net earnings, £9,968. The averages per ton of ore crushed, reduced to United States currency, were: Earnings, \$20.07; expenses, \$14.31; net profit, \$5.76. The returns are in fine gold.

ASIA.

INDIA—MYSORE.

Kolar Gold-field.—The output of gold from the mines of this field again showed a decrease in April, owing to a scarcity of water resulting from prolonged drought, which has seriously interfered with milling and cyaniding operations. The total production for the month was 38,329 oz. crude, being 3,246 oz. less than in March, and 3,709 oz. less than in April, 1901. For the four months ending April 30 the total was 161,569 oz. crude, against 168,358 oz. to the corresponding date in 1901; a decrease of 6,789 oz. The total this year was equal to 145,412 oz. fine gold, or \$3,005,666.

AUSTRALIA.

NEW SOUTH WALES.

The gold yield during the month of March showed a gratifying increase, being 22,762 oz. crude, equal to 19,091 oz. fine, as against 14,824 oz. crude, equal to 12,402 oz. fine for the corresponding month of last year. The increase is 6,689 oz. fine, or 35 per cent. The yield for the first three months of the current year is 79,949 oz. crude, equal to 66,513 oz. fine. This compares with 57,073 oz. crude, equal to 46,399 oz. fine, for the first three months of last year. The increase is equal to 20,114 oz. fine, or about 30 per cent.

QUEENSLAND.

The Mines Department reports for March a total yield of 60,278 oz. crude, equal to 44,105 oz. fine gold; showing a decrease of 4,797 oz. fine, or 9.6 per cent. For the three months ending March 31 the total was 174,207 oz. crude, against 175,875 oz. for the first quarter of 1901; a decrease of 1,668 oz., or 0.9 per cent. The total this year was equal to 126,300 oz. fine gold, or \$2,610,621.

VICTORIA.

The Department of Mines reports the gold production for February at 57,318 oz. crude. For the two months ending February 28 the total was 96,409 oz., against 105,770 oz. in the corresponding period of last year; a decrease of 9,361 oz., or 8.8 per cent.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

(From Our Special Correspondent.)

Granby Consolidated Mining, Smelting and Power Company, Limited.—This company has ordered from the Jenkes Machine Company, of Sherbrooke, Quebec, for its group of mines at Phoenix, 2 duplex tandem compound Rand compressors, cylinder 16 in. by 36 in. and 28 in. by 36 in., to have a capacity of 8,200 cu. ft. of free air at 80 revolutions per minute. High and low pressure cylinders are to be connected by a Rand water tube inter cooler. The capacity of the compressor, which will weigh in all about 300,000 lbs., will be 60 3/4 in. Rand drills at an altitude of 5,000 ft. The approximate horse power will be 1,300, and the motive power electricity, power arrangements having been made with the Cascade Water Power and Light Company, whose 3-wire transmission lines from Cascade to Phoenix are nearly completed. The motors, which will operate the compressors through a rope drive, have not been ordered. Included in the order given the Jenkes Company is an aftercooler, a 10-ton traveling crane, 20 3/4 New Giant drills, 10,500 ft. of rope, a 72 in. by 20 ft. air receiver and 6 small receivers. This plant will give the Granby Company the largest drill capacity, power in the Boundary District, and will be additional to 2 10-drill compressors now in use. A 12 by 18 in. Jenkes 2-cylinder hoist with drum 60 in. by 48 in. long, fitted with Lane's patent clutch, raw hide pinion and cut gear, for use at No. 2 shaft, is due to arrive at the mines. The company contemplates putting in a large crusher, similar to that installed at the B. C. Copper Companies' Mother Lode Mine.

BRITISH COLUMBIA—LAIDEAU DISTRICT.

(From Our Special Correspondent.)

Niagara Mining and Developing Company.—For 3 or 4 years a syndicate composed of New York men headed by George Gould, has been working quite extensively on the Skeena River, near Kitsalas Canyon, prospecting and developing some copper-gold propositions. This syndicate is now incorporated as a joint stock company, capitalized at \$600,000, in \$5 shares.

At present Alfred Skitt, of New York City, is acting president, while the management and superintendence of the work is in the hands of S. Arden Singlehurst, at present in Vancouver purchasing supplies. Mr. Singlehurst has been manager of the operations conducted by the Gould Syndicate and is familiar with the section in which the claims are located. During the past 3 years, the Gould Syndicate has expended a large amount of capital in prospecting and developing the properties. The fact that the developments are so important that it was not considered desirable to continue work merely as a syndicate is one of the principal reasons why the Niagara Mining and Developing Company was organized. During the present season your correspondent expects to visit that section of the Skeena River and give the readers of the ENGINEERING AND MINING JOURNAL a comprehensive description of it.

ONTARIO—LAKE OF THE WOODS DISTRICT.

(From Our Special Correspondent.)

Ontario.—On May 10 the usual monthly gold bricks arrived in Rat Portage from the Mikado, Sultana and Black Eagle mines.

Golden Reefs.—This property was recently purchased by the Gold Reefs Company of Traverse City, Mich., and was examined by Messrs. Gibbs, Burns, and Walpole Roland, who had a mill test of a few tons of the ore. The property is near the Mikado. Development work will begin forthwith.

Golden Horn.—H. Rideaut, the manager of this mine, arrived in Rat Portage recently with Capt. Williams, the company's engineer, who brought in some samples of ore from the new workings.

The stories of remarkably rich ore in the 100-ft. level are true, judging by specimens Mr. Rideaut secured from a 2-ft. streak down the vein. The ore-body proper is 12 ft. wide; the lowest average assay of this outside the 2 ft. is \$9.50, whilst the rich streak assays \$22 to \$76 per ton.

Development work to date includes a main shaft 110 ft. and cross-cutting of 70 ft. The air compressor plant is not yet working.

**MEXICO.
CHIHUAHUA.**

(From Our Special Correspondent.)

Bucna Suerte.—Victor Primrose, who is associated with C. C. Harris in the Santa Barbara District, is in New York City, where he was to meet Mr. Harris, and it is reported that the sale of this property has been consummated.

Tecolotes.—It is reported that this mill of the Guggenheim Exploration Company, a 500-ton concentrating plant, will be in working order in the course of the next 30 days. The mill is attracting much attention, as it will use the Loomis-Pettibone gas generating system, and will be the largest plant in Mexico operated under this system.

GUANAJUATO.

Guanajuato Power and Electric Company.—This \$3,000,000 concern has just completed its final organization at Colorado Springs, Colo., by the election of these officers: President and general manager, Henry Hine; vice-president, John Hays Hammond; second vice-president and treasurer, Leonard E. Curtis; secretary, Irving W. Bonbright; assistant secretary and treasurer, Edward B. Coffin. The Board of Directors for the first year comprises the above, with the exception of E. R. Coffin, together with R. A. Coffin, John S. Bartlett and Judge H. G. Lunt.

A costly power plant will be constructed on the Duero River, 110 miles from the City of Guanajuato, the capacity being 7,000-h. p. This current will be transmitted to Guanajuato and the neighboring mining sections. The work will begin July 1. It is expected that power will be supplied the neighboring properties within 1 year.

MINING STOCKS.

(Complete quotations will be found on pages 748 and 749.)

New York May 22.

The improvement in the metal trade is reflected in better prices for the copper shares. It is also noticeable that with advancing prices more stock is offered, as there are many holders ready to take advantage of the opportunity to sell. Consequently, transactions in both Amalgamated and Anaconda are larger, and prices higher than for some weeks past. Amalgamated sold up to \$71½ from \$66.75, and Anaconda to 117 per cent (\$29.25) from 112 per cent (\$28). Compared with the corresponding period last year the higher prices show a falling off of 44½% in Amalgamated, and 7.00 in Anaconda. The curb coppers also show more strength. Greene Consolidated, of Mexico, advanced from \$25½ to \$26; United, of Montana, from \$34½ to \$36½; White Knob, of Idaho, from \$20¼ to \$23¼; Gold Hill, of North Carolina, \$1½ to \$1¾; Union, in the same State, \$3¾ to \$4; British Columbia, \$7¾ to \$9¼; Montreal & Boston, also of British Columbia, \$2¾ to \$3¾. Sales of Tennessee were made at \$11¼ to \$12.75.

Ontario Silver, of Utah, sold again at \$7.75, while Horn Silver brought \$1.40.

Standard Gold, of California, reappeared at \$3.50.

Of the Cripple Creek stocks comparatively few investment orders have been reported. Portland hangs around \$1.80, and Elkton at 65c., while Isabella fluctuated between 37c. and 32c., recovering later to 36c.

Deadwood Terra, of South Dakota, has been dissolved as a company, the property being under control of the Homestake Mining Company. The last sale of Deadwood Terra stock was reported at 75c. on April 11, putting the market value of the property at \$150,000, while the company was capitalized at \$5,000,000. The company paid \$1,350,000 in dividends, the last being 15c. per share in May, 1898. This is a return of 27 per cent on the capital stock.

In the Comstock list the usual favorites were traded in, while prices fluctuated with the announcement of more assessments. The levies since January 1 aggregated \$239,830, or from 1 to 15c. per share by 24 companies, while for the corresponding period last year the total was \$305,702, or 3 to 20c. per share by 23 companies. Sales of Consolidated California and Virginia are noted at \$1.40 to \$1.50.

The first transaction in General Chemical preferred shares were made on 'change on May 20 at \$100¼. It is not expected that much will be done in the common or preferred shares, as they are held principally by individuals who are directly interested in the manufacturing operations of the company.

Auction sales were 350 shares Cornish Silver Mining Company of Canada (par \$50) at \$3 for lot; \$18,000 first consolidated mortgage 6 per cent bonds (15 bonds \$1,000 each and 6 bonds \$500 each) of the Guanajuato Consolidated Mining and Milling Company, of Mexico, at 5.

Boston. May 21.

(From Our Special Correspondent.)

Although favorable conditions prevail, copper shares have been dormant until to-day. The continued strength of Amalgamated helped and the list acted much better than for a long while. The activity, however, has been in the cheaper grade of stocks. The better dividend class is firm, but the medium grade, or expected dividend payers, which are the popular ones, seem to be criss-cross with prevailing conditions. The secret of this lies in the fact that a certain coterie of Boston capitalists is said to be short of Amalgamated and will not take hold of the Boston list until they have covered their shorts in this specialty. The public merely awaits the time when activity shall prevail. Some pool buying has been noticeable, while traders have bid up other stocks. Commission buying is said to be on the increase in Copper Range, Amalgamated, United States Mining, Mohawk and some others. The talk here is that Amalgamated will sell up 10 per cent before down this amount. Sentiment is unquestionably growing more confident regarding the copper situation. It certainly looks as if the metal was on the mend and would see higher prices. The Mass. Consolidated Mining Company is reported to have sold 100,000 lbs. at 12½c. this price and declined the same offer for 300,000 lbs. more.

United Copper has been quiet here, but more activity may be seen when listed. Papers are now being prepared for listing this stock on the Boston Stock Exchange.

Shannon Copper Company shares were regularly listed Monday, starting at \$17, reacting to \$16.50 and rallying to \$17.75 to-night. The total capitalization is 300,000 shares, par \$10, and \$600,000 in 7 per cent. first mortgage 10-year gold sinking fund bonds. But 185,296 shares are listed, as 111,847 shares are held in trust and 2,857 shares are held in the treasury. The stock in trust is the amount pooled by directors and other large holders until January 1, 1904. The mines are located in Graham County, Arizona, and consist of some 35 claims, containing over 600 acres. Development work to date amounts to over 17,000 ft. of tunnels, winzes, etc. The smelting plant is about 8 miles distant from the mining property on the line of a railroad. The company intends to build a \$300,000 concentrating plant.

Considerable selling of Isle Royale mining occurred early in the week on advices that the working force had been materially reduced at the property. The price broke \$3.25 to \$11.25, with recovery to \$13.25. The company will, however, make a search for the Baltic lode. The Bigelow management is also curtailing at the Tamarack and Osceola mines. Osceola settled \$2.50 to \$60.50, but recovered to \$62. It is now expected that the dividend usual at this time will be passed. The company paid two \$3 dividends last year. Tamarack improved \$5 to \$175. Calumet & Hecla is firm at \$550 to \$560.

Nothing new can be learned regarding the consolidation of Adventure and Mass. The former has fluctuated between \$23 and \$24, and the latter between \$19.50 and \$21. Atlantic has taken on \$2.50 to \$34.50. Parrot jumped up to \$27.87½ on reports of a rich strike. Utah Consolidated has been quiet at from \$21.12½ to \$23. Last year a dividend of 5s. was paid May 1, but none is likely to be paid at this time. About 900,000 lbs. of copper per month is being produced at a cost, said to be 6c. per pound. Mohawk has advanced \$2.50 to \$41. Copper Range fell \$3 to \$56, but recovered to \$58.50. Dominion Iron and Steel fell \$4 to \$52.50, but closed at \$57 to-night. Canadian interests are reported the late buyers.

Colorado Springs. May 15

(From Our Special Correspondent.)

The strength manifested last week in Cripple Creek mining shares has been well maintained throughout the present week. There is a strong undercurrent of interest, which constitutes the real backing of the market. The low prices now prevailing are attracting investors to the better class of securities, and purchases are being made all along the line. The old favorites still lead, and show considerable strength.

On May 9 Elkton sold up to 67½c., but weakened several points in the three days following, and closed the week selling down to 64c. to-day. El Paso opened on May 9, selling from 50c. down to 47½c., the decline being due to the expending of the force of the first announcement of the rich strike in the 600-foot workings. Realizing sales carried it down to 46½c. on the 13th, when the tide turned. The stock has gained all it lost and closed the week strong, selling at 50c. to-day. Golden Cycle sold at 59c. on May 9, but has manifested considerable strength during the week, selling up to 62c. to-day on the announcement of the opening of a new vein of high-grade ore in the 900-ft. workings. Isabella has oscillated between 27 and 29c. dur-

ing the week, closing strong to-day at 28¾c. Portland sold May 9 from \$1.85 down to \$1.81, and closed to-day in strong demand at \$1.87½.

The United Gold Mines Company was incorporated this week under the laws of this State to take over the property of the \$5,000,000 merger of the Woods Investment Company effected a month ago. The new company starts off June 1 by declaring a regular monthly dividend of \$40,000. The stock will be listed on the Exchange here.

Salt Lake City. May 17.

(From Our Special Correspondent.)

The week has been an active one in stocks. The most active traders during the week are as follows: Ajax was traded in to the extent of 13,350 shares, at from 45¼ to 41¾c.; same prices as last week. Carisa increased sales this week 10,000 shares over last week, bringing out 34,000 shares at lower prices. Consolidated Mercur has stiffened somewhat in price, most of the sales being made around \$1.83. The limit was \$1.85½ and \$1.80½, with 4,000 shares coming out on call. A little greater activity is noticed in Daly than usual, 280 shares coming out at \$1.96 to \$1.90. Daly-West of Park City still continues to be a feature, opening on Monday at \$42, closing on Saturday at \$45.10, a total of 836 shares being exchanged at prices between \$45.10 and \$41.63. The lower price is a falling off of \$3 from the closing of last week. May Day was quoted at 29¾ to 24¼c., the sales aggregating 45,400 shares. Lower Mammoth has been inactive, marketing only 600 shares at \$1.52½ to \$1.40. Sacramento rose to 24c., on sales of 2,600 shares, none lower than 21¼c. The sensation was the trading in Star Consolidated, of which 93,425 shares were placed this week at prices ranging from 37 to 22½c., the bulk of the sales being at 35c. The prices in the previous week were 25 to 20c. The most sensational drop in prices this week has been recorded by South Swansea, which declined from 58 to 37c., on sales of 12,200 shares.

United Sunbeam, long silent, reports sales of 500 shares at 35c. Uncle Sam was steady at 38 to 36c., with 25,000 shares sold. Victor made a sudden spurt the middle of the week and ran up from 18 to 27c., with sales of 8,900 shares. Yankee Consolidated opened two weeks ago at \$2.15 and ever since then has been steadily declining until at the close of this week \$1.56 was reached. To-day it rose to \$1.60 to \$1.70; only 5,200 shares were dealt in. California stock rose from its opening at 11 to 18c, marketing to-day 20,900 shares. The total sales for the week, the bulk of them about 15c., were 125,650 shares.

DIVIDENDS.

Name of Company.	Latest Dividend		Total to Date
	Date.	Per Share.	
*Ala. Coal & Iron pf.....	June 2	1.75	43,750 481,250
*Amalgamated Copper.....	May 26	.50	769,439 18,117,809
Am. I. & St., com.....	May 28	\$0.15	5,100 265,100
*Bartolome de Medina.....	May 30	.62	1,240 79,950
*General Chemical com.....	June 2	..	74,103 849,140
*Gold Coin, Colo.....	May 26	.03	30,000 1,210,000
*Helena, Oregon.....	May 26	.00½	6,500 150,500
*Homestake, S. Dak.....	May 26	.25	52,500 1,178,750
Homestake, extra.....	May 26	.25	52,500 ..
Lehigh C. & Nav.....	May 27	1.50	430,399 19,808,187
*National Lead pf.....	June 16	1.75	200,820 12,405,200
*Olin & Ind. Nat'l Gas.....	June 3	1.00	90,000 900,000
*Ontario, Utah.....	Jun. 20	.30	45,000 14,827,000
*Pacific Coast Borax.....	May 29	1.00	19,000 1,084,500
*Phila. Gas pf.....	June 2	1.25	99,959 599,754
*Rambler-Cariboo, B. C.....	May 30	.01	12,500 150,500
Shawmut Oil, W. Va.....	June 10	.50	25,000 125,000
*Sta. Gertrudis, Mex.....	May 26	.20	5,700 2,577,164
*St. Joseph Lead, Mo.....	June 10	1.50	37,500 3,534,500
Standard Oil.....	June 16	10.00	9,700,000 49,485,000
United Gold Mines, Colo.....	June 2	.01	40,000 40,000
*Va. Car. Chem. com.....	June 2	1.25	349,805 2,279,649

*Monthly. †Quarterly.

ASSESSMENTS.

Name of Company.	Loca- tion. No.	Delinq.	Sale.	Amt.
Alta.....	Nov.	May 26	June 20	.65
Andes.....	Nov. 56	June 18	..	.65
Annandale.....	Utah.	May 15	June 7	.00½
April Fool.....	Nov.	June 7	June 28	.65
Argentum-Juniata.....	Colo.	June 2	..	.68
Con. Imperial.....	Nov.	Apr. 27	May 27	.01
Emerald.....	Utah.	May 15	June 7	.60½
Eutonia.....	Utah. 11	June 7	June 30	.60½
Golden Star.....	Cal.	May 31	..	.64
Hale & Norcross.....	Nov.	May 27	June 20	.10
Jumbo.....	Utah.	May 16	June 4	.00 1-6
Kern River Oil.....	Cal.	May 29	..	.50
Little Chief.....	Utah. 12	June 19	July 7	.01
Little Standard Oil.....	3	June 2	..	.10
Madeleine.....	Utah. 1	June 9	June 30	.00½
Mayflower.....	Utah.	June 5	June 21	.03
Melno.....	Cal.	May 31	..	.63
Occidental.....	Nov. 38	May 15	June 5	.65
R. G. W.....	Utah.	May 6	May 26	.00½
Sierra Union.....	Cal.	June 2	..	75.00
Silver Bow.....	Utah. 3	May 30	June 17	.00½
Silver State.....	Utah.	May 10	May 31	.01½
Southern Queen.....	Utah.	May 5	June 24	.00½
Silver King.....	Ariz. 24	May 27	May 24	1.00
Usona Oil.....	Cal.	June 7	..	.01
Va. Con.....	Cal. 12	May 5	May 26	.02
Victor.....	Utah. 5	June 9	June 30	.03
West Morning Glory.....	Utah. 11	May 15	May 29	.01
Yellow Jacket.....	Nev. 11	May 10	June 19	.10

San Francisco. May 17.

(From Our Special Correspondent.)

Business has been somewhat quieter this week. A decline in the North End Comstocks was the feature of the market, and all prices weakened in sympathy. Some quotations noted are: Ophir, \$1.40@1.50, closing at the lower figure; Consolidated California & Virginia, \$1.40@1.45; Caledonia, 82@90c.; Mexican, 45@50c.; Silver Hill, 45c.; Potosi, 33c.; Sierra Nevada, 26@27c.; Yellow Jacket, 23c.

The monthly financial statements, as filed in the offices of the mining companies according to law, show cash on hand as below, with all expenses paid unless otherwise noted: Alta, \$30, with indebtedness of \$3,045; Alpha Consolidated, \$9.35; Andes, \$80, with indebtedness of \$445; Best & Belcher, \$1,666, with shipment of concentrates on the way and bills payable of \$17,500; Belcher, \$834, with liabilities of \$10,122 and April expenses unpaid; Bullion, \$1,376; Caledonia, \$3,452, with April expenses unpaid; Consolidated California & Virginia, \$77,699, with all bills on concentrates unsettled; Confidence, \$965, with April expenses unpaid; Crown Point, \$2,653, with April expenses unpaid; Chollar, \$1,658; Consolidated Imperial, \$1,315; Challenge Consolidated, \$816; Gould & Curry, \$4,799, with bills receivable of \$17,500, and liabilities due of \$13,161; Justice, \$216, with indebtedness of \$5,267; Mexican, \$4,764; Ophir, \$7,975; Overman, \$10,716, with April expenses unpaid; Potosi, \$2,789; Savage, \$7,352; Segregated Belcher, \$55; Silver Hill, \$15,252; Sierra Nevada, \$3,692; Standard Consolidated, \$123,127, with bullion account and mine expenses for April to be accounted for; Syndicate, \$3,435; Union Consolidated, \$2,995; Utah Consolidated, \$1,141.

The following companies have assessments under collection at the present date: Alta, Belcher, Chollar and Gould & Curry. Andes this week levied an assessment of 5c. a share, delinquent June 18.

Business on the Producers' Oil Exchange continued active. Sterling is still the chief feature of the market, but Junction, Lion and California Standard were also in demand. Some quotations noted are: Hanford, \$85; Home, \$3.55; Sterling, \$1.90@1.97½; Reed Crude, 33c.; Occidental, 21c.; Junction, 19@20c.; California Standard, 19c.; Lion, 19c.

The monthly record of sales on the Oil Exchange since January 1, 1902, is as follows:

Month—	Shares.	Value.
January	187,854	\$81,633
February	288,562	76,447
March	214,293	109,364
April	442,231	239,938

Totals

The April sales were greater than those of any of the preceding months; they were more than double those for March.

London. May 8.

(From Our Special Correspondent.)

The mining market has been very dull again and transactions have been few and far between. South Africans are waiting further developments in the situation with regard to peace proposals, and West Australians are still depressed by the threats of the bears. The British Columbian market has been very weak, owing to the report on Le Roi, which I mentioned in my last letter, and the others of the same group are inclined to fall in sympathy.

In the absence of business in South Africans the eyes of the mining market have been fixed on another bear raid on West Australians. This market has been famous or notorious for the organized bear raids that have from time to time upset the promoters and workers off of shares. This time a dead set has been made on Great Boulder Perseverance, the mine controlled by Frank Gardner. It is only recently that the report of this mine showed that it had been put on a good working basis with plenty of ore reserves and suitable plant and Mr. Gardner talked about 200 per cent dividends. The £1 shares were at £15 and people bought at that price, expecting a further rise. The bears have already brought the quotation down to £11 and they intend to get it down lower. The rumors circulated by them are to the effect that the reserves are not of as high a grade as was estimated and that the development at depth has not been encouraging recently. It is quite impossible to judge whether there is any truth in the rumors, but it should be remembered that all the West Australian bears' previous presages have unfortunately turned out to be true. Great Fingalls have also received similar attentions from the bears, and the quotation has dropped seriously. In fact, all the leading West Australian shares have to a certain extent been affected by these tactics. It is a long time since the general public has given much attention to this market and the bull and bear struggles have been confined to rival parties trying to wrest the control from each other.

The sensation in the mining market has been the publication of Mr. C. A. Moreing's report on the Etruscan Copper Estates. I have mentioned this company several times recently and have referred to it as an extensive property in Italy, where there was a

large amount of ore but of such a quality that it could not be worked at a profit by any usual method. Mr. Moreing has written a stinging report, in which he states that not only is the ore intractable, but it is of exceedingly low grade. He also gives the reader to understand that the managers were aware of the poorness of the ore, and mentions "confidence tricks" and "opera bouffe mining." Mr. Alexander Hill's report is also printed and he confirms Mr. Moreing's opinion of the ore without criticising the management. I understand that Mr. R. J. Frecheville, who recently reported on the Le Roi, was associated with Mr. Moreing in the examination of the Etruscan, so that there are practically three opinions here, all against the property. I have several times reported that the chief use of the company was to sell off the shares to the public at high premiums, though there was no doubt that real attention was being paid to the question of treatment. As a matter of fact, a good deal of trouble had been taken to get good advice as to treatment, but if there is not enough ore to treat these tactics amount only to a solemn farce. The number of sensational collapses in the mining market during the past year or two are enough to drive the ordinary speculator away altogether. There is at present very little prospect of any genuine revival in mining speculation.

COAL TRADE REVIEW.

New York. May 23.

ANTHRACITE.

Some people cannot or will not learn from experience, and prefer the absurd statements published by irresponsible newspapers to the dictates of plain common sense. At least this seems to be the only explanation that can be given for the flurry in the anthracite market. In April there were shipped, in round numbers, 5,000,000 tons of coal from the mines; the production to May 11 probably amounted to about 2,000,000 tons more. But a very small part of this has been held by the railroads, and the largest part of the remainder has not been consumed. It is held by dealers and individual consumers. Talk of an impending coal famine and a general suspension of all industrial activity comes from overheated brains. If the strike lasts till August 1, or if, as seems unbelievable, the bituminous mines in a number of districts deliberately violate their agreements with operators, then the situation will be serious; until that time or occasion there is no reason for the public to get excited. There is more coal on hand than certain dealers would have people think, and with warm weather ahead and consumption at a minimum 5,000,000 tons should satisfy all actual necessities for fully 2 months. The action of the retailers' association in New York City in raising prices \$1 per ton and the raises of 25 to 50c. per ton by dealers in other cities, whatever may be said in condemnation, have at least the merit of restricting buying and making supplies last longer.

As all the collieries are idle and a number of washeries that were running last week have since stopped, to avoid riotous demonstrations from strike sympathizers, the production of anthracite is very small, in fact, too small to cut any figure.

As to the probable duration of the strike opinions differ. There is no doubt that a large part, perhaps a majority of all the men in the union, would return to work to-day but for fear of personal injury and social obloquy. Their earnings have been the best on record, and some of them at least can compare conditions when the strike was ordered with conditions 4 years ago. But certain labor leaders are determined that the union shall be recognized, that is, that none but union labor shall be employed, that labor organizers shall have free access to mines to see if non-union men are at work, and that the operators shall aid the labor leaders in collecting the union dues from the miners.

The claims of the mine laborers, the injection of political interests have played a large part in precipitating the struggle, but underlying all talk about higher wages and shorter hours is this question of recognition. The strike might be ended within a week by the operators making some concessions in wages, but they know that next year other demands would be made, and that the question of the miners or the operators controlling the management of the mines should be settled now. Bearing this in mind, it will be seen that all talk about arbitration is not to the point. The control of the mines is not a question for arbitration. Moreover, the operators see a revival of the old Molly Maguire spirit.

There is a great demand for coal. Producers are doling out what they have at regular prices to their customers. Retail dealers and jobbers are taking advantage of the situation. As high as \$8 per ton has been asked by dealers in New York City this week.

BITUMINOUS

The Atlantic seaboard soft coal trade during the week has been influenced by the anthracite situation, and has been excited and almost hysterical. Appar-

ently nearly all consumers have put in an order or two even when in no immediate need of coal, fearing that they might need some later. Consumers have also placed orders for the same amount with different concerns, and this duplication of orders has helped make the demand appear greater than it really is. Spot Clearfield coal has been selling up to \$3 per ton f. o. b. New York harbor shipping ports. Car supply at the mines is slightly better than last week, but not to what it was the week before, and producers would like a more liberal allotment. For coastwise traffic the vessel supply has been augmented by craft that were to carry anthracite, and at some shipping ports there are now more vessels than are wanted.

Demand from points beyond Cape Cod increased during the week on account of the fears of consumers and producers in some cases are receiving calls for from 3 to 4 times their production; yet the consumers cannot, apparently, understand why the coal is not sent forward at once. Along Long Island Sound the call for coal probably rests on greater needs than in certain other districts, as many consumers, it is believed, have not been able to get coal enough since last fall. New York Harbor trade shows the speculative character of the market better than that in any other territory, and people who wanted spot coal or early delivery have been paying speculators fancy prices. It is generally believed that most of the producing companies are delivering all the coal they can to their regular customers, and are not seeking to profit by the market situation.

Transportation from the mines to tidewater is slow, and producers fear that this will block some relief to the market. Car supply at the collieries is 75 per cent of the demand and over. In the coastwise vessel market things are in a curious state. Some shipping ports are bare of vessels, while at others there are more vessels than are needed. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 75@80c.; Boston, Salem and Portland, 95c.; Wareham and Bath, \$1; Lynn and Gardiner, \$1.05 with towages to latter port; Newburyport, and Bangor, \$1.10; Portsmouth, 95c@1.

Birmingham. May 19.

(From Our Special Correspondent.)

The work being done on the opening of new mines in several of the coal-producing counties in this State is being pushed. The Sloss-Sheffield Steel and Iron Company has started the removal of the convicts from the Coalburg mines, in Jefferson County, to the Flat Top Mountain mines, in Walker County. The Coalburg mines and prisons have been condemned, and the State ordered the convicts removed. The company is making quite an extensive improvement in the way of development, and, as the railroad is built to the Flat Top mines, the shipment of coal will begin. Fifty convicts have been moved to Flat Top, and will be given employment in the opening of the mines and building of stockades. The company leases between 800 and 900 convicts from the State and several counties.

The new mines at Abernant, in Tuscaloosa County, are idle. The miners declare that the company refuses to recognize the union, hence the lock-out. Between 40 and 50 miners are usually employed there.

Chicago. May 20.

(From Our Special Correspondent.)

Apprehension of a strike in the anthracite mines, that may spread to the bituminous mines as well, has almost suspended wholesale coal business. The large firms are not taking new orders, but confining their operations to filling orders already on hand. Retail dealers have in some instances advanced prices, but the wholesale price of \$5.60 for the month of May is as yet unaffected. Very little anthracite is coming into Chicago, but the local supply is sufficient for present needs.

Bituminous coals are, with slight changes, selling at the same prices as last week. All grades are in plentiful supply for present needs, but wholesale dealers are shy about booking new orders; as with anthracite, everything awaits the outcome of the strike movement. To-day's quotations are: Hocking, \$3 net; West Virginia, \$3.12 net; Youghiogheny, \$3.20 net; Indiana block, \$2.45; Indiana semi-block, \$2.10; Clinton lump, \$1.90; Indiana lump, \$1.80; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2; blacksmith's coal, \$3.40. The first three grades—Hocking, West Virginia and Youghiogheny—have a special discount, the established prices being \$3.35, \$3.47 and \$3.55, respectively. There is still something of a scarcity of blacksmith's coal. Smokeless grades are in light demand at \$3.25 for lump and egg, \$3 for nut and \$2.85 for run-of-mine.

It has been discovered that by the removal of a row of piles along the Washington street tunnel, boats drawing 1 ft. more water can be admitted to the South Branch of the Chicago River. The city will immediately remove the piles. This improvement

will be of especial value to the dealers in anthracite coal who have docks along the South Branch.

Cleveland. May 20.

(From Our Special Correspondent.)

The shipment of coal up the lakes during the past week has been beset by more difficulties, the principal one being the lack of cars with which to bring it to the lakes. This has been a calamitous season for the coal shippers—one in which the supply of material has been constantly less than the demand. While they have kept the consumers at the head of the lakes from actually running short of coal they have been unable to collect any large stocks, and consequently are catching up none of their movement for the year. This week there has been a flood of boats at the lower lake docks to move the soft coal. Hard coal shipments have been suspended entirely from Erie and Buffalo, which has thrown all of the coal boats back to the Ohio ports for loads. Naturally this would flood the market. The condition, however, has been eased up some by an action of the vessel owners, who, objecting to a reduction to 30c. on the Duluth rates, have withdrawn their boats from the coal trade. But even at that there have not been enough boats withdrawn to do any injury to the trade. The movement to Lake Michigan has been heavier than that to Lake Superior ports. Canadian ports are taking a great deal of coal for the Canadian railways, and this shipment has been the feature of the trade, so as those ports take small boats for which it is easier to get loads than for the larger ones. The lake rates continue 45c. to Milwaukee and 30c. to the head of the lakes.

Pittsburg. May 21.

(From Our Special Correspondent.)

Coal.—The demand for coal is increasing, but there is no improvement in the supply of railroad cars. While all of the mines are in operation none is running to full capacity on this account. An important deal was made by the Pittsburg Coal Company this week which will enable it to ship more coal to the northwestern markets. A three years' contract was entered into with the Pittsburg & Buffalo and the Manufacturers' & Consumers' coal companies for the lake output of these concerns. It is agreed to furnish not less than 300,000 tons annually, and for this season it is expected that the amount will reach 1,000,000 tons. The rivers have not been navigable for several weeks, and the Monongahela River Consolidated Coal and Coke Company now has fully 15,000,000 bushels loaded ready to go out. There will not likely be a rise in the rivers until next month. A rise in June is almost a certainty, as it has only failed on one or two occasions within the past 20 years. Reports from Cincinnati are to the effect that there is less coal afloat at that port than there has been for many years. Prices of coal remain unchanged.

Connellsville Coke.—There is an improvement in the car supply this week, and the shipments promise to be heavy. Complaints were numerous of the shortage in shipments last week, as furnace owners are anxious to get as large a tonnage as possible in the event of labor disturbances that are promised by the workers on June 1. The price for furnace coke for prompt shipment is firm at \$2.50, and foundry is \$3. But few sales are recorded this week at less than those prices. In the last issue of the *Courier* the production for the previous week is given at 221,740 tons. The shipments for the week aggregated 11,649 cars, distributed as follows: To Pittsburg and river tripples, 3,860 cars; to points west of Pittsburg, 5,570 cars; to points east of Connellsville, 2,219 cars. This was a decrease of 326 cars compared with the shipments of the previous week.

San Francisco. May 17.

(Special Report of J. W. Harrison.)

During the week the coal arrivals have been as follows: One from Japan, 9,150 tons; 3 from British Columbia, 12,062 tons; 1 from Washington, 350 tons; 2 from Australia, 4,112 tons; total, 25,674 tons. The total amount received is fully equal to the quantity required for general use. There has been a singular arrival of 9,150 tons on the *Algoa*, from Japan. This is the largest amount we have had at any one time from that section. It does not come here seeking a buyer, but is for consumption by the importers. Business in the coal line does not show any marked improvement as to the quantity consumed, or the prices obtained, no sale being made where the importer can show any profit, although prices asked are exceptionally cheap. Freight rates on coal from Great Britain and Australia still rule low. This is a singular fact in view of the grain freight rates outward from here, remaining likewise exceedingly low. This year will prove a particularly unprofitable one to ship owners, as freights inward and outward will leave little, if any, profit to the carriers. Another cargo of East Greta is just at hand, and will be used exclusively for domestic consumption. This is the third cargo which has been bought and distributed solely for house

uses, and is very strong evidence that it has been tried and found well suited for that purpose.

Foreign Coal Trade. May 22.

Somewhat more inquiry is noted for cargoes to Mediterranean ports, otherwise the export market is quiet.

Exports of coal and coke from Great Britain for the four months ending April 30 are given by the Board of Trade returns as below, in long tons:

	1901.	1902.	Changes.
Coal	12,419,865	12,750,864	I. 330,999
Coke	236,031	188,916	D. 47,115
Briquettes	317,228	340,299	I. 23,071
Total	12,973,124	13,280,079	I. 306,955

In addition to the exports given above, there were 4,641,868 tons of coal sent abroad for the use of steamships engaged in foreign trade, against 4,067,703 tons last year; an increase of 574,165 tons.

Imports of coal and coke into Germany for the three months ending March 31 were, in metric tons:

	1901.	1902.	Changes.
Coal	1,023,903	1,053,746	I. 29,843
Brown coal, lignite	1,718,191	1,660,789	D. 57,402
Coke	104,209	98,070	D. 6,139
Totals	2,846,303	2,812,605	D. 33,698

The quantity credited to the United States this year was 1,727 tons, against 41 tons in 1901.

The exports of coal and coke from Germany for the three months are reported as follows:

	1901.	1902.	Changes.
Coal	3,628,129	3,508,632	D. 119,497
Brown coal	5,681	4,260	D. 1,421
Coke	559,422	439,704	D. 119,718
Total	4,193,232	3,952,596	D. 240,636

The larger exports of coal were to Austria, Holland, Belgium and Switzerland.

The production of coal in Germany is reported as below for the three months ending March 31, in metric tons:

	1901.	1902.	Changes.
Coal	27,238,335	25,080,178	D. 2,158,157
Brown coal (lignite)	11,027,244	10,205,395	D. 821,849
Totals	38,265,579	35,285,573	D. 2,980,006

The total coke made was 2,009,439 tons, against 2,483,010 tons in the first quarter of 1901; a decrease of 383,570 tons. The briquettes made were 2,040,312 tons, against 2,177,274 tons in 1901; a decrease of 136,962 tons this year.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of May 10 that the tone of the Welsh coal market is somewhat weaker, owing to the exceedingly large output combined with scarcity of tonnage. Quotations are: Best Welsh steam coal, \$3.90@3.96; seconds, \$3.72; thirds, \$3.48; dry coals, \$3.24; best Monmouthshire, \$3.42@3.48; seconds, \$3.18; best small steam coal, \$2.16; seconds, \$1.92; other sorts, \$1.80.

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 remains about unaltered, although, owing to lack of prompt handy-sized tonnage, Mediterranean rates are again firmer. Some rates quoted from Cardiff are: Marseilles, \$1.40; Genoa, \$1.44; Naples, \$1.44; Sabang, \$2.76; Singapore, \$2.76; Las Palmas, \$1.56; St. Vincent, \$1.74; Rio Janeiro, \$3; Santos, \$3.36; Buenos Aires, \$3.24.

IRON TRADE REVIEW.

New York. May 22.

The iron trade continues extremely active, as shown in the local reports which follow. The struggle now is to secure the needed material for construction work in progress, and it looks as if a good deal of foreign material would be required to fill the gaps.

As to prices, it is not easy to speak definitely. Nominally quotations continue unchanged for most classes of material, and these rates hold on long contracts. For earlier deliveries, however, all sorts of premiums are paid, the amount depending largely on the buyers' necessities. These premiums, it must be remembered, affect only a comparatively small part of the actual deliveries of material.

Birmingham. May 19.

(From Our Special Correspondent.)

The public announcement was made during the past week that No. 2 foundry iron was selling at \$16 per ton, whereas quotations had been published up to that day at \$12. It has been common knowledge among furnacemen that all sales being made were at prices considerably in excess of those published, but the official quotations never were above \$12. The formal announcement of \$16 iron was made by J. C. Maben, president of the Sloss-Sheffield Steel and Iron Company, and he further announced a great scarcity of the product. Inquiry developed the fact that some of

the larger concerns were out of the market entirely, while two or three of the smaller firms were selling iron for delivery during the last months of the year. A high official of one of the iron concerns in this district when questioned as to the \$16 iron said that that price had been in vogue for some time, but that it was useless to make announcements when there was no iron to be sold. That the manufacturers had been protecting their regular customers right along. A small buyer, needing something like 200 tons, got it only at a rate of \$17.50 per ton, delivered in 50-ton lots, one lot per week.

The announcement of the \$16 rate caused considerable comment in the market here. The statement is made that much iron is being shipped and will continue to be shipped for some weeks at the old rate of \$12. Orders are on hand which will be worked on until the end of the year. No disposition is apparent as far as can be seen to sell iron for delivery next year at the \$12 rate. Southern manufacturers have made every effort to be conservative, but it was a hard strain and the bridle is now off; it would not be surprising to see immediate-delivery iron go as high as \$20 per ton.

The following quotations are now given: No. 1 foundry, \$16.50; No. 2 foundry, \$16; No. 3 foundry, \$15; No. 4 foundry, \$14; gray forge, \$12.50@13; No. 1 soft, \$16.50; No. 2 soft, \$16.

Several officials of other iron companies, seen after the announcement was made, said that they were surprised at the public statement made, inasmuch as the Sloss-Sheffield Company would not be able to deliver much iron this year on orders to be placed hereafter; that company is well covered with orders for its make for some months to come.

No change in conditions has occurred in the finished iron and steel manufacturing interests in this section. There is much activity in cast-iron pipe circles in the district, all the plants making heavy shipments.

Buffalo. May 21.

(Special Report of Rogers, Brown & Co.)

Local conditions are unchanged; a strong market exists with very little unsold iron available for delivery during the present year. On account of the shortage of domestic iron it has become necessary to bring into the territory east of here considerable foreign metal. Such shipments as have already been imported to relieve the situation have been absorbed by those who for one reason or another have found their supply insufficient to take care of their requirements. We quote below on the cash basis, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$22.25@22.75; No. 2, \$21.75@22.25; Southern soft No. 1, \$21.75@22.50; No. 2, \$21.25@21.75; Lake Superior charcoal iron, \$22@23.

Chicago. May 20.

(From Our Special Correspondent.)

It appears probable that if the present rate of buying pig iron continues unchecked the market for 1902 will be sold out in about a month. At present two things are worrying local producers of iron: the prospect of a coal strike that may tie up the coke supply and the efforts being made to unionize labor employed at the furnaces. The condition of things at the coal mines causes much apprehension among iron men.

There has been practically no change in prices since last week. No. 1 Northern is selling at \$21.50@22; No. 2 Northern at \$21@21.50; No. 3 Northern at \$20.50@21. Southern is still a doubtful commodity as regards price; No. 1 has sold at \$20.15@21.35, and No. 2 at \$19.65@20.85; these figures are probably destined soon to reach those for Northern iron.

Coke is plentiful so far as regards West Virginia grades, but there continues to be complaint about Connellsville. The price is \$5@5.25, a little lower than last week. Advice received to-day by dealers in coke say that the producers of the fuel will not accept any new orders until the strike question is definitely settled.

Cleveland. May 20.

(From Our Special Correspondent.)

Iron Ore.—Delays to boats coming down with iron ore have been an annoying feature of the trade, and is the direct result of the overchartering of vessels by shippers, superinduced, perhaps, by the lack of cars with which to move the ore away from the lower lake docks. The shippers, however, in order to keep the rates steady, are taking all the boats which are presented; these being more numerous than the trade demands, delays in unloading are inevitable. The rates are steady at 75c. from Duluth, 65c. from Marquette and 55c. from Escanaba. A few sales have been reported this week, being about the winding up of the buying for the year. It is now ascertained that the probable shipment this year will exceed somewhat the original estimate of 22,000,000 tons, which is indicated in the sales made. The prices hold firm at \$4.25 for bessemer old range, \$3.25 for non-bessemer old range and bessemer Mesabi, and \$2.75 for non-bessemer Mesabi.

Pig Iron.—There is a steady demand for pig iron during the last week, and the inquiries are coming in almost daily for large amounts of material, which the furnaces are unable to furnish, especially in the foundry grades. The quotations now are \$22 Cleveland for No. 2 alloy iron and \$16.50 Birmingham for a Southern No. 2. There has been a report abroad this week of a few sales of basic at \$20 Pittsburg. Cleveland producers report no iron for sale.

Finished Material.—There has been a good call for structural steel this week, deliveries being desired during the first quarter of next year. On such terms 2,000 tons have been contracted for of late. The mills are now sending out word that any one who wants material for delivery during the first quarter of next year must needs get his orders in early now. The price holds steady at 1.70c. Plate sales have been small, but the demand considerable. The mills are quoting 1.80c. generally, which, however, has not been sanctioned by any action of the association. The supply is getting to be very short, as some of the Eastern consumers have been in the market this week bidding up for sheared plates. The bar situation is very strong, as there is a good call for the material, and very little left for sale for some months to come. The quotations do not change from 1.60c. for bessemer steel bars, 1.70c. for open-hearth steel bars and 1.80c. for bar iron, all based on Pittsburg. The demand for sheets does not seem to improve greatly, and the mills are not sold up very far in advance. The condition of this market is more nearly normal than that of any other trade. The prices hold at 2.50c. for No. 10 and 3.50@3.60c. for No. 27, out of store. In all grades of steel the larger mills are absolutely refusing to sell to speculators even for deliveries at remote periods in the future.

Old Material.—The market has been a speculative one this week and a bit unsteady, but without a break in prices. The transactions have been large.

Philadelphia. May 23.

(From Our Special Correspondent.)

Pig Iron.—No developments have attracted attention in pig iron. Brokers are not concerned over the strike, even when coal supplies are short. The market, however, is unsettled, and a good many consumers are at sea. No. 1X foundry is still wanted for early delivery, particularly for July. A good deal could be sold. Large foundry buyers have failed this week to bring negotiations for summer deliveries to a point. A great deal of No. 2 will soon be demanded. Prices are not far from \$20.50@21. The outlook for forge is uncertain. If mills cannot run they will be able to do without forge, but the closest possible inquiry fails to unearth any probabilities as to how the coal strike will affect the mills. Basic has sold in large lots, and buyers want more. To-day \$20 was quoted, but where deferred deliveries will answer business is being done at a dollar less.

Billets.—German billets will help us out to some extent, but there is no assurance as to how much will get here in sixty days. American steel is nominally \$35.

Bars.—The bar iron trade is being acted upon from outside sources as well as home influences. The possibility of restricted production is one influence. Small buyers have been scouring around, and quite a store and retail business at mills has been done within a few days. Prices are \$2.00 higher, and quite a rush of small orders is now on.

Nails.—The demand for nails is quite active.

Sheets.—The business for the week fell below the average.

Pipes and Tubes.—Both these products are in excellent demand.

Scrap.—Our manufacturers are not concerned over strike probabilities, and will keep on booking all the business they can possibly handle.

Plates.—The effect of the persistent agitation to put up prices on plate is to hurry needy consumers into market. Quarter-inch plate is 2c.; flange, 2.10@2.20c.; fire-box, 2.25c.

Structural Material.—A good deal of disappointment has arisen to a number of small interests over deliveries. The mill people are doing the best they can. Prices usually published are altogether nominal.

Rails.—The rush of inquiries for 1903 delivery is on, and awards of contracts are expected to be announced soon.

Scrap.—Scrap of nearly all kinds is scarce, but for all that there is a wabbling in prices over certain sorts, as yard scrap and machinery cast. For heavy melting steel there is a very urgent demand at about \$21.50.

Pittsburg. May 21.

(From Our Special Correspondent.)

Prompt bessemer pig iron cannot be had this week at \$22. Valley furnaces and third quarter iron is equally scarce. One large lot for fourth quarter delivery sold at the highest price paid so far for late shipment. All the furnaces are being operated to their fullest capacity, and a heavy tonnage is being turned

out, but it is now said to be doubtful if all second quarter contracts will be filled by July 1. Extraordinary efforts are being made to get out as much iron as possible, owing to the probability of a shut down on June 1 through a strike of the workers. A strike now seems certain, but how serious it will prove cannot be determined until the date fixed for the enforcement of the demands for a three-turn system. It is known that in the Shenango and Mahoning valleys the English-speaking workers are thoroughly organized. The foreign element, however, is in the majority, and unless this class of workers join in the movement it will undoubtedly prove a failure, but in either event the disturbance is bound to have a bad effect on the iron and steel industries. No requests have been made by either side for a conference in an effort to avert a strike. The officers of the National Association of Blast Furnace Workers and Smelters insist that there will be no compromise, and a strike will certainly follow a failure to comply with the demands. The furnace owners say they will make no move until the result of the strike order is fully known. It is reported that some orders have been placed for foundry iron, next year's delivery, on a basis of \$20, Pittsburg.

The steel market is unusually firm, and prices are higher except in finished lines. Foreign steel is lower than the domestic product, it being possible at the present rates abroad to deliver billets and sheet bars in Pittsburg at from \$32 to \$33. This is from \$2 to \$3 a ton under the price offered for American steel. But little foreign steel is being received here. If the present prices were assured there is no doubt but that some large orders would be placed in the German market. Prices abroad are fluctuating, and as the duty is based on the foreign values at the time of shipment, the actual cost upon delivery in Pittsburg is uncertain. The mills are all in operation, and have enough to do for the balance of the year without taking on any new business. The United States Steel Corporation is still booking orders for structural material for delivery next year, and other leading interests in this district are now figuring on business for 1903. The plate pool meeting scheduled for last week was postponed, and will not be held until early in the coming month. There is a growing sentiment in favor of an advance. It has been decided to make the skyscraper being erected at Fifth avenue and Wood street larger than at first contemplated. It will be necessary to increase the order for steel needed by fully one-third. Under the revised plans the cost of the building will be increased about \$1,000,000.

The Crucible Steel Company of America announces this week the consolidation of two subsidiary concerns, the St. Clair Steel Company and the St. Clair Furnace Company, the merged companies to be operated by the Crucible company as the Clairton Steel Company. A steel plant and blast furnaces are being built at the new town of Clairton, on the Monongahela River, near Pittsburg, and the plants are expected to be completed and put in operation about September 1. The new concern has arranged with the Union Trust Company for \$5,000,000 to provide the money necessary to complete the furnace and steel plants, and to furnish ample working capital. Bonds for that amount will be issued and will be guaranteed by the Crucible Steel Company of America.

As noted last week there is no likelihood of an advance in the price of steel rails for 1903 delivery. The railroads are ready to place large orders as soon as the books of the rail producing companies are opened for next year's business. No sales have yet been made, but it is reported that the Cotton Belt system has placed an order for 30,000 tons said to be for delivery this year. It is not probable that these rails will be shipped until after January 1.

Pig Iron.—The only sale this week of bessemer pig iron was one lot of 15,000 tons for fourth quarter delivery at \$20.50, Valley furnaces. Spot bessemer cannot be had at \$22. Gray forge is in demand, and fancy prices could be had for early delivery. A lot of 500 tons for shipment in the last quarter sold this week at \$20, Pittsburg. Foundry iron cannot be bought at any price for early delivery. An offer of \$23, Pittsburg, for No. 2 is reported.

Steel.—The price of bessemer steel billets has advanced to \$33, but no sales of any consequence are recorded. Tank plate and steel bars are still quoted at 1.60c.

Sheets.—The market is unusually firm, and there is a stronger demand for special sheets for enameling and stamping. No. 28 gauge black sheets are still quoted at 3.10@3.15c., and galvanized sheets at 4.47c. in carload lots.

Ferro-manganese.—There is no change, the leading producer continuing to quote 80 per cent domestic at \$52.50.

New York. May 23.

Pig Iron.—Iron for summer delivery is harder to get, owing to furnaces in the Lehigh region running short of anthracite. Considerable foreign iron is coming in. We quote for tidewater delivery: No. 1X foundry, \$20@22.50; No. 2X, \$19.50@20.50; No. 2 plain, \$19@20. For Southern iron on dock, New

York, No. 1 foundry, \$20@21; No. 2, \$19@19.50; No. 3, \$18@18.50.

Bar Iron and Steel.—Prices are still higher. We quote or large lots on dock: Refined bars, 1.95@2c.; soft steel bars, 1.83c.

Plates.—Demand is still strong. We quote for tide-water delivery in car-loads: Tank, 1/4-in. and heavier, 1.95@2c.; flange, 2@2.10c.; marine, 2.10@2.20c.; universal, 1.95@2c.

Steel Rails.—There has been more buying. Deliveries will run into 1903. Standard sections are still nominally quoted at \$28 at Eastern mills; light rails at \$30@33, according to weight.

Structural Material.—Demand continues large, and sales of imported material are increasing. We quote for forward delivery on large lots at tidewater as follows: Beams, 2@2.20c.; tees, 1.95@2.15c.; angles, 1.95@2.20c.

Nails.—Demand for both cut and wire nails continues fair. We quote for large lots on dock: Wire nails, \$2.20; cut nails, \$2.18.

CHEMICALS AND MINERALS.

New York. May 23.

(For further prices of chemicals, minerals and rare elements, see page 750.)

Heavy Chemicals.—There is a good demand for future shipments of alkali and caustic soda, and sales of the latter for 1904 are noted on basis of quotations as below. Bleaching powder is unsteady, as efforts are being made to clear dock supplies. Some export orders for domestic bicarb. soda are noted, but the quantity is not large. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: Highest alkali, in bags, 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 shipping contracts; bleaching powder, off-test, \$1.35; best grades mostly under contract. 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, prime brands, \$1.60@1.87 1/2, according to make.

Zinc Dust.—The final settlement of the dispute over the duty question now places zinc dust on the free list. Consequently the price is lower, and contracts can be made at 4 1/2@4 3/4c. per lb.

Acids.—Contract deliveries are regular, at practically unchanged prices.

Exports of copper sulphate from New York in April and the 4 months this year are as follows, in pounds:

Table with columns: Destination, April 1902, Four Months 1902, 1901. Rows include Austria, Belgium, England, France, Germany, Greece, Holland, Italy, Portugal, Russia, Spain, Total Europe, Africa (French), Australia, Argentina, Bermuda, Chile, Ecuador, Mexico, Nicaragua, Nova Scotia, Uruguay, Venezuela, West Indies, Grand total, Total value, Average per 100 lbs.

The exports this year have fallen off 10,596,371 lbs., or nearly 65 per cent, due principally to the smaller demand in Italy. The average invoice value is 76c. per 100 lbs. less than last year, owing partly to the lower price of copper. It is noteworthy that we have exported 814,365 lbs. to Greece, 22,500 lbs. to Spain and 5,330 lbs. to Venezuela, whereas in the first 4 months last year neither of these countries received any copper sulphate from New York. It is also gratifying to see that our trade with Holland and Argentina is rapidly improving.

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

Table with columns: Chemical name and price. Rows include Blue Vitriol, Muriatic acid (18, 20, 22 deg.), Nitric acid (36, 38, 40, 42 deg.), Oxalic acid, Sulphuric acid (50, 60, 66 deg.).

Brimstone.—Quiet. Spot best unimixed seconds are

quoted at \$23@23.25 per ton, and shipments at \$22.50. Best thirds are worth \$2.50 per ton less than seconds.

Brimstone imports into Great Britain in the 4 months ending April 30 were 8,341 long tons, against 7,417 tons last year; showing a decrease of 924 tons, owing partly to excessive prices asked by sellers. Taking the valuation of the imports this year at \$197,070, and those of last year at \$165,010, there is an increase in 1902 of \$1.38 per ton, or \$11,511 on the total quantity.

Pyrites.—Demand is seasonably good, and prices are steady.

Imports of pyrites into Great Britain in the 4 months ending April 30 were 218,684 long tons, against 239,599 tons in the corresponding period of last year. This reduction of 20,915 tons means a falling off in the consumption of sulphur amounting to 10,039 tons, which is more than the total imports of Sicilian brimstone this year. One reason for the smaller imports of pyrites is the curtailed manufacture of fertilizers. 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@13c. per unit, New York and other Atlantic ports. Spanish pyrites contain 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Potash Salts.—Orders are still being filled at last year's prices, as the syndicate has not yet made up its new schedule, which is long past due. No new developments are reported in the negotiations of the Americans who are seeking control of German potash deposits. The press dispatch that the Virginia-Carolina Chemical Company had taken hold of the Einigkeit, an independent plant, is authoritatively denied. Nor does it seem likely that the German Kali Syndicate's works, or those of the Prussian Government, will be acquired. The syndicate's property is capitalized at about \$56,250,000, and its shares are widely held. True, the agreement with its associated works expires in 1905, but as the profits are large from amalgamation and systematic propagation of potash salts as a fertilizer, those interested in the industry express doubt whether the syndicate will affiliate itself with the Americans. It is not unlikely, however, that some understanding as regards the selling price of potash salts may be arrived at whereby the Virginia-Carolina Chemical Company and the American Agricultural Chemical Company, the two big fertilizer combinations in the United States, will receive more advantageous terms. To show the magnitude of the United States as a consumer we give below the imports at Atlantic ports during the past 3 years as kindly furnished by the New York representative of the German Kali Works:

	1899.	1900.	1901.
Muriate of potash.....	48,271	62,688	62,709
Sulphate of potash.....	8,337	11,555	12,725
Manure salt.....	20,519	47,151	56,042
Double manure salt.....	5,280	6,797	6,919
Kainit.....	123,892	171,440	218,415
Sylvinit.....	10,831	3,390	2,450

Total long tons.....217,130 303,021 359,260

The increase in 1901 over the previous year is 56,239 tons, or 18.5 per cent, and over 1899, 142,130 tons, or 65.5 per cent, due largely to the heavier consumption of kainit.

Sulphate of Ammonia.—Owing to a reported small supply abroad, 24@25 per cent gas liquor is stronger, and sellers ask for early deliveries \$3.12½ per 100 lbs. Indications point to a firmer market and higher prices soon. The shipments to the United States this month are comparatively small, resulting in a marked depletion in stocks. In fact, the imports since the first of the year have been less than last year. Fathored by an increased consumption abroad, owing to the high price of nitrate of soda, the present quotations on sulphate of ammonia are at the highest notch this year.

Nitrate of Soda.—The market is weaker, owing to the unfavorable conditions prevailing in Europe. Although the European spot market is firmer and has advanced 2½d. per cwt. over the recent decline consumption is impaired by the weather. Indications point to lower prices. The depression now existing may last 4 or 6 weeks longer, after which it is expected the market will re-act, as buying for the next European season will commence. Sales in New York are reported at \$2.15 per 100 lbs. for spot delivery, and \$1.92½ for futures. Brokers are now asking for bids at \$1.90 on futures, but the tendency of buyers is to hold off for the present. The ocean freight market is unchanged; a trifle firmer if anything. The *Coya* has arrived at Charleston with 15,000 bags, and the sailings from the west coast of South America this month are the *Hero*, on the 15th, with 42,000 bags, and *Lady Joicy*, on the 18th, with 26,000 bags. The quota of production for the coming year has not yet been fixed by the combination, and probably will not be until it is known what the May and June consumption in Europe may be. The English companies are recommending 29,000,000 qtls. for the nitrate year, from April 1, 1902, to March 31, 1903. In the

first year of the combination (April 1, 1901, to March 31, 1902,) the exports were approximately 29,034,645 qtls., which was somewhat less than had been intended when the quota was agreed upon.

Additional dividends noted for the year 1901 are London Nitrate Company, 8 per cent, and San Jorge, 7½ per cent.

As regards the European situation, it is worthy of note that the deliveries in the 4 months ending April 30 were the smallest in 6 years. Stocks in Germany are larger, and, although, consumption shows a decrease, prices are still higher than buyers care to pay.

The statistical position of nitrate of soda in Europe in the 4 months ending April 30 is shown below, comparison being made with the corresponding period in the two years preceding, in long tons of 2,240 lbs.:

	1900.	1901.	1902.
Exports to Europe.....	289,061	304,757	385,702
Imports.....	486,970	583,490	435,460
Deliveries.....	641,920	692,640	550,550
Loadings for, on May 1.....	23,177	71,614	25,418
Visible supply, May 1.....	386,350	385,440	435,410

It is noteworthy that the imports and deliveries this year show a heavy decrease as compared with previous years, while the visible supply (including stocks on hand and cargoes afloat) has grown fully 9 per cent. High prices and an unfavorable beet-sugar market, especially in Germany, explain the falling off in the consumption of nitrate of soda.

The world's consumption in the year ended April 30 is estimated at 1,248,500 tons, showing a heavy falling off as compared with the two years previous.

Phosphates.—Quiet as regards new business, but shipments on contracts taken some time ago are active. Some new orders for South Carolina rock are reported for France on a freight rate of 13s. (\$3.12), which would make the f. o. b. price less than \$3 per ton. In Tennessee difficulty is again experienced in getting laborers. The mines are producing in a large way, as demand is better. In Florida miners report larger shipments of both hard rock and land pebble. Prices are unchanged.

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 (17@80%)..	\$6.50@7.00	6¼@6½d.	\$9.75@10.63
*Fla. land peb. (68@73%)..	3.00@3.25	4¼@5d	6.05@ 7.00
*Fla. Peace Riv. (58@63%)..	2.25@2.50	4¼@5d	5.70@ 6.00
Tenn., (78@80%) export.....	3.75	5¼@6d.	8.55@ 9.36
†Tenn., 75% domestic.....	3.00@3.25	.....	.....
†Tenn., 73% 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	4½@5d	5.67@ 6.30
‡So. Car. river rock.....	2.75@3.00	.....	.....
Algerian (63@68%).....	.....	5¼@6½d.	7.48@ 8.45
Algerian (58@63%).....	.....	5¼@6d.	6.30@ 7.20
Algerian (53@58%).....	.....	5 @5¼d.	5.50@ 5.78

*Fernandina, Brunswick or Savannah.
†Mt. Pleasant. ‡On vessels, Ashley River.

Liverpool. May 14.

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

The export inquiry for heavy chemicals continues quiet, but prices are practically without change.

The exports of bleaching powder and sodas for the month of April, as taken from the Board of Trade returns, are as follows: Bleaching Powder—Shipments to United States, 55,453 cwts.; other countries, 20,536 cwts.; total, 75,989 cwts. Soda ash, 116,818 cwts.; caustic soda, 129,061; bicarb. soda, 29,061; soda crystals, 14,801; salt cake, 48,216; other sorts, 33,002; total, 370,959 cwts.

The exports of both bleaching powder and sodas show an increase as compared with the corresponding month of last year, sodas, especially, being much heavier. This increase is probably accounted for by the reopening of the Baltic and Canadian navigation.

Soda ash keeps very steady. We quote spot range for tierces about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@ £4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags 5s. per ton under price for tierces. Soda crystals are selling at generally £5 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export quarters. Caustic soda is still quiet, but buyers have to pay full prices for their requirements. We quote spot range as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash.

Bleaching powder is dull, and £6 15s. per ton is about the nominal quotation for unbarred makes of hardwood, with special terms for Continental and a few other export markets.

Chlorate of potash, outside of contract deliveries, is slow at 3d. per lb. net.

Bicarb. soda in fair request at £6 15s. per ton, less 2½ per cent for the finest quality, cash in 1 cwt. kegs, with usual allowances for larger packages; also special terms for a few favored markets.

Sulphate of ammonia continues very scarce, and is again dearer at £12 17s. 6d.@£13 per ton, less 2½

per cent for good gray, 24@25 per cent in double bags f. o. b. here.

Nitrate of soda is dull and drooping, at nominally £9 15s.@£9 17s. 6d. per ton, less 2½ per cent for double bags f. o. b. here.

METAL MARKET.

New York. May 22.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in April and Year.

Metal	April.		Year.	
	1901.	1902.	1901.	1902.
Gold.				
Exports....	\$4,916,965	\$2,844,204	\$14,045,205	\$18,167,347
Imports....	2,249,038	1,864,767	15,884,393	7,563,567
Excess. E.	\$2,667,927	E. \$979,437	E. \$8,160,812	E. \$10,603,840
Silver.				
Exports....	\$4,969,047	\$3,739,900	\$19,478,721	\$15,502,253
Imports....	2,370,114	2,051,251	10,456,207	8,490,730
Excess. E.	\$2,598,933	E. \$1,688,649	E. \$9,022,514	E. \$7,011,523

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 May 22 and for years from January 1, 1902, 1901 and 1900:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...		\$28,010	\$375,865	\$3,260 E.	\$344,595
1902.....	16,455,001	1,072,879	11,995,142	477,708 E.	26,899,556
1901.....	18,888,997	1,095,548	14,032,735	1,633,293 E.	30,192,896
1900.....	14,333,065	1,358,244	15,685,696	1,791,384 E.	26,869,583

There were no gold exports this week, while most of the silver went to London. Imports were from Central America and the West Indies.

Financial Notes of the Week.

General business continues rather quiet. The crop reports are favorable, and there is nothing to indicate any material changes in prospect. Money in New York is somewhat easier. The amounts required for the United States Steel Corporation bond issue and other large transactions pending seem to have been provided largely by foreign loans. These may disturb the market later, but they have supplied the immediate demands.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending May 17 gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$788,225,400	\$873,512,100	\$879,029,900
Deposits.....	488,213,345	868,620,300	951,626,700
Circulation.....	21,617,000	31,109,000	31,273,200
Specie.....	164,929,100	176,889,100	168,825,800
Legal tenders.....	68,781,200	74,317,500	73,561,200
Total reserve.....	\$233,710,300	\$251,206,600	\$242,387,000
Legal requirements.....	217,155,075	237,906,675	234,040,475
Balance surplus.....	\$16,555,225	\$13,299,925	\$8,346,525

Changes for the week, this year, were increases of \$43,600 in circulation, \$531,700 in legal tenders, and \$4,885,525 in surplus reserve; decreases of \$22,908,100 in loans and discounts, \$24,073,700 in deposits, and \$1,664,600 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'd.....	\$176,889,100	.....	\$168,825,800	.....
England.....	175,792,400	.....	176,802,730	.....
France.....	488,213,345	\$220,991,555	513,570,065	\$221,741,600
Germany.....	163,870,000	73,625,000	195,305,000	72,235,000
Spain.....	70,010,000	82,990,000	70,550,000	92,030,000
Neth'lds.....	25,506,000	28,483,000	23,910,000	33,068,000
Belgium.....	14,850,000	7,425,000	16,056,665	8,028,335
Italy.....	75,620,000	9,522,000	80,740,000	10,777,500
Russia.....	353,415,000	36,010,000	355,835,000	40,015,000

The returns of the Associated Banks of New York are of date May 17, and the others May 15, 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 gold only.

Short supplies in London and an active India demand for prompt shipment have been the chief causes of the advanced prices of silver. The market closes firm.

The United States Assay Office in New York reports receipts of 78,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to May 8 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£2,973,210	£2,839,085	D. £134,125
China	339,125	16,500	D. 322,625
The Straits	79,976	250	D. 79,726
Totals	£3,392,311	£2,855,835	D. £536,476

Arrivals for the week this year were £174,000 in bar silver from New York, £25,000 from the West Indies, and £7,000 from Australia; total, £206,000. Shipments were £95,000 in bar silver to Bombay, and £2,500 to Madras; total, £97,500.

Indian Exchange has been somewhat easier, and the demand for Council bills in London has been rather weak. About 30 lakhs of rupees were sold at the average price of 15.9d. per rupee, and the outside market rate is somewhat lower. The Chinese Exchange has been disturbed by the fall in silver, and the rate, both for dollars and taels, is lower than for some time past. The unusual feature of the present situation is that the low price of silver has failed to stimulate buying in India.

Shipments of gold from Australia up to the end of March were valued at £2,684,520, against £2,531,714 to the corresponding date last year; an increase of £152,806. The shipments this year included £65,666 to Hong Kong, £300,000 to South Africa, and £1,231,149 to India. No shipments to San Francisco are noted.

The foreign merchandise trade of Great Britain for the 4 months ending April 30 is given in the Board of Trade returns as below:

	1901.	1902.	Changes.
Imports	£178,373,053	£178,841,736	D. 468,683
Exports	115,303,439	113,424,184	I. 1,879,255
Excess, imports	£ 63,069,614	£ 65,417,552	I. 2,347,938

This shows an increase of £468,683, or 0.3 per cent, in imports; a decrease of £1,879,255, or 1.6 per cent, in exports, and a corresponding increase of £2,347,938, or 3.7 per cent, in the excess of imports. The gold and silver movement for the 4 months was as follows:

	1901.	1902.	Changes.
Gold: Imports	£8,562,997	£6,224,359	D. £2,338,638
Exports	3,497,119	3,876,587	I. 379,468
Excess	I. £5,065,878	I. £2,347,772	D. £2,718,106
Silver: Imports	4,261,313	3,183,453	D. 1,077,860
Exports	4,478,569	3,837,350	D. 641,219
Excess	E. £ 217,256	E. £ 653,897	I. £ 436,641

Of the silver imported this year, £2,643,256, or 83 per cent of the total, is credited to the United States.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$0.41 1/2	\$0.44
Peruvian soles and Chilean pesos .....	.37 1/2	.41 1/2
Victoria 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.

May	Silver		Copper		Spelter		
	N. Y. Cts.	London Pence.	Lake Cts. per lb.	Electrolytic per lb.	London & per ton.	Lead N. Y. cts.	St. L. cts.
16 4.80 1/2	51 3/4	23 1/4	12 1/4	11 1/2	30 3/4	4.05	4.15
17 4.80 3/4	51 3/4	23 1/4	12 1/4	11 1/2	30 3/4	4.05	4.20
19 4.80 3/4	51 3/4	23 1/4	12 1/4	11 1/2	30 3/4	4.05	4.25
20 4.80 7/8	51 3/4	23 1/4	12 1/4	11 1/2	30 3/4	4.05	4.30
21 4.80 7/8	51 3/4	23 1/4	12 1/4	11 1/2	30 3/4	4.05	4.35
22 4.80 3/4	51 3/4	23 1/4	12 1/4	11 1/2	30 3/4	4.05	4.35

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 0.2c lower than these figures.

Copper.—The market continues firm. A good business is reported both for domestic consumption and for export, and prices show a further improvement. Manufacturers are very busy, and the prospects for the near future are bright. The European consumption is constantly improving. We quote Lake copper at 12 1/2c.; electrolytic in cakes, wire bars and ingots at 12 1/2c.; in cathodes, at 12c.; casting copper at 12 1/2c.

The London Metal Exchange was closed from Thursday to Tuesday. It opened on the latter day at £54 17s. 6d. for both spot and futures. On Thursday a very large business was done at advancing prices, and the market touched £55 7s. 6d., reacting at the close to £55 for both deliveries.

Statistics for the first half of the month show a decrease in the visible supplies of 1,500 tons.

Refined and manufactured sorts we quote: English tough, £57@£57 10s.; best selected, £58@£58 10s.; strong sheets, £69; India sheets, £66; yellow metal, 6 1/4d.

Exports of copper from New York and Baltimore in the week ending May 21, are reported by our special correspondents as follows: To Great Britain, 491 tons; Germany, 1,477; Holland, 793; Belgium, 70; Russia, 201; France, 229; Brazil, 4; Africa, 6; total, 3,271 tons. Imports were 275 tons copper from Mexico.

Imports of copper into Great Britain for the 4 months ending April 30 are given by the Board of Trade returns as below, in long tons; the totals giving the approximate contents in fine copper:

	1901.	1902.	Changes.
Copper Ore	28,121	33,981	I. 5,860
Matte and precipitate	25,421	28,926	I. 3,505
Fine copper	21,004	40,525	I. 19,521
Totals, fine copper	36,527	58,386	I. 21,859

Imports from the United States this year were 286 tons ore, 8,647 tons matte and 24,298 tons fine copper; against 298 tons ore, 3,573 tons matte and 6,109 tons fine copper for the corresponding period last year. The total increase in fine copper this year was 59.9 per cent.

Tin.—The London Metal Exchange being closed from Thursday to Tuesday, not much business was transacted here during that time, and since then the market has been rather quiet. Buyers are filling only their immediate wants in the hope that after the recent advance a reaction will set in. Tin for early delivery continues rather scarce. At the close we quote spot at 30 1/4c.; May delivery, 30c.; June, 29 3/4c.

The foreign market, which closed last Thursday at £136 7s. 6d. for spot, £132 5s. for three months, opened on Tuesday at £137 for spot, £133 for three months, and closed on the 22d at £136 5s. and £131 15s., respectively.

Imports of tin into Great Britain for the 4 months ending April 30 and re-exports of imported tin are given, as below, in long tons:

	1901.	1902.	Changes.
Straits	8,807	7,876	D. 931
Australia	921	1,102	I. 181
Other countries	1,811	1,224	D. 587
Total	11,539	10,202	D. 1,337
Re-exports	7,758	7,299	D. 459
Balance	3,781	2,903	D. 878

The decrease in receipts from the Straits was mainly in tin in transit for the United States.

Lead.—The market is active at last prices. We quote 3.97 1/2@4.05c. St. Louis, 4.05@4.10c. New York. The foreign market is cabled at £11 11s. 3d.@£11 12s. 6d. for Spanish lead, £11 15s.@£11 17s. 6d. for English lead.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is firm at 3.97 1/2c. for soft Missouri and chemical, and 4.05c. for argentiferous lead.

Imports of lead into Great Britain for the 4 months ending April 30, with exports of the metal, are reported as below, in long tons:

	1901.	1902.	Changes.
United States	17,443	20,903	I. 3,460
Spain	25,335	33,816	I. 8,481
Australia	23,142	22,600	D. 542
Other countries	4,663	4,965	I. 302
Total imports	70,583	82,284	I. 11,701
Exports	7,758	10,401	I. 2,643
Balance	62,825	71,883	I. 9,058

The lead credited to the United States is chiefly Mexican lead, refined here in bond.

Spelter.—Smelters having withdrawn from the market in consequence of the threatened labor troubles, prices have advanced, and we quote St. Louis 4 3/8c.; New York, 4 1/2@4 5/8c.

The foreign market is unchanged, good ordinaries being quoted at £18 10s.; specials, 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is strong and advancing on account of scant offerings. Smelters anticipate labor troubles, and practically refuse to quote metal for prompt or near-by delivery. The latest sales are on a basis of 4.30c. East St. Louis.

Imports of spelter or metallic zinc into Great Britain for the 4 months ending April 30 were 27,887 long tons, against 20,663 tons for the corresponding period in 1901; an increase of 7,224 tons, or 34.9 per cent.

Antimony.—We quote Cookson's at 9 3/4@10c.; Hal-

lett's, 8 1/4c.; Hungarian, Italian, Japanese and United States Star at 8c.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

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 is \$48 per flask for large lots, with a slightly higher figure asked for small orders. In San Francisco quotations are unchanged, \$46@46.50 being named for domestic orders, with \$43 quoted for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Imports of quicksilver into Great Britain for the four months ending April 30 were 1,265,321 lbs., against 1,473,669 lbs. for the corresponding period last year. Exports were 651,933 lbs., against 620,629 lbs. last year.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb.	Per lb.
Aluminum No. 1, 99% ingots	33@37c.	29c.
No. 2, 90% ingots	31@34c.	27c.
Rolled sheets	4c. up	1.00
Alum-bronze	20@23c.	22c.
Nickel-alum	33@35c.	32c.
Bismuth	11.50	11.00
Chromium (over 90%)	1.00	1.00
Copper, red oxide	50c.	50c.
Ferro-Molyb'dum (50%)	1.125	1.125
Ferro-Titanium (10%)	90c.	90c.
Ferro-Titanium (20%)	1.10	1.10
Ferro-Tungsten (37%)	22c.	22c.
Magnesium	2.75	2.75
Manganese (over 90%)	1.00	1.00
Manganese Cop. (20% Mn)	52c.	52c.
Manganese Cop. (50% Mn)	35c.	35c.
Molybdenum (Best)	1.00	1.00
Phosphorus	60c.	60c.
American	70c.	70c.
Sodium metal	50c.	50c.
Tungsten (Best)	62c.	62c.

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

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1902.	1901.	1902.	1901.	1902.	1901.
January	23.54	26.51	4.00	4.350	4.27	4.13
February	24.07	26.88	4.075	4.350	4.15	4.01
March	26.32	26.93	4.075	4.350	4.28	3.91
April	27.77	25.93	4.075	4.350	4.37	3.98
May	27.12	27.12	4.350	4.350	4.04	4.04
June	28.90	28.90	4.350	4.350	3.99	3.99
July	27.85	27.85	4.350	4.350	3.95	3.95
August	20.78	20.78	4.350	4.350	3.99	3.99
September	25.31	25.31	4.350	4.350	4.08	4.08
October	26.62	26.62	4.350	4.350	4.23	4.23
November	26.67	26.67	4.350	4.350	4.29	4.29
December	24.36	24.36	4.153	4.153	4.31	4.31
Year	26.54	26.54	4.334	4.334	4.08	4.08

Average Prices of Copper.

Month.	—New York—		—London—	
	Electrolytic.	Lake.	Standard.	Standard.
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	11.618	16.43	11.986	16.94
May	16.41	16.41	16.94	16.94
June	16.38	16.38	16.90	16.90
July	16.31	16.31	16.61	16.61
August	16.25	16.25	16.50	16.50
September	16.25	16.25	16.54	16.54
October	16.224	16.224	16.60	16.60
November	13.845	13.845	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.	
January	25.62	55.56	28.97	62.82	59.30
February	25.41	55.09	28.13	61.06	59.76
March	25.00	54.23	27.04	60.63	59.81
April	24.34	52.72	27.30	59.29	59.59
May	27.43	59.64	27.56	59.90	59.90
June	27.42	59.57	27.81	60.42	60.42
July	26.96	58.46	28.23	61.25	61.25
August	26.94	58.37	28.13	61.14	61.14
September	26.95	58.26	28.85	62.63	62.63
October	26.62	57.59	29.58	63.83	63.83
November	26.12	56.64	29.68	64.04	64.04
December	25.46	55.10	29.68	64.14	64.14
Year	27.11	58.95	28.27	61.33	61.33

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

LATE NEWS.

PENNSYLVANIA.

ANTHRACITE COAL.

Anthracite Miners' Strike.—The Hazleton convention of delegates of the United Mine Workers on May 15 by a vote of 461 to 349 voted to suspend work indefinitely, and all collieries are still idle. The officials of the Mine Workers have ordered pumpmen, firemen and engineers to remain at work until June 2, pending a demand for an 8-hour work day.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Acacia, Alamo, Amalgamated, etc., with columns for par value, May 15-21, and sales.

*Per cent.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations, including Am. Agr. Chem., Am. Car & Fdy., etc., with columns for par value, May 15-21, and sales.

Total sales, 391,052 shares. * Ex-dividend.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, PA, listing companies like Am. Alkali, Am. Cement, etc., with columns for par value, May 15-21, and sales.

§Reported by Townsend, Whelan & Co., 309 Walnut St., Philadelphia, Pa. Total sales 14,492 shares. †Ex-privileges.

MEXICO.

May 10.

Table of stock quotations for Mexico, listing companies like Durango, Guanajuato, Guerrero, etc., with columns for shares, last dividend, prices, and sales.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Adventure Con., Aetna Cons., Allouez, etc., with columns for par value, May 15-21, and sales.

Official Quotations Boston Stock Exchange. Total sales, 103,160 shares. †Ex-dividend

ST. LOUIS, MO.*

May 17.

Table of stock quotations for St. Louis, MO, listing companies like Adams, Am. Nettie, etc., with columns for name, shares, par, bid, ask, and sales.

*From our Special Correspondent.

SPOKANE, WASH.*

May 15.

Table of stock quotations for Spokane, Wash., listing companies like American Boy, Black Tail, etc., with columns for name, par value, bid, ask, and sales.

Total sales 48,000 shares. *Reported by Hunner & Harris.

SALT LAKE CITY.*

May 17.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Anchor, Bullion Beck, etc., with columns for name, location, shares, par value, quotations, and sales.

*By our Special Correspondent. Total number of shares sold, 402,641.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Anaconda, and others with columns for par value, high/low prices, and sales.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph), listing companies like Acacia, Alamo, Anaconda, and others with columns for par value, high/low prices, and sales.

MONTREAL, CANADA.

May 19.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, Can. Gold Fields, and others with columns for par value, high/low prices, and sales.

LONDON.

May 10.

Table of stock quotations for London, listing companies like Anaconda, Copiapo, De Lamar, and others with columns for authorized capital, par value, last dividend, and quotations.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-dividend.

PARIS.

May 1.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Firminy, Huta-Bank, and others with columns for name, country, product, capital stock, par value, latest dividend, and prices.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, British Columbia, Cariboo MCK, and others with columns for name, par value, high/low prices, and sales.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasive—			Barium—			Graphite—Am. f.o.b. Provi-			Paints and Colors—		
Cust. Meas.	Price		Cust. Meas.	Price		Cust. Meas.	Price		Cust. Meas.	Price	
Carborundum, f.o.b. Niagara			Oxide, Am. hyd. cryst.	lb.	\$0.02 ³ / ₄	dence, R. I. lump.	sh. ton	\$8.00	Metallic, brown	sh. ton	\$19.00
Falls, Powd., F. F. FFF.	lb.	\$0.08	Sulphate (Blanc Fixe)	"	.02	Pulverized	"	30.00	Red	"	16.00
Grains	"	.10	Barytes—			German, som. pulv.	lb.	.01 ¹ / ₄ @.01 ¹ / ₂	Ocher, Am. common	"	9.25@10.00
Corundum, N. C.	"	.07@.10	Am. Crude, No. 1	sh. ton	9.00	Best pulverized	"	.01 ¹ / ₂ @.02	Best	"	21.25@25.00
Chester, Mass.	"	.04 ¹ / ₂ @.05	Crude, No. 2	"	8.00	Ceylon, common pulv.	"	.02 ³ / ₄ @.03 ¹ / ₂	Dutch, washed	lb.	.04 ¹ / ₂
Barry's Bay, Ont.	"	.07 ¹ / ₂ @.09 ¹ / ₂	Crude, No. 3	"	7.75	Best pulverized	"	.04@.08	French, washed	"	.01 ¹ / ₂ @.01 ³ / ₄
Crushed Steel, f.o.b. Pitts-	"	.05 ¹ / ₂	German, gray	"	14.50	Italian, pulv.	"	.01 ¹ / ₄	Orange mineral, Am.	"	.07 ¹ / ₂ @.08
burg	"	.05 ¹ / ₂	Snow white	"	17.00	Gypsum—Ground	sh. ton	8.00@8.50	Foreign, as to make	"	.08 ¹ / ₂ @.11 ¹ / ₂
Emery, Turkish flour, in kegs.	"	.03 ¹ / ₂	Bauxite—Ga. or Ala. mines:			Fertilizer	"	7.00	Paris green, pure, bulk	"	.11 ¹ / ₄ @.12
Grains, in kegs	"	.05@.05 ¹ / ₂	First grade	lg. ton	5.50	Rock	lg. ton	4.00	Red lead, American	"	.05 ¹ / ₂ @.05 ³ / ₄
Naxos flour, in kegs	"	.03 ¹ / ₂	Second grade	"	4.75	English and French	"	14.00@16.00	Foreign	"	.06 ¹ / ₂ @.08
Grains, in kegs	"	.05@.05 ¹ / ₂	Bismuth—Subnitrate	lb.	1.40	Infusorial Earth—Ground	"	20.00	Turpentine, spirits	gal.	.40 ¹ / ₂
Chester flour, in kegs	"	.03 ¹ / ₂	Subcarbonate	"	1.65	American, best	"	37.50	White lead, Am., dry	lb.	.04 ¹ / ₂ @.04 ¹ / ₄
Grains, in kegs	"	.05@.05 ¹ / ₂	Bitumen—"B"	"	.03 ¹ / ₂	French	"	40.00	American, in oil	"	.05 ¹ / ₂ @.05 ³ / ₄
Poekskill, f.o.b. Easton, Pa.,	"	.01 ¹ / ₂	"A"	"	.05	German	"	40.00	Foreign, in oil	"	.07 ¹ / ₂ @.08 ¹ / ₂
flour, in kegs	"	.02 ¹ / ₂	Bone Ash	"	.02 ¹ / ₄ @.02 ¹ / ₂	Iodine—Crude	100 lbs	2.45	Zinc, white, Am., ex dry	"	.04 ¹ / ₂ @.04 ³ / ₄
Grains, in kegs	"	.02 ¹ / ₂	Borax	"	.07 ¹ / ₄ @.07 ¹ / ₂	True	"	.04	American, red seal	"	.09 ¹ / ₂
Crude, ex-ship N. Y.: Ab-	"		Bromine	"	1.40	Oxide, pure copperas col.	"	.05@.10	Green seal	"	.07
bott (Turkey)	lg. ton	26.50@30.00	Cadmium—Metallic	"	4.00	Purple-brown	"	.02	Foreign, red seal, dry	"	.05 ¹ / ₂ @.08 ¹ / ₂
Kuluk (Turkey)	"	22.00@24.00	Sulphate	100 lbs.	2.00@2.50	Venetian red	"	.01@.01 ¹ / ₂	Green seal, dry	"	.06 ¹ / ₂ @.08 ¹ / ₂
Naxos (Greek) h. gr.	"	.20.00	Calcium—Acetate, gray	"	1.30	Scale	"	.01@.03	Potash—		
Garnet, as per quality	sh. ton	25.00@35.00	"brown	"	.90	Kaolin—(See Clay, China.)			Caustic, ordinary	"	.04 ¹ / ₂ @.06
Pumice Stone, Am. powd.	lb.	.01 ¹ / ₂ @.02	Carbide, ton lots f.o.b. Niagara			Kryolith—(See Cryolite.)			Elect. (90%)	"	.06 ¹ / ₂
Lump, powdered	"	.01 ¹ / ₂	Falls, N. Y. or Jersey City,			Lead—Acetate, white	"	.07 ¹ / ₄ @.08	Potassium—		
Lump, per quality	"	.04@.40	N. J.	sh. ton	75.00	Brown	"	.06	Bicarbonate cryst.	"	.05 ¹ / ₂
Rotenstone, ground	"	.02 ¹ / ₄ @.04 ¹ / ₂	Carbonate, ppt.	lb.	.05	Nitrate, com'l.	"	.06 ¹ / ₂	Powdered cr gran.	"	.14
Lump, per quality	"	.09@.20	Chloride	sh. ton	9.00@10.00	"gran	"	.08 ¹ / ₂	Bichromate, Am.	"	.08 ¹ / ₂ @.09 ¹ / ₂
Rouge, per quality	"	.10@.30	Cement—			Lead—Com. abt. 250 lbs.	bbl.	.80	Scotch	"	.08 ¹ / ₂ @.09
Steel Emery, f.o.b. Pittsburg.	"	.07	Portland, Am., 400 lbs.	bbl.	1.70@1.90	Finishing	"	.90	Carbonate, hydrated	"	.04@.04 ¹ / ₂
Acids—			Foreign	"	1.65@2.25	Magnesite—Greece.			Calcined	"	.03 ¹ / ₂ @.03 ³ / ₄
Boracic, crystals	"	.10 ¹ / ₄ @.11	"Rosendale," 300 lbs.	"	.75	Crude (95%)	lg. ton	6.50@7.00	Chromate	"	.35
Powdered	"	.11 ¹ / ₄ @.11 ³ / ₄	Slag cement, imported	"	1.65	Calcined	sh. ton	14.00@15.00	Cyanide (98@99%)	"	.23
Carbonic, liquid gas	"	.12 ¹ / ₂	Ceresine—			Bricks	M	170.00	Kalnit.	lg. ton	9.05
Chromic, crude	"	.20	Orange and Yellow	lb.	.12	Am. Bricks, f.o.b. Pittsburg.	"	175.00	Manure salt, 20%	100 lbs.	.66
Hydrofluoric, 30%	"	.06	White	"	.13 ¹ / ₂	Magnesium—			Double Manure salt, 48@53%	"	1.12
4%	"	.05	Chalk—Lump, bulk	sh. ton	2.50	Carbonate, light, fine pd.	lb.	.05	Muriate, 80@85%	"	1.83
6%	"	.11	Ppt. per quality	lb.	.03 ¹ / ₄ @.08	Blocks	"	.07@.09	95%	"	1.86
Sulphurous, liquid anhy.	"	.05	Chlorine—Liquid	"	.30	Chloride, com'l.	"	.01 ¹ / ₂	Permanganate	lb.	.06 ¹ / ₄ @.10 ¹ / ₄
Alcohol—Grain	gal.	2.45	Purified	"	.10	Fused	"	.20	Prussiate, yellow	"	.13 ¹ / ₂ @.14
Refined wood, 95@97%	"	.60@.65	Chrome Ore—			Nitrate	"	.60	Red	"	.36
Purified	"	1.20@1.50	(50% ch.) ex-ship N. Y.	lg. ton	24.75	Sulphate	100 lbs.	.75@.95	Sulphate, 90%	100 lbs.	2.11
Alum—Lump	100 lbs.	1.75	Sand, f.o.b. Baltimore	"	33.00	Manganese—Powdered,			96%	"	2.14
Ground	"	1.80	Bricks, f.o.b. Pittsburg	M	175.00	70@75% binoxide	lb.	.01 ¹ / ₄ @.01 ¹ / ₂	Sylvinit.	unit	.36 ¹ / ₂
Powdered	"	3.00	Clay, China—Am. com., ex-			Crude, pow'd.	"	.01 ¹ / ₂ @.02 ¹ / ₄	Quartz—(See Silica.)		
Chrome, com'l.	"	2.75@3.00	Am. best, ex-dock, N. Y.	lg. ton	8.00	75@85% binoxide	"	.01 ¹ / ₂ @.02 ¹ / ₄	Salt—N. Y. com. fine	sh. ton	2.00
Aluminum—			English, common	"	12.00	85@90% binoxide	"	.02 ¹ / ₄ @.03 ¹ / ₄	N. Y. agricultural	"	1.50
Nitrate	lb.	1.50	Best grade	"	17.00	90@95% binoxide	"	.03 ¹ / ₄ @.05 ¹ / ₄	Saltpetre—Crude	100 lbs.	3.20@3.37 ¹ / ₂
Oxide, com'l, common	"	.06 ¹ / ₂	Fire Clay, ordinary	sh. ton	4.25	Carbonate	"	.16@.20	Refined	"	4.25@4.62 ¹ / ₂
Best	"	.20	Best	"	6.00	Chloride	"	.04	Silica—Best foreign	lg. ton	10.00@11.00
Pure	"	.80	Slip Clay	"	5.00	Ore, 50% Foreign	unit	.20@.21	Ground quartz, ord.	sh. ton	6.00@8.00
Hydrated	100 lbs.	2.60	Coal Tar Pitch	gal.	.08	Domestic	"	.30	Best	"	12.00@13.00
Sulphate, pure	"	1.50@2.00	Nitrate	lb.	1.50	Marble—Flour	sh. ton	6.00@7.00	Lump quartz	"	2.50@4.00
Com'l.	"	1.15@1.25	Oxide—Black	"	2.26@2.30	Mercury—Bichloride	lb.	.77	Glass sand	"	2.75
Ammonia—			Gray	"	2.28@2.40	Mica—N. Y. gr'nd, coarse	"	.03@.04	Silver—Chloride	oz.	.65
Aqua, 16°	lb.	.03	Small, blue ordinary	"	.06	Fine	"	.04@.05	Nitrate	"	.35
18°	"	.03 ¹ / ₂	Best	"	.20	Sheets, N. C. 2x4 in.	"	.30	Oxide	"	.85@1.10
20°	"	.03 ¹ / ₂	Coppers	100 lbs.	.30@.35	3x3 in.	"	.80	Sodium—		
28°	"	.05 ¹ / ₂	Carbonate, lump	"	.08 ¹ / ₂ @.08 ³ / ₄	3x4 in.	"	1.50	Bichromate	lb.	.06 ¹ / ₂
Ammonium—			Powdered	"	.09@.09 ¹ / ₂	4x4 in.	"	2.00	Chlorate, com'l.	lb.	.07 ¹ / ₂ @.08 ¹ / ₂
Carbonate, lump	"	.08 ¹ / ₂ @.08 ³ / ₄	Muriate, grain	"	.35	6x6 in.	"	3.00	Hyposulphite, Am.	100 lbs.	1.60@1.65
Powdered	"	.09@.09 ¹ / ₂	Lump	"	.08 ¹ / ₂	Mineral Wool—			German	lb.	1.70@1.90
Muriate, grain	"	.05 ¹ / ₂ @.06	Nitrate, white, pure (99%)	"	.12	Slag, ordinary	sh. ton	19.00	Peroxide	"	.45
Powdered, ordinary	"	.06 ¹ / ₂ @.07 ¹ / ₂	Phosphate, com'l.	"	.09	Selected	"	25.00	Phosphate	lb.	.02 ¹ / ₄ @.03
Oxide, com'l white, 95%	"	.09 ¹ / ₂	Pure	"	.12	Rock, ordinary	"	32.00	Prussiate	"	.10 ¹ / ₂ @.11
Com'l white, 99%	"	.12	Antimony—Glass	"	.30@.40	Selected	"	40.00	Silicate, conc.	"	.05
Com'l gray	"	.07	Needle, lump	"	.05 ¹ / ₂ @.06	Nickel—Oxide, No. 1	lb.	1.00	Com'l.	"	.01
Sulphuret com'l.	"	.16	Powdered, ordinary	"	.06 ¹ / ₂ @.07 ¹ / ₂	No. 2	"	.60	Sulphate, com'l.	100 lb.	.77 ¹ / ₂
Arsenic—White	"	.08 ¹ / ₂ @.09 ¹ / ₂	Oxide, com'l	"	.05 ¹ / ₂	Sulphate	"	.20@.21	Sulphide	lb.	.01 ¹ / ₂
Red	"	.06 ¹ / ₂ @.07	Cryolite	"	.06 ¹ / ₂	Oils—Black, reduced 29 gr.:			Sulphite crystals	"	.02 ¹ / ₄
Asphaltum—			Blasting powder, A	25 lb. keg	2.65	25@30, cold test.	gal.	.09 ¹ / ₂ @.10 ¹ / ₂	Sulphur—Roll	100 lbs.	1.85
Ventura, Cal.	sh. ton	32.00	Blasting powder, B	"	1.40	15, cold test.	"	.10 ¹ / ₂ @.11 ¹ / ₂	Flour	"	1.90
Cuban	lb.	.01 ¹ / ₂ @.03 ¹ / ₂	"Rackarock," A	lb.	.25	Zero	"	.11 ¹ / ₂ @.12 ¹ / ₂	Flowers, sublimed	"	2.15
Egyptian, crude	"	.05 ¹ / ₂ @.06	"Rackarock," B	"	.18	Summer	"	.09 ¹ / ₂ @.09 ¹ / ₂	Tale—N. C., 1st grade	sh. ton	13.75
Trinidad, refined	sh. ton	35.00	Judson R. R. powder	"	.10	Cylinder, dark steam ref.	"	.08 ¹ / ₂ @.10 ¹ / ₂	N. Y., Fibrous, best	"	10.20
San Valentino (Italian)	lg. ton	16.00	Dynamite (20% nitro-glycer-	"	.13	Dark, filtered	"	.11 ¹ / ₂ @.15 ¹ / ₂	French, best	100 lbs.	1.25
Seyssel (French), mastic	sh. ton	21.00	ime)	"	.14	Light filtered	"	.14 ¹ / ₂ @.17 ¹ / ₂	Italian, best	"	1.62 ¹ / ₂
Gilsonite, Utah, ordinary	lb.	.03	(30% nitro-glycerine)	"	.13	Extra cold test	"	.21 ¹ / ₂ @.26 ¹ / ₂	Tar—Regular	bbl.	1.85
Select	"	.03 ¹ / ₂	(40% nitro-glycerine)	"	.15	Gasoline, 86°@90°	"	.14@.19	Oil barrels	"	3.75
Barium—			(50% nitro-glycerine)	"	.16 ¹ / ₂	Naphtha, crude, 68°@72°	bbl.	9.05	Tin—Crystals	lb.	.20
Carb. Lump, 80@90%	sh. ton	25.00@27.50	(60% nitro-glycerine)	"	.18	"Stove"	gal.	.12	Oxide	"	.45
92@98%	"	26.00@29.00	(75% nitro-glycerine)	"	.21	Linseed, domestic raw	"	.63@.65	Uranium—Oxide	"	2.25@3.00
Powdered, 80@90%	lb.	.01 ¹ / ₂ @.02	Glycerine for nitro (32-2-10°	Be.)	.12 ¹ / ₄ @.13	Boiled	"	.67	Zinc—Metallic, ch. pure	"	.07@.09 ¹ / ₂
Chloride, com'l	100 lbs.	1.67 ¹ / ₂ @1.76	Feldspar—Ground	sh. ton	8.00@9.00	Calcutta, raw	"	.85	Carbonate, ppt.	"	.09
Chem. pure cryst.	lb.	.05	Flint Pebbles—Danish, Best.	lg. ton	14.75	Ozokerite	lb.	.11 ¹ / ₂	Chloride solution, com'l.	"	.44 ¹ / ₂ @.04 ³ / ₄
Nitrate, powdered	"	.05 ¹ / ₂	French, Best.	"	11.75	Paints and Colors—			Dust.	"	.04 ¹ / ₂ @.04 ³ / ₄
			Fluorspar—		</						