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A CONTRACT recently placed by the Daira Sanieh, an Egyptian investment company, for four or five cargoes of American coal and to which we have previously referred is causing considerable comment in England. It may be made the subject of Parliamentary inquiry as the Daira Sanieh is under government control. The *Colliery Guardian* calls attention to the fact that the best English screened coal could have been obtained for 18 shillings per ton, while a price of about 20 shillings was paid for the American coal unscreened. But what enabled the Americans to take the contract was the fact that they took payment "in trade," sugar being taken in return for the coal.



THE SULPHIDE Corporation, of London, and of Broken Hill, and Cockle Creek, New South Wales, has decided to adopt the Sulman-Picard process for treating the zinc-lead sulphide middlings and the zinc concentrates. This process is practically a zinc distilling process, which can be used when there is a comparatively high proportion of lead present. The roasted ore is charged into the retort, with bituminous coal as reducing agent. The zinc is distilled off and the coal becomes coked. The lead and silver are reduced also. They are not volatilized, but are held in the pores of the coke, and are afterwards treated in the lead smelter. Five furnaces on this system are being erected at Cockle Creek and they will be the first zinc furnaces in Australia. We hope to give an account of the process in an early issue.



IN ANOTHER column will be found an interesting analysis of the causes leading to the present great strike in the Pennsylvania anthracite region. The facts therein given were collected by a correspondent who has personally interviewed many men in the region and his conclusions may be accepted as based on a careful study of the facts. His opinions agree in the main with those that we have previously expressed, but emphasize the importance of the Union demands and minimize the political considerations. Our correspondent states that the miners, while having locally some complaints, have no real grievance in the main, and the strike has been declared because the operators realize that any concessions made this year would mean further concessions next year and every point gained by the Union but adds to its strength. The operators also believe that the Union will never be satisfied until it is in absolute control, with power to regulate the employment of individual miners at every colliery. This really means a repetition of some of the worst features of the Molly Maguire rule; hence, it is evident that the present strike is, so to speak, an irrepressible conflict. It was bound to come sooner or later and both sides have apparently agreed to fight it out now.



SOME TIME ago we referred at considerable length to the Elmore process of making copper tubes by direct deposition in the electrolytic bath. This process was improved by the late M. Secretan in France. The English Electro-metallurgical Company, which was formed three years ago to acquire the English works and patents of the Elmore copper tube busi-

ness has now got into working order, and is producing about 25 tons of tubes a week. It will be remembered that the owners of the French patents, who had worked the process successfully, acquired the English rights from the Elmore company, which had from its inception been under the cloud of bad financial organization and lack of capital. The new French owners went to a good deal of unnecessary expense in removing and rebuilding the works and remodeling the plant as an exact duplicate of that in France, and their policy of importing French machinery and workmen was irritating to the British trade. They have now abandoned to some extent this policy, and have appointed English electro-metallurgists from Elliott's and Bolton's as managers. There are still quite a number of points in dispute between the company and the vendor syndicate as regards the terms of purchase, but these ought to be settled before long. It is intended eventually, when the company has been placed on the Admiralty list of contractors and the Board of Trade's requirements as to quality have been complied with, to increase the output to 60 tons a week, this being the output for which the present works have been designed.



### THE JONES MIXER PATENT.

THE DECISION of the United States Supreme Court in the case of the Jones mixer patent has now been made public, and it is apparent that it does not turn on matters of detail, but on the question of the general validity of the patent. The injunction against infringement of the patent which has been ordered by the court does not apply to specific features of the Cambria Steel Company's mixer, but to the general use of the apparatus. The decision considers carefully different devices which were claimed to have anticipated Captain Jones' invention, and sets them all aside; holding that, while the idea of a reservoir for molten metal, from which it could be drawn as needed for casting or steel making as required, was not new, the specific application of such apparatus in steel making, and its use to mix metal from different furnaces, was a novel application, entitling the inventor to the issue of a valid patent. The British patent of Tabbener and Deighton; the American patents of Durfee and Witherow; and the unpatented Whitney device, used in casting car wheels, were all set aside by the Court as having no application in this case. Two paragraphs of the opinion, which we quote below, show its general tenor:

"To enable the Jones process to be successfully carried out it is necessary: 1, That the intermediate reservoir or mixer should be of large size, 'say 100 tons' capacity; 2, that it be covered to prevent the access of cold air from without; 3, that it be provided with a stop, so that it may not be tilted so far as to be emptied of its contents; 4, that a quantity of molten metal so large as to absorb all the variations of the product of the blast furnace received into it and thus to unify the metals discharged into the converters be constantly retained in it. None of the prior patents or processes to which we are referred meets these requirements. Indeed, it is scarcely too much to say that none meets more than one of them. When we add to this that none of them was ever used, or was ever susceptible of being used, without material alteration, to carry out the Jones process, it is evident that the defense of anticipation by prior patents rests upon a slender foundation.

"Discarding now all that does not bear directly upon the validity of the Jones patent, and dropping all superfluity of words, let us determine exactly what Jones has contributed, if anything, to the art of making steel. He undoubtedly found reservoirs of small size in use, in which was poured from receiving ladles enough molten metal to fill them, and from which a sufficient amount was discharged to supply a converter, usually about half the size of the reservoir. But in all these cases the fact whether any particular amount of metal was left in the reservoir was treated as a matter of indifference or accident, although there must have been necessarily some incidental mixing; and probably the metal as it ran into the converters approximated more nearly to uniformity than when it ran into the reservoir. The former methods were adequate for cupola metal, uniformity in which had been largely secured by a careful selection and breaking up of the pigs, but it had not proved a success for blast furnace metal, except that it had been used to a very limited extent in foreign countries where the peculiar character of the iron ore had rendered it possible to carry on a direct process, although apparently by methods quite other than those employed by Jones. The principal step employed by Jones was to magnify the capacity of the reservoir about twentyfold, provide it with a cover, and to arrange that it should not be tilted beyond a certain point, in order that a 'considerable quantity' of molten metal might be retained in it for a sufficient time to accomplish a pretty thorough mixing, but little change having been made in the meantime in the size of the receiving ladles and converters. As the reservoir was designed to hold a large quantity of metal for a considerable time it must have been covered to obviate the contents being crusted over or sculled."

The decision seems practically to close the case, and to establish the rule that no mixer for molten metal can be used without license from the owner of the Jones patent, which is now the United States Steel Corporation. As the manufacture of steel by the direct process—that is, from molten metal drawn from the blast furnace and transferred to the converter or open-hearth furnaces without re-melting—can hardly be carried on without the use of the mixer or reservoir of molten metal, the decision, as we have heretofore noted, is of much importance.

We do not suppose that the United States Steel Corporation will seek to enjoin its rivals absolutely from using the mixer; but it will probably enforce the right, given by this decision, of making them pay some form of royalty for its use. In any event its control of the patent has an appreciable value.



#### MARKET CONDITIONS.

**Iron and Steel.**—The iron market may be said to be comparatively quiet this week. The fact is that very little new business can now be placed for the present year and there is still some hesitation about orders for 1903. This is felt by the majority of operators, although the United States Steel Corporation has already contracts out for a large amount of raw material for the first half of next year. The mills continue to make deliveries as fast as possible, although there is complaint among buyers as to delay in receiving what their contracts call for. This is especially the case in structural material, for which the demand is great. Builders find difficulty in securing their steel, especially on small orders. A peculiar demand seems to have arisen on short notice for light rails for contractors' and mining purposes. It is almost impossible to secure these within any reasonable time from the mills and some fancy prices, running as high as \$38 or \$40 a ton have been paid for this description. In heavy rails several orders could be placed if the mills could take them and it is said to be quite probable that some large contracts for this class of work will be made abroad before long. At current quotations it is quite possible for railroad companies to sell their old rails at prices which would almost, if not quite, pay for new material; but they cannot take advantage of this owing to the congested condition of our rail mills. Girder

rails for some large trolley enterprises are also needed; at least a portion of these orders may go abroad.

The threatened strike in the Shenango and Mahoning valleys is still in doubt. The blast furnace workers in these districts, as will be remembered, demanded eight hours time, which would necessitate the employment of three shifts, instead of two, increasing the number of workmen about 50 per cent. The operators refused to consider this, but offered instead to increase wages for the present time. If this offer is not accepted as a compromise work will be stopped on June 1, causing a serious drop in production at a time when it will be extremely inconvenient.

The anthracite coal strike has had little effect on iron production, as it concerns only a few furnaces in Eastern Pennsylvania. If prolonged, however, its effect may be felt further.

**Other Metals.**—The copper market continues in fair condition, with but little change since our last report. There are abundant indications that consumption continues on a large scale in this country and that matters are slowly improving on the other side. Some of our large producers are sold out for two or three months to come. At the same time, there is no foundation for the assertion which has been made in some quarters that copper has sold at a large advance over recent quotations. The gains in price have been comparatively small, and any claim of higher rates is merely speculative. The slow but steady advance, however, is encouraging and seems to show better conditions. A drop in standard copper in London of about £1 is reported, which was due chiefly to the closing out of some large speculative holdings. This fall, however, rather restores the equilibrium of the market as standard copper has been selling too high in proportion to refined copper, and the fall in the former about restores normal relations.

In other metals business continues very good. Tin maintains its price, although spot supplies are somewhat larger. Lead is steady, with a very good consumption. Spelter has been higher on account of the strike in the smelters in the Kansas District, which threatens to curtail supplies, but the suspension of work is not so general as had been expected, and there is no particular opportunity for any sensational rise in quotations.

The silver market continues practically unchanged; the demand for Indian account shows some improvement. While this is not of very great proportions, it is enough to steady prices. It is hardly necessary to say that any increase in demand is readily supplied, and sellers are quite willing to meet buyers who are in need of the metal. At the same time the offerings have not been excessive.

**Coal.**—The Western coal market continues to depend chiefly upon transportation. In some directions there has been an increase in car supplies, so that trade to the large cities is better, but the Lake coal trade is still very much behind and shippers are finding it impossible to keep vessels going. The lake trade is consequently in a very unsettled condition. Demand is strong and the mines are quite ready to supply it if they could only get the coal to the ports. From the shippers' point of view the railroads have been very much to blame in not keeping pace better with the demand upon them.

The seaboard bituminous trade shows a very heavy demand, which is due partly to buying by customers, who generally use anthracite, and partly to the action of some regular consumers, who have increased their demands in order to provide against a possible shortage later. In a number of cases orders have been

duplicated, but it is quite possible that some of these may be cancelled. In the seaboard trade transportation conditions are very much better than in the Western trade, and car supplies have been fairly good; not much attention is paid yet to the possibility of a strike of the bituminous coal miners. One has been ordered in West Virginia, but the great majority of the miners there are not connected with the union, and it is believed that very few mines will stop working.

The anthracite trade is, of course, at a standstill, and everything depends on the continuance of the strike. About its possible duration, nothing definite can be said at present, and one prediction is as good as another; it looks very much, however, as if the companies had decided to fight the matter out at this time and would decline to make any compromise. The strike question is fully considered on another page.



#### ANTHRACITE COAL SIZES.

No other report of the operation of anthracite collieries is made which shows so many interesting details as that made yearly by Mr. Heber S. Thompson as engineer of the Girard Estate, which is included among the Philadelphia city trusts. The collieries on the Girard Estate, moreover, may be taken as in some degree typical, since they extend over a considerable area, and are operated under lease by several different companies.

The total production and shipments of coal from the collieries on the Girard Estate for two years past has been as follows, in long tons:

	1900.		1901.		Changes.
	Tons.	Per ct.	Tons.	Per ct.	
Mined from collieries.	987,650	77.8	1,086,429	75.7	I. 98,779
Saved from wash'ies.	104,707	8.2	161,605	11.2	I. 56,898
Total marketed.	1,092,357	86.0	1,248,034	86.9	I. 155,677
Used in production.	177,087	14.0	188,081	13.1	I. 10,994
Total	1,269,444	100.0	1,436,115	100.0	I. 166,671

The proportion of the total coal mined which is used in operating the collieries appears unusually large. The Lehigh Coal and Navigation Company last year reported 8.6 per cent of the coal mined as used at collieries; while other companies report from 7 to 10 per cent. The mine inspectors' reports for 1901 give a general average for the whole anthracite region of 8.8 per cent.

The division of the coal prepared and shipped into the various market sizes is a point of much interest, about which almost the only complete statistics published are those given in the report now under review. This statement shows not only the sizes coming from the breakers, but also the sizes of the coal saved by the washeries from the old culm heaps. In the latter the small sizes predominate, as might be expected, raising considerably the proportion of those sizes in the total.

The proportions of the different sizes of coal sent to market from the collieries on the Girard Estate last year are given in the table below:

	1901.			1900.
	Collieries.	Washeries.	Total.	
Lump	0.07	.....	0.06	0.40
Steamboat	1.96	.....	1.70	3.39
Broken	10.60	.....	9.23	10.65
Egg	12.07	0.03	10.51	16.22
Stove	15.48	0.19	13.50	13.57
Chestnut	23.28	4.51	20.85	19.21
Total large sizes.	63.46	4.73	55.85	57.41
Pea	13.94	21.12	14.87	13.98
Buckwheat	18.78	45.58	22.26	21.10
Rice	3.82	24.69	6.52	7.51
Barley	.....	3.88	0.50	.....
Total small or steam sizes	36.54	95.27	44.15	42.59
Totals	100.00	100.00	100.00	100.00

The only parallel statement which can be found is in the report of the Lehigh Coal and Navigation Company. That company in 1901 reported 50.16 per cent of large sizes—chestnut and over—and 49.84 per cent of steam sizes, showing a somewhat larger



proportion of the latter than the collieries of the Girard Estate.

The table above shows only the sizes of coal shipped. The coal used in operating collieries is of the small sizes, as a rule. If we take the total used and shipped, we find that the proportion of large sizes in the Girard collieries last year—counting all the coal consumed in operation as of small sizes—was 48.54 per cent of the total; or 54.09 per cent of the colliery product, excluding that of the washeries. The inference which may be drawn is that the proportion of steam sizes made in the anthracite trade is approximating one-half of the total shipments. This shows the increasing care taken in screening and separating the coal, in saving the small coal and in reducing the final proportion of culm or waste. As it is the large sizes which are sold for domestic consumption, it would also indicate that the proportion of anthracite sold for steam purposes is approximating 50 per cent of the shipments. This must be modified by the fact that a large quantity of pea coal really goes into domestic consumption. Most of it is used in New York and other cities in apartment houses, hotel and office buildings where steam heat and electric lights are used; for while this coal is used for raising steam, it is really burned for domestic, and not for manufacturing purposes. It is also a practice among retail dealers in Eastern cities to buy a certain proportion of pea coal, which is mixed with the chestnut sold for house purposes.

The sizing of anthracite is an important question to producers; and to consumers also, since increased saving in preparing coal affects—or at least ought to affect—the selling price. After all, however, the saving cannot be of large proportion, and we cannot expect any material reduction in costs or prices until the present system is done away with, at least in part, and a large proportion of the coal converted into gas at or near the mines, for transmission to consuming points in that form.

DEMANDS OF ANTHRACITE COAL MINERS.

EDITORIAL CORRESPONDENCE.

Wilkesbarre, Pa., May 28.

The present strike in the anthracite region of Pennsylvania, involving fully 145,000 men, has some unique features. It is the largest strike of organized labor this country has ever seen, yet is being conducted very quietly; in fact, papers in Philadelphia and New York have been giving more space to it than those in the mining region. Both the officials of the United Mine Workers and the heads of the mining companies are saying little for publication and many of the published statements regarding the situation have been written by correspondents who have based them on very imperfect information, while the opinions editorially expressed by most newspapers show apparent ignorance. This is not to be wondered at, however, since the questions involved in mining and preparing anthracite are extremely complex and their bearing on mining costs and miners' wages can be appreciated only by persons having considerable familiarity with local conditions.

The first thing that impresses any one who seeks to get from the miners or their representatives some just idea of their grievances is the variety of grievances alleged. One man will insist that the sole question involved is that of an 8-hour day for all men employed on company account; another from the Wyoming or Lackawanna regions will assert that the sole question is the weighing of coal—that miners ought to be paid by weight instead of by the car as at present; another will allege the system of dockage an old grievance. This, he claims, often unjustly penalizes the miner who sends up coal mixed with rock and slate, the docking boss favoring the company rather than the miner. Little is said about a recognition of the Union.

From long experience the mine officials are familiar with these various complaints and see in their variety that men really have no great grievance.

The United Mine Workers of America is as yet hardly a benevolent association and has no beneficiary features. The association does not, as certain well-known labor organizations do, pay death benefits, nor has it ever been able to make any regular payments to men out on a long strike. It is composed of men scattered over a vast tract of country, very many of them of foreign birth and of diverse nationalities. These men are working under very diverse conditions at a great variety of tasks. There is, therefore, but a very slight sense of unity among them, and they can be held together only by the sense of direct benefits received. For this reason, the officials of the Union, to keep the men in line must every year or so make demands on employers for higher wages or, what is practically the same thing, for shorter hours. These demands must be cumulative, for any recession or any weakening by the officials means a large desertion of the rank and file. The demands must not only be cumulative, but every demand if followed by a strike must result in some direct gain to the men.

It can be easily seen, therefore, that an organization thus held together must sooner or later make demands on employers which they will absolutely refuse to grant or even to arbitrate. A strike is then inevitable and is likely to be long and bitter. As the operators are better able to withstand a long suspension of work than the miners, the final result of such a strike is generally a complete defeat for the strikers and the utter wreck of the strikers' Union. This has been, in brief, the history of every attempt to organize the Pennsylvania anthracite miners. The last and most ambitious attempt was that of the Knights of Labor, whose power was finally broken by the long strike which tied up the Lehigh Region for six months in 1887.

That the miners at present have some real grievances in certain cases is undoubtedly true. Local superintendents and bosses may be unduly severe or arbitrary or may seek to make a showing of low mining cost at the expense of the miners, yet the companies in posting their notices of a 10 per cent advance in wages after the strike of 1900 stated that they would take up local grievances and endeavor to adjust them. Most of the large companies have lived up to their promises in this respect and many grievances have been adjusted, of which the public has heard nothing.

On the other hand the officials of the United Mine Workers have not been able to control their men. Over a year ago they agreed to prevent unauthorized strikes. This they have not done. The number of such strikes last year was 128, and many of them were for utterly frivolous reasons. Thus some were on account of the discharge of incompetent men and boys. One mine was tied up several days because a driver boy who had brutally maimed a mule was discharged. At another colliery 800 men were idle a week because of the discharge of a drunken breaker boss. The foreman of another colliery, who asked why a large portion of his men, enough to keep the mine from working, did not show up one morning, found out that they had neglected to observe a certain saint's day the month before, and would observe it that month. At many collieries all the men have quit for half a day to attend a funeral. In all these cases no notice was given the mine superintendent.

Conscious of the strength of their Union, the men have become insolent in their demeanor, have refused to obey orders and have worked far less effectively. A district superintendent of a large mining company states that the men in the collieries under his control have fallen off in efficiency 40 per cent. This company has in hand an important piece of work, a duplicate of an undertaking completed some years ago. The conditions are the same, the facilities for removing rock better, yet the men only get out 60 cars of rock a day when a few years ago they got out 100. The superintendent of another company says that he now averages to a mine car 300 pounds of coal less than three years ago.

From this it is evident that the real cause of the present strike is the determination of the mine operators to resist any further concession to the Union. I have heard officials of the Mine Workers say that the strike would be called off if the operators granted but a 2 per cent increase in wages. But the operators realize that the same old grievances would be presented next year for another increase and that each point gained by the Union strengthens its power and decreases the efficiency of the employees. In fact, from the standpoint of the mine superintendents conditions this spring were becoming unbearable.

The expense of keeping a large colliery in the Wyoming Valley idle is great. I know of one group where it costs \$1,800 a day to keep the three mines in order, whether any coal is mined or not. The company's interests require that these mines shall work so long as there is a profitable market for the coal, yet the miners have been known to quit on the slightest pretext, tying up a mine for half a day or perhaps a week, as shown by the instances quoted above.

Under such conditions it is apparent that a great strike was bound to come; the only question was when. It is often asked why the miners did not wait till September when political complications might help them and the specter of a coal famine with winter approaching rouse public clamor. The answer is that there is more or less jealousy among the leaders of the Union and all feared a loss of prestige if after all the parleying a strike had been delayed several months. Again the miners in the Lehigh Region are credited with being eager for a trial of strength. In the Wyoming and Lackawanna regions the men were evenly divided on striking. The Schuylkill miners were mainly opposed to a strike, but the delegates from the Lehigh Region carried the Hazleton convention. A large proportion of the Lehigh miners are Lithuanians and are credited with being the most quarrelsome and turbulent of the foreign element in the anthracite fields.

From these considerations it is clear that the present strike is, so to speak, an irrepressible conflict. The mine superintendents generally have bitterly regretted the settlement due to political considerations of the strike in 1900. There are no political questions whatever in the present conflict, however, if the motives of certain members of the Civic Federation be excepted. The contest now on is recognized by miners and operators as a struggle that will determine whether the operator will have power to control the conditions of employment at the mines or whether this power shall be delegated to the United Mine Workers. The claims of shorter hours and higher wages are put forth as pretexts by the miners, but the real issue is the recognition of the Union with all that such recognition implies.

The three chief grievances alleged by the Hazleton convention of representatives from the various locals of the Miners' Union are these, and for them the strike was declared: (1) An eight-hour day for all men on company account. (2) Coal mined to be weighed and the miner paid by weight instead of by the car, 2,240 pounds making a ton. (3) Recognition of the Union.

As to these grievances the first was put out to get the firemen, engineers and pumpmen to quit work in case of a general strike. These men work 12-hour shifts, and the firemen have been seeking shorter hours for some time, having started an unsuccessful strike with this end in view last year. Of all the men likely to take part in the present strike they seem to have the strongest grievance. A boiler house containing 20 to 30 old style cylinder boilers is not a cool place on a July day and to keep up a good fire with culm requires steady shoveling. With the growth of the eight-hour movement all over the country, a reduction in the firemen's hours of work is likely to come before long whether the present strike is successful or not. The pumpmen and engineers draw fair salaries for little work, some engineers getting as high as \$100 monthly. They are often middle aged men with families and, except in the Lehigh Region, are likely to stay at

work, as are the pumpmen. The majority of the firemen in all the districts will probably quit on June 2.

The second grievance is an old one and was probably brought forth because it appeals directly to every miner working on a contract basis. At first sight the demand appears just, but a slight investigation shows its weakness. The miner paid by the car knows just how much coal he has got to load and how much "topping" he must give the car. He also knows that the docking boss in the majority of cases is fair-minded and will not dock a miner except for cause. A full car of coal, containing from 75 to 105 cubic feet, entitles the miner to from 85 cents to \$1.05, according to the hardness of the vein, the size of the car, etc. If the coal was weighed the company would have to impose some system of docking to prevent the men from loading too much fine coal and send up a car nearly full of rock and slate with a thin veneer of coal on top. Some mine laborers are adept at loading cars so as to deceive the docking boss. Slate is much heavier than coal. Inasmuch as the companies prepare coal in several sizes, there is always a certain proportion of a car of run-of-mine that goes to the culm pile. This proportion varies according to the character of the vein. Hence if the companies paid by weight they would deduct this loss, the miner would think he was being defrauded and the public at large would never understand the matter. The present system, complex as it may seem, is the best that experience suggests, unless breakers be so constructed that the weight of prepared coal, fine coal and waste in each car can be determined. This is not impossible, but involves a reconstruction of every breaker in the Wyoming and Lackawanna regions.

The third claim put forth by the miners is that their Union be recognized. By recognition is not meant that representatives of the operators and of the miners shall get together once a year and arrange a wage scale. Recognition in the anthracite country, judging from the attitude of the mine employees during the past three years, means that the individual miner shall do what a local lodge may think best. He shall work or quit without notice, get the salary of a union man, though absolutely unfitted for the work given him, and shall in all respects obey his local lodge rather than the mine superintendent. Carried to its logical end the position of the United Mine Workers is that the union shall control all questions of employment, and every man, every breaker boy shall owe it allegiance. The operator's duty is to sign the pay roll, and draw his profits, if the system leaves any. The plain truth is that an objectionable trade union spirit has grown greatly of late years in the anthracite region. It pervades all trades, and frequently shows the "canny" spirit that has made trade unions in England a menace to that country's prosperity. Miners are less efficient and do not care to work as long as formerly. Six cars are considered a day's work, yet men frequently quit after loading three cars, saying they do not care to work longer. At a certain mine near Wilkes-Barre employing 800 men, it requires 150 headings worked to supply 400 cars of coal daily. The men thus average about 2-3 cars daily, instead of the six that they often could send out.

**TESTS OF AMERICAN COAL.**—The London *Colliery Guardian* reports that a cargo of American gas coal was used for 24 hours on March 1 at the Copenhagen gasworks in the production of gas in retort house No. 1, with the following report: Quantity of coal used, 144.14 tons; gas produced, 1,599,390 cubic feet; gas produced by each ton of coal, 11,091 cubic feet; power of the gas, 16.52 Hefner light 76 Omm 15° C.; coke resulting from each ton of coal, 16.37 pounds; ashes in the coke, 7½ per cent. The coke was firm, substantial, and gave a good heat, but left considerable slag in the fire-box. In stoves it burnt well, giving off strong heat, but required good draft. The coal was sold at 20s. per ton c. i. f. Two cargoes of Canadian coal of 5,000 tons each have been sold at Copenhagen at 15s. 3d. c. i. f.

#### THE CARNEGIE RESEARCH SCHOLARSHIPS.

At the recent meeting of the Iron and Steel Institute in London, it was announced the Council had awarded the Andrew Carnegie gold medal for 1902 to Dr. J. A. Mathews, of New York, for the research carried out by him as a holder of an Andrew Carnegie research scholarship during the past year. The first recipient, Dr. Mathews, has previously received a Fellowship for the encouragement of scientific research from Columbia College, New York, where he has been working under the guidance of Professor H. M. Howe.

For the present year the council of the Iron and Steel Institute has awarded six Andrew Carnegie research scholarships, each of the value of £100. The following are some particulars of the careers of the successful candidates:

Octave Boudouard, of Paris, aged 30, has already published 32 original memoirs and, in connection with Professor Le Chatelier, four books. He is assistant professor of chemistry at the College of France, and has previously received in France bronze and silver medals for research.

William Campbell, of New York, aged 25, has published papers for the Institution of Mechanical Engineers, the American Chemical Society, and the Franklin Institute. He studied at the Durham College of Science, and was awarded an 1851 Royal Exhibition Scholarship to the Royal School of Mines, London. He is now working under Professor H. M. Howe at Columbia College.

Alfred Campion, of Cooper's Hill, aged 27, is a member of the Iron and Steel Institute, who has had practical experience with the Steel Company of Scotland, and has previously written papers for Glasgow societies.

Percy Longmuir, of Manchester, aged 25, was a student of the Sheffield University College. He has had experience in foundry work, and has written several papers on that subject.

Ernest Schott, of Berlin, aged 26, studied under Professor Ledebur, of Freiberg, and is assistant in the Royal Testing Institution at Charlottenburg. He has published a number of original memoirs.

Frederick Henry Wigham, of Wakefield, aged 32, is a member of the Iron and Steel Institute. He is a steel works manager to Messrs. George Cradock & Co., and communicated, in connection with Mr. Stead, a paper on steel for wiremaking to the Iron and Steel Institute last year.

#### CALIFORNIA'S MINERAL PRODUCT AND ASSESSED VALUATION.

BY OUR SPECIAL CORRESPONDENT.

The California State Mining Bureau, under charge of Lewis E. Aubury, State Mineralogist, has issued a small folder entitled "A Few Facts Concerning the Mineral Production of California as Compared with the Total Assessed Valuation." The basis is the figures of value by counties of the mineral output of the State for 1900, which was \$32,622,945, including gold, silver, borax, copper, petroleum and all other mineral products. This is 2½ per cent of the total assessed valuation of the State in 1901, which was \$1,241,705,803. The idea of the folder is to impress upon the public the importance and extent of the mining industry. The total assessed valuation includes real estate, personal property, railroads, money and credits, etc.

A small diagram is printed of each county in which the total assessed value as represented by a square checked into 100 parts; and a portion is shaded to represent the mineral product of the county in its percentage to the total assessed value.

Diagrams are also given showing agricultural percentages, in which the full square represents the entire mineral product in the State and the shaded portions the agricultural. The whole value of the oranges, cured fruits and prunes produced in 1900 in California is shown to be 73 per cent of the mineral product. The flour, lumber, butter, sugar and hops amount to 64 per cent of the mineral product.

The oranges and lemons amounted to 40 per cent in value of the mineral product; cured fruits, 22 per cent; prunes, 11 per cent; lumber, 21 per cent; flour, 11 per cent; butter, 20 per cent; beet sugar, 9 per cent, and hops, 3 per cent.

This is a proper method of showing the relative importance of the mineral industry of the State as compared with the leading agricultural products and their value in the same year.

A condensed statement showing the percentage of the mineral product to the assessed valuation, by county, is here given:

County.	Assessed valuation.	Mineral product.	per cent.
Mono	\$1,137,276	\$752,121	66
Shasta	9,362,304	5,374,026	59½
Trinity	1,567,998	698,689	44
Sierra	1,529,604	663,159	43
Calaveras	5,434,379	1,905,856	35
Amador	4,641,489	1,479,009	31
Nevada	7,076,340	1,916,899	27
Tuolumne	6,424,670	1,659,258	25
Inyo	1,885,336	420,586	22
Plumas	2,093,004	369,379	17
Placer	9,097,657	1,128,882	12
San Bernardino	16,416,149	1,965,143	11
Siskiyou	8,991,828	1,010,383	11
El Dorado	4,039,566	426,420	10
Mariposa	2,006,587	171,516	8
Kern	21,129,890	1,867,856	8
Lake	3,178,460	172,745	5
Ventura	8,658,243	476,161	5
Yuba	5,464,434	284,631	5
Madera	6,289,942	268,467	4
Napa	11,765,301	493,100	4
Butte	13,879,046	500,786	3
San Benito	6,018,740	205,650	3
Santa Barbara	13,969,868	528,438	3
Los Angeles	103,328,904	2,155,198	2
Orange	11,245,544	259,174	2
Riverside	12,248,709	285,112	2
San Diego	19,961,959	402,061	2
Fresno	30,770,729	609,847	2

In the leaflet from which these figures are taken are some odd conclusions based on the total mineral product of California for 1900.

**THE DISCOVERER OF GOLD IN NEW SOUTH WALES.**—The *Australian Mining Standard* says: "Mr. George Hunt, a veteran miner, died at Merrylands, near Sydney, recently. He persistently claimed that he discovered gold in New South Wales before Hargreaves, to whom the credit is generally accorded. According to Hunt's account, he met Hargreaves at the old White Horse Hotel, Sydney, where both were staying. Hargreaves at that time had just returned from California, and he and Hunt used to talk of the possibilities of gold being discovered here. Hargreaves told Hunt he knew where gold could be found, and mentioned some likely places. Hunt then resolved to try his luck in the search for the metal, and with this intention started for Bathurst. After prospecting various localities, Hunt, on February 5, 1851, claimed that he struck a patch near Lewis' Ponds, from which he washed 17 pennyweights of gold. The old gentleman was very positive as to the date, as it happened on his birthday. Shortly after this he met Hargreaves who, he said, did not get gold until a few days after their meeting. Hunt then went into Orange for the purpose of getting tucker, while Hargreaves came down to Sydney and reported the discovery. After the diggings broke out Hunt worked on them with varying success, and then settled down to farming on the Manning River, where he resided for some years, but left there to once more take up his old pursuits. About 10 years ago he bought some ground in Merrylands, and resided there since. He was born in 1819, and had just completed his 83rd year. The cause of death was bronchitis and pneumonia."

**ACCIDENTS IN GERMAN COAL MINES.**—Returns of accidents in mines in the Breslau District (Silesia) of Germany, in which the average number of persons employed is 104,295, shows that in coal mines in 1901, a total of 250 persons killed and 2,755 injured, including 219 killed and 2,193 injured below ground. This gives a death-rate per 1,000 persons employed below ground of 2.911. Of the deaths below ground, 109 were caused by falls of roof and side, 15 by shaft accidents, 37 by accidents in galleries and headings, 2 by explosions, 31 by foul air, and 15 by shot-firing accidents.



## PUDDLED IRON AND MECHANICAL MEANS FOR THE PRODUCTION OF SAME.\*

By JAMES P. ROE.

Puddling consists, essentially, in the removal of most of the carbon and silicon, and part of the phosphorus and sulphur from pig iron by agitating it while molten in the presence of suitable cinder and gases of the right composition and temperature. These are broadly the conditions, regardless of means, up to the period of balling, which final operation may, and almost of necessity must, differ according as it is carried out by manual or mechanical means. The process developed by the writer was carried out in the machine or furnace illustrated herewith. The general framing consists of two side plates, suspended from a trunnion on each side, carrying the whole machine, and these trunnions rest upon roller bearings supported by an elevated framework. The side plates are produced on their lower sides, forming segments of circles, to which the operating racks are secured, which gear into pinions driven by a re-

of convenience of application and ease of regulation. The fuel is introduced through the two trunnions, which form efficient combustion chambers, and the flames directly impinge on each other at the middle line of the furnace, thus producing a most intense and thorough combustion. They then pass to the four converging stacks, two of which are at each end of the furnace, and by this means is assured a complete filling of the chamber.

The whole of one end is closed by a door, built up of removable sections, which is suspended from a shaft running across the furnace. The door is opened and closed by two side-connecting rods, which connect the bottom girder of the door to a cross-head operated by a hydraulic cylinder under the furnace. Parallel motion in the cross-head is assured by means of pinions at each end engaging in racks fastened to the side plates of the machine. The closed door is locked by means of wedges, operated by hydraulic cylinders which pass through the side plates and the connecting rods. The wedges also aid in making tight the joints of the door.

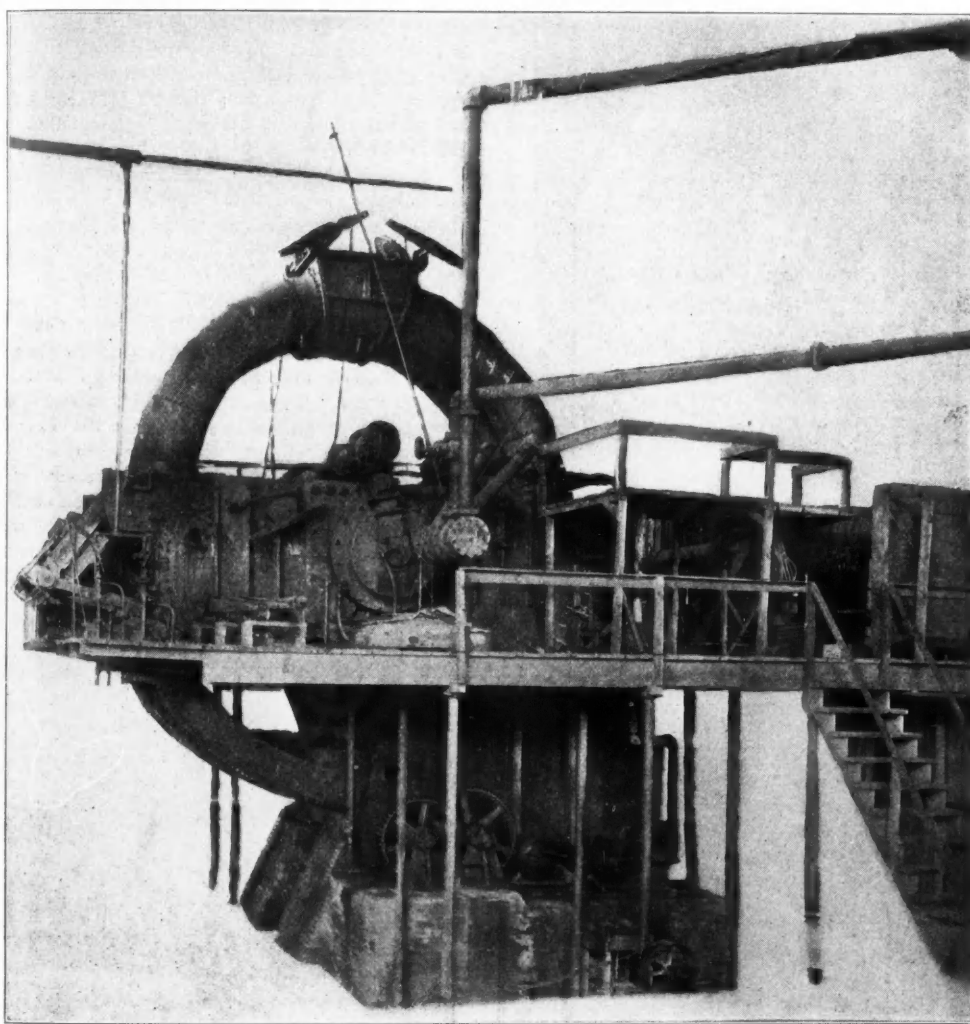


FIG. 1—ROE'S PUDDLING MACHINE.

versing engine. Between the side plates are four distance pieces, which form girders from one trunnion to the other. The stack bases and the angles under the bottom also serve to form part of and strengthen the frame-work.

The bottom, consisting of a series of water-cooled parts, rests upon the angles referred to and supports the working bottom of magnesite brick. The same material is used to line the end and sides up to the wash line of the cinder, the sides above the cinder line, the roof and the lining of the four stacks being built of fire brick.

At present the furnace is fired by means of crude oil and blast, although coal or gas can also be used should convenience or economical reasons require it. Oil was adopted in the present instance on account

\*Paper read at the Philadelphia meeting of the American Institute of Mining Engineers.

The machine can swing through about 65° on each side of the center line of the trunnions. It is, therefore, a puddling furnace, in which the necessary agitation for producing an intimate mixture of the molten metal and oxides is obtained by allowing them to run down hill, first in one direction and then in the other, and suddenly arresting them at the bottom. The subsequent balling of the iron, when it has come to nature, is produced by precisely the same means. A good idea of the general outlines of the machine may be obtained by the photograph, Plate 1.

It has been sought to embody in the present effort, as far as possible, the general practice in steel works; since there is but one period in the production of iron, that from the beginning of crystallization to the squeezing of the mass, where the change from pig iron to wrought iron is necessarily different from that of steel.

The bottom, sides and ends of the furnace, being formed as described, are intended to possess relatively permanent characteristics, and thus differ radically from the cinder bottom and sides, fixed with ore, from which much of the cinder necessary for puddling is obtained in the ordinary furnace. It is necessary, therefore, to charge molten cinder into the puddling machine as an equivalent. This is melted in an auxiliary furnace, designed for the purpose. The cinder used for this purpose is the tap cinder from the ordinary furnace, and is not an active puddling agent. It serves principally to seal the door joints, cover and protect the bottom in a measure, present a medium for retaining the phosphoric acid, form a lubricant as the iron comes to nature and is massed, and, finally, to act as a welding cinder in the ball. Roll scale is added during the process to act as the principal puddling agent.

It is intended to use molten iron from a blast furnace by charging it into a mixer and drawing from that the iron as needed for the puddler, but at this time a cupola is used. This latter, however, is open to the two objections of greater cost and increased difficulty in obtaining low sulphur.

The molten iron—in the existing machine varying from 3,000 to 4,000 pounds—is poured through the charging hole immediately after the cinder, and as soon as the iron is charged the machine is oscillated two or three times. Then the oxidizing agent (roll scale or easily reduced iron ore) is added by means of a long spoon (made of a piece of pipe cut longitudinally in two), which is run in through one of the end peep holes, given half a revolution and withdrawn, thus evenly distributing the scale through the bath. This is continued between oscillations until, in the judgment of the puddler, sufficient scale has been added. This is told by free iron ceasing to run on the bottom or the bath rising for the high boil. This latter is much more active than in an ordinary puddle furnace, large volumes of carbonic oxide being emitted, which burn above the surface of the bath to carbonic acid, adding materially to the temperature of the furnace and the bath without any additional fuel. During the periods of scaling and boiling, as the bath descends the inclined hearth, it is most thoroughly agitated and uniformly mixed; in part by the lower strata being retarded by the friction of the bottom, the upper strata flowing over the lower, and, more largely, because as the direction of the bath is suddenly arrested by the end it turns over upon itself precisely as an ocean wave does.

As the iron comes to nature and thickens, the progress down the hearth, from end to end, becomes slower, so that the clusters pass slowly through the zone of highest temperature and acquire the heat necessary for thoroughly welding the whole together in the ball. This massing, or balling, is accomplished by increasing the angle of the hearth so that the mass slides with sufficient momentum to compress and solidify itself. This mass, or ball, then assumes the form shown in the photograph (Plate 2), having a length about equal to the width of the machine, a width of about 3 feet and a height of 24 to 30 inches. When the balling is completed the side-rod wedges are withdrawn and, as the front end of the machine descends, the door is opened and

the mass is discharged directly into the squeezer by its own gravity. Any free cinder that may exist is discharged ahead of the mass, and falls in front of the squeezer. The door is then closed and locked, the cinder is poured in and the machine is ready for the next heat.

Before following the puddled mass further, it is desirable to call attention to the squeezer. The cof-

jecting clusters cool. Besides this, rapid oxidation takes place on the ball as it is exposed to the atmosphere, thus causing a loss, and producing an infusible oxide, which tends to prevent welding and a thorough removal of the cinder.

The squeezer has proved very effective as regards shaping up and solidifying its product. There has been some trouble in freeing all of the blooms

Comparison seems so essential to many conclusions that it is almost necessary to point to some features in the Cort process, as improved by Rogers, in order to obtain a just conception of the present effort. In manual puddling the conditions throughout the bath, or heat, lack uniformity. This is recognized by all practical puddlers when they select a bar for testing. This lack of uniformity is cured, in a large measure, at the finishing mills by piling the good, bad and indifferent together, thus producing a mean that meets requirements. Hence, apart from the inability of manual means to furnish a mass of sufficient size to finish direct, the product so made would vary so much that the proportion of inferior material would condemn the whole. On the other hand, the product of the machine under discussion is relatively uniform throughout a given heat and is, therefore, well fitted to roll as directly as possible into a finished product.

This can be done, provided there is work enough, that is, a sufficient number of reductions in section from the squeezer bloom to such product. Samples produced go far to combat the usual statement that repeated working and heating of iron is necessary to produce a good product. This statement is illogical. It is impossible to conceive that there can be any inherent virtues in a second or third heating and piling, other than accomplishing something that had not been done in the prior heatings.

The requirements in the material for good results in rolling or forging iron or steel are, homogeneity, mass enough to give opportunity for the necessary work (reduction of section) and to retain the temperature, and pressure enough (heavy and effective machinery) to accomplish the desired end before the necessary temperature is dissipated. This has been confirmed in modern steel production.

The puddler and squeezer, although presenting some of the shortcomings inevitably associated with being the first of their kind, have, in the main, fulfilled their mission of development satisfactorily, which is shown by the following summary of results in conjunction with the samples exhibited.

The pig iron used has varied in composition as follows: Sulphur, 0.03 to 0.26; phosphorus, 0.50 to 1.35; silicon, 0.60 to 1.40. Many of the heats have shown a satisfactory elimination of phosphorus and, as was to be expected, this elimination has been

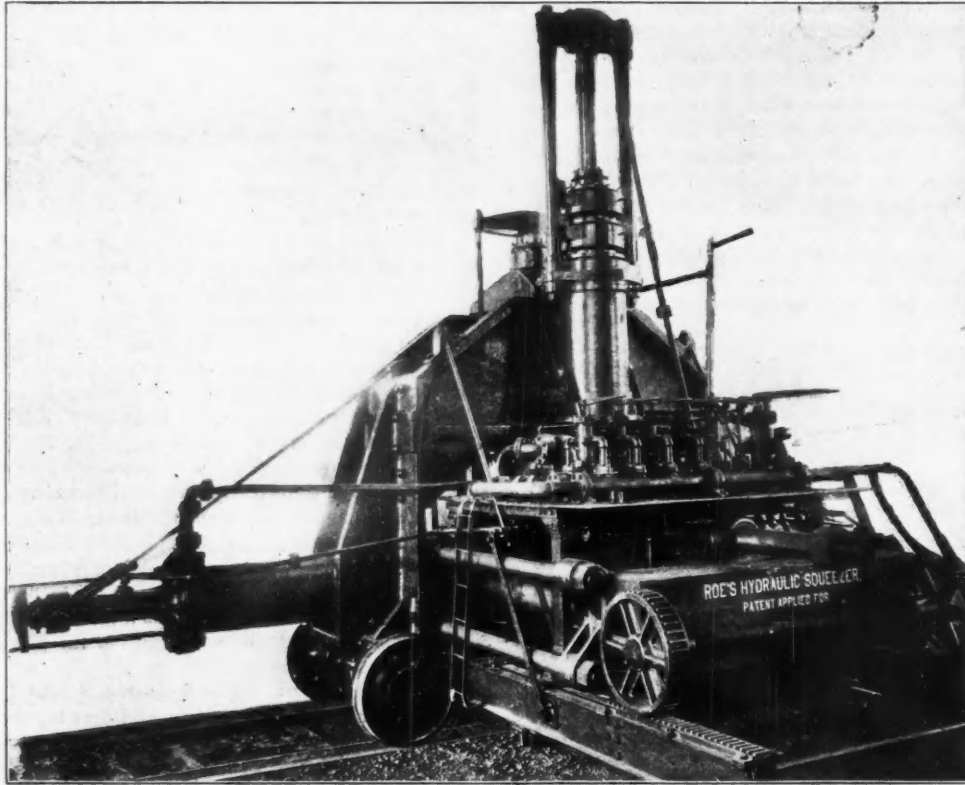


FIG. 2. HYDRAULIC SQUEEZER.

fee-mill squeezer is almost universally used to-day, in conjunction with the ordinary process of puddling iron and working with the balls, weighing about 180 pounds. Although it is in this case probably as effective a mechanical device for a given end as was ever designed, it is not equally well fitted for handling masses now weighing 4,000 pounds and which in the future probably will weigh 10,000 pounds, especially since the product sought is to be of square or rectangular section, as desired.

Hence a special squeezer had to be designed to meet the conditions, and took the form shown in the photograph (Plate 3). Hydraulic power was selected. It is applied in one horizontal direction, by means of a front girder operated by the cylinder in the rear, and at right angles to this, by means of the two end cylinders, thus giving at this time a fixed length of 54 inches and a width of 24 inches to the bloom. The vertical pressure is applied by means of the top cylinder. In order to increase the final pressure, an intensifier is mounted on the squeezer, which raises the hydraulic pressure from the initial 600 pounds to 2,500 pounds per square inch, thus giving a pressure of 1,800 tons on the top area of the bloom. All of the facing plates coming into contact with the mass are sectional, having spaces between them for the egress of the cinder as it is squeezed out of the mass.

The return motions of the various parts are effected by smaller hydraulic cylinders, and, by similar means, the bloom is pushed from under the head piece to the open front.

The whole is mounted upon four wheels, which it is intended should run on rails extending in front of and parallel to a series of puddling machines. One squeezer, therefore, would take the balls from all the furnaces and deposit the bloom at a point convenient to the blooming mill.

The specific object in having a movable squeezer, is to avoid any delay at this important period, as it is vital that the iron be put together before the pro-

jecting clusters cool, but, judging from the number that have been so freed and from the fact that the trouble is not in an aggravated form in any, it is believed that by giving the cinder somewhat more freedom for egress, the result will be equally satis-

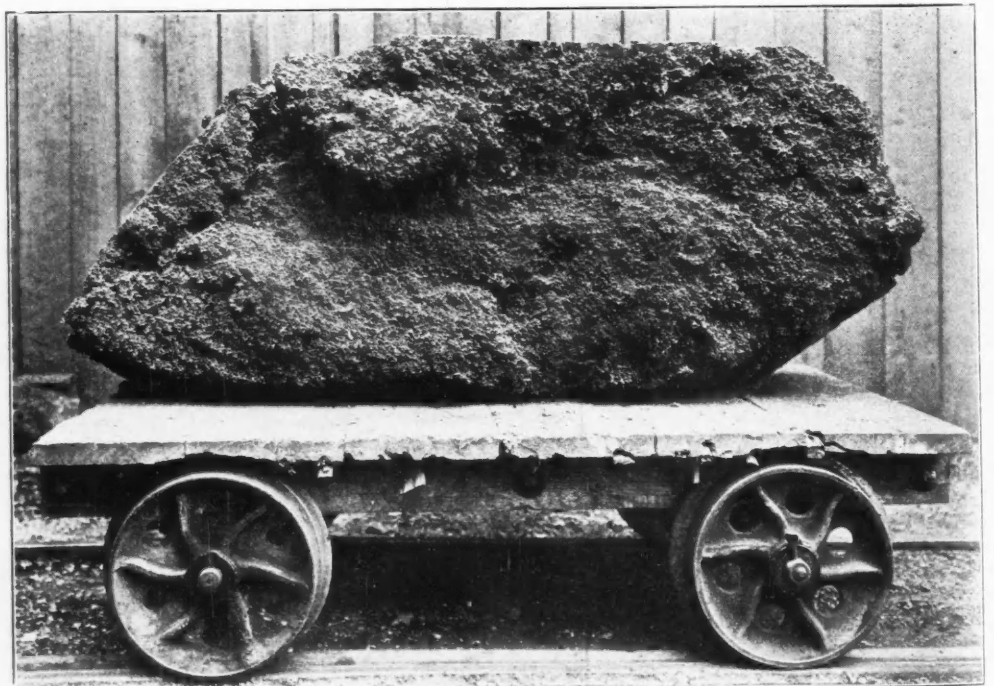


FIG. 3. MASS OF SPONGY IRON.

factory in this direction as in the others. All the operations on the bloom, after it has left the squeezer, are identical with those now applied to steel; thereby extending the economy of production to the finishing mills.

shown to depend upon the composition and condition of the cinder and the manipulation of the bath during the period before the iron comes to nature. Some elimination of sulphur has been shown, but, as a general rule, this element should be kept as low as



possible in the iron charged. Those heats which have been made with iron taken directly from the blast furnace have shown the special advantage of such a practice in this respect. The cinder used has a normal composition of about 0.30 sulphur, 1.73 phosphorus and 20.00 silica. Ordinary roll scale was used for the additions.

The weight of pig iron charged has generally been between 3,000 and 4,000 pounds, although some heats as low as 2,500 pounds have been made, the average being 3,500 pounds. The weight of cinder has varied considerably, but it has been shown that about 500 pounds per ton of iron (22 to 25 per cent) is the proper amount. The amount of scale used has run from 350 to 550 pounds and depends entirely upon the individual characteristics of the heat, such as the character of the pig iron, the temperature of the bath, etc., just as it does in the ordinary process.

The time required to make a heat has, of course, varied very much, especially at first, running from 24 to 102 minutes. The average duration is 48 minutes, but it is believed that 40 minutes for a 4,000-pound charge will be the average under regular running conditions. This would mean from 15 to 18 heats per turn of 12 hours, or a product of from about 27 to 32 tons of rolled slabs or blooms per furnace per turn.

While some heats have shown a loss and others a gain between pig and slab, the indications are that the weight of the rolled slab will be about equal to that of the pig iron charged, or will only slightly exceed it. The loss from slab to finished plate, however, runs between 5 and 6 per cent, thus coming close to that of steel. The difference is largely due to the fact that the iron is heated to a higher temperature, with a consequent higher heating loss. This difference in finishing loss is, however, more than compensated for by the fact that all of the iron made is in the slab, there being no crop ends such as are necessary when steel slabs are rolled from ingots. The loss from pig iron to finished plate is, therefore, from 5 to 6 per cent in this process while in the ordinary puddling process it is about 16 per cent.

The physical tests made on this material show better results than those from plates of similar analysis made from ordinary puddled iron. For instance, the samples shown from plates containing 0.016 sulphur, 0.10 phosphorous, 0.05 carbon give an ultimate strength of 51,000 pounds per square inch with an elongation of 24 per cent in 8 inches; while that from a plate containing 0.019 sulphur, 0.13 phosphorus and 0.10 carbon gives an ultimate strength of 62,000 pounds per square inch, with an elongation of 23 per cent in 8 inches. The latter is a material which may again open to iron the large field of ship-building. The above results, together with the entire absence of blisters, show the high grade of product obtained.

It is, of course, somewhat difficult to estimate the probable cost in a properly organized plant from data obtained in working a single machine under experimental conditions; but the indications are, and it is confidently believed, that slabs and billets will be produced at a cost not exceeding that of ordinary steel; and if slabs and billets, then the finished product.

**COAL PRODUCTION OF WEST SCOTLAND DISTRICT.**—According to the report of Mr. J. M. Ronaldson, His Majesty's Inspector of Mines for the West Scotland District, the production of coal for that district in 1901 amounted to 17,733,912 long tons as compared with 14,105,138 long tons in 1900 and 13,393,108 long tons in 1899.

Of the total amount produced in 1901, 339,683 long tons, or less than two per cent, was mined by the use of mining machines. There was, however, an increase from 12 machines in use in 1900 to 33 in 1901. Of these 33 machines, 30 were driven by compressed air and 3 used electricity. Two of the machines employed, one electric and one compressed air, were Jeffrey machines imported from the United States.

**ALBERTA TERRITORY, CANADA. COAL FIELDS ON CROW'S NEST PASS BRANCH OF THE CANADIAN PACIFIC RAILWAY.**

By WM. M. BREWER.

There are two distinct coal fields in the portion of Alberta Territory traversed by the Crow's Nest Pass branch of the Canadian Pacific Railway. The western of these is a portion of the Crow's Nest Pass coal-field situated on the eastern side of the summit of the Rocky Mountains; the eastern field is on the Belly River on the outskirts of the town of Lethbridge.

**Geography.**—After crossing the summit of the Rockies from the west, the first productive coal seams at present known are near Blairmore Station, on the middle fork of the Crow's Nest River, about 10 miles east of Crow's Nest Lake, and about 40 miles east from Fernie, the headquarters of the Crow's Nest Pass Coal Company.

**Geology.**—According to the reports of the late Dr. Dawson, the Blairmore coal-field is a portion of the Crow's Nest Pass coal-field. At Crow's Nest Lake the Cretaceous rocks have been removed by erosion and the Carboniferous limestone on which the Cretaceous rocks were laid down is exposed for some distance. The structure of the Cretaceous strata on the west side of the lake is that of a synclinal trough, occupying the distance between Michel Creek and the lake, but eastward from the lake the strata have the structure of an anticlinal fold, dipping to the west at an angle of from 45° to 60°, with the opposite side of the anticlinal to the east of the limestone range, known as the Gap. The line of strike of the Cretaceous rocks and coal seams is magnetic north. The limestone exposed in the vicinity of the Crow's Nest Lake is 9,610 feet thick, dipping 30° in a southwest-by-west direction. The altitude of the lake is 4,250 feet above sea level. The altitude at the summit, a short distance west of the lake, is 4,400 feet. The dip of the main coal seam taken in the tunnel, about three-quarters of a mile from Blairmore Station, is from 45° to 48° to the west.

The highest seam of coal on which most of the work has been done, lies between a conglomerate roof and sandstone floor, which because of the steep dip might be more properly designated as the hanging wall and the foot wall. But other seams lower in the formation occur between shale roof and sandstone floor.

The maximum thickness of any of the coal seams is about 30 feet as exposed. Several open cuts have been made across the table land and down the side of the bluff, exposing coal seams four feet and upwards in thickness.

**Development Work and Opportunities for Mining.**—The work so far performed in the portion of the field contiguous to Blairmore, consists of open cuts across the outcrops on the table land and on the side of the low mountain, and three tunnels. No. 1 is being run in on the strike of the coal seam at an elevation of 500 feet above the level of the Middle Fork of the Old Man, or Crow's Nest, River. No. 2 is being run on the strike of another seam to the westward of No. 1 and about 150 feet above No. 1. No. 3 is a cross-cut tunnel on the western slope of the mountain about 400 feet above the river. This is being run towards the west to intersect all the seams at that level. One of these 6 to 8 feet in thickness was cross-cut about 100 feet from the mouth and was drifted on for some distance. Coal from this tunnel has been sold locally.

Usually the steep dip of these coal seams would be considered detrimental to economical mining, but in this particular instance such is not the case in any marked degree because from the western slope of the mountain an adit can be driven which would cross-cut the seams at various depths from 500 to 1,200 feet below the outcrops, and by mining on the rise of the coal it could be stoped down quite economically. By pursuing such a method of mining, sinking shafts and hoisting would not be necessary for some years to come.

**Extent of Field.**—So far as at present known, the extent of the field or zone westward from the Gap is about 14 miles along the strike, while the width is undetermined, but probably does not exceed 500 feet.

**Quality of Coal.**—The following table shows the results of several analyses from samples of coal from openings near Blairmore as taken by the owners of properties:

*Analyses of Blairmore, Alberta Territory, Coal.*

	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Moisture	10.24	1.25	1.25	1.1	...	...	...	...
Volatile matter	29.03	21.30	24.2	22.1	25.7	12.0	13.0	24.3
Fixed carbon	64.80	73.00	69.3	63.7	64.8	64.5	80.0	66.5
Ash	6.10	4.5	6.5	8.9	19.5	23.5	7.0	9.2
Percentage of coke, slight coking	...	...	75.8	77.9	74.3	...	87.0	75.7

The sulphur in the average samples are 0.94 per cent; iron, 0.3. The specific gravity was 1.28.

**Frank Colliery.**—About two miles east of Blairmore and on the east side of the Gap, productive Coal Measures again occur, and have been developed to a shipping stage. These measures have the same northerly strike as the others in the Crow's Nest Pass coal-field, but the dip is more nearly vertical than at any other colliery. A small battery of six coke ovens has been constructed of the bee-hive style, but the coal is reported as not adapted for coking.

Most of the coal mined at Frank up to the present time has been consumed by the Canadian Pacific Railway Company for steaming purposes. It is proposed in the near future to develop the mines.

**LETHBRIDGE COAL FIELD.**

**Geography.**—About 90 miles east from the foot hills of the Rocky Mountains is situated this isolated coal-field. The outcroppings were discovered several years ago along the banks of the Belly River. The discovery resulted in the opening of a colliery and construction of a narrow gauge railroad to Great Falls, Montana, a distance of 200 miles.

**Geology.**—This field belongs to the Tertiary period. Bore holes 1,000 feet in depth have been drilled but no rock found. A frail shale, 25 feet thick, forms the roof of the productive coal seam, which in its turn is overlaid by gravel; an impure fire clay forms the floor of the seam.

The coal is a high grade lignite and is very popular for domestic purposes, but does not coke.

The line of strike of the seam is Northeast, and its dip towards the Northwest is almost flat, not exceeding 25 feet to the mile.

The coal seam apparently covers a basin of undetermined extent. At the shaft, from which the present workings are carried on, the coal occurs 320 feet below the surface. In working the coal on the rise, it is found that the quality decreases appreciably as the work advances towards the surface. The thickness of the seam is 4 feet 4 inches of clean coal; a clay parting of variable thickness separates the seam into two parts.

The Belly River flows nearly parallel to the line of strike of the coal seam. This stream has cut a deep channel through clay banks, and exposed the coal outcrops, which do not show on the surface at any other points. The surrounding country is the typical rolling prairie of the Plains, with the Rocky Mountains in the distance towards the west, and south.

**Quality of Coal.**—The following show the average analyses of samples of Lethbridge coal made at the Landon School of Mines:

*Analyses of Lethbridge Coal.*

	Per cent.	Per cent.
Water	4.37	7.25
Volatile matter	34.61	21.46
Carbon	50.43	64.30
Ash	9.89	6.20
Sulphur	.70	.69

\*H, 4.26 per cent.; O and N, 17.20 per cent.

**Mining Operations.**—For some years mining was carried on by means of drifts opened from the banks of the Belly River. Eleven drifts in all were driven and the available coal mined from quite an extensive

area, but the dip of the coal seam carried it below the water line, rendering it impossible to continue this method, so it was deemed advisable to sink to the seam and hoist. There are six miles of endless rope haulage employed in the mine.

The pillar and stall is the method of mining. Seventeen Ingersoll-Sergeant coal cutting machines, run by compressed air, are kept running continuously during the winter months, when the output reaches 1,000 tons per day, but during the summer months the machines are not all in use, as the output then is only about 500 tons per day. The pillars are drawn throughout the workings as conditions warrant, and consequently from 84 per cent to 91 per cent of the coal in the seam is mined out before any portion of the old workings is abandoned.

One Capell single-inlet fan, 13½ feet in diameter, 5 feet wide, produces ventilation through the workings, No. 3 shaft being the intake and No. 2 shaft the upcast. No. 4 shaft has been sunk to the seam, but the workings have not yet been connected with it. No. 1 shaft has been abandoned, as all the coal which could be economically handled through it has been mined out. The pumps are run by compressed air. In loading the cars from the tippie, a Rainsey automatic car loader is used, by means of which the cost for loading and trimming the coal when box cars are used is very greatly reduced.

The principal market for Lethbridge coal is along the line of the Canadian Pacific Railway. It is also used by that company for steaming purposes, and in Great Falls, Montana, for domestic use.

The cost for mining in narrow places is 70 cents per ton, and in wide places 60 cents per ton, with an additional cost of 30 cents per ton for hoisting, screening and loading into cars. A revolving screen is used with ¾-inch openings. The lump coal is sold for domestic purposes, the nut is shipped for use on the railroad, the pen is used in the boilers, and the slack is dumped as waste.

The surface plants and slopes are lighted by electricity supplied from the company's own dynamo. The nominal capacity of the boilers for running all the machinery is 900 horsepower.

#### PETROLEUM DEPOSITS IN MEXICO.

Consul Griffiths at Matamoros reports to the State Department that in view of the scarcity of fuel in Mexico, the exploration and exploitation of oil lands is attracting considerable attention in that country. The recent discoveries at Beaumont, Tex., have given rise to the hope that oil in paying quantities will also be found in Mexico. Very favorable indications of its presence have been discovered at several places, and liberal concessions for the development of petroleum deposits on national lands have recently been granted by the Federal Government to prospectors.

Almost certain indications of the existence of petroleum are to be seen in many States, and especially in Tamaulipas, where in places there is an abundance of asphalt, sulphur, and oil on the surface. Besides these signs, some of the topographical features, according to the opinion of an expert engineer and oil prospector, are due to the great pressure of the confined natural gas beneath. In most cases, the exudation does not consist of any one substance in a paying quantity, but passes through all the grades, from an inferior, dark-colored oil to massive hard asphaltum rock. There are also other equally encouraging indications of an abundance of gas and oil in the shale below.

Several companies, formed principally with American capital, have been organized in order to prospect and drill for oil in Mexico. The Mexican Petroleum Company has invested extensively and is now operating in the district west of Tampico. The Mexican National Oil and Development Company, recently organized under the laws of New Jersey with a capital of \$1,000,000, has had its charter filed in Mexico. This company has secured valuable leases embracing over 1,000,000 acres of land, and will soon begin drilling a series of wells throughout the central part of the State of Tamaulipas. Its office is at Monterey.

#### MINING EXHIBIT AT THE CHARLESTON EXPOSITION—II.

By H. CONNOR BROWN.

Besides the mining exhibits installed in the Mines and Forestry Building at the exposition in Charleston there are numerous other exhibits of interest to the mining world that are housed in other buildings. The South Carolina mining exhibit, which has been arranged by the State Geological Survey, is established in a girdle of cases in the center of the State building. A conspicuous decoration here is a drawing of the Thies chlorination plant as designed by Capt. Adolph Thies for the Haile gold mine at Lancaster, S. C., with a sketch of the complete milling and chlorination plant erected by the Mecklenberg Iron Works at Charlotte, N. C. The first case contains gold ores and products. The Haile gold mine makes a good showing with samples of auriferous pyrites in slate and quartz and samples of auriferous pyrite concentrated to a value of \$40 a ton, and also of roasted concentrates worth \$53 a ton in gold.



EXHIBIT OF CHARLESTON, S. C., MINING AND MANUFACTURING CO., AT CHARLESTON EXPOSITION.

Mines in York County and various mines in Cherokee County exhibit good specimens of auriferous pyrites in quartz.

A case of stratigraphic specimens contains samples of South Carolina slate, shale, olivine quartz, quartzite, itacolumite, pudding stone, Eocene iron ore, buhrstone, etc.

Good rough specimens of granite, gneiss, porphyry and serpentine, with one piece of syenite from Abbeville, are exhibited.

Under the head of "Industrial Mineral Products" are exhibited graphite, ground mica, mica of the biotite, muscovite, and margarodite types, iron oxide, barite, corundum, abrasive sands, feldspar, gypsum, magnesite, marl, soapstone, limestone and granite.

Some good gem stones are exhibited, including amethyst, smoky quartz, garnet, beryl and tourmaline.

Of particular interest in this locality are several cases containing phosphate rock and fossils from the phosphate beds of South Carolina.

Near the State exhibit is a very complete private exhibit of fossils found in the phosphate beds. This collection belongs to Capt. C. A. Scanlan, who has spent years in amassing it.

South Carolina phosphates are also conspicuously advertised in the center of the Cotton Palace by the exhibits of the Mining and Manufacturing Company of Charleston and the Virginia Carolina Chemical Company, both in charge of R. P. Hyer.

In each corner of the booth of the former is a pile of rock, one of South Carolina phosphate rock,

one of Florida rock, and one of Tennessee rock. The fourth pile is composed of fossils taken from phosphate beds. A case in the center of the booth also contains fossils, and bottles on top of it are filled with ground phosphate rock.

The exhibit of the Virginia-Carolina Chemical Company is installed in a booth, the columns of which are made out of 200-lb. bags of fertilizers. Appropriate posts are made at the entrance out of ears of corn, and on the keystone are inscribed the words of Jonathan Swift: "Whoever makes two ears of corn to grow where only one grew before deserves well of mankind and is of service to his country." The most significant feature in the interior of the booth is the pictures of about 40 phosphate plants of this great company, situated in different localities.

Florida phosphate and phosphate rock are exhibited in small quantities alongside specimens of quicklime and kaolin in Florida's attractive booth in the Agriculture Hall. The booth itself, made of palmetto

trunks and hung with Florida moss, is very artistic.

Louisiana is represented here by a splendid exhibit of all her natural resources. The exhibit, which occupies 4,500 sq. ft. of space in the Agricultural Hall, is in charge of Robert Glenk, of Audubon Park, New Orleans.

The mineral products of Louisiana seem to be not numerous, but plentiful. Petroleum, salt and sulphur have the most conspicuous place in the exhibit.

Of timely interest in this exhibit is a jar of crude petroleum from Jennings, La. There are 10 gushing wells in the southern part of the State, yielding each from 20,000 to 50,000 barrels of oil a day. About 600 new wells are being bored.

The rock salt, of which large specimens are displayed, averages 96 per cent pure salt. In thickness and purity, the Louisiana salt deposits outrank all others known in America and stand second in the great salt deposits of the world.

The important work done by the Southern Railway in the development of Southern industries has been often recognized and appreciated. Its handsome exhibit at this exposition of minerals found in Southern fields is worthy of the highest praise and is sure to call attention to the advantages of developing the mineral resources of the South. This exhibit is most artistically installed in an exedra connected by colonnade with the Government exhibit. It is under the efficient charge of G. F. Green, who is responsible for the admirable arrangement of the fine specimens. Minerals are shown here



from 500 properties, samples from 75 quarries. The exhibit consists mainly of a collection of samples of gold, copper, tin, silver, lead, zinc, aluminum, and iron ores, of building stones, clays and kaolins. The fine character of each individual specimen and the lucid way in which each is labeled and mounted are particularly commendable.

The gold ores are chiefly the well known typical ones of the Appalachian system. The silver, copper, tin, lead, zinc, and aluminum ores are mainly from properties now worked and whose names are familiar to the mining world. A case of the iron ores of Mississippi, Alabama, and North Carolina is particularly comprehensive. The bituminous coal of Alabama is also well represented. Especially handsome is the display of building stones. Granites of every grade are shown from all the Southern States. Beautiful fine-grained granites are also shown from South Carolina. The distinctive character of Georgia, Tennessee, and North Carolina marbles is well brought out in this exhibit, the coarse-grained, fine-

est analysis is on ore from the Lola Mine: Metallic iron, 69.7; silica, 1.0; phosphorus, 0.035; sulphur, none. The lowest analysis is of Berraco ore: Metallic iron, 59.2; silica, 4.2; phosphorus, none; sulphur, trace.

Many pictures are shown of the extensive works of the Juragua Iron Company at Firmeza, Santiago de Cuba, but no specimens of their ore are exhibited.

Manganese from three mines in Manzanillo is shown, from Tamayo, Segunda Tamayo, and Terceira Tamayo; also from Barrio Los Negros.

A pile of rich-looking copper ore from Mina Cuba Libre, in Puerto Principe, attracts attention. Pieces of iron and copper ore labeled "El Angel" are shown, in which there is 59 per cent copper iron and 10 per cent copper. Copper is also exhibited from mines in Bahia Honda, notably the mines Joaquina and Casualidad. One specimen comes from the Navidad, one of the Brazo de Cauto copper mines, of which a mining expert named M. Medina de Pomar has recently made a study.



EXHIBIT OF VIRGINIA-CAROLINA CHEMICAL COMPANY AT CHARLESTON EXPOSITION.

tinted marble of Georgia contrasting with the finer grain and quiet colors from Tennessee and the variegated hues of that from North Carolina.

Soapstone from North Garden, Va., is exhibited, tale from North Carolina, the finest in the world. The display of clays from Alabama, Georgia, Mississippi and South Carolina is beyond criticism. Specimens of kaolin, quartz, feldspar, monazite, red and yellow ochre, asbestos, corundum, barites, glass sand, graphite and lithograph stone attest the varied richness of these Southern fields.

As the most important of the West Indian islands, Cuba is properly conspicuous at this exposition. Cuba is rich in mineral resources, though they are little known and inadequately developed, it is fitting to find here significant evidence of its wealth in iron, manganese, copper, marble and asphalt. These deposits, which are nearly all in the eastern end of the island, have never been thoroughly exploited, but the samples of ore exhibited here clearly indicate their great value.

Iron ore is exhibited here from the mines of the Spanish-American Iron Company at Daiquiri. The mines represented are Lola, Magdalena, San Antonio, Faustus, Providencia and Berraco. The high-

Cuba is rich in asphalt, and makes some very creditable exhibits of that useful mineral product. Especially good are samples of asphalt from mines possessed by the Hamel, Reynaldos Asphalt Mining Company in the Province of Matanzas. Analysis shows their product to contain: Moisture and volatile matter at 105° C. 6.56; bitumen, 91.49; other organic matter, 0.10; mineral matter, 1.85; total, 100.00.

Asphalt from the Evelina and Matilde mines at Banes is exhibited by Funnell, Smith and Rovirosa, of Havana. Asphalt from these extensive deposits has been thoroughly tested in paving and other work, and has proved equal to the best in the world.

As an indication of what the island may contain in the way of mineral resources, Cuba's exhibit is valuable, but owing to lack of labels and descriptive matter in connection with it, the collection in itself is not very instructive.

In the Electricity and Machinery Building, conspicuous space is given to the display of the General Electric Company of Schenectady, N. Y., which occupies 1,500 sq. ft. in the centre of the building opposite the main entrance. The central feature of the exhibit is a large model of the company's factories at Schenectady, N. Y.; Lynn, Mass., and Harrison, N.

J. The wall back of the exhibit is covered with photographs of all kinds of electrical apparatus.

The exhibit of John A. Roebling's Sons Company is practically the same here as it was in Buffalo. It is not so effectively installed, however, lacking the background of Brooklyn Bridge in imitation stone 40 ft. high that it had there. The 28-ft. model of the bridge was exhibited here for a time as it was in Paris and Buffalo. This model, which is true to scale, is of copper bronzed over to give the effect of steel. It was made in the Roebling shops.

Fairbanks, Morse & Company, of Chicago, manufacturers of gas and gasoline engines, exhibit here three of their engines, one of 12, one of 5 and one of 1½-horse power. All engines are geared up and at work running machinery.

The Trenton Iron Company, of Trenton, N. J., boasts a neat little exhibit of wire rope and wire cables artistically arranged in a geometrical design in an upright case against the wall of the building. Pliable hoisting rope, iron tiller rope, transmission and standing rope, sash cords, galvanized mast arm rope, galvanized strand, galvanized wire rope, galvanized flexible running rope, galvanized cast steel yacht rigging, and railroad switch and wrecking ropes are some of the varieties made by this firm.

The Jeffrey Manufacturing Company, of Columbus, Ohio, manufacturers of chains, conveyors, electric and mining machinery, is represented here by two rock drills, one for use with steam power, the other with electricity. A flour separator is also shown, and an iron elevator from which depend numerous samples of the standard and special chains made by this company.

Jenkins Brothers, whose agencies in New York, Philadelphia, Chicago, and Boston are well known, are represented here by a neat exhibit of gasket tubings, sheet packing, regulators, valves, and injectors. As agents for the steam regulating devices of the Mason Regulator Company, of Boston, they exhibit a variety of that company's valves, and as agents for the Sellers' restarting injector, they advertise here that device, which is designed for stationary, portable, traction, and hoisting engines, marine boilers, etc.

The Lidgerwood Manufacturing Company exhibits an 8 by 10 double drum hoisting engine, a fine piece of machinery.

The Carborundum Company, of Niagara Falls, makes an interesting exhibit of its artificial abrasive, which is still new enough to the industrial world to attract more than the ordinary amount of attention.

The Hartford Steam Boiler Inspection and Insurance Company exhibits a variety of battered objects which illustrate the value of the special kind of insurance which it offers. Among them might be mentioned the model of an exploded hotel boiler, showing the initial line of rupture between the man-hole and steam nozzle, exploded elbows of blow-off pipes, an imperfectly welded tube which showed no weakness under less than 1,000 pounds internal pressure, burnt and bulged water tubes, corroded blow-offs, defective rivets, etc. These concrete evidences of disaster make a powerful appeal to steam users for protection, through competent inspection, not only of life and property but against controversy and vexatious lawsuits.

**ENCOURAGING NEW PROCESSES.**—As an evidence of the interest taken in the problem of the economic handling of low grade refractory ores, we note the announcement that the so-called McNeill & Tutt Syndicate, which controls chlorination works at Colorado City and elsewhere, has incorporated a new company, the sole purpose of which will be to encourage all legitimate efforts in the line of original research and methods or improvement in processes of reduction, and then to control and apply the same. The capitalization of this company is \$100,000, divided into 1,000 shares of a par value of \$1, and the incorporators are, Charles M. McNeill, Spencer Penrose, J. D. Hawkins, Charles L. Tutt, of Colorado Springs; W. L. Hartman, of Pueblo. The principal offices will be in Colorado Springs, Colorado.

### PRODUCTION OF ASBESTOS, ETC., IN 1901.

The United States Geological Survey has published as advance chapters from the annual volume "Mineral Resources of the United States" for 1901 the reports by Dr. Joseph Hyde Pratt on asbestos, lithium, fluorspar, monazite, tungsten, molybdenum, uranium and vanadium. These reports have been compiled under the direction of Dr. David T. Day, Chief of the Division of Mining and Mineral Resources, and may be obtained by applying to the Director of the Geological Survey.

#### ASBESTOS.

The production of asbestos in 1901 amounted to 747 short tons valued at \$13,498, as compared with 1,054 short tons valued at \$16,310 in 1900.

Almost the entire production was from the mines at Sall Mountain, White County, Ga., with small amounts from Riverside County, California, and from Berkshire County, Massachusetts.

In somewhat striking contrast with this domestic production is an increase of nearly 100 per cent in the value of the asbestos imported, principally from Canada. The total value of the asbestos imported into the United States in 1901 was \$691,828, which was nearly double the value of the imports for 1900, amounting to \$355,951. It will be observed that the value of the imports was about 50 times that of the domestic product. It is probable that the year 1902 will show a considerable increase in production over 1901, as actual development work has been prosecuted on deposits near Caspar, Wyo., and near Eden, Vermont, where are found veins of chrysotile similar in quality to that which is now imported from Canada as asbestos.

#### MONAZITE.

According to this report the monazite industry of the United States, which was nearly at a standstill from 1896 to 1900, has again been revived, and is now a small but thriving industry in North Carolina. Considerable attention has been given to the North Carolina and the South Carolina deposits by German manufacturers, who wish to obtain deposits of the mineral. Although the actual amount of this mineral used per year has perhaps increased but little, there is an increased demand for Carolina monazite on account of the Brazilian monazite sand deposits having, in a large measure, come under a single control with the result that the price has advanced.

This mineral is essentially an anhydrous phosphate of the rare earth metals, cerium, lanthanum, and didymium (Ce, La, Di) PO<sub>4</sub>. There is nearly always present a varying but small percentage of thoria (ThO<sub>2</sub>) and silicic acid (SiO<sub>2</sub>), which are very probably united in the form of a thorium silicate (ThSiO<sub>4</sub>). Some monazites contain but a fraction of a per cent of thoria, and some have been analyzed that showed none; others have been recorded that showed the presence of 18 to 32 per cent; but the majority contain from 3 to 9 per cent of this oxide. It is the presence of the thorium oxide that gives the monazite its commercial value. The analysis occasionally shows also the presence of other constituents, as the yttrium and erbium oxides, zirconia, alumina, magnesia, lime, iron oxides, manganese oxide, and titanium oxide.

Monazite is obtained by sluicing the sands and gravels, just as placer gold is washed. The resulting concentrates are dried, and magnetite, ilmenite, etc., are separated by means of the electro-magnet. Even with very careful washing all the rutile, garnet, etc., cannot be eliminated, so that the commercial sand is not pure monazite, but contains from 70 to 90 per cent of this mineral. Of course the percentage of thoria in the sand depends upon the amount of monazite, and as the value of the sand increases with the percentage of this oxide, it is to the producer's advantage to make his sand as high in monazite as possible. There are many small producers in North Carolina who carry their sand through only one sluice box, and, when the concentrates are dry, remove what they can with a hand magnet. All this material is bought and treated again, giving a cleaner product, before it is sold to the consumers.

Monazite has been produced chiefly in North Caro-

lina, with a smaller amount in South Carolina, and the product amounted in 1901 to 748,736 pounds, valued at \$59,262, as compared with 908,000 pounds, valued at \$48,805, in 1900. This is an increase of \$10,457 in the value of the monazite produced, but a decrease of 159,264 pounds in the production of the sand. This increase in the value per pound of the monazite is partly due to an increase in the price of the sand, but it is also partly due to the fact that the production reported is from sand that is cleaner and therefore higher in thoria.

In the following table is given the production and the value of monazite mined in the United States from 1893 to 1901:

#### Production of Monazite in the United States from 1893 to 1901.

Year—	Quantity. Pounds.	Value.
1893 .....	139,000	\$7,600
1894 .....	545,855	36,193
1895 .....	1,573,000	137,150
1896 .....	30,000	1,500
1897 .....	44,000	1,980
1898 .....	250,776	13,542
1899 .....	350,000	20,000
1900 .....	908,000	48,805
1901 .....	748,736	59,262

#### LITHIUM.

The demand for lithium minerals has been considerably accelerated during the last few years by the manufacture of artificial lithia waters. There are, however, only two minerals that have been mined for this purpose; they are lepidolite, a lithium mica and spodumene, a metasilicate of aluminum and lithium. The former is the chief source of lithia supply. The largest deposits of lepidolite so far found in the United States are near Pala, San Diego County, California, and these were the largest producers during 1901. The product during the year amounted to 750 tons, an increase from 520 tons in 1900. The value of the product in 1901 amounted to \$43,200, the average price received amounting to \$24.68 per ton. Most of it was exported to Germany for chemical treatment.

#### FLUORSPAR.

Owing to the discovery and development of fluorspar deposits in Crittenden and Livingston counties, Kentucky, in 1898, the production of this mineral in the last three years has shown considerable increase, the output in 1901 amounting to 19,586 short tons, as against 18,450 short tons in 1900, 15,900 short tons in 1899, and 7,675 short tons in 1898. The value of the product in 1901 was \$113,803, which was an increase of nearly \$20,000 over 1900, and nearly double that of 1898. Previous to 1898 nearly all of the fluorspar obtained in the United States was from Rosiclair, Ill. With the gradual exhaustion of these deposits, which began in 1893, the production fell off nearly two-thirds by 1895, but has been revived by the exploitation of the Kentucky localities.

Formerly the chief use for fluorspar was in the preparation of hydrofluoric acid; it is now used to considerable extent in the manufacture of opalescent glass, and its consumption in this industry is increasing. It also makes a valuable flux in the manufacture of pig iron. It is claimed that it makes a more fluid slag and produces a superior grade of pig iron and reduces the fuel consumption.

#### TUNGSTEN.

The production of marketable tungsten ores in 1901 amounted to 179 tons, which was concentrated from 1,221 short tons of crude ore. The value of the tungsten depends entirely upon its contents in tungstic acid. The concentrates sold in 1901 varied from 60 to 70 per cent of tungstic acid contents, and sold at an average price of \$154.86 per ton, the total value being \$27,720. The lowest price reported was \$102, while \$333 is reported as the highest price paid for high-grade concentrates.

The product sold was obtained principally from Boulder County, Colorado, and smaller amounts from San Juan County, in the same State; from near Leeds City, South Dakota, and from Long Hill, Connecticut. A considerable quantity was mined in other localities, but was neither concentrated nor sold. The demand is limited, but it is anticipated that the increased use of this mineral in the manufacture of

tungsten steel will be developed if manufacturers are sure of a steady supply of good quality material.

Until recently the use of tungsten was in the manufacture of salts, which were used for making "fast" the colors in calicoes and other cotton goods, and for making theatre curtains, etc., non-inflammable. It has also been used to some extent in the manufacture of stained paper. Its most recent application is in the manufacture of tungsten steel, and will probably continue to be the chief use to which it is put.

*Tests for Tungsten.*—When the mineral to be tested is readily decomposed by boiling with hydrochloric acid, an insoluble canary-yellow tungstic oxide, WO<sub>3</sub>, will be obtained if the mineral contains tungsten. If a little granulated tin is added to the solution and the boiling is continued, a blue color is obtained, which finally changes to brown by further boiling. If, however, the tungsten mineral is insoluble, or not easily soluble in boiling hydrochloric acid, as in the case of the mineral wolframite, the finely powdered mineral should be mixed with six times its volume of sodium carbonate, and the mixture be made into a paste with water and fused. By pulverizing the fused mass the sodium tungstate formed during the fusion is readily dissolved in a test tube with a little water. By acidifying this filtrate with hydrochloric acid and boiling with tin the blue color is obtained.

#### MOLYBDENUM.

Like tungsten, molybdenum is now being experimented with largely in the manufacture of steel, and the same may be said about its increased use as is said about tungsten; that is, that when convinced that a supply of the material is available, the manufacturers will give more consideration to its use. The demand is on the increase, and active prospecting for molybdenum is being carried on. The production of molybdenum in the United States in 1901 was small, not exceeding 15 tons, which varied in price from 10 cents to \$1.10 per pound. The principal ore is molybdenite, a sulphide of molybdenum, and it usually occurs disseminated through crystalline rocks. It has been observed in California, Washington, Montana, Utah, Arizona, New Mexico and Alaska.

*Test for Molybdenite.*—A good test for the sulphide of molybdenum is to heat a fragment of the mineral on the flat surface of a piece of charcoal for a considerable time in an oxidizing flame. There is then deposited a short distance from the assay a coating of molybdic oxide, MoO<sub>3</sub>. This is pale yellow when hot and almost white when cool. This oxide is volatile in the oxidizing flame, but if touched for an instant with a moderately hot reducing flame, it assumes a beautiful ultramarine-blue color.

#### URANIUM AND VANADIUM.

There has been some demand for these two metals rather for experimental work in ascertaining what beneficial properties they may impart to steel thus far; no practical results have been obtained, but experiments are still being made. The minerals containing these two metals are uranite, gummite and carnotite. The latter contains also a considerable percentage of vanadium, and is the ore chiefly used for the two metals. Vanadium also occurs as vanadinite, a vanadate of lead. The occurrences of all these minerals which have been reported are in the Rocky Mountain States.

The production in 1901 amounted to 375 tons, principally from Colorado.

*CHALDEAN ALLOYS.*—A communication by M. Berthelot in *Comptes Rendus* shows that the Chaldeans and Babylonians were possessed of considerable metallurgical skill. A Babylonian statuette was found to consist of a copper alloy containing 79.5 per cent of copper, 1.25 per cent of tin, and 0.8 per cent of iron. A statuette from Chaldea, estimated to be 2,200 years old, was composed of nearly pure copper containing only a slight proportion of iron, whereas another Chaldean statuette, some 400 years older, consisted mainly of an alloy of 4 parts of copper with 1 part of lead and a trace of sulphur.



**WIRE ROPES.\***

By W. D. HARDIE, LITHBRIDGE, ALBERTA.

Wire ropes for mine use are generally composed of:

(1) Six wire strands composed of seven wires each, twisted on a hemp center. The center wire of the strand sometimes being soft.

(2) Six wire strands, composed of twelve wires each, twisted on a hemp center.

(3) Six wire strands, composed of nineteen wires each, twisted on a hemp center.

This construction is sometimes varied so that there are 13 larger wires and 6 smaller wires in each strand, but the general construction of the rope is the same.

The ratios of the diameter of the individual wires to the diameter of the rope in these three cases, not including the rope with two sized wires as in No. 3, are as follows: (1) 1-9, (2) 1-12, (3) 1-15. From this, the gauge of wire required to constitute a rope can readily be got to a close approximation.

No. 1 is only used where large wheel drums and easy curves can be employed. Such a condition does not very often present itself in coal mines. The No. 2 rope is a more pliable one and can be used on smaller drums, wheels, and curves, but when we remember that the size of the individual wires govern the size of wheel it will be seen that with this rope, with a heavy load, such as is usual in mine haulage, the wheels would be relatively large. A wire should not be bent over a wheel less than 1,000 times its diameter for good results in length of life and tons hauled.

Excepting in ropes of large diameter No. 3 is not used for mine haulage, but is largely employed for hoisting ropes.

To meet the conditions of severe bending usual in the underground working of collieries the British manufacturers construct a compound rope which we will designate as (4):

(4) Six wire strands, each composed of 9 large wires twisted around 7 smaller wires (the center or seventh wire being soft), twisted round a hemp center. The gauges of wire used and number of wires used in the construction of a compound rope are varied to suit the circumstances. These ropes are very serviceable and meet the mine manager's wants with a wonderful degree of satisfaction.

I am not aware that any American rope makers are constructing ropes of this style.

In computing the strength of any twisted wire rope it is well to remember that the strength of each individual wire is reduced from 4 per cent to 10 per cent by twisting. The makers claim the strength is reduced 4 per cent, while disinterested experimenters claim the strength is reduced 10 per cent. Perhaps a fair allowable reduction of strength for twisting in manufacturing would be the average of the two, viz.: 7 per cent.

Iron wire ropes are not suitable for mining purposes, and are not considered in this paper.

There is a very wide range in the grades of steel ropes, and as the breaking strength per square inch of section of the material of which they are constructed is fundamental, we herewith give a short table which will make the point clear:

Name.	Homogeneous Steel.			Patent Impr.		
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Quality	40-45	60	75	80		
oved or Crucible Steel.		Plough Steel.				
Tons.	85	90	95	100	105	110
		100	105	110	120	

The quality here is in tons of 2,240 pounds per square inch of section.

The composition that enters into these grades is partly a secret of the manufacturer; however, a vast amount of information has been published, but the articles are too numerous and conflicting to be brought within the limits of this paper.

The following we regard is a good sample of a specification for wire rope:

1. *Quality of Wire.*—All steel used in the manufacture of the cable shall be of the "best selected patent

improved crucible steel," drawn to a uniform diameter throughout, and capable of withstanding the tests mentioned in the table given below.

2. *Length, Size and Form of Wire.*—The cable shall be --- feet long and shall have a circumference of 3 3/4 inches when finished. It shall consist of six outside strands laid up in the formation known as the "Lang lay," with the lay in the rope in the same direction as the lay in the strands.

3. *Strands.*—Each strand shall be composed of 7 wires 0.115 inch in diameter, laid round a core consisting of 5 wires 0.061 inch in diameter round one wire 0.049 inch diameter.

4. *Spinning.*—Each strand shall be spun in --- feet lengths and evenly wound direct from the machine on to a reel. When it is necessary to join either the outside or inside wires they shall be properly scarfed and brazed.

5. *Closing.*—The 6 strands shall be closed under uniform tension round a heart consisting of the best white manila rope, having 3 strands, hard laid, and well soaked in oil.

6. *Lay.*—The lay of the wires in the strands shall be 3/4 inches, and the lay of the strands in the cable 9 1/2 inches.

7. *Tests.*—The tensile test is as follows:

Diameter of wire.	Length of test-piece between gauge marks.	Stress per square inch.	Stress per wire.
.115 inch	8 inches	90 tons	2,094 lbs.
.061 inch	8 inches	85 tons	556 lbs.
.049 inch	8 inches	85 tons	359 lbs.

Here the core wire of the strand is not soft as in the case we made the calculation for.

The ductile test is shown in the following table:

Length of test-piece between gauge marks.	Number of twists.	Bends to 180° over 1/4 inch radius.
8 inches	25 number	3 number
8 inches	45 number	6 number
8 inches	58 number	10 number

8. *Each Hank to be Subjected to Test.*—Before proceeding with the manufacture of the cable, the contractor shall submit every hank of wire to the engineer, who will make tensile and ductile tests from each end of the hank before it is worked into the cable.

9. *Variation from Specified Tests.*—Every hank which shall be found to vary more than 2 1/2 per cent in either direction from the tensile tests specified above, or more than 8 per cent below the specified number of twists in 8 inches, will be rejected.

10. *Tests of Cable.*—The contractor shall make the cable sufficiently long to allow for cutting off a suitable portion which shall be tested for tensile strength in the presence of the engineer, or his representative, and must withstand a load of 43 tons (of 2,240 pounds) without breaking.

11. *Cost of Making Tests.*—The cost of all tests, whether made at the contractor's works or elsewhere, shall be borne by the contractor.

12. *Chemical Tests.*—In addition to the above, chemical tests may be made at the discretion of the engineer.

	Outer wire per cent. 0.115 in. diam.	Inner wire per cent. 0.061 in. diam.	Core wire per cent. 0.049 in. diam.
Carbon	0.50	0.50	0.50
Silicon	0.06	0.06	0.06
Manganese	0.50	0.50	0.50
Phosphorus	0.045	0.045	0.045
Sulphur	0.040	0.040	0.040

In the ordinary construction of wire ropes the wires forming the strands are twisted to the left hand, but the strands are twisted to the right hand, or opposite direction. In the "Lang lay" the wires forming the strands and the strands comprising the rope are all laid in the same direction. Ropes may be laid up right or left hand, and this is no small consideration in the life of a rope if one coil chafes on another. If, when standing behind the drum facing the pit head pulleys, the rope travels on drum from left to right, the rope should be laid right handed, or vice versa. The tendency to mount and side friction are minimized.

The lays adopted in wire rope making are principally dependent upon the gauge of the wires employed, the size of the rope to be made, and the pur-

poses they are intended for. Approximately it may be said that the lays in strand vary about 3 to 4 times the diameter of the rope, and the lays in the rope vary from 7 to 10 times the diameter of the rope.

The average elongation of ordinary constructed rope is about 3 per cent, and with Lang lay 1 1/2 to 2 per cent, which must not be lost sight of in hoisting ropes and endless ropes. A suitable tightening arrangement will take up the elongation in endless ropes, but in hoisting ropes it is a case of pulling the rope up in the fastenings in the drum.

With hoisting ropes the life can be greatly increased by ordering sufficient length to enable 0.6 foot to be cut off the end periodically and thus change the point of lift or stress.

It is of the first importance that ropes be greased frequently and carefully with a good, pure grease, which is absolutely free from acids. A grease with acids in it is worse than no grease.

It is obvious where ropes have to bend round wheels, drums, or curves, that the outer fibers of each wire, as they accommodate themselves to the curvature, are in tension, and the inner wires in compression, while the center or neutral axis is unchanged. As a consequence, it may be assumed that the more flexible a rope—and the less resistance in compression and tension in each wire, where it is subjected to much binding in work—the better will be the results, provided that such flexibility be not obtained by the use of such fine wires that the wearing capacity of the rope is affected.

In this connection we might call attention to the baneful effect attending the use of wire ropes where reverse bends are made. Careful record and experiment have shown that the life of the winding rope which goes over the pit-head pulley and under the drum is only from one-half to three-quarters as great as the rope which goes over the pit-head pulley on to the top of the drum.

The importance of greasing ropes is also accentuated by Mr. Biggart's tests. Two lengths of the same size and manufacture of rope were used; the unoiled length made only 16,000, whereas the oiled length made 38,700 bends over the same pulley before breaking. Other similar pieces of rope unoiled would run over a 24-inch pulley 74,000 times, and the oiled length 386,000 times.

There still remain to be considered many other important points in wire rope construction and use, such as the neutral axis, the proper diameter of sheaves, curves, etc., which will have to be treated in another paper.

**MINERAL PRODUCTION OF PORTUGAL.**

We are indebted for the following figures of the mineral production of Portugal for the year 1900 to Senhor Severiano Augusto da Fonseca Monteiro, Chief of the Department of Mines in the Ministry of Public Works at Lisbon. The figures are in metric tons, except for gold, which is given in kilograms:

Gold, kilograms	2.6
Gold-antimony concentrates, tons	75
Antimony ore, tons	38
Arsenic, tons	1,031
Coal, tons	24,066
Copper precipitate, tons	2,948
Copper-bearing pyrites, tons	57,540
Iron ore, tons	19,803
Lead ore, tons	3,620
Manganese ore, tons	1,971
Pyrites, mined for sulphur values, tons	345,330
Tin ore, tons	81
Wolfram or tungsten ore, tons	49
Zinc ore, tons	114

The total number of mining concessions in force was 461, covering 28,755 hectares. Of these 428 were for mining metallic ores, including pyrites; 22 for coal; 5 for coal and iron ores, and 6 unspecified. The total number of persons employed in and about the mines was 5,760, of whom 5,505 were men and boys and 245 women. There were 3,317 employed underground and 2,443 on the surface. All the women employed worked on the surface.

**MINING SCHOOLS IN RUSSIA.**—The Russian Government has approved of the project to establish a mining section in the Warsaw Polytechnic.

\*Abstract of paper read before the Canadian Mining Institute, March, 1902.

### MINING CONDITIONS IN THE NOME REGION, ALASKA.\*

By ARTHUR J. COLLIER.

During the season of 1901 mining operations were conducted in the Seward Peninsula in widely distributed localities lying within a broad belt extending northeast from Nome to the south shore of Kotzebue Sound. The northwestern and southeastern parts of the peninsula were not productive of gold in commercial quantities. Within this belt, however, a number of new discoveries were made, and a great deal of ground which had been located the previous year was developed, although the greater part of the gold produced came from the better known localities near Nome and Council City. Of the new discoveries, Boulder Creek, in the Kugruk District, which, though opened up late in the season, produced approximately \$7,000, and Candle Creek, in the Fair Haven District, which produced approximately \$25,000, attracted the greatest amount of attention. One of the most remarkable developments was on Iron Creek, which was discovered, but produced nothing, in 1900, while during the season of 1901 Iron Creek is estimated to have yielded \$100,000. The Bluestone River, Quartz Creek, and Garfield Creek, which in 1900 promised large returns, failed to justify these expectations and were almost abandoned before the end of the season in 1901.

Dr. Cabell Whitehead, of the United States Mint, estimates the production of gold in the Seward Peninsula in 1901 at between \$4,000,000 and \$4,200,000. This amount, compared with the yield of \$4,700,000 in 1900, shows a falling off of about \$500,000. This decrease calls for an explanation, unless it is to be regarded as indicating the exhaustion of the placers of the Seward Peninsula.

The most important cause of the decreased production was the unusually short season. In 1900 the country was open and ready for mining operations by the first of June; and, although unusual drought through July, and severe storms through September, in many instances interfered with operations, nevertheless the larger and better equipped mines were worked continuously for nearly four months. In 1901, on the contrary, throughout nearly all of June heavy teaming was done with sledges over the ice at Port Clarence, and many of the creeks and gulches were filled with snow and ice. In some instances mining operations could not be commenced before August. The result was that the mining season, which ends early in October, was from one-half to one-third shorter than it was in the previous year. At the end of the season the frozen ground was found within a few inches of the surface. The thawing from the surface downward was hardly perceptible during the whole summer.

A second and minor cause for the decreased production in 1901 is to be found in the exhaustion of the phenomenally rich beach placers at Nome and Cape Topkok. These beaches during 1900 are estimated to have produced approximately \$950,000, and in 1901 only a small fraction of that amount. With the application of more refined methods they will probably continue to yield gold for some years to come.

With regard to the first of these causes it may be said that while the season of 1901 was unusually short, that of 1900 was unusually long. It is probable that an average between the two is what may normally be expected. A great range of variation in climate from one season to the next is probably not unusual, and mining operations will necessarily be greatly affected by it. With the rapid development of the region which is now going on the richest claims, which the miner without capital can alone work with profit, will become exhausted within a few years. Strong companies with large holdings and sufficient capital for systematic and economical development on a large scale will undoubtedly be able to work placer mines at a good profit in many of these localities. While this continues the production of gold in the Seward Penin-

sula is likely to increase for a number of years. In the vicinity of Nome some mining has already been done successfully by hydraulic methods. A mining ditch, 14 miles in length, is being built from Hobson Creek, a tributary of Nome River, to the high bench planes about the head of Anvil Creek. It has been demonstrated that such ditches can be built in the Nome Region, and at a comparatively small expense. Practically all of the claims on Ophir Creek, in the Council City Region, have passed into the hands of one company and are being systematically developed. Ophir Creek, which in 1900 yielded only about \$100,000, with the improved methods of mining, which were introduced in 1901, yielded \$400,000 in spite of the short season.

### BARYTES IN MISSOURI.

Missouri is at present the most important source of the American supply of barytes. Its production has been increasing rapidly of late and the industry is capable of much further extension if the demand of the market requires it, inasmuch as the deposits of the mineral are widespread. The barytes of this region occurs in connection with the pipe veins of lead ore, which have been exploited in a desultory manner for more than a century. The country rock is a limestone, which in certain zones is mineralized with ramifying and connecting pipes of high grade galena ore, the net-work being frequently many acres in extent and existing in a series of underlying horizons to a depth which has not yet been determined. Barytes almost invariably accompanies the galena, lying adjacent to the pipes of ore and sometimes being intermixed with the galena, from which it is separated by cobbing. This is not, however, the source of the barytes that is collected for market, although it is without doubt the original occurrence of all the mineral of the region. The country rock of the latter has suffered a great surface decay. In the thick bed of residual clay overlying the present surface of the limestone there are found nests of galena and barytes, sometimes in conjunction, sometimes independent, which are doubtless the remains of veins in the former rock, long since decomposed and washed away in solution. It is from such nests, especially those lying within a few feet of the surface, that the present production of barytes in Missouri is obtained.

The mining is done by the local population, the farmers, boys and anyone, when there is nothing else to do and the needs for subsistence compel work. The only tools required are a pick and shovel and a small cobbing hammer, and by arrangement with the owner of the land the prospector is able to dig almost anywhere he desires, the land owner claiming a royalty on the product. The mineral is graded according to its quality, the pure white constituting the first class, and the more or less iron-stained the second and third. The freight rate on barytes from Potosi and adjacent points on the Iron Mountain Railway to St. Louis is \$2.30 per ton. The value of first class mineral on board cars, a few months ago, was about \$4.80; of second class about \$3.80; and of third class about \$2.25. Mineral of the second and third classes is stained a deep flesh-red by oxide of iron, which thoroughly permeates the mass, so that if the mineral be crushed to pass a standard 8-mesh wire screen each particle still shows the iron stain. By digesting the finely pulverized mineral with sulphuric acid, the ferric oxide can be dissolved and the barytes bleached to a satisfactory degree of whiteness, but this involves a consumption of acid (each unit of iron requiring about 66 2-3 pounds of 60° B. sulphuric acid), besides the labor and other expense of treatment, wherefore the discount in its value.

The sale of the mineral is effected through local brokers, who buy the product of the miners, accumulating it in heaps alongside of the railway switch, whence it is loaded on the cars. The brokers buy of the miners at the pits where produced, paying them \$2.50 to \$3 per ton for first class white mineral, and in addition thereto a royalty of

50 cents per ton to the owner of the land. Carting to the railway switch costs, generally, 50 cents per ton, making the total cost delivered at the railway \$3.50 to \$4 per ton. Shipments are made from Cadet, Mineral Point, Potosi, and a few other points in Washington County on the Iron Mountain Railway; the limit of mining is determined largely by the cost of carting the mineral to the shipping points. Deposits of barytes of the same character occur throughout Washington County and westward into Crawford County, where the St. Louis & San Francisco Railroad passes through, but the distance across country, in a direct line, from Potosi on one road to Steelville on the other, is about 30 miles, and there is consequently a large area in between from which products of a small value per ton will not stand the cost of transportation, which would amount to about \$3 per ton for a 15 to 18 mile haul under present conditions. Any increase in the demand for barytes which would cause an advance in the value of the mineral to above \$7 per ton, St. Louis, would render available numerous deposits of the mineral in the interior, as it would permit the wagon haul to be done from a longer distance. This is of considerable interest, inasmuch as it is now recognized by unprejudiced authorities that barytes as a pigment is not merely an adulterant, or an inferior substitute, for white lead, but on the contrary has excellent qualities of its own, which appear advantageously when it is employed in admixture with white lead and zinc white; while the new method of making barium hydrate from barytes, now in operation at Niagara Falls, promises to extend the usefulness of that mineral as a source for all the compounds of barium.

COAL IN WESTERN SIBERIA.—The Scudschensk coal deposits are situated at no great distance from the Siberian Railroad—1575 versts from Tchelabinsk and 28 versts (18½ miles) from Taiga, on the European side of Tomsk—the distance from the railway being only ½ verst. The deposits belong to various owners, the portion nearest the railway belonging to the Crown. In addition to the Crown property there are three private owners. The Auskerski deposits, which are on the Crown property, are being worked from three pits. The Auskerski coal yields good coke for metallurgical purposes, does not leave much ash (7 per cent), and it gives so far 62½ per cent of hard metallurgical coke, a percentage which rational working is expected to raise to 75 per cent. The total output has hitherto been 3,300,000 poods on the Crown deposits, on one private property 5,000,000 poods, and on another 500,000 poods. For the present year an output of 10,000,000 poods on the Crown property is anticipated. Also the private coal-fields of this district yield excellent coke, all of which is considered suitable for the Ural blast furnaces.

Great expectations were at one time entertained about the Ekibas-Tus deposits, in the neighborhood of Pavlodaz, but the quality is not good. The Siberian Railroad uses annually some 3,000,000 poods of Siberian coal, at a price of 11½ kopeks at Omsk.

RHODESIAN COAL.—The London *Engineer* says that an excellent steam coal is obtained from the Wankie Mine in Matabeleland. The coal in the lower portion of the Wankie seam is semi-bituminous, containing from 6 to 9 per cent of ash, 16 to 20 per cent of volatile matter, and from 1.4 to 2.17 per cent of sulphur, with a theoretical heating power of from 13.6 to 14.02 pounds of water evaporated per pound of coal. This heating power would be from 4 to 6 per cent inferior to the theoretical heating power of a similar class of Welsh steam coal. The sulphur and ash contained are above the average of that met with in Welsh coal, but compare favorably in this respect with other South African coals. The quality of this lower portion of the seam, which has been proved to extend over a large area, is well suited for locomotive and general purposes.

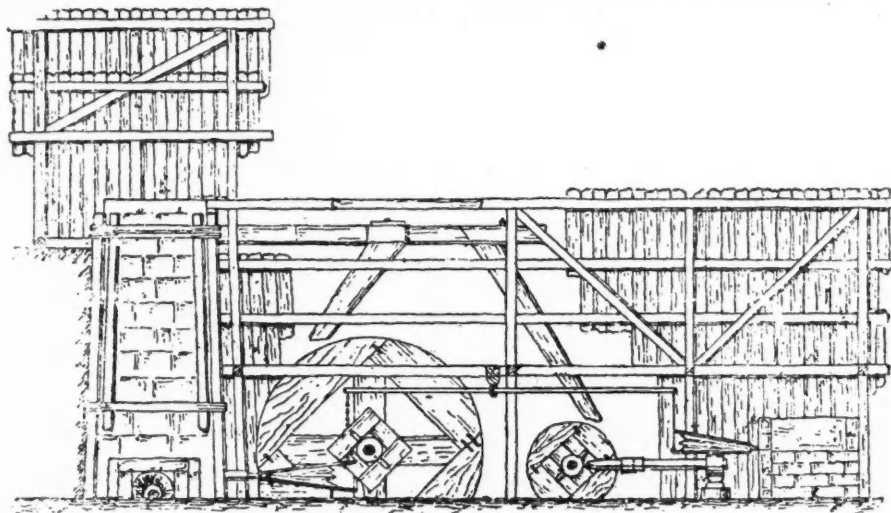
\*Published by permission of the Director of the United States Geological Survey.



**A LARGE CHARCOAL FURNACE**

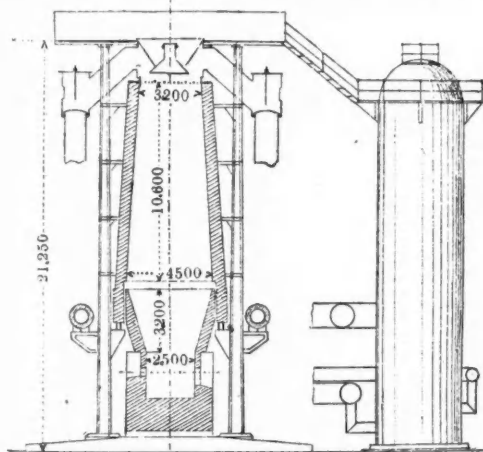
In a recent number of *Stahl und Eisen*, a description is given of charcoal blast furnace recently erected by the Vareser Eisenindustrie Aktien-Gesellschaft at Vares in Bosnia, which is, the writer claims, the largest charcoal furnace in existence. The company owns iron ore at Przici, Droskovich and Smreka, which is—the last-named especially—extensive and easily worked by open cut.

The furnace, a sketch of which is shown herewith, is 21.25 meters in height from the ground to the top of the gas outlet, the diameter varying from 2.5 to 4.5 meters, as shown on the section. It is provided with hot blast stoves in which the blast is heated to



OLD BLAST FURNACE AT VARES, BOSNIA.

850°. The charge usually consists of 40 per cent hematite from Smreka and 60 per cent brown ore from Droskovich, the latter being roasted before charging. The hematite averages 40.4 per cent metallic iron and 11.3 per cent manganese; the brown ore 57.7 per cent iron and 6.2 manganese. The average phosphorus in the ore is 0.02 to 0.03 per cent and 0.01 to 0.06 sulphur; there are also traces of copper. The average yield from the charge is 53 per cent in pig iron. The highest output of the new furnace at Vares has been 3,270 metric tons in one month, an



CHARCOAL FURNACE AT VARES, BOSNIA.

average of 105.5 tons a day, with an average consumption of 350 kilograms of charcoal to 1 ton of iron.

Iron has been made at Vares for many years, but before the Austrian occupation of Bosnia the work was done in very primitive fashion. By way of contrast, a sketch of one of the old furnaces is shown. The stone stack had an interior diameter of 1 meter, and was 5 meters in height. Blast was furnished by bellows, driven by a water-wheel, as shown in the sketch. This furnace was tapped once in three days, when about 3 tons of iron would be taken out, a part going off with the slag. The iron was re-heated and worked up into bars and other shapes under a trip-hammer driven by water-power. It is said to have taken over 3,000 kilograms of charcoal to make 1 ton of iron.

**BAUXITE IN NEW SOUTH WALES.**

By JOHN PLUMMER.

The existence of bauxite in New South Wales was not known until 1899, when it was recognized by Mr. Jaquet, State Geological Surveyor, at Wingello, about 100 miles south of Sydney, where he found it occupying considerable areas. Almost simultaneously it was detected in extensive deposits in the Inverell and Emmaville districts, in the northern part of the State. At Emmaville, in 1886, Professor David, when making a geological survey of the tin-mining field, found that 12 square miles of country were covered by deposits of laterite or vol-

canic ash, from 3 up to 50 feet in thickness, and this material now proves to be bauxite and wocheinite, for it occurs both in the pisolitic and massive forms. In the Inverell District, also, it is now known to occupy very considerable areas. Its mode of occurrence is similar in both districts; it is frequently roughly stratified, and is generally found capping small hills, in many cases surrounding points of eruption. It is clearly of volcanic origin, and while in some cases it appears to consist of volcanic ash, in others it may have been derived from the decomposition of basalt in situ.

In color the New South Wales bauxite varies from pale yellow to deep red. Near Inverell it has been extensively used for making roads, with very satisfactory results, its value in the production of aluminum being unknown at the time. Only the bauxite deposits near Emmaville have been officially mapped out as yet; nor has there been anything in the shape of a systematic examination of those whose existence in the State has so far been ascertained.

**RECENT DECISIONS AFFECTING THE MINING INDUSTRY.**

Specially Reported.

**EVIDENCE AS TO WHETHER LAND FROM WHICH TIMBER WAS CUT WAS MINERAL.**—On an issue whether public land on which timber was cut was mineral land, within Act of Congress, June 3, 1878, authorizing residents of certain districts to cut timber on mineral lands, a geological map of the territory in which the lands were located, issued by authority of the Interior Department, was admissible for use in connection with the evidence of witnesses, and to show the general nature of the land described, its elevation, surroundings, and its situation with relation to lands proven to be mineral, where not in any way purporting to show the nature of the land in controversy, or to indicate that it was mineral. In case one cuts timber from public lands in good faith, believing it to be lawful, and it is proven that such lands were not in reality of the nature supposed by him, he was only liable for the value of the timber as cut, and not as manufactured. *United States v. Van Winkle.* (113 *Federal Re-*

*porter*, 903); United States Circuit Court of Appeals, Ninth Circuit.

**EXTRA-LATERAL RIGHTS IN MINING LANDS.**—The laws of the United States, section 2322, and the patents issued thereunder, confer upon the locators of mining claims the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all the veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical lines of such surface locations; and the statute further specifies that such locators, notwithstanding their extra lateral rights, shall have no authority to enter upon the surface of a claim owned or possessed by another. There is no warrant for saying that a locator has any general right of exploration within the land of an adjoining claim, whether upon or below the surface. The right of exploration is given for the purpose of making discovery of mineral. Of what avail would be the right of exploration if no benefit could be obtained from discovery made thereby? The ground covered by a subsisting, valid mineral location is open to exploration only by the owner of the same. The mining laws, as we construe them, grant to a mineral locator more than the mere right to the surface of his claim and the veins or lodes which have their apices therein. Section 2319 declares "the lands" in which valuable mineral deposits are found to be open to occupation and purchase; and section 2325 provides that "a patent for any land claimed and located for valuable deposits may be obtained in the following manner." These provisions tend to indicate that the patent when issued is a grant of the land with all the rights incident to common-law ownership. The reason for specifying in the description of the grant the "veins, lodes and ledges" is for the purpose of defining what is granted in addition to the land, namely, the right to pursue such veins, lodes and ledges extra-laterally in case they depart from the perpendicular and extend beyond the side lines of the claim. This view is in accord with the trend of all the decisions to which our attention has been called.—*St. Louis Mining and Milling Company v. Montana Mining Company.* (113 *Federal Reporter*, 900); *Court of Appeals of the United States*, Ninth Circuit.

**LIFE ESTATE IN LANDS EXTENDS TO THE MINERALS AND OIL THEREIN.**—According to all the cases and text-books a life estate in land invariably extends to all minerals beneath the surface; but the right being merely to use and enjoy, and not to dispose of the land, the difficulty arises in determining what is the proper use and enjoyment, and when a life tenant may and when he may not sever and dispose of minerals without being guilty of waste. It is obvious that a life-tenant, if allowed to mine, might get a much larger proportion of the benefit of the estate than he would ordinarily receive. On the other hand, if not allowed to mine, he might get much less. The courts have undertaken to draw the line, and it may be stated as a general rule, at common law, that while a life tenant may continue to work mines that were open when the tenancy commenced, and this even to exhaustion, and may construct new approaches, he cannot open new mines, for to do so would be to commit waste. The rule allowing life tenants to mine, when the operations are commenced before the tenancy is created, is based on the theory that in such cases mining is a mere mode of use and enjoyment, and to extract minerals is but to take the accruing profits of the land. The matter resolves itself then into a question of when and under what circumstances mining may be adopted as a mode of using the land. The authorities all agree that there is no restriction when the land has once been used for mining purposes before the life tenant comes in; and they now go a step further, and hold that mining will

be allowed if the owner of the preceding estate has fixed on it the character of mining land by lease or the like, though no mines were opened.—Higgins Oil & Fuel Company v. Snow (113 *Federal Reporter*, 435); United States Circuit Court of Appeals, Texas.

#### ABSTRACTS OF OFFICIAL REPORTS.

##### *Tharsis Sulphur and Copper Company, Spain.*

This company's report, as issued from the London office, covers the year ending December 31, 1901. The income account shows profit from operations, £323,734; interest, £26,905; total, £350,639. The charges against this income were: Management, legal expenses, etc., £44,801; depreciation of properties and plant, £42,160; total, £86,961, leaving a net profit of £263,678. To this is to be added £30,108 brought forward from 1900, making a total of £293,786. Dividends paid were 8 shillings per share, or 20 per cent, requiring £250,000, and leaving a balance of £43,786 forward to the current year.

The extraction of ore and the shipments made during the year were as follows, in long tons:

	1900.	1901.	Changes.
Tharsis mines.....	127,990	46,334	D. 81,656
Calañas mines.....	302,257	332,227	I. 29,970
Lagunazo mines.....	38,491	21,601	D. 16,890
Total ore extracted.....	468,738	400,162	D. 68,576
Pyrites shipped.....	398,106	371,412	D. 26,694
Copper precipitated shipped.....	6,774	6,133	D. 641
Refined copper made.....	7,967	7,427	D. 540

The report says that at the Tharsis Mines an extension of the Sierra Bullones opencast to the eastward was resolved on, in order that a mass of mineral of good quality as regards sulphur, though low in copper contents, might be made available. Operations were commenced in the Autumn, and 23,703 cubic meters of overburden were removed. The ore from this mine was retained for local treatment. The extraction at this mine is for the present completed.

At the Calañas Mines 384,817 cubic meters of overburden were removed in extending the opencast workings both east and west. From this mine the supply of ore for export was taken, while in addition a large quantity was retained for local treatment. Of cupreous sterile, 44,933 tons were removed, against 88,287 in 1900, this being also laid down for treatment.

The ore taken from the Lagunazo Mine was retained for treatment at the mine. The ore left for extraction here is now limited in extent, but the production of copper from the heaps already deposited will continue for some time, and for the past year was quite satisfactory.

The rainfall at the mines was somewhat greater than in 1900, but the water supply still requires vary careful management. The railroad and shipping piers are in good condition. The metal works were in regular operation and the cost of producing refined copper was lower. Deliveries of iron ore were smaller, and a lower price was realized for the ore.

The report says: "The quantity of refined copper produced during the year 1901 was 7,427 tons, against 7,967 tons for the year 1900, showing a decrease of 540 tons. This decrease is due to the smaller outturn of copper precipitate at Tharsis Mines, where, as has been already mentioned, the extraction of ore for local treatment for the years 1900 and 1901 was on a smaller scale than formerly.

"The search for new mines has been continued with unabated energy during the past year, and your directors have pleasure in being able to announce the purchase of a copper property in the south of Norway. This new acquisition, while not capable of yielding an annual quantity of copper sufficient to raise the total production of the company from all sources to its former level, will, it is hoped, be a valuable auxiliary. It has been decided to carry on development work at the new mine during the greater part of the year 1902, in order to acquire fuller information as to the extent of its resources before incurring the expense of a com-

plete equipment of the property, but it is expected that by the middle of 1903 all arrangements will be completed, in order to allow of the extraction of ore being begun on a fairly large scale. Notwithstanding the purchase of the Norwegian mine, the search after new properties has not been in the slightest degree relaxed, and no efforts will be spared in endeavoring to make good from other sources the deficiency in the output of refined copper from the Spanish mines.

"Exploration works have been vigorously carried on at Calañas Mine during the past few years, and it is gratifying to your directors to be able to state that, in addition to the already proved resources of ore which can profitably be treated for the production of copper, a large mass of low grade ore has been thereby proved to exist. Though comparatively poor in copper, this ore is rich in sulphur, and with the increasing demand for such ore, there is every prospect of being able, in the course of a few years, to dispose of considerable quantities at remunerative prices."

##### *Mason & Barry, Limited, Portugal.*

This company owns and works a large deposit of copper bearing pyrites in Portugal. The report, which has just been issued from the London office, covers the year ending December 31, 1901. The profit and loss account shows balance from 1900, £7,292; profit from mines—after deducting £32,772 royalty—£122,539; La Sabina Company, £8,898; interest, etc., £2,899; total, £141,628. The charges were for management expenses in England, £9,578; reduction in investments, £125; written off La Sabina shares, £2,000; total, £11,703, leaving a balance of £129,925 for the year. From this there has been appropriated £1,000 to pension fund, and dividends amounting to £120,362—13 shillings per share, or 65 per cent—have been declared. This makes a total of £121,362, leaving a balance of £8,563 forward to current year.

The mine assets in Portugal (after writing off for depreciation) stood December 31, 1901, at £114,871. These assets embrace the following items, and compare with the preceding two years as under:

	1899.	1900.	1901.
Works, buildings, land, plant, etc.....	£29,017	£21,209	£17,985
Railways, shipping piers, tug-boats, etc..	33,741	25,802	24,026
Total.....	£62,758	£47,011	£42,011
Mine stores and cash assets.....	27,977	14,041	13,746
Stocks of ore and copper precipitate.....	89,907	80,943	59,114
Total.....	£180,642	£141,995	£114,871

The company has for several years pursued the policy of writing off considerable amounts for depreciation each year, and of reducing its capital stock in view of the approaching exhaustion of its mines. The value of the stock in Portugal on December 31 was made up as follows: Ore at cementation works, £33,156; ore ready for shipment, £16,142; copper precipitate, £9,816; total, £59,114. To this is to be added £11,384 for value of stocks in England, making a total of £70,498.

The report says that the total quantity of ore broken and raised at the mine during the year 1901 was 129,314 tons, as against 117,714 tons in 1900, and the shipments during the same period (inclusive of ore from the cementation works) amounted to 449,760 tons, as against 394,740 tons in the previous year. The quantity of ore sold and invoiced for its sulphur value during 1901 amounted to 453,027 tons, as against 392,813 tons in 1900.

##### *Phoenix Consolidated Copper Company, Michigan.*

This company is opening up a new copper mine in the Lake Superior region. The report is for the year ending December 31, 1901. During the year there were 93,643 pounds of copper taken out in development work; this was sold at an average of 15.34 cents per pound. The total receipts for copper sold and interest were \$16,491. The charges were: Working expenses at mine, \$112,770; construction, \$8,075; freight, smelting and general expenses, \$8,142; to-

tal, \$128,987, showing an excess of payments amounting to \$112,496. The balance brought forward from the previous year was \$160,080; deducting the excess above left \$47,584 on hand at the close of the year.

The report says: "The operations for the year have been confined to openings at the St. Clair and West Vein and to the installation and arrangement of the plants necessary to sustain a continued output from our present and contemplated workings. The showing at both St. Clair and West Vein is such as to still further justify the erection of a one head stamp mill on Eagle River. A site for such mill has been selected and ground was broken for the foundation, which will be laid as early in the Spring as weather will permit. Surveys were completed for a line of railroad to connect both the St. Clair and West Vein shafts with the mill and with the operating portions of our surface plant. Severe weather stopped work of grading for the railroad, but ties are being cut and rails have been procured that advantage can be taken to continue this work and complete the road as early as possible."

##### *Tennessee Coal, Iron and Railroad Company.*

This company owns extensive coal and iron properties, blast furnaces, rolling mills and steel works in Alabama and Tennessee. Its capital account includes \$22,582,800 common stock; \$248,300 preferred stock; \$440,000 guaranteed stock; and a bonded debt amounting—after deducting sinking funds—to \$13,285,036. The report is for the year ending December 31, 1901.

The income account shows profit from mining and manufacturing, \$1,640,105; rents, etc., \$84,033; other income, \$1,500; total, \$1,725,638. Interest, sinking funds and other charges amounted to \$862,189, leaving a net balance of \$863,449. Deductions from this were as follows: Royalty on ore and coal removed from company's lands, \$359,234; additions to reserve and insurance funds, \$151,095; depreciation, \$89,447; dividends on preferred stock, \$19,864; total, \$619,640, leaving a balance of \$243,809 as surplus for the year. This sum was used to reduce the value of plant account.

There was expended during the year for new construction at Ensley steel works, \$636,405; at Pratt mines, \$46,370; at Bessemer rolling mill, \$12,671; at other plants, \$64,208; total, \$759,634.

The production of the company's mines and works during the year, and the disposition of products are shown below; shipments to markets covering sales, and those to departments deliveries to the company's mills, furnaces and other works:

Mine Products:	Total Production.	Shipments.	
		To Depts.	To markets.
Red ore.....	1,113,362	1,113,362	.....
Brown ore.....	302,361	302,361	.....
Total iron ore.....	1,415,723	1,415,723	.....
Coal.....	4,085,086	2,410,880	1,672,814
Limestone.....	220,569	218,805	820
Manufactured Products:			
Coke.....	1,179,855	1,155,904	22,899
Pig iron.....	628,268	102,580	572,435
Open-hearth steel ingots	109,805	108,260	.....
Steel billets, blooms, etc	94,565	13,905	81,205
Bars, plates and sheets	23,026	3,024	20,475

The total sold and shipped to market included therefore 1,695,713 tons coal and coke; 820 tons of limestone; and 674,115 tons of iron and steel products. Of the coal included above as shipped to departments 441,875 tons were used in the company's operations, and 1,969,005 tons were converted into coke. This shows a yield of 59.9 per cent; that is, 1.67 tons of coal were consumed in making 1 ton of coke.

The directors' report says: "At the close of the year 1900, the floating indebtedness of this company amounted to \$4,120,000, of which \$920,000 was for account of current business, the balance of \$3,200,000 representing borrowed money and overdue accounts. Your board of directors decided to issue a general mortgage for \$15,000,000; \$10,653,500 to be used for retiring bonds then outstanding as they fell due; \$3,000,000 to be sold and the floating liabilities reduced; \$1,346,500 to be sold and the proceeds expended for additions and betterment. Up to April



17, 1902, it has been necessary to market only \$3,000,000 of bonds, the money received for them reducing floating obligations, the balance required (except \$100,000 still due) having been taken from earnings. All bills are now met promptly or anticipated, and discounts secured. During 1901, for construction and improvements, the sum of \$759,000 was expended, and the company has, or will soon have under way, at its mines, furnaces and mills, additions and improvements costing the aggregate sum of \$1,020,000. Further important additions have practically been decided upon.

"Under the system of accounting that was followed prior to 1901, we believe that to real estate or plants were charged many items that should have been charged to cost, thus increasing the book value of your property and the profits shown, and reducing the apparent cost of output. The method now followed is believed to be conservative. Had the market price of pig-iron during 1900 continued through 1901, the net earnings of the company would have been \$1,704,228 greater than now shown. An examination showed that many of the plants for manufacturing and the equipment at others were overvalued, and that accounts receivable included large sums that were in no sense receivable. In the readjustment, plants, investments, accounts, and bills receivable were reduced by the sum of \$6,424,000.

"This company holds in fee large quantities of iron ore and coking coal, estimated as sufficient to supply our present furnaces 60 years, and so located as to insure cheap delivery. The iron mines are being put in order to make a large output at a reduced cost, and the coal mines are receiving some attention.

"In the construction of your steel mill, several new and untried devices were introduced. Their removal and the substitution of others has been costly, both in time and money. The output, which is now about 14,000 tons per month, will be increased.

"Your directors recommend that the net earnings be used to improve or replace your different plants, making them conform more closely to the best ones of like character."

**Butterfly-Terrible Gold Mining Company, Colorado.**

The report of this company covers the year ending December 31, 1901. During the year a great deal of development work was done, and 11,467 tons of ore were taken out and put through the mill. The statement of receipts and operations is as follows:

	Amount.	Per ton.
Bullion .....	\$63,454	\$5.53
Concentrates .....	10,114	0.88
Miscellaneous .....	457	0.04
<b>Total receipts.....</b>	<b>\$74,025</b>	<b>\$6.45</b>
Mine improvements and repairs.....	\$2,641	\$0.23
Mill operating.....	53,544	4.67
Mill improvements and repairs.....	2,299	0.20
Mill operating.....	6,493	0.56
Transportation and treatment.....	169	0.01
General expenses.....	7,736	0.68
<b>Total expenses.....</b>	<b>\$72,882</b>	<b>\$6.35</b>
<b>Profit for the year.....</b>	<b>\$1,143</b>	<b>\$0.10</b>

The profit and loss account for the year is as follows: Profit for the year, as above, \$1,143; balance from previous year, \$13,822; treasury stock sold, \$20,738; total, \$35,703. From this the sum of \$25,000 was paid in dividends, leaving \$10,703 cash in hand at the close of the year.

The president's report says: "During the past year you have been advised from time to time of the varying conditions at the mine. Beginning with the fiscal year the prospects were exceedingly bright, but during the latter half the ore in the main shoot, from which most of the values had been taken, grew unexpectedly lean. There is still considerable ore left in this stope, but of so low grade that it can be mined only at a loss. This was thoroughly prospected and repeated experiments made to see if it could be handled at a profit, but when the failure of this shoot to hold its values as it approached the surface had been proven beyond question, the management did not feel justified in prosecuting work upon it further.

"Mr. Sayer, the superintendent, recommended that all attention be put upon development work by push-

ing forward the lower tunnel, in which the directors fully concurred. In order to satisfy both themselves and the stockholders, however, that this course was the best one to pursue, the directors sent an expert mining engineer, Mr. Fred. G. Farish, of Denver, a man who is in no way connected with the company, to make a thorough examination of the property and report upon conditions and advise us as to the best method of future operations. His advice was entirely in line with the superintendent's, namely, to crosscut to the main vein at the lowest accessible level, and drift along it to the point where ore again might be found in such quantities as to enable us to resume production. This advice has been followed, the vein has been reached in the crosscut, and work is being carried along the vein. This point is covered fully in the superintendent's report.

"The last dividend was declared in the expectation that the ore in the main shoot would pay expenses of mining and milling, and yield enough additional profit to carry on whatever development work was needed. With this intention the dividend was reduced in order to install a steam plant so as to increase production. Fortunately, although the plant had been already ordered, before it was delivered the order was countermanded, and a compressor and heavy machine drills were obtained instead in order to push the crosscut and drift along the vein. In order to curtail expenses this work was attempted at first by hand, but the rock was so exceedingly hard that progress was very slow indeed, and it would have been a matter of months before the work could have been completed in this manner. The new plant has done its work well, and work on this tunnel is being carried on with the utmost speed.

"When the company was organized \$10,000 in cash was given to the treasury by the incorporators to be used in putting the mine in good condition, and also 250,000 shares of stock to be held as a reserve fund to be called upon as it might be needed for the actual purposes of the business.

"The sum of money referred to was used in the first few months of the company's ownership for improvements, necessary repairs, and getting things in good running order. The treasury stock has remained intact until after the first of this year. It was then necessary to call upon that to meet the expenses of the work now in progress, and there have been sold altogether 142,600 shares, realizing for the company \$20,738. Only enough of this stock has been sold to provide sufficient funds to carry on development work to a point where we may expect to get into good pay ore. On account of the stock being listed it has of course been impossible to sell the treasury stock above the market price, and on account of the dull state of the market this winter it has been necessary to place the stock outside to the best possible advantage, for if it had been forced on the market the company would not have been able to realize nearly as much as has been received from this source. None of the officers of the company has received any salary, except the secretary and treasurer, who during the past year has been paid \$50 a month for his services. Mr. Upham as general counsel for the company has received \$200 a year. Mr. Sayer as superintendent of the mine has received a salary of \$250 per month up to February 1, when he voluntarily offered to reduce his salary to \$200, which amount has been paid since that time.

"There are absolutely no debts of any description, except for current expenses, for which the Company has ample funds. Its property, both real and personal, is in good condition. We believe that with the advancements of work along the Ida vein there is every reason to expect the opening of better and larger ore bodies than have ever been disclosed in the upper levels, and that the Company will be in vastly better condition than it has ever been before.

"At the time of the regular annual meeting several weeks ago there was a plan under consideration for consolidating our interests with those of another mining company, in which the officers of the Butterfly have no interest whatever, and with which they are not connected in any manner, and there was good reason to expect that such a consolidation

would go through. This would have been of great benefit to all concerned. It will be readily understood that if publicity had been given to the plans at the time it would in all probability have prevented any possible chance of effecting the consolidation. Negotiations have now fallen through, and if they should be resumed again on similar lines, the stockholders will be fully advised. It should also be understood that such a deal could not and would not have been effected without a full submission of the matter to the stockholders, and we had the matter under advisement only for the purpose of getting a satisfactory proposal which as matters turned out, did not come. If this consolidation had not been under consideration with prospects of successful accomplishment, the annual meeting would not have been postponed.

"The profits from September 1, 1900, to September 1, 1901, inclusive, were \$39,453. The dividends paid from January 28, 1901, to October 28, 1901, inclusive, amounted to \$31,250."

**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.

*Statistics of the Colony of New Zealand for 1900.* Compiled in the Registrar-General's Office, Wellington, N. Z.; Government Printer. Pages, 556.

*Report on the Tin Ore Deposits of North Dundas.* By G. A. Waller. Hobart, Tasmania; Government Printer. Pages, 20; illustrated.

*Report on Coal Discovery near Oatlands.* By W. H. Twelvetrees, Government Geologist. Hobart, Tasmania; Government Printer. Pages, 12.

*Yorkshire Philosophical Society, Annual Report for 1901.* York, England; published by the Society. Pages, 108; illustrated.

*The Decay of Timber and Methods of Preventing it Bulletin No. 14,* Bureau of Plant Industry, Department of Agriculture. By Herman von Schrenk. Washington; Government Printing Office. Pages, 96; illustrated.

*American Engineers in South Africa.* Kimberley, Cape Colony; compiled and issued by Alpheus S. Williams. Pamphlet, 24 pages.

*Die Electrolyse des Wassers.* By Viktor Engelhardt. Halle, Germany; Wilhelm Knapp. Pages, 120; illustrated. Price (in New York), \$1.75.

*Power Plants of the Pacific Coast.* By F. A. C. Perrine. Reprinted for the Author from the *Proceedings of the New York Electrical Society.* Pages, 24; illustrated.

*Register of Mines and Minerals of Lake County, California.* Prepared under direction of Lewis E. Aubury, State Mineralogist. San Francisco, Cal.; State Mining Bureau. Pamphlet, 16 pages; with map.

*Report on the Kiandra Lead, New South Wales.* By E. C. Andrews. Sydney, N. S. W.; Government Printer. Pages, 32; illustrated.

*Topographical Record and Sketch Book for Use with Transit and Stadia.* By Daniel Lawrence Turner. New York: *Engineering News Publishing Company.* Pages, 92. Price, \$0.75.

*Tables for Obtaining Horizontal Distances and Differences of Level from Stadia Readings.* Computed by Alfred Noble and William T. Casgrain. New York; *Engineering News Publishing Company.* Pages, 28. Price, \$1.

*Twenty-fourth Annual Report of the Bureau of Statistics of Labor and Industry of New Jersey.* William Stainsby, Chief of Bureau. Trenton, N. J.; State Printers. Pages, 516.

**BOOKS REVIEWED.**

*Deep-Level Mines of the Rand and Their Future Development.* By G. A. Denny. London, England; Crosby Lookwood & Son. New York; the D. Van Nostrand Company. Pages, 170; illustrated. Price, \$10.

The review of this book, given in our issue of May 3, was made from the first London edition.

The book is now issued in this country, we are informed, by the D. Van Nostrand Company. The price here is \$10.

*Arithmetic of Electrical Measurements.* By W. R. P. Hobbs; revised by Dr. Richard Wornell. London; Thomas Murby. New York; the D. Van Nostrand Company. Pages, 112; illustrated. Price, 50 cents.

This is a convenient manual, giving in compact form the formulas in use in electrical work and the methods of computation employed by electrical engineers. It is illustrated by a large number of practical examples which are worked out for the student. It has been carefully revised and brought up to date.

*Hills' Official Manualette. A Directory of Mines. Cripple Creek Series, No. 1.* Colorado Springs, Colo.; Fred Hills. Pages, 104, paper cover. Price, 25 cents.

This is a very convenient list of Cripple Creek mining companies, giving their officers, capital and a condensed account of the property. For the use of brokers, holders of shares and others interested it is indispensable. Mr. Hills, who compiled it, prepared the *Official Manual of the Cripple Creek District*, which is a standard work. The present issue is a condensation for pocket use and reference, but does not by any means supersede the more important work, having its separate and useful place.

*The British Railway Position.* By George Paish. With an Introduction by George S. Gibb. London, England; *The Statist*. Pages, 336. Price (in New York), \$3.50.

This is a revised republication of a series of articles published in the *London Statist*, which attracted much attention at the time of their appearance. It is in effect an analysis of the traffic statistics of the leading railroads of Great Britain, including incidental comparisons with American railroads. These are made the basis of sharp criticisms of British methods of handling traffic and of railroad charges. The writer believes that the adoption of better methods and the use of better equipment would enable the railroads to reduce their expenses and furnish transportation at lower rates, with great advantage to industry generally. Thus, while in the United States the traffic problem has been at least partly solved by the great increase of train loads permitted by the use of larger cars and more powerful engines, in Great Britain the average train load is about the same as it was 10 or 20 years ago; increase of traffic has been handled by merely putting on more trains of the same kind and capacity, and run at about the same cost. An investigation into British conditions was rendered difficult by the fact that the railroad companies do not keep the statistics which are here considered necessary. We are so accustomed here to base all our calculations and comparisons on the essential units of traffic—the ton-mile and the passenger-mile—that it is difficult to understand or appreciate the fact that accounts as kept on all British railroads, with only a few exceptions, do not refer to those units at all. The figures contained in their reports are limited to the number of tons and passengers carried, no statements as to mileage being recorded.

In railroad work as in mining and metallurgy, the first step to improving practice is to know just what we are doing now and just what it costs. That knowledge is the basis of all further work. The improvement in American railroad methods may be said to have begun when the late Gen. Albert Fink on the Louisville & Nashville road went to work to find out, as we have said above, just what work his equipment was doing and just what it cost. He secondly laid the foundation for the study of railroad economy, admirably carried on as it was by Edgar Thomson and his assistants on the Pennsylvania Railroad, by Mr. Paine on the Lake Shore, Mr. Harrison, the Chicago, Burlington & Quincy,

and not less in other directions by Mr. S. Wright Dunning in the *Railroad Gazette*, and Mr. Charles Francis Adams on the Massachusetts Railroad Commission. The British railroads, good as some of their work is, have not reached the point of knowing just what they are doing; and consequently it is costing them more than it ought to do, as Mr. Paish tries to show. His criticisms ought to stir up the British railroad managers, much to their own benefit.

*Coal of Michigan. Its Mode of Occurrence and Quality. Part 2, Volume VIII, Geological Survey of Michigan.* By Alfred C. Lane, State Geologist. Lansing, Mich.; State Printers. Pages, 232; illustrated.

The coal mining industry of Michigan has increased rapidly during the past three years, and the present report is a timely one. Its general scope is best shown by Mr. Lane's own introduction, which is as follows: "Although it does not pretend to be exhaustive in its description of the wealth of the State in this particular material it seems to me that it may help give some idea as to the known variations in quality, which is better on the whole than has been reported, may help those who desire to test the quality to do so to best advantage; may give some idea of what has been done, and yet remains to be done in testing, and may save some useless exploration. If I have given especial attention to the probable depth to which it is worth while to test and have depicted the hindrances quite fully it must be remembered that forewarned is forearmed. I have not attempted to trespass on the field of the Commissioner of Mineral Statistics, and the Coal Mine Inspector, Mr. Wm. Atwood, whose valuable reports are made at frequent intervals to the Labor Commissioner, except so far as it has been necessary to use the facts gathered by them in studying problems proper to economic geology.

"The records herein given of test borings are reported to us, and I do not guarantee their accuracy. I think that so far as they throw light upon the area and thickness of the coal series as a whole they may be trusted. Not so much reliance can be placed upon the indications for individual beds, but in any case these can vary much in a few yards."

The report carries out well the purposes as above stated, and contains much material that will be of much value to all who are interested in Michigan and its growing coal industry.

*Cultivazione delle Miniere.* By Prof. Sollman Bertolio. Milan, Italy; Ulrico Hoepli. Pages, 284; illustrated. Price (in New York), 90 cents.

This is one of a series of small and compact manuals issued by the Hoepli publishing house on various scientific and practical subjects. The present volume is intended to give Italian miners and mining engineers a brief and compact account of the general nature of mineral deposits and the methods adopted in working them. The nature of the contents is indicated by the divisions of the book, which include a brief abstract of the geology of mineral deposits; methods of exploring for such deposits; methods of mining; mining machinery; the preparations of minerals; and mining law. The information is condensed and of a somewhat elementary kind, but for the most part carefully prepared.

*La Guyane Française en, 1902.* By David Levat. Paris, France; Imprimerie Universelle. Pages, 124; illustrated.

The peculiar conditions existing in the colony of French Guiana has not so far favored its rapid development. The fact that Cayenne has been known in France chiefly as a convict settlement has done much to discourage free immigration and to give the colony a bad name at home. M. Levat's book is a report on the gold resources of the colony, which are, according to him, of much importance, exceeding in value those of either of the adjoining colonies of British Guiana and Dutch Guiana. The placers

have been worked with much success, and the exploitation of the quartz deposits on a large scale has been undertaken at St. Elie and Adieu-Vat by the Compagnie St. Elie, a French organization with large capital.

M. Levat has not only made a valuable report on the gold mines of French Guiana; he has made a bright and readable book, which is far more interesting than the ordinary report or description of a mining district. In his opinion the gold output of the colony has been under-estimated in the official returns, as there is no doubt that a considerable quantity of the precious metal is hidden or smuggled out of the country to avoid the tax or royalty of 8 per cent, which is levied by the Government. There are special facilities for concealing it in a country which is largely unexplored and is everywhere covered by tropical forests. A peculiar institution is found in the "maraudeurs," of free prospectors, who traverse the country in small parties—sometimes provided with prospectors' licenses, but more often without—and work placer ground on the rivers and creeks wherever they can find it without regard to the boundaries of government concessions or the rights of their owners. They are a pest to the large companies, but to their enterprise and their close prospecting have been due some of the most important discoveries made in recent years, such as that of the very rich placers of the Inini, four years ago.

There is no doubt that French Guiana presents great possibilities as a gold producer. The difficulties of climate can be mitigated to some extent by proper precautions. If the transportation facilities afforded by the numerous rivers can be supplemented by two or three railroads of moderate length and the mining industry relieved from excessive taxation and too close bureaucratic control a great development may be expected.

#### 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.

#### Coal in Alberta, Canada.

SIR:—The issue of THE ENGINEERING AND MINING JOURNAL of April 19 last contained an article by Mr. W. M. Brewer on the Crow's Nest coal-fields. Many of your readers who are not acquainted with this part of Canada after reading the article would erroneously conclude that the Fernie Coal Company controlled all the coking coals of Southeast Kootenay and Alberta, along the Crow's Nest Pass Railway, although the article only deals with the Southeast Kootenay coal-fields.

These coal-fields extend east from British Columbia into Alberta for fully 12 miles, along the Canadian Pacific Railway, and contain as strong a coking coal as those in Southeast Kootenay, controlled by the Fernie Coal Company; they are owned by the Dominion Government and open for sale.

This coal basin lies on the eastern side of the Crow's Nest Gap, in the territory of Alberta, at an average elevation of 3,900 feet above sea level. The middle fork of the Old Man River runs east through the center of this basin. Along the valley of the river the branch of the Crow's Nest line of the Canadian Pacific is located.

This coal-field is divided into two basins, between the range of hills lying on the eastern horizon, known as the Livingstone Range, on 49° 45' latitude North and 114° 15' longitude West of Greenwich and the Crow's Nest mountains, which form the western horizon by a ridge of carboniferous lime running north and south. The coal measures occur in the basins, between these horizons that overlie the mountain limestones, which dip below them and are in contact with and superimposed by sandstones and the regular argillaceous coal shales.

There is a belt of conglomerate running through the country, conformably with the formation of



each coal zone; this has been traced by the writer (formerly coal prospector for the Crow's Nest Coal Company) for many miles as a very bold outcrop and as a cap to the coal zones.

The general strike of the seams of coal is nearly North 5° East (magnetic north variation on true north about 23° 15'), with a very regular dip to the West from 35° to 40°. As exposed by the workings done by the writer and others on the different properties in this coal-field, the hanging wall of these seams is shale and the foot-wall sandstone.

There are 10 seams in this field, ranging in thickness from 6 to 42 feet. The coal contained in these seams is of first-class steaming quality, and also a good blacksmith coal; while several of the discovered seams produce a coking coal of a very superior kind. Analyses have shown these seams to contain coal that will make 80 per cent coke of a very fine texture and cellular structure, and burned as 72-hour coke it is equal to the standard cokes of Pennsylvania and West Virginia, both in strength and per cent of ash.

All the seams in these zones are traced for many miles north and south of the Crow's Nest River without a break, the seams passing up and down the mountains with a true course and without any disturbance in the strata.

JULIUS RICKERT,  
Coal Prospector.

Blairmore, Alberta, Canada.

We take pleasure in publishing Mr. Rickert's communication, although the necessity for doing so is obviated by Mr. Brewer's article on the Alberta coal-fields which appears on another page.—Ed. E. & M. J.

*The Newhouse Tunnel, Colorado.*

Sir: I have read with considerable interest an article published in your issue of April 19, on the Newhouse Tunnel, written by H. Foster Bain. Evidently Mr. Bain has been greatly misinformed as to the conditions existing prior to the time the present management took charge of the tunnel property. What I most seriously object to is his statement that the best record made by the tunnel up to the time that Mr. Hanchett took charge was 160 feet per month.

For several years I was the superintendent of the Newhouse tunnel, and at the present time am, and have been since its organization, a shareholder in the tunnel company, being thus in a position to be thoroughly familiar with the operations in the tunnel from its commencement up to the present time.

The tunnel was started on January 1, 1894, and during the months of January and February, 1894, only a few men were employed. On March 1, 1894, the force was increased, making then a total of twelve men on the pay roll, including the superintendent. During the month of March the tunnel was driven 152 feet at a cost of less than \$13 per foot. The average work per month was about 150 feet with the above number of workmen. Within a short time the second shift was put to work, which as a matter of fact enabled us to make better progress in the way of footage, but added considerable to the cost per foot for construction. June, 1896, proved to be the banner month for footage since the commencement of the enterprise. With 26 men on the pay roll we drove 329 feet in 28 days and at a cost of \$15 per foot.

It must, of course, be understood that certain conditions will make a material change in many cases, and nowhere is this more true than in the construction and operation of tunnels to be used for transportation, drainage or other purposes. I have known of tunnels being driven 450 feet per month, but the formation of the ground in this case was entirely different from that through which the Newhouse is being driven. Do not forget the fact that the Newhouse is a cross-cut tunnel 12 by 12 feet in the clear and is being driven through a granitic-gneiss formation, which any one familiar with geologic conditions knows is not only hard to drill in, but also difficult to break.

At present I am superintendent of the Gunnison Tunnel which is being constructed by the State of

Colorado as an irrigation tunnel, and in January of this year we drove 150 feet in 25 days with 12 men at work. The cross section of this tunnel is 11 by 13 feet.

When the cost of construction of any work, especially a tunnel, is increased over 100 per cent, we ought certainly to expect and should get greater results. In an enterprise of the magnitude of the Newhouse it must be remembered that time is money, and in a certain sense no expense should be spared trying to make rapid progress; but at the same time no practical man will undertake to throw money away, at least they will not under the management of Mr. Newhouse, as he is a gentleman that understands mining thoroughly and will not allow his own nor his associates' money to be spent without getting practical results.

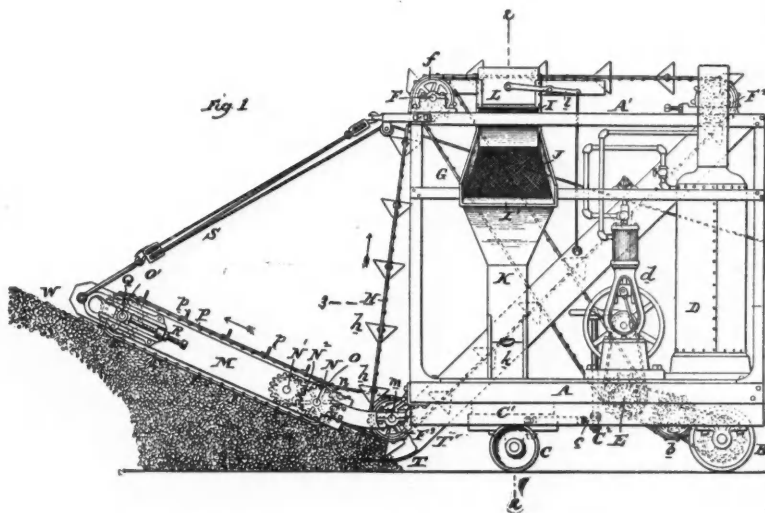
Mr. Hanchett, who has been in charge of the tunnel for the past two years, has accomplished good

*Swedish Feldspar.*—We would like to know what firms are importing Swedish and Norwegian ground feldspar into the United States; also what quantities are imported.—T. C.

*Answer.*—No feldspar is imported into the United States from Sweden or Norway. Some feldspar is imported, but it comes from Great Britain.

**PORTABLE COAL LOADING AND SCREENING MACHINE.**

A recent invention for loading coal from storage piles on the ground at the mine is shown in the accompanying illustration. It is known as the Seitz portable coal loading and screening machine. It is propelled by steam, being run to the edge of a coal pile, where by means of an automatic endless chain-belt raking device, the material is brought to the upright buckets which carry it to the screens on each side. It passes then by gravity into the car or cart. Two



SEITZ PORTABLE COAL LOADER AND SCREEN.

work and made remarkable progress since he assumed the management. But I feel that Mr. Bain should not undertake to censure some prior management unless he is thoroughly familiar with all the circumstances. Why does not Mr. Bain give all the facts from the commencement of the work up to the present time and not select some particular report now nearly two years old to show the cost of construction. Why did he not mention what the cost was just prior to the closing down of the enterprise? I happen to know that for the month of January, it was over \$40 per foot with a footage of 225 feet, working 25 days and from 30 to 35 men employed.

I trust you may see your way clear to give this communication as much prominence as you did Mr. Bain's.

T. R. HENAHEN.

Idaho Springs, Colo., April 30, 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.)

*Natural Soda.*—I am interested in a large natural deposit of sesquicarbonate of soda that has as its chief impurity, chloride of sodium. Would be very much obliged if you could give me some references on this class of deposits where I could find out how they are being treated commercially.—J. A. T.

*Answer.*—You will find the references you need in *The Mineral Industry*, Volume I and VI; and in *Bulletin No. 60*, of the United States Geological Survey, written by Mr. Thomas M. Chatard.

carts can be loaded and screened at one time if desired, the dirt falling into pockets under the screens and removed at intervals.

It is a portable machine and moved entirely by its own power, running preferably on planking or track, or on the ground if necessary. The cars or carts are loaded without manual labor other than that which directs the running of the engine.

The use of one of these machines in Philadelphia is said to have effected the saving of six laborers formerly engaged in loading and screening by hand. A machine of the size shown loads and screens one ton per minute, and can be manufactured to meet nearly all requirements as to loading capacity.

There seems to be no reason why this machine would not be available for reclaiming coal from culm banks, with a saving over the machinery now in use for this purpose.

**PATENTS RELATING TO MINING AND METALLURGY**

**UNITED STATES.**

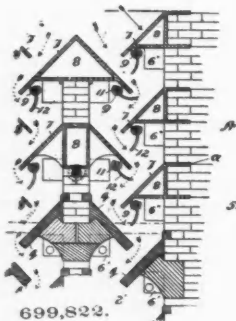
The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the *ENGINEERING AND MINING JOURNAL* upon receipt of 25 cents.

*Week ending May 13, 1902.*

- 699,654. **ELECTRIC FURNACE.**—Guillaume de Chalmot, Holcombs Rock, Va., assignor to the Willson Aluminum Company, New York, N. Y., a corporation of New York. The combination with the pot and carbon pencil entering the furnace of a cover for the furnace consisting of a plurality of sections fitting closely together, each formed of hollow metal with a water-chamber within it and water-pipes for causing water to flow through said chamber, the opening through which said pencil passes being formed partly in each of two adjoining sections, which may remain in place undisturbed during the operation, while other sections are removable independently thereof for stoking.
- 699,655. **APPARATUS FOR PURIFYING WATER.**—William C. Clarke, Pittsburg, Pa., assignor to James V.

Scaife, Pittsburg, Pa. A precipitating-tank, a supply-pipe, its exit being near the bottom of the tank, a pipe connected to said main pipe whereby a neutralizing solution is discharged thereinto, and a pipe entering said tank and said main pipe inside the tank, whereby a precipitating solution is discharged thereinto.

- 699,680. PNEUMATIC SHOVEL.—Lafayette Hanchett, Idaho Springs, and William C. Davis, Denver, Colo. In a power-shovel, a carrying-truck, a turn-table mounted thereon, guides on said turn-table, arms slidingly and pivotally supported from said guides, a shovel carried by said arms, means for advancing and retracting said arms, and means connected to said arms for raising and lowering them.
- 699,684. INCRUSTATION PREVENTIVE.—Edward Holm, Chicago, Ill. A metallic composition for preventing incrustation in steam-generating appliances, consisting of zinc, tin, antimony, mercury, and nitrate of silver; the zinc being present in a greater proportion than that of the tin, the proportions of the tin being greater than that of the antimony, the proportion of the antimony being greater than that of the mercury, and the proportion of the nitrate of silver being less than that of any other element.
- 699,759. METALLURGICAL FURNACE.—John A. Hunter, Philadelphia, Pa. A metallurgical furnace having a working chamber, a flue beneath the floor of the same, a discharge-flue communicating with said base-flue, and a dampened opening at that end of the working chamber, through which said working chamber communicates with the discharge-flue, and means for supplying heat independently to the working chamber and the base-flue.
- 699,762. DISINTEGRATING-MACHINE.—James M. MacDonald, Detroit, Mich., assignor to Parke, Davis & Company, Detroit, Mich., a corporation of Michigan. The combination with a frame-work, of a semicylindrical grating therein provided with a continuous lateral flange or rim at its upper edge, said rim being rabbeted or recessed as described, a rectangular frame detachably arranged within said recessed rim, a semicylindrical sieve detachably secured to the frame and resting upon the bars of the grating, a rock-shaft within the grating, and scraper-blades carried by said rock-shaft, extending in proximity to the sieve.
- 699,793. CONDENSING APPARATUS.—Eugene R. Edson, Cleveland, Ohio. Condensing apparatus comprising a water-receiving chamber; means for draining the said chamber of liquid received thereby or formed therein; means for conducting gases and vapors into the said chamber; a water-distributing pipe-section arranged within and transversely of the said chamber, which pipe-section is closed at its inner end and has slots formed in the sides and extending longitudinally thereof, and a water-supply pipe arranged to feed water to the said water-distributing pipe-section.
- 699,806. HOISTING AND DUMPING APPARATUS.—Charles A. Morris, Glenridge, N. J.—A hoisting and dumping apparatus, having a supporting-frame, a dumping-guide hinged in said frame and provided with guide-sheaves for the hoisting-ropes, the said rope, the bucket, and a locking device which locks said guide from turning, said device adapted to be unlocked by the ascending bucket.
- 699,820. DOOR FOR DUMPING CARS.—Ralph V. Sage, Westmont, Pa. In a hopper-car, a door mounted on swinging links, an endless flexible member secured to said door, and means for operating the same to open and close the door.
- 699,822. QUICKSILVER-FURNACE.—Robert Scott, San Jose, Cal. A quicksilver-furnace provided with a series of



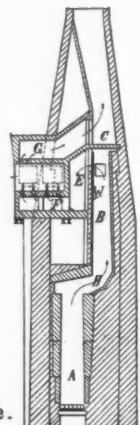
tiles over which the ore is adapted to pass, a flue formed in one or more of said tiles and through which gases from said ore are adapted to pass, and means for directing said gases from said ore to said flue.

- 699,839. DRY-KILN.—Edward Gerrard, Indianapolis, Ind., assignor to the National Dry Kiln Company, Indianapolis, Ind., a corporation of Indiana. A dry-kiln having a suitable floor, walls and roof, with doors at the ends, said floor having suitable openings near one end for the admission of air, and escape-flues at the other end having widened lower ends, one side of said flues being inclined, and the exposed side extending at right angles therewith being provided with a series of closable ingress-openings arranged parallel to the inclined edge.

699,849. APPARATUS FOR SINKING TUBULAR WELLS.—Charles F. Preslar, Cincinnati, Ohio, assignor to the Preslar-Crawley Manufacturing Co., Cincinnati, Ohio, a corporation of Ohio. A rectangular supporting-frame composed of an upper and lower series of horizontal tubular sills connected by vertical tubular uprights united thereto by "pipe-fittings" and with corner-uprights extended above the uppermost horizontal sills, in combination with the derrick consisting of two side pieces, one at each side of the frame and provided with fittings extending in the direction of the length of the said side pieces and provided with terminal studs, said forward-extended corner-uprights having sockets to receive said studs when the derrick is in its elevated position, and said fittings pivotally mounted to said forward uprights.

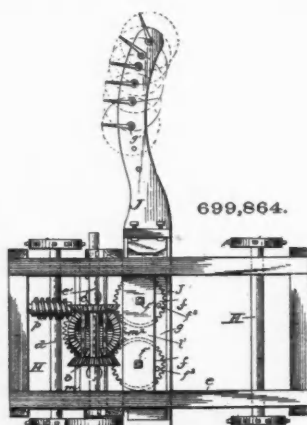
699,851. APPARATUS FOR FUSED-BATH ELECTROLYSIS.—Chas. W. Roepper and George P. Scholl, Philadelphia, Pa.; said Scholl assignor to said Roepper. In an apparatus for the electrolysis of fused substances, the combination of a vessel for containing fusible substances; a heating-chamber of smaller dimensions than said vessel, but of which a portion of said vessel forms the bottom, and means in said heating-chamber for reducing the contents of said vessel to fusion; a partition forming one of the said walls of the heating-chamber which extends below the normal level of the fused contents of said vessel but does not reach to its bottom; an electrolytic chamber outside but immediately alongside of the heating-chamber separated from it only by said partial partition, there being no uncontrolled air-space between the two; and means consisting of positive and negative electrodes situated within said electrolytic chamber, and wholly exterior to the heating-chamber, for carrying on the electrolysis of the fused contents of the vessel.

699,852. SHAFT-FURNACE FOR BURNING CEMENT, ETC. Johann A. F. C. Seumenicht, Lagerdorf, Germany. In combination in a furnace, a drying-chamber, heating and



protecting chambers above and below said drying-chamber and opening thereinto, a combustion-chamber, a preliminary-heating chamber into which the hot gases from the combustion-chamber pass, and a heating and protecting chamber lying back of the drying-chamber and connecting the preliminary-heating chamber with the chamber below the drying-chamber, the gases passing therethrough in a downward direction.

699,864. COAL-MINING MACHINE.—John Burton and William B. Lodwick, Mystic, Ia. In a mining machine, the combination with the frame having a rotating shaft with sidewise-movable beveled gear-wheels arranged at suitable



distances apart thereon, girths arranged one above the other, a slotted slide mounted on the upper girth, a vertical worm-shaft having its upper end journaled in the upper girth and passing through the slot of the slide, a bevel-gear on said upper end of the worm-shaft, a cog gear-wheel on

the lower end thereof meshing with crank-wheels journaled on a cross-bar of the frame, a cutter-bar drive-shaft, a cutter-bar with teeth mounted on the crank-pins of the said crank-wheels, whereby a longitudinal and vertical movement is imparted to said cutter-bar.

699,870. GAS-RETORT.—Charles W. Isbell, New York, N. Y. The combination with an upright gas-retort having upwardly-directed channels in its inner face and an external furnace for heating said retort, of means for introducing steam or air directly into the lower part of said retort without its entering the furnace.

699,885. GOLD-SEPARATOR.—Robert C. Lester, Mapleton, N. D. A gold-separator having in combination a pipe curved downward near its middle, or between its ends forming a short and a long inclined arm, a vacuum-chamber at the upper side of the curve, opening into the pipe and having a petcock at its top, said chamber and curve of the pipe being adapted to contain mercury; an inclined stirrer-shaft in the long arm of the pipe for driving and stirring the water-mixed gold-holding sand through the pipe, a stirrer at the outlet end of the short arm of the pipe for separating the mercury and gold from the sand or gravel before it leaves the machine, means for connecting and driving or operating said stirrers, and means for providing a current of water to pass through the pipe.

699,907. ELECTROLYTIC APPARATUS FOR MANUFACTURING CERTAIN SALTS SUITABLE FOR THE SUBSEQUENT PRODUCTION OF CHLORINE.—George J. Atkins, London, England. Electrolytic apparatus for manufacturing certain salts suitable for the subsequent production of chlorine, which consists of a long trough-like vessel lined with a suitable anode, a cylinder cased in sheet-lead forming a cathode arranged to rotate in a trough-like vessel connections with a source of electricity arranged to deliver a current.

699,964. ELECTROLYTIC CONVERTER.—Frederick H. Long, Chicago, Ill., assignor to Ross J. Beatty, trustee, Muncie, Ind. In electrolytic converters, the combination with the closed reducer vessel having the anode and cathode terminals and the interposed diaphragm dividing the vessel into upper anode and lower cathode chambers, of a combined separator and vent-pipe connected to the cathode-chamber beneath the diaphragm extending upwardly above the level of said diaphragm and having a free outlet for the gases.

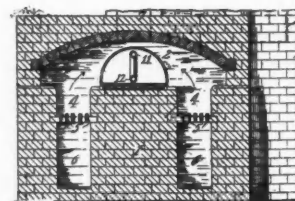
699,969. PROCESS OF MAKING SPELTER.—Oskar Nagel, New York, N. Y. An improved process for condensing zinc-vapors to spelter, which consists in cooling the vapors in an atmosphere of water-gas.

699,992. HOISTING APPARATUS.—Samuel S. Wales, Munhall, Pa. A rotary element having two sets of driving connections, one set including worm-gearing, and connections between the two sets, said connections including a plurality of clutches, each having lost motion.

700,081. IMPACT-TOOL.—Thomas H. Phillips, St. Davids, Pa. The combination, in an impact-tool, of the cylinder, the piston having a steam-supplying groove, the valve-chest, the valve having heads of different area, a steam-inlet uncontrolled by the piston for admitting steam to the forward end of the cylinder through the medium of the valve, and a steam-inlet controlled by the piston for admitting steam to the rear end of the cylinder.

700,090. PROCESS OF COLORING MARBLE, STONE, OR THE LIKE.—William G. Roach and Albert C. Roach, Cincinnati, Ohio, assignors of three-fifths to Henry C. Yeiser and Otto H. L. Wernicke, Cincinnati, Ohio. The process consists in first heating the slabs to a temperature of about 212° and then applying the dyes dissolved in coal-oil to permeate the pores of the material.

700,101. APPARATUS FOR ANNEALING SILVER OR OTHER METALS.—Caleb Stickney, Newburyport, Mass.,



assignor to Towle Manufacturing Company, Newburyport, Mass. The combination of a muffle, means for heating the muffle exteriorly; a hot-gas-inlet pipe discharging into said muffle; a source of hot-gas supply connected with said hot-gas-inlet pipe; means for forcing said gas through said hot-gas-inlet pipe; a door for said muffle; a receiving-table at the front of said muffle; and a tank for an air-excluding bath; the receiving-table mounted to discharge into said tank.

700,132. MACHINE FOR SETTING DIAMONDS IN METAL.—Joseph Brejcha, Strasburg-Neudorf, Germany. In a machine for setting hard substances in metal, the combination of a support for the metal piece, a lever having means for pressing the said substance into the metal, a tube connected with the lever, a port leading through the lever for directing a cooling liquid to the metal piece and a valve carried by the lever and controlling said port.



## PERSONALS.

Mr. John Allan, of Cerillos, N. M., has gone to Chicago on business.

Mr. Walter Koch, of the Lustre Mining Company, is in Parral, Chihuahua, Mex.

Mr. Walter P. Jenney, a well known geologist and mining man, has returned to Salt Lake from the East.

Mr. Martin J. Heller, engineer for Capt. J. R. De La Mar, is now in Colorado examining copper properties.

Messrs. G. Whitmore and E. C. Ketchum have been inspecting mining property in the vicinity of Cerillos, N. M.

Mr. L. W. Tatum, mining engineer of Chicago, has been visiting the iron regions of Michigan on professional business.

Mr. Edward W. Sebben has gone from Denver to Atlantic, Wyoming, to examine some of the big mines in that district.

Mr. R. E. Perry, formerly manager for John Johnson & Co., of New York, has formed a connection with T. Shriver & Co., of New York.

Dr. Dillon Brown, who is heavily interested in the mines of Chihuahua, Mex., left Parral last week for New York to be absent a few weeks.

Mr. J. A. Marshall, of the San Julian mines, passed through Parral on his way to the mines from Mexico City, where he has been for the past six weeks.

Mr. Herbert Haas, formerly of El Copete, Sonora, Mex., but now of Torreon, State of Coahuila, is on a visit to the Calivanes Mines, near Durango, Mex.

Mr. James M. Moighan, who has been operating the Mount Jefferson Mine of Groveland, Tuolumne County, Cal., is spending a few weeks in the East.

Mr. C. L. Morgan, manager of the Buena Fe Mine, has recently been in Parral. He reports to our correspondent that the pay streak is widening on this property.

Mr. H. M. Crowther, a well known mining engineer, has returned to Salt Lake from Boston and New York, where he has been consulting with clients relative to prominent Utah properties.

Mr. William Ramsay, of Pittsburg, has accepted the position of manager of the coal mines and coke plant of the Mexican Gulf Coal and Transportation Company at Howe in the Indian Territory.

Mr. Walter R. Woodford has been chosen second vice-president of the Pittsburg Coal Company, and will have charge of the company's mining and transportation departments, and of the sales. He has had much experience in the past, having been for several years in charge of the coal properties of the Wheeling & Lake Erie Railroad; later he was president of the Cleveland, Lorain & Wheeling Railroad, and recently he has been superintendent of the Baltimore & Ohio at Pittsburg.

Mr. E. C. Englehardt has been appointed superintendent of the New Jersey Copper Gold Reduction Company, which has renovated the old Harrison Reduction Works, at Leadville, Colo. Several years ago Mr. Englehardt acquired considerable experience in that camp. It is the intention to start work on the treatment of the old slag dumps, where a large amount of values was lost at the time when metallurgy had not reached the perfection which it has now. This smelter had been closed down for about 20 years.

Last week, J. S. Jones, of Chicago, president of the Jones & Adams Company, the Catlin Coal Company, and the Miller Creek Coal Company; C. W. Adams, of St. Paul, Minn., secretary of the former company; J. N. Tittmore, general traffic manager of the Iowa Central Railway, and W. M. Hopkins, general freight agent of the Minneapolis & St. Louis Railway, went over the line of the Iowa Central Railway, visiting all the mines along the line with a possible view of pooling the interests, especially in Iowa. They were joined at Oskaloosa, Iowa, by L. R. Rosebrook, vice-president and treasurer of the Miller Creek Coal Company, and at Coalfield by Edw. H. Coxe, mining engineer for the first three named companies.

## OBITUARY.

George A. Decker, son of Morgan Decker, of 277 Varick street, Jersey City, who was connected with the United States Geological Survey, died recently in New Mexico, where he had gone for his health. His body was brought to Jersey City for interment.

In the obituary notice of Mr. Howard Van Fleet Furman, in our issue of May 10, it was stated that he went to Mapimi, State of Durango, Mexico, last winter, as superintendent of the smelting plant of the Compania Minera de Penoles. This statement was, in part, erroneous, as his engagement had no connection with the smelting plant, Mr. Arthur W. Jenks being its superintendent, but Mr. Furman was in charge of the extensive mines of that company.

## SOCIETIES AND TECHNICAL SCHOOLS.

UNIVERSITY OF ILLINOIS.—This institution, at Urbana and Champaign, Ill., issues a little 22-page pamphlet calling attention to its equipment and the courses of study it offers and making mention incidentally of various attractions for students. An estimate of necessary expenses is given.

MCGILL UNIVERSITY.—The mining department's summer school of 1902 will be held this year in Nova Scotia, the greater part of the time being spent at Sydney, C. B. The lines of study include geology, with special reference to the George's River and Glace Bay districts; coal mining and coal handling, as practiced by the Dominion Coal Company, and the manufacture of iron and steel at the Dominion Iron and Steel Company's works. Gold mines will also be investigated. A number of the students are now engaged in studying the geological conditions as shown by the deep shafts of collieries at Sydney and vicinity.

CENTRAL MINING INSTITUTE OF WESTERN PENNSYLVANIA.—The summer meeting of this association will be held in Uniontown, Pa., beginning June 24, and the program provides for 3 days' work. The first day's program will include a reception to the visitors. Hon. E. H. Reppert, president judge of the Fayette District, will deliver the address of welcome, and President Keighley will respond in behalf of the Institute. B. F. Jones, division superintendent of the H. C. Frick Coke Company, will read a paper on "Different Methods of Mine Haulage Compared." This paper will be discussed. A trip of inspection to the plants of the Masontown District will be taken on the second day. The main feature of this day's program will be a paper on the subject, "The Resources and Mineral Wealth of the Connellsville and Lower Connellsville Regions Compared," by H. E. Evanson, assistant chief engineer of the H. C. Frick Coke Company. This paper will be discussed by the members of the Institute. Other mining topics will be discussed. It is probable a banquet will be given in the evening. The third day's session will be devoted to routine business, election of officers, etc. Then the whole party with other guests will make a tour of the Leisenring plants of the Frick Company.

The officers of the Institute are: President, Frederick C. Keighley, of Uniontown; vice-presidents, Austin King, of Leisenring, and Charles Connors, of California, Pa.; secretary and treasurer, James Blick; auditors, Reuben Street and John Britt.

## INDUSTRIAL NOTES.

The Kennicott Water Softener Company, of Chicago, has established its New England agency, in charge of Mr. J. Edwin McNamee, at 10 Sargent street, Boston, Mass.

The Bucyrus Company has purchased of T. R. Goth & Co., of San Francisco, Cal., 4 centrifugal pumps to be used in connection with the formers' dredging operations at Oroville, Cal.

The Curtis & Co. Manufacturing Company, of St. Louis, Mo., reports a large call for its pneumatic machinery, which is being shipped all over the country. The Curtis air compressors and air hoists are going to many industrial sections.

The Boston & Montana Consolidated Copper and Silver Mining Company is making considerable additions to the electrical equipment of its smelters and refineries at Great Falls, Mont., having recently purchased 11 15-h.p. and three 40-h.p. Westinghouse, 500-volt, shunt wound, direct-current motors. About four years ago this company installed a number of Westinghouse 180-volt, electrolytic generators and at the same time put in a large number of Westinghouse and other motors for driving ventilating fans and other machinery about the smelters. Although the smelters are filled with sulphur dust and are extremely dirty, the Westinghouse motors have given excellent satisfaction.

The Chicago Pneumatic Tool Company, of Chicago, Ill., reports that Mr. J. W. Duntley, president of the company, has just returned from a trip through Europe, and that, while there, he secured orders for an aggregate of 2,700 "Boyer" and "Little Giant" pneumatic tools and 25 "Franklin" air-compressors, for early delivery. Mr. Duntley states that the Europeans now realize the absolute necessity of using labor-saving tools so as to reduce the cost of manufacture and counteract the influence of the "American invasion" (which is causing widespread alarm in commercial circles) and enable them to compete for the markets of the world. The company states that the recent unprecedented increase in the sales of its pneumatic tools in foreign countries may be attributed, in a measure, to the cause above mentioned, and also to the fact that the opposition to pneumatic tools by workmen, on account of their labor-saving qualities, has been entirely overcome. The company also states that its various plants are taxed to their utmost capacity, and will have to be enlarged in the near future, in order to meet the increasing demand for its products.

## TRADE CATALOGUES.

An attractive folder illustrating several types of filter presses, is published by T. Shriver & Company, of 333 East 56th street, New York City. This is an old concern, and its experience in filter press manufacture has been extensive. The company is building these devices for mine and other classes of filtering where simple filtration or filtering and washing is required.

Bulletin No. 1020, sent out by the Fort Wayne Electric Works, of Fort Wayne, Ind., describes Wood direct-current multipolar generators for all classes of lighting and power service in isolated plants where comparatively small units are required. Bulletin No. 1021 tells about Wood belted direct-current multipolar motors furnished in 3 speeds for all the standard direct-current voltages. Bulletin 1023 treats of alternating current enclosed arc lights for street service.

The Holthoff Machinery Company, of Cudahy, Milwaukee County, Wis., has just issued its first catalogue illustrating the mining machinery, etc., manufactured by it, consisting of stamp mills, chlorination mills, cyanide mills, concentration and combination mills, sampling works, copper bessemerizing plants, boilers and hoisting and transmission machinery. The catalogue, which consists of 70 pages, is attractively illustrated, and contains brief descriptions of these different classes of machinery. Although this is a new company, the men comprising it have had many years experience in the designing of milling and metallurgical machinery and in laying out plans for complete plants. They are in a position to supply their customers with machinery of the latest and most improved type and with plans for its installation in accordance with up-to-date and practical methods. A good index accompanies the catalogue, which may be obtained free by applying to the company.

The New Leyner Rock Drill, manufactured by J. George Leyner, of Denver, Col., is made the subject of an interesting little pamphlet of 26 pages attractively illustrated. This drill is a pneumatic or air drill for use in boring rock ore in mines, tunnels and quarries. It is different from the ordinary type of rock drills, in that the steel is entirely disconnected from the piston—that is to say, the steel, instead of being punched by the piston against the rock, is struck by the piston and driven into the rock. The steels used for drilling are made hollow. A small tank filled with water is connected with the air line, the air furnishing pressure to carry the water to and through the drill, the tank is connected by means of a hose back of the machine a steel tube passes from this water connection through the machine and into the hollow drilling steel. The water passing through the drill washes out the cuttings from the hole free of dust. The manufacturer guarantees the New Leyner drill to be equal in drilling capacity to any rock drill of the ordinary type having the same diameter of cylinder. He claims that it will operate with half the volume of air. The New Leyner drill is made in two sizes, the larger one with 3-in. diameter of cylinder weighs 165 lbs., the smaller one with 2½-in. cylinder weighs 115 lbs. The former is recommended for general work, such as shaft sinking, the driving of headings and tunnels, etc.; the small one for stoping and upraising. Columns, bars and uprights are alike for the two drills.

The Mine and Smelter Supply Company, of Denver, Colo., has issued a 24-page illustrated circular calling attention to the merits of the Durkee Lighting Drill manufactured by this concern. In referring to drills generally, the circular states that, as now constructed, the drill is a simple and comparatively durable machine, and will stand a surprising amount of rough usage. The weak points which naturally developed when the air drill was new have been eliminated, and corresponding improvements have been made in the accessories and attachments. The columns, arms and clamps have been made simpler, lighter and stronger; the various adjustments have been simplified in order to allow much quicker handling of the machine, and it is claimed that with this improvement there is not much to be expected in the way of increased cutting capacity unless decided improvements are made in the steel used for drills. In the Durkee drill the standard form of air drill column, arm, clamp, guide fall, feeding devices and check for holding the steel are used. The common rifle-bar, nut, ratchet and falls are also used, but the arrangement of the parts is changed to meet the requirements of this machine. It is driven by a small electric motor provided with speed-controlling devices, through which the speed of the drill is controlled as readily as the throttle valve of an air drill. In the use of this drill, it is claimed that the large steam plant required to drive an air drill is obviated, the plant for the electric drill being small, compact, and needs no expensive foundations. Water wheels or gas engines which may be used for generating power for operating the drill are also illustrated in the catalogue. In addition to this, the pamphlet contains general instructions for installing and operating the



drill. Quite a number of interesting testimonials from parties who have used the drill are also given.

### GENERAL MINING NEWS.

#### ALABAMA.

(From Our Special Correspondent.)

The Birmingham District is to have another railroad. The Seaboard Air Line will, within the next 12 or 15 months, be running trains into Birmingham. Rights of way are now being secured from Pell City to the city limits in Birmingham, and the City Council of Birmingham has acted favorably on a petition for rights in the city limits. J. M. Barr, vice-president and general manager of the Seaboard Air Line, spent nearly two weeks in Birmingham recently, and he has been working on the proposition. Options have been secured on several blocks of property in the city limits for depot and yard rights, and the right of way being secured means that the new road will get into the great Alabama mineral and manufacturing district. The East & West Railroad of Alabama, extending from Pell City, Ala., to Cartersville, Ga., has been purchased by an interest friendly to the Seaboard Air Line, and will be turned over just as soon as it is needed to give the line into the Birmingham territory. Another line will be constructed from Cartersville into Atlanta, where the Seaboard now has terminals. All the new line has asked for in Birmingham is the right of way.

#### ARIZONA.

##### COCHISE COUNTY.

*Calumet & Arizona Mining Company.*—The directors have elected the following officers: President, Charles Briggs; vice-president, John S. Dymock; treasurer, Peter Ruppe; secretary, Gordon R. Campbell, all of Calumet. Only one change has been made in the board of directors, Thomas Hoatson, of Calumet, Mich., succeeding James Milligan, resigned.

##### MARICOPA COUNTY.

*Wickenburg Smelting and Refining Company.*—This company has been organized to build a smelter at Wickenburg.

##### YAVAPAI COUNTY.

*Cumberland Mining Company.*—This company has been organized to work the Roach group of claims on Turkey Creek. E. D. Seaton, of Prescott, is manager.

#### ARKANSAS.

##### MARION COUNTY.

*Dyson.*—Work is now going on at this mine, on Clabber Creek, near Yellville. An open cut and three drifts are being run into the hill.

*Bald Jessie.*—This property, 5 miles southeast of Yellville, has been sold to McCoy & Co., of Helena, for \$9,000.

#### CALIFORNIA.

##### BUTTE COUNTY.

(From Our Special Correspondent.)

John Spencer, of San Francisco, is running a tunnel in a quartz mine at Forbestown so as to tap the ledge 800 ft. below the croppings.

*Blackbird.*—This is a new location by Adams & Achorn, near Clipper Mills. Good ore is being taken out.

*Dutch Ravine.*—At Oroville a company has been organized by P. P. Austin, W. R. Pond, Dr. C. M. Armistead and others to develop and install machinery upon this mine at Forbestown.

*Golden Trout.*—New machinery is being put in this mine at Clipper Mills in order to run the mill, pumps, etc., by electric power.

##### CALAVERAS COUNTY.

(From Our Special Correspondent.)

*Utica Gold Mining Company.*—This company is now installing, at Angel's Camp, a electrical unit, consisting of a Pelton water wheel direct connected to a 750 kw. Westinghouse generator, this being the second unit of the same capacity. The company now uses a number of Pelton wheels, running all varieties of machines used in the mills; also the new double drum reversible hoist, which has a capacity of 18,500 lbs. working to a depth of 2,000 ft.

*Blue Jay.*—James D. Sword, of San Francisco, in the interest of other parties, is about to bond or buy this mine, at Jesus Maria (Mokelumne Hill Post Office).

*Dredger.*—T. L. Dennis, of Jenny Lind, has sold 100 acres of land on the Cutter farm along the Calaveras River to the Oroville Gold Producing and Exploration Company. The ground is to be worked by dredge.

*Golden Gate.*—On this mine, near Angels, they are about to put in an engine and hoist.

*Oriole Mining Company.*—This Stockton corporation is operating the old Harris property, near Angels. D. J. Griffiths, superintendent. The shaft is down 600 ft., and the mine is being developed.

*San Joaquin.*—This Stockton company is operating the old Sugar Pine Mine, near Angels. Frank A. Stewart, superintendent. They have a 10-stamp mill and hoist operated by water power.

*Water Supply.*—The Stanislaus Water and Power Company, recently incorporated by W. Frank Pierce, J. E. Greene, H. P. and H. Veeder, of San Francisco, is to obtain water from the Middle Fork of the Stanislaus River, which will be diverted at a point about 25 miles above Sonora. From there some 15,000 in. will be carried by ditch and flume to a point about 6 miles from Murphy's, where a vertical fall of 1,500 ft. is obtained. Here an electric power plant will be established, and 7,000 in. utilized to generate power. The remainder is to be carried in an inverted siphon 9,000 ft. long cross the cañon and used for hydraulic mining and other mining operations near Murphy's, Douglas Flat, Vallecito and Angels. The 21,000 h.p. generated at Murphy's is to be brought to San Francisco and other cities by wire.

##### CONTRA COSTA COUNTY.

(From Our Special Correspondent.)

A fourth attempt to obtain oil is being made 3 miles northeast of San Pablo. The first 2 wells were in bad ground. In the third, after reaching 1,050 ft., the tools got stuck, and the well was abandoned. Now the fourth well has been started. This is a new oil region.

##### DEL NORTE COUNTY.

(From Our Special Correspondent.)

*Diamond Creek Copper Mines.*—These mines are to be opened by a Keswick, Shasta County, company, and a road is being opened so that the ore can be marketed. Col. W. M. Draper has also been in Crescent City lately looking for an outlet by sea for the Waldo Copper Company, of Waldo, Oregon. It is the proposition to build a railroad from Grant's Pass, Ore., to Crescent City, Cal. The ores of the mine at Waldo are not rich enough to stand the railroad tariff to Tacoma or San Francisco on present basis, and it is proposed to build a short line to Crescent City, and from there ship the ores by sea to San Francisco, or else establish a smelter near Crescent City. If this road should be built it would open up the copper mines in the Diamond Creek, Low Divide and North Fork of Smith districts, the ores of which are not now being utilized owing to cost of transportation.

##### EL DORADO COUNTY.

(From Our Special Correspondent.)

*Oro Fino Mining Company.*—This Los Angeles corporation, which is opening the California Jack Mine, at Georgetown, has erected a 10-stamp mill and shipped concentrators. Systematic work is to be done upon the property.

##### HUMBOLDT COUNTY.

(From Our Special Correspondent.)

*Placer Locations.*—At Blue Lake, W. R. Lindsay, J. R. and William Graham, F. J., W. A. and C. M. Preston and Jere Smith have filed their notices of location on 2,080 acres of placer ground in Willow Creek District, to be known as the Eslick group. F. J. Preston and J. Smith have also located the River claim in the same district.

*Rainbow Copper Mining Company.*—This company has held a meeting at Eureka, and decided to commence active development work upon its properties.

##### INYO COUNTY.

(From Our Special Correspondent.)

*Inyo Gold Company.*—This company, owning claims in the Panamint Mountains, 8 miles from Ballarat, will install a cyanide plant, and will also have electric lights. J. P. Flint, W. S. James and others are interested.

*Reward Mining Company.*—On the mine of this company, at Reward, H. C. Steele, manager, a 14-ft. ledge of good ore has been found, showing free gold. This mine has been a producer for some time. The long tunnel is still being driven ahead.

##### KERN COUNTY.

(From Our Special Correspondent.)

*Borax.*—Ten miles from Caliente Messrs. B. B. and H. Phillips, of Bakersfield, have found a vein of borax which they are about to open.

*Keyes.*—This old mine, at Keyes, owned by Col. James Spellacy and the State Bank at Sacramento, is employing 20 men and milling high grade ore.

*Lady Belle.*—This mine, at Kernville, is one of the oldest in the county, but it has been in litigation for some years. It is now about to be reopened, and a boiler and pumping machinery have been shipped. The deepest shaft is 350 ft. This shaft and the drifts are at present full of water. The mine is one of the Big Blue group.

*Placers.*—The placer claims in Mammoth and Keyes gulches which were worked in early days are again to be worked, this time higher up, as a new ditch at a greater elevation brings the water on to new ground.

*Randsburg Coal and Power Company.*—This com-

pany has been organized in Los Angeles by Carl Johnson and others to take over the coal property of the Mammoth Coal Company, about 15 miles from Randsburg. A contract for a 1,000-ft. tunnel on the mine has been let. The new company is in demand in this region, where water is scarce. There are 640 acres of coal lanes owned by the company.

##### MARIPOSA COUNTY.

(From Our Special Correspondent.)

*Buckeye.*—D. F. McRae, one of the owners of this mine at Mariposa, states that a force of men will be put on at once to develop it.

*Mount Buckingham.*—Barnard Kane and John Smither, of Mariposa, have been running a tunnel on a claim on Mount Buckingham, and have struck a vein 90 ft. below the surface. While of low grade the ore-body is large.

*Tyro Mill.*—This mill, at Coulterville, Thomas Brown superintendent, is crushing ore from the Columbus Mine. With wood fuel, milling costs about \$3 per ton.

##### MONO COUNTY.

(From Our Special Correspondent.)

The copper mines near Benton being operated by a Philadelphia company, are being actively developed.

*Lundy Cyanide and Development Company.*—This company, near Lundy, is placing a headgate near the lower end of the lake. Tailings now submerged are to be worked.

##### MONTEREY COUNTY.

(From Our Special Correspondent.)

*Los Burros Camp.*—At this camp (Jolon P. O.), in addition to the Mother Lode Mining Company, mention of which was made in this column last week, some other claims are being worked. The Ralston Company is taking out gold on Spruce Creek. Juhl Bros. are taking out some on Willow Creek. The Ajax Hill, owned by Mr. Krenkle, is turning out some good ore. The New York, owned by Cruikshank, Pugh & McCormick, is to have a mill. This is a quartz camp, but a number of nuggets, etc., have been taken from surface soil.

##### NAPA COUNTY.

(From Our Special Correspondent.)

William J. Dinee, of San Francisco, and William G. Henshaw and F. C. Havens, of Oakland, have acquired the limestone deposits at Napa Junction, and intend establishing a factory for cement at that point. Bore holes have been sunk 500 ft., showing that the deposits extend to that depth at least. This quarry furnished the Selby Smelting Company its lime for flux last year.

##### NEVADA COUNTY.

(From Our Special Correspondent.)

*California Gold and Copper Company.*—This company, at Spenceville, has encountered an 8-ft. ledge of ore carrying copper, gold and silver. A contract has been let to run a cross-cut to another claim on which the company is sinking.

*Gold Hill.*—A strike is reported in this mine at Grass Valley, Robert Walker superintendent.

*Sunflower.*—Liens have been filed against this mine by men who have been employed. The mine is owned by a Sacramento company.

##### PLUMAS COUNTY.

(From Our Special Correspondent.)

*Claybank.*—At this mine at La Porte the tunnel is going ahead rapidly with one air drill at work.

*Elizabeth.*—This mine, near Spanish Ranch, is owned by Charles R. Thompson, who has been developing it for a year. An 8-stamp prospecting mill has been erected, run by a Pelton wheel under 170-ft. pressure. Open cuts show pay ore for 1,000 ft. along the surface. A tunnel is being run.

##### SACRAMENTO COUNTY.

(From Our Special Correspondent.)

*Blue Ravine.*—On this drift mine, near Folsom, C. C. Belding, superintendent, the depth to bed rock is 80 ft. The mine has been paying well for some time.

*Gray Wing.*—This is one of the new but prosperous drift mines near Folsom. A. A. Gray superintendent. They have drifted about 400 ft. in pay gravel. The mine is worked by an Oakland, Alameda County, company.

##### SAN FRANCISCO COUNTY.

(From Our Special Correspondent.)

It is understood in San Francisco that the Standard Oil Company, through its subsidiary company, the Pacific Coast Oil Company, H. C. Breeden secretary, has acquired the entire interests of the Arctic Oil Company, which has carried on for years a business in the transportation and sale of Eastern refined oil and by-products. The Arctic Oil Company has an extensive plant with docks and other facilities on the water-front near the Union Iron Works, and also a warehouse and dock at Seattle, all of which



are included in the transfer. This company was about the only active competitor of the Standard Oil Company on the Pacific Coast.

## SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

**Black Buttes District.**—In this hitherto unprospected region over 50 new mining locations have recently been made, but little development work has as yet been done.

**California Portland Cement Company.**—At this company's quarries at Colton, Chas. Albright is superintendent, F. H. Jackson, of Los Angeles, is agent, and C. W. Smith, of Los Angeles, has recently been elected president. New machinery is being installed with a capacity of 12,000 bbls. of cement per month. Lately the works have been turning out between 9,000 and 10,000 bbls. monthly. A new rock-crushing plant for railroad ballast has been ordered. Oil burners are being attached to the new lime kilns, and about 100 bbls. of fuel oil will be used daily.

**Victor.**—These marble quarries are shipping marble to Colton to be polished.

## SHASTA COUNTY.

(From Our Special Correspondent.)

**Afterthought.**—This mine, near Redding, George D. De Tailleu, superintendent, is to be worked by a new company, and machinery will be placed on the property to properly develop it. The office of the company is in the Claus Spreckels Building, San Francisco. The name of the company is the Afterthought Gold Mining Company. Mr. C. W. Gammon is general manager, with H. H. Picking president and C. V. Childs secretary. They are to put in a boiler and hoist, and the ore is to be shipped to the smelter at Keswick for reduction. This was formerly known as the Poorman Mine, and was owned by A. B. Paul, the pioneer cyanide man of California.

**Marina Marsicano Mining Company.**—The mines of this company, at Ono, are to be reopened, and power drills are to be used. The company owns the Summit mines, and have recently bought the Smith claims adjoining, so that both properties will be worked at the same time. A long level is to be extended and a new shaft sunk. The office of this company is at 217 Sacramento street, San Francisco, and Charles Boone is secretary.

**Mount Shasta Gold Mines.**—This company, F. E. Ware, president, which is operating at several points in this county, is to have its headquarters in the new Craddock Block, Redding.

## SIERRA COUNTY.

(From Our Special Correspondent.)

**Bellevue.**—On this mine, near Gibsonville, the bed-rock tunnel is now in 3,000 ft., and they have to go that much farther yet to reach the gravel channel. Forty men are employed.

## SISKIYOU COUNTY.

(From Our Special Correspondent.)

**Alabama.**—This mine, near Cecilville, is driving a lower tunnel to cut the ledge deeper.

**Harris.**—This placer claim, near Sawyer's Bar, owned by E. Harris, has been shut down for lack of water.

**King Solomon.**—This mine, at Matthews, is owned by the Fidelity Investment and Development Company, F. N. Fletcher superintendent. Some of the ore is high grade, but most of it contains considerable sulphurates, and is sent to the smelter to be treated.

**Klamath River Placers.**—The miners who work the Klamath River bars by wingdams are preparing for their season's work. There is very little snow on the Siskiyou Range this year, and the water is expected to run low at an early date, allowing the wingdam miners to begin work.

**New Mills.**—Las Perlas Company, at Cecilville, is to have a new mill, as is also the Wild Irishman, Harvey Bowerman owner, at the same place.

**Punch Creek.**—On this mine, at Humbug (Montague P. O.), owned by the Golden Star Mining Company, of Hollister, San Benito County, there is a 350-ft. shaft in which is a 5-ft. ledge of good ore.

**Quigley Ranch.**—The ditch from Beaver Creek to the claim on the Tom Quigley Ranch, near Walker, will soon be completed, and the Portland, Ore., company operating there will soon be ready for work.

## SONOMA COUNTY.

(From Our Special Correspondent.)

**A. H. Ingham,** of Santa Rosa, has leased the limestone deposit of the Blanck Ranch, near Cloverdale, and will develop it. This place was worked some 17 years since, but work was given up owing to lack of capital. The deposit is represented as quite large.

**Healdsburg Quicksilver Mining Company.**—J. C. Hobson, F. A. Kruse and others, of Healdsburg, have organized this company to operate a quicksilver mine on the H. C. Wall ranch, near the road between

Healdsburg and Guerneville. Drilling tests on the ground are satisfactory.

## STANISLAUS COUNTY.

(From Our Special Correspondent.)

**Alexander Brown and J. E. Doolittle** have commenced drilling on the dredging ground they have bonded near LaGrange.

## TUOLUMNE COUNTY.

(From Our Special Correspondent.)

**Cosmopolitan.**—This mine, near Groveland, Harry Argal superintendent, is running a good force of men.

**Harvard.**—This Boston, Mass., company, at Jamestown, B. N. Newcomb, of Oat Hill, Napa County, manager, is working 30 stamps. Connection between shaft and tunnel will soon be made.

**Two Brothers.**—This mine, at Big Oak Flat, owned by A. H. Ward, 71 Stevenson street, San Francisco, is employing 10 men and looking well.

## VENTURA COUNTY.

(From Our Special Correspondent.)

**Richelieu Mining Company.**—This company has started work on several claims recently purchased near Piru on Frazier Mountain. This field has been very little worked.

## COLORADO.

## LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Much new work is under way on Fryer Hill, Carbonate Hill, Graham Park and California Gulch. These operations include the drainage of the Fryer Hill mines, the sinking of a new deep shaft by the Mahala Mining Company, a \$25,000 mill nearing completion, and sinking of a new shaft by the A. Y. & Minnie Leasing Company, the starting down of a shaft to open up the drill contacts caught on the Montgomery, and the probable starting up soon of the Valentine and Home Extension properties.

**Zinc Output.**—About 250 tons daily are being produced, coming from the A. M. W., Iron-Silver and Yak combinations. Of this 100 tons a day are shipped to Belgium. The remaining tonnage is handled in Colorado and Kansas.

**A. M. W. Combination.**—Shipments average 250 tons daily of sulphides and 100 tons zinc ores. The development work shows enormous sulphide bodies.

**A. Y. & Minnie.**—Sixty tons crude ore are being mined. The new mill is being rapidly completed, and will handle 100 to 120 tons daily. The tables are now being erected, and 3 Huntington mills should arrive June 1.

**Amity.**—The new lessees are sinking 100 ft. New machinery is being put in and the property will be extensively developed. Some streaks of rich sulphide material have been cut.

**Arnold Leasing Company.**—Operations have been resumed on the Rose-Emmet shaft of this big acreage on Carbonate Hill. They are after the Evelyn sulphide shoot, and the shaft is now down \$25 ft.

**Ballard.**—Legal difficulties over early ownership of this ground has retarded work. Prospecting is being carried on at the 400-ft. level. Large bodies of low grade ore are opened up, but do not pay to ship.

**Bartlett.**—A combination of lessees has this mine and surrounding territory, and has just started a 1,200-ft. tunnel which will be driven within a year. The old workings have yielded well, but it required almost all the money to pay for pumping. The tunnel will obviate this and will also develop the territory. It will cost \$20,000, and will be 3½ by 6 ft. in the clear.

**Belgian.**—Lessees are following a good streak in the contact, which assays \$50 a ton.

**Blue Bird Combination.**—This is the Blue Bird and Amity claims, and a new shaft is going down to tap the sulphide shoot.

**Bohn.**—The best grade iron now mined in the downtown section comes from the Bohn workings at 500 ft. and averages 25 to 40 ozs. silver. Several carloads have just been shipped.

**Bug Gold Mining Company.**—C. E. Dewey has charge for New York and other Eastern people. They have opened up a large body of milling ore and other richer material. Work will be resumed shortly, and a large mill is to be erected.

**Carbonate Hill Mining Company.**—A contract has just been made to extend the 115-ft. drift into the Aetna ground, which should open up a good iron ore-body.

**Chippewa Consolidated Mining Company.**—A dividend of ½c. a share has just been declared on the 250,000 shares of stock. The money is from royalties received from the Chippewa lease conducted by N. M. Estey and others on the Lady Jane, of the Chippewa combination. The ore is rich in gold, but not found in large quantities.

**Colorado-Manhattan Gold Mining Company.**—This is a five years' lease on the Montgomery, Alma and Bryan claims, near the A. Y. & Minnie. The base of the new operations is the Montgomery shaft, where, at a depth of 240 ft., a churn drill was put down, showing everything in place for 487 ft. Work is to be resumed this week. New York and Ohio people are financing the proposition.

**Comstock.**—This property in Buckeye Gulch shows an 8-in. streak of quartz carrying gold in the outcrop. There are 3 shafts and a tunnel on the property. The shafts are 70 to 90 ft. and the tunnel is now in 195 ft.

**Corona.**—The lessees are after the A. Y. & Minnie ore shoot and are cleaning out the old Corona workings. They are now down about 130 ft.

**Emmet Mining Company.**—T. H. Dunn, at the head of the leasing company, is operating on the Emmet, Columbia, Mary Murphy and Crescentia claims. The ground is being prospected at 30 ft. No shipment is reported.

**Empire Gulch Mining Company.**—Only No. 1 shaft is working. In a drift in 320 ft., at a depth of 280 ft. from the surface, very good contact material is now being followed.

**Fanchon Mining Company.**—Two drifts are showing 2 ft. of ore, assays averaging 50 to 100 oz. silver and a fraction in gold. The Ross lease on this ground is now paying royalties.

**Gold Basin Mining Company.**—At 360 ft. in the new shaft on the Big Four ground, a drift is following very rich gold ore. No large body has yet been encountered, but values are improving.

**Last Chance.**—This lies close to Fryer Hill ore shoot. New lessees are putting down a new shaft.

**Long & Derry Mining and Leasing Company.**—A meeting will be held this week relative to resuming operations on an extensive scale.

**Mahala Mining Company.**—After 2 years of idleness this company resumes work immediately under new management. S. D. Nicholson, of the A. M. W. Company, is general manager; Julius Rodman president. The company will begin work on a new shaft 700 ft. south of the old Mahala Mine. This is an old 200-ft. shaft, and will be sent down to a depth of 800 ft. Here it will connect with the old winze of the Mahala Company, and give a depth of nearly 1,100 ft. There are immense bodies of lead sulphides opened up in this ground, but they could not be worked because of heavy pumping expense. Now the water will be handled through the seventh level of the Wolfstone and hoisting done direct, so that half the expense formerly incurred will be eliminated. This sulphide shoot is one of the largest in the district, and in addition to the immense bodies already blocked there is a large area of virgin ground upon which to conduct new prospecting operations.

**Nayr Mining and Development Company.**—In drifting on the old White Cap mine this company, at 800 ft. is developing a fine sulphide body which is improving in value. Several sets of lessees are handling 300 tons a month from the other workings of the White Cap.

**New Leadville Home Mining Company.**—Development work on both the Bon Air and Starr claims has ceased, and the pumps have been pulled. All the work is being done through the Penrose claim, from which several hundred tons of fair grade iron ore is coming daily.

**Ohio Mining Company.**—Eastern people are at the back of this company, which announces that it will resume this week, after an idleness of several months. They have cut a number of very good streaks. The showing is very encouraging.

**Ollie Reed.**—Systematic work from several drifts is opening up bunches of good gold ore. Manager Baker is after the extension of the New Monarch shoots.

**Oro-Laplata Combination.**—New lessees are preparing for active development work through the Slipper Claim. The workings are being retimbered. Operations will start at the 200-ft. level.

**Peerless Maud.**—Hugh Dyatt is opening up a fine lead shoot. Both smelting and milling ore is being shipped. Much new work is planned.

**Phoenix Mining Company.**—This is controlled by the Colorado Fuel and Iron Company, and they are shipping a heavy tonnage of manganese to the steel works at Pueblo. The Coronado and Sixth Street both have large manganese deposits. All pumping is being done through the Coronado.

**Reno Mining Company.**—The new plant is being placed in position. The shaft is 400 ft. deep, and is to be sent to the sulphides.

**Resurrection Mining Company.**—Shipments are light from No. 2 shaft, but considerable new development work is under way. Immense low-grade sulphide bodies have been blocked out. Sinking has been resumed at No. 2 shaft, which is already in the sulphide shoot.

**Robinson Smelting Company.**—The new plant blows in one furnace this week. They will handle the ores from the Robinson combination of mines, about 100 tons a day to begin with. If successful 2 more furnaces will be added at once. The plant is located at Robinson.

**Ruby.**—Operations have been resumed by James Kavanaugh. He has a strong lead ore shoot. This shoot will also be developed in the Colin-Campbell claim adjoining.

**Sierra Nevada.**—B. D. Rowe and other Kansas City men have the new lease on this mine. They are shipping 50 tons of zinc ores, and have large zinc and sulphide bodies to develop.

**Toledo Avenue Mining Company.**—The company's lease on its territory on Carbonate Hill will be subleased to a company made up of many stockholders of the present company. Work will be resumed after an idleness of many months. Much development work has been done.

**Two-Bit Mining Company.**—This company is operating on the Great Western claim and the new shaft is down 240 ft. Good contact is already showing.

**Yak Mining, Milling and Tunnel Company.**—Arrangements are being completed to push the tunnel into the Ixex ground. The tunnel is in the Forest Queen ground now, and is in 10,000 ft. At the annual meeting of the directors just held the following officers were elected: A. R. Meyer, Kansas City, president; W. H. James, Denver, vice-president; W. W. Davis, Leadville, second vice-president and general counsellor; J. C. Mitchell, Denver, secretary and treasurer. The company and the lessees on its territory are now handling 225 tons daily, which comes through the tunnel.

#### LARIMER COUNTY.

**Boston-Colorado Copper Mining Company.**—This company, which owns the Empire Mine 9 miles from Fort Collins, is preparing to build a 50-ton smelter to handle the ore. A good deal of development work has been done, and it is understood that the showing is good, a considerable quantity of ore having been blocked out. The main shaft is 340 ft. deep, and it is said that the ore shows at that depth 10 per cent copper and \$3 to \$4 per ton in gold and silver. The chief owners are William Barbour, Raymond Leshar and Charles R. Hall, of New York; John MacMillan and Sanford Stark, of Denver, the latter manager of mine.

#### ILLINOIS.

##### BLACKFORD COUNTY.

(From Our Special Correspondent.)

The oil well drilled by the city authorities of Dunkirk is yielding 50 barrels a day. The oil was found at a depth of 1,500 ft.

#### INDIANA.

##### GRANT COUNTY.

(From Our Special Correspondent.)

It is now proposed by the City Council of Marion to procure from the oil operators the refuse oil now floating down the streams adjoining the city, and use it for sprinkling the streets. The collection can be made by oil traps.

##### GREEN COUNTY.

(From Our Special Correspondent.)

Changes in the route of the Indianapolis Southern Railway Company destined to reach the Midland coal-fields of this county are being made. The preliminary work on the construction on the road began last week, and coal land is being enhanced in price by reason of the prospect of a speedy completion of the road.

##### MARION COUNTY.

(From Our Special Correspondent.)

W. B. Wilson, secretary of the United Mine Workers, has returned to Indianapolis from Fairmount, W. Va., where he attended the conference of the organizers and officers of the union in that State. The conference decided to order a strike to take place June 7, unless the demands of the miners are acceded to in the mean time. The conference was also in favor of calling a special convention of the United Mine Workers to vote on the policy of extending the anthracite strike into the bituminous fields. This makes up the 5 districts necessary to call a convention, as the 3 districts in the anthracite region and Michigan have voted for it, and all that now remains is the formality of a call to be placed in the hands of the national officers. The time for holding a convention will be set by President Mitchell, and it will be held in Indianapolis.

##### SANGAMON COUNTY.

(From Our Special Correspondent.)

A number of the operators in this county have optioned their property to another syndicate. It is hard to tell whether or not this will amount to any more than the other recent attempts at consolidation.

#### SULLIVAN COUNTY.

(From Our Special Correspondent.)

The Standard Oil Company has secured options on a large area of coal land lying east of Sullivan and extending into Green County. From a reliable source it is learned that the company now has very extensive holdings in the coal fields of this vicinity, and it is arranging to sink a number of coal mines and operate a number of coke ovens.

Citizens of this county have complained to the State authorities of stream pollution by the refuse of the various coal mines. The water question throughout the county is a serious one, and citizens are making every effort to solve it without working hardship upon the mines.

**Winfield Coal and Mining Company.**—This company was incorporated May 22 with a capital stock of \$200,000. The company will open mines and operate in this county. Paul Wright heads the Board of Directors.

#### VIGO COUNTY.

**Jackson Coal and Coke Company.**—At the recent annual meeting in Terre Haute, Crawford Fairbanks was elected president, Bruce F. Failey secretary, and J. C. Kolsen treasurer and general manager. The directors in addition to the officers are L. T. Dickinson, Chicago; W. O. Jenkins, D. D. Houston, Paris, and Henry Hafer, Chicago.

**New Pittsburg Coal Mining Company.**—At the annual meeting in Terre Haute, recently, the following officers were chosen: D. Cummings, Chicago, president; J. H. Seifert, Chicago, secretary, treasurer and general manager, and F. S. Peabody, Henry Hafer and R. Floyd Clinch, Chicago, directors.

(From Our Special Correspondent.)

The coal operators here declare there is no truth in the report sent out from Chicago that the consolidation of all the coal interests of Indiana will be effected within a month. The combination, it was stated, was to include 117 mines with an annual output of 6,000,000 tons, valued at \$15,000,000. The plan of the promoters is to buy the smaller mines outright and to issue stock in the combination to the larger interests. There is no doubt that the Chicago men who own large blocks of territory in Indiana have been consulting regarding a combination.

#### INDIAN TERRITORY.

**Mexican Gulf Coal and Transportation Company.**—This company will soon begin work on three additional shafts on its property near Howe. Each shaft will be able to handle 2,000 tons of coal daily. The company has now two shafts and two slopes. Contracts have been let for the erection of 1,400 coke ovens at Howe.

#### IOWA.

##### MONROE COUNTY.

(From Our Special Correspondent.)

**Hocking Coal Company.**—This company, with two mines near Albia, is in a peculiar predicament. Mr. Gibbs, the president, some time ago, gave an option on the properties to A. B. Little and others, of Oskaloosa. A few days ago Mr. Seevers, of Oskaloosa, representing some other parties, made Mr. Gibbs an offer for the property, which he accepted, thinking the first parties were not going to exercise their option, but when Mr. Seevers tendered him the purchase price Mr. Gibbs refused to deliver the property until the option expired, which will be some three months hence. Now people are wondering what the outcome will be.

**Miller Creek Coal Company.**—This company is opening a couple of small mines about ½ mile south of the Iowa Central Railway, at Coalfield, and the Iowa Central is building tracks to them. The railroad company expects to finish its tracks in June, and the coal company hopes to be shipping coal soon after July 1. The coal company expects also to open a large mine in the course of a year about two miles northwest of its present mine north of Coalfield.

#### KENTUCKY.

##### WOODFORD COUNTY.

Lead is reported found on the Withrow farm, near Versailles. Several parties are trying to secure leases on the property.

#### MARYLAND.

##### ALLEGHANY COUNTY.

**Moscow-Georges Creek Mining Company.**—This company has been incorporated with \$150,000 capital, and will at once begin the development of an extensive coal tract near Barton, which was purchased from Robert H. Gordon and Thomas R. Osbourne, trustees, for \$22,000. William A. Somerville, of Frostburg, through whom the purchase was made; Archibald T. B. Somerville, A. L. Shultz, of Pittsburg; John S. Askey, Hugh Scott and Clinton Brotemarkle, of Lonaconing, are the directors. The property was formerly owned by the Pickell Mining Company, incorporated in 1853.

#### MINNESOTA.

##### IRON—MESABI RANGE.

(From Our Special Correspondent.)

**Burt.**—Winston Brothers & Dear's stripping contract amounts to 500,000 yds. with another 500,000 in sight to complete the projected work. It will require 4 to 5 years, and will take off the earth north to the crest of the hill above Hibbing and west to the Pillsbury road. The overburden varies from 21 to 40 ft.

**Mahoning.**—No stripping is going on, and almost no men appear to be working. Things are quiet, neat and clean, but about 6,000 tons a day are shipped. Three shovels are in the ore and 3 mine locomotives serve them. The company will do some stripping later.

**Stevenson.**—At this mine 2 105-ton shovels are in the ore, and a third is expected July 1. The shovels are working in the breast of a comparatively narrow opening, and but one car can be handled at each shovel without switching. The shipments of this month have ranged between 2,500 and 6,900 tons a day, probably averaging almost 5,000. The mine could easily ship 8,000 tons if conditions were all favorable. Two shovels are stripping above the ore in an extension of the pit. Stripping will also be undertaken at the east end of the pit to widen it. Coal docks, a large 4-track yard, shops, water works, an office building and other improvements are being made. The Stevenson shipments this year are expected to be second only to those of Fayal.

#### MISSOURI.

##### CHRISTIAN COUNTY.

(From Our Special Correspondent.)

**New Lead Strike.**—Several shallow shafts upon the Chicago Lead and Zinc Company's tract, in the east end of this county, have developed a wonderful deposit of lead with good zinc ore formation. Over half a ton of lead ore was taken from an excavation of less than 2 cubic yards, and without the use of even a windlass, as the ore cropped at the surface. Further sinking has proven the strike to be very large.

##### JASPER COUNTY.

(From Our Special Correspondent.)

**Joplin Ore Market.**—The disquieting feature of the present situation is a strike that has just been ordered by the smelter men at the A. B. Cockrell and Prime Western smelters at Gas City, Kansas. Should these smelters be shut down it will reduce the zinc ore demand by 30 cars, or 1,750,000 lbs., per week. An advance in the price of spelter was registered Wednesday, and is generally ascribed to the threatening conditions of the labor situation in the smelter field.

Zinc ore prices were generally advanced from 50c. to \$1 a ton for the better grades of ore last week. The Kohinor, on the Continental land; the Royal Blue, on the Granby; the Perkins, on the Collins land at Zincite, and the Eagle, on the Arkansas land, all sold at \$34 a ton. Lead was steady and in good demand at \$44.50 per ton. For the corresponding week of last year the shipment was less by 557,720 lbs. of zinc, and value was less by \$34,784, but the lead sales were greater by 230,880 lbs. For the corresponding 21 weeks last year the sales of zinc were less by 2,922,190 lbs., but the sales of lead were greater by 59,740 lbs. The total value was less by \$572,638. The following were the sales from the various producing camps of the Missouri-Kansas mining district for the week ending May 24, 1902.

	Zinc ore.	Lead ore.	Values.
Joplin .....	4,428,650	350,590	\$78,650
Galena .....	1,071,690	134,250	18,025
Webb City .....	477,990	123,990	9,690
Oronogo .....	341,280	14,620	5,358
Zincite .....	437,790	.....	7,224
Prosperity .....	532,960	119,700	10,657
Carterville .....	1,129,210	243,480	21,790
Cave Springs .....	187,450	10,470	3,141
Central City .....	210,050	2,770	2,793
Duenweg .....	918,270	70,870	14,433
Stotts City .....	177,390	.....	2,838
Carthage .....	1,074,300	.....	17,189
Alba .....	89,550	36,220	2,149
Reeds .....	130,310	.....	1,955
Granby .....	290,000	40,000	3,850
Ash Grove .....	126,000	62,000	3,254
Sarcoie .....	40,080	.....	561
Springfield .....	66,000	.....	924
Carl Junction .....	380,060	.....	6,081
Harrison .....	26,000	.....	156
Total .....	12,135,030	1,208,910	\$210,728
Total, 21 weeks .....	219,012,040	26,560,870	\$3,650,489
Zinc value last week, \$183,822; lead, \$26,906; 21 weeks, zinc value, \$3,073,388; lead, \$576,100.			

**Continental Zinc and Lead Mining and Smelting Company.**—This company has sent a circular to stockholders in which it is stated that the payment of dividends can be shortly undertaken. In furtherance of this object the Continental Zinc Company, of Maine, has been organized with a capital of \$500,000, which will acquire the outstanding stock of the company. The new company offers to exchange one share of its stock, par value \$25, for five shares of the old company's stock. Upon the consummation of the exchange of securities it is intended to commence the



payment of dividends. The surplus of the company now amounts to more than 2 years' dividends at 6 per cent on the capital stock. Hayden, Stone & Co., of Boston, are the depositaries. Exchange will not be made until 75 per cent of the stock is deposited. Deposits should be made by June 7.

## TANEY COUNTY.

(From Our Special Correspondent.)

**Medals for Lead and Zinc Ore.**—Several exhibits of lead and zinc ore from this and Christian County have been awarded prizes at the Charleston Exhibition. Recent strikes in many places in this district proves the extent of large mineral deposits of both these ores as well as valuable carbonates. Much land is being purchased as a result of these strikes, and the indications are that a railroad will penetrate the district.

## MONTANA.

## FLATHEAD COUNTY.

(From an Occasional Correspondent.)

**American Kootenai.**—This company is putting in electric drills. Manager W. J. Beager states that everything will be in shape to start up about July 1.

**Blacktail.**—A. J. Moore, the new manager for this company, has a small force of men getting things in shape to start up the mill, which was greatly damaged by a snow slide last winter.

**Brick & Brannigan.**—This mine and mill have been working all winter with results satisfactory to the fortunate owners.

**Cabinet District.**—This is the name of the new mining camp which has sprung up in the past year in the heart of the West Fisher District in the western part of Flathead County. A post office was established March 1, 1902, and since then the news of this camp is reaching the outside world. A great many men who have been disappointed in their prospecting trips into the Thunder Mountain region have turned their attention to this new camp and find that this is what old timers call a poor man's camp, the ore being free milling can be worked with the old style arrastra or with small stamp mills, which can be enlarged to any size, as the mines become developed.

**Eldorado Placer.**—This mine, which is situated on Libby Creek just below the falls, is working night and day shifts with a No. 2 hydraulic giant. The owners, Beager, Greenwell & Vaughan, report indications of a rich clean-up. This mine was discovered by accident; while prospecting for quartz it was noticed that the gravel carried gold.

**Mother Lode.**—This company has begun work on a big fissure ledge and will do several thousand feet of tunneling. This property has ore enough in sight to run a mill some time.

## SILVER BOW COUNTY.

**United Copper Company.**—The organization of this company has been completed by the election of the following directors: F. A. Heinze, John Maginnis, Butte; A. P. Heinze, F. W. Whitridge, Henry Budge, A. A. Brownlee, S. E. Nash, G. Rensens and J. Langeloth, New York. The board elected the following officers for the ensuing year: F. A. Heinze, president; A. P. Heinze and John Maginnis, vice-presidents; Stanley Gifford, treasurer; Richard Lacey, secretary.

## NEVADA.

## LINCOLN COUNTY.

**De La Mar Mines.**—It is stated that Capt. J. R. De La Mar has given an option on his properties at De La Mar to Messrs. Jacob E. and Simon Bamberger, of New York.

## NEW JERSEY.

## WARREN COUNTY.

**Pahaquarry Copper Mine.**—L. Dewitt Taylor, as receiver of the Allegheny Mining Company, has sold this property for \$2,500 to a new concern known as the Montgomery Gold Leaf Mining Company. The mine has been reopened at intervals a number of times, but without success.

## NEW MEXICO.

## SANTA FE COUNTY.

**New Mexico Smelting and Refining Company.**—Mr. J. A. Frank, president of this company, has been at Algodones, arranging to build a smelter at that place, on the Santa Fe Railway. Mr. Frank bought 500 acres of land at Algodones some years ago for the purpose of erecting a smelter, but at that time the mines in the Sandia Mountains had not been developed to such an extent as to warrant the building of reduction works at that point, but now the conditions are changed by recent developments in that district, and it is said that a smelter will be built in the near

## NEW YORK.

## ESSEX COUNTY.

**Arnold Hill Iron Mine.**—This mine, near Ausable Forks, is to be re-opened. Pumps are being put in, and the old workings will be cleared of water.

## NORTH CAROLINA.

## RANDOLPH COUNTY.

(From Our Special Correspondent.)

**Rowan.**—This gold and copper mine, formerly the Oddie, is down 90 ft. from which point a high grade copper sulphuret carrying well in gold is mined and hauled to a smelter. R. D. Cind, of Salisbury, is general manager.

**Sawyer.**—Some 10 or 20 Minnesota men recently visited the mine, where it is reported they will undertake development on a large scale. This gold mine has a record of rich gold ore in a talcy slate which has always hindered good amalgamation.

**Whitney Reduction Company.**—This company, under the management of Col. E. B. C. Hambley, of Salisbury, is pushing sinking at its mine and is down 600 ft. on a large body of low grade gold ore. The company is building 6 miles of railroad to be operated by the Southern, which will give it railroad connection via New London, to the 40,000 h. p. plant on the Yadkin River.

## OREGON.

## BAKER COUNTY.

(From Our Special Correspondent.)

**Clipper.**—Andy Hansen has a 5-stamp mill about completed on this Clipper mine. He has a body of ore blocked out.

**Gem.**—A hoist is being erected at this Sumpter mine with a capacity of 1,000 ft. The mill is now idle, but will start as soon as the hoist is finished.

**Halma.**—Work has been started on the Halma group of claims in the Greenhorn District. A sinking plant, compressors and power drills are being installed. The property is owned by John E. McManus, of Seattle.

**I. X. L.**—F. T. Kelly, of Spokane, Wash., owner of this mine, is installing a hoist, with a capacity of 1,000 ft. The shaft is down 100 ft.

**Phoenix.**—This mine and mill have been started up after a 30-day shut down.

**Prairie Diggings.**—At this mine, near Sumpter, the electric light plant is completed. Twenty-five stamps may be added to the plant this summer.

**Standard.**—At this mine, in the Quartzburg District, they have a streak of cobalt ore running 20 per cent in cobalt and carrying gold values, with some copper and silver. The streak is from 3 to 10 in. wide, and was struck at a depth of 350 ft. in a tunnel.

**Western Union Mining and Development Company.**—This company, of Minneapolis, has purchased the McArdle group of 6 mining claims, located on North Pole Hill, and believed to be on extensions of the North Pole vein. The consideration was \$60,000. The company is represented by J. A. Hilliker, of Spokane.

## GRANT COUNTY.

(From Our Special Correspondent.)

**Badger Tunnel.**—On account of difficulty in getting quick delivery from the electric machine companies, there has been considerable delay experienced in the driving of this tunnel at Ophir, but it is expected that the vein will be cut before November 1. The wires have been strung and the converter house built for some time. At present only a small force is working, but as soon as the machines arrive a large force will be employed. Good ore has been encountered in 2 of the leads. The objective point is Santa Cruz vein and the extension of the Crown Point, which will be cut at a depth of 900 ft. from the surface.

## JOSEPHINE COUNTY.

(From Our Special Correspondent.)

**Baby.**—This mine is on Jump-off-Joe Creek. An upraise has been completed of 90 ft. from the first to the second level. The tunnel on the lower level is in about 300 ft. and the upraise was at about 200 ft. The ledge ran from a mere stringer on the surface to about 30 in. and averages about \$20 to the ton.

**Old Bill.**—J. B. Safford and associates, who have a bond on this property, have started work. A hoist was moved from the Golden Slipper to the shaft on the Old Bill last winter. This shaft is down 180 ft. and is to be continued. The original owners are H. N. Ross and partners.

**Wabash Mining Company.**—Work is resumed, and the 200-ft. shaft is being sunk under contract.

## PENNSYLVANIA.

## BITUMINOUS COAL.

**Kendall Coal and Coke Company.**—This company has been incorporated by Jacob L. Kendall, of Pittsburgh; John A. Guiler, of Connellsville, and others. The company will open mines near Vanderbilt, in Fayette County.

## BUCKS COUNTY.

A shaft is being sunk on the farm of J. H. Shea, near Agnetong, where it is said that copper ore has

been found. Attempts to open a mine in this vicinity have been made several times.

## SOUTH DAKOTA.

## LAWRENCE COUNTY.

(From Our Special Correspondent.)

**Alder Creek Company.**—The new cyanide plant on Yellow Creek has developed a capacity of 65 tons a day. By putting in two more tanks and running two shifts this is to be increased to 100 tons. The first clean-up has just been made.

**Bear Gulch Mining Company.**—At the annual meeting of stockholders N. W. Tomblin, of Aurora, Ill., was elected president; H. J. Martin, of Chicago, vice-president; W. E. Fritts, Chicago, secretary and treasurer. These, with L. E. Tomblin, Deadwood, and A. J. Johnston, of Bear Gulch, S. D., constitute the directorate. A shaft is to be put down on the property near the main tunnel.

**Hidden Fortune Gold Mining Company.**—The plans have been perfected for the new mill at Deadwood, and Secretary Mayham and Manager Steele are in Denver for the purpose of letting the contract. The mill will be a wet stamp cyanide plant of 300 tons capacity to start with, and will be enlarged and converted into a free milling plant later. Siliceous ore is being mined at the Hidden Fortune claim, and will be shipped to the National Smelter at Rapid City. Free milling ore has been discovered in both the east and west cross-cuts from the main Baltic Tunnel.

**Highland Mill.**—The engine wrecked by the breaking of a crank pin several weeks ago has been repaired and the 140 stamps of the mill are running again. Their idleness did not affect the Homestake output materially.

**Merritt.**—W. E. Sutton has shipped a car-load of silver-lead ore from Galena to the National Smelter at Rapid City. Another car is being loaded. The ore is high grade. Mr. Sutton has a bond on the mine for \$42,000.

**North Star Group.**—G. A. Duncan and associates, of Mercur, Utah, who have a bond on 313 acres, have 30 miners prospecting the claims. If the ore-bodies come up to expectations a 300-ton cyanide plant will be built at Maurice, on the Spearfish River.

**Penobscot Mining Company.**—Another body of ore, assaying as high as \$35 per ton, has been found on the ground recently purchased. The company is preparing to build a wet crushing cyanide plant, with 40 stamps. Alexander Maitland, of Negaunee, Mich., one of the principal stockholders, has recently visited the mines.

**Spearfish Mining and Reduction Company.**—The cyanide plant under the superintendency of O. N. Brown, at Cyanide Post Office, has lately been running full capacity of 300 tons a day with two shifts at work.

**Union Hill.**—C. B. Harris is shipping concentrates from the old mill of the Union Hill Company at Galena, where they have laid several years. The Burlington Railroad has completed its spur into the region, which greatly facilitates shipping.

## PENNINGTON COUNTY.

(From Our Special Correspondent.)

**Electro-Cyanide Plant.**—The mill is to be started up after a shut-down of several months for improvements and repairs. Ore will be treated from the Hidden Fortune and other mines in the northern Black Hills. F. H. Long, of Chicago, built the plant four years ago.

**Keystone.**—E. H. Flynn and W. E. Gerrard have encountered rich free milling ore, near Keystone, the former within 300 ft. of the Holy Terror Mine, and the latter a short distance southeast of the mine. Mr. Flynn's discovery is in a ravine that proved rich in placer gold in 1877.

**Pactola Placers.**—H. M. Johnson is repairing the machinery of the Big Bend Placer Company, preparatory to starting up. J. C. Sherman is receiving machinery for a new plant to be installed, and the Rapid River Placer Company has a plant nearly ready to run. There will be four plants in operation on Rapid Creek between Rapid City and Mystic this year.

## REMINGTON COUNTY.

(From Our Special Correspondent.)

**Diamond Joe.**—This Red Mountain property, operated by W. E. Wright, shows 500 ft. of tunneling, an 85-ft. shaft and 75 ft. of drifting. Some good ore is being shipped.

**Fairview.**—Some 500 tons a month of good iron are hoisted. A new shaft has just been completed, which has opened up a very large iron body. Shipments will now be increased.

**Fortuna.**—This property will shortly resume operations through its tunnel after an idleness of 6 months. \$60,000 was taken out of the workings in the early days.

**Hill Top Mining Company.**—Litigation has temporarily closed this property, which has immense lead

ore bodies opened up. An early settlement is looked for.

**Mab Dump.**—Lessee Thos. Cully is working this dump on a jiggling proposition, making a good profit. It averages 12 ozs. silver and 10 per cent lead.

#### TENNESSEE.

##### ANDERSON COUNTY.

**Coal Creek Mining Company.**—Twenty damage suits have been filed against this company as a result of the recent explosion in Fraterville Mine. The total damages sought thus far are in excess of \$200,000.

##### UTAH.

(From Our Special Correspondent.)

**Ore and Bullion Settlements.**—During the week ending May 24 Salt Lake City banks report settlements on bullion ore and gold bars as follows: Gold, silver, lead and copper ore, \$132,800; bullion, \$62,900; gold bars, \$15,800.

##### BEAVER COUNTY.

(From Our Special Correspondent.)

**Frisco Shipments.**—During the week ending May 24 the Horn Silver Mine reports at the smelter 60 cars of ore.

**Smelter at Milford.**—The result of the report by Col. William A. Farrish has been that money has been advanced upon the strength of it for a new smelter, which will be situated at Milford, on a site already provided for it, and where fuel and fluxes can be easily and economically secured. He stated that a contract has just been closed for a furnace that employs the same methods as those at the Bingham Consolidated plant. It is also stated by the manufacturer of the furnace that he will have it in running order ready to blow in 4 months from the date of the contract. According to the report of Col. Farrish, and upon information of ores already blocked out in the district, it is safe to say that with economical management, the camp of Milford, with the smelter, will be in a fair way to make a fine record of itself.

##### JUAB COUNTY.

(From Our Special Correspondent.)

**Tintic Shipments.**—The total shipments for the week ending May 24 number 91 cars, ores and concentrates, and are divided among the producers as follows: Ajax, 2 cars ore; Carisa, 3 cars ore; May Day, 1 car concentrates, 2 cars ore; Grand Central, 5 cars ore; Yankee Consolidated, 6 cars ore; Bullion Beck, 8 cars ore; Mammoth, 10 cars ore, 2 cars concentrates, 1 gold and silver bar bullion of value of \$2,000; Star Consolidated, 3 cars ore; Boss Tweed, 1 car ore; Eagle & Blue Bell, 4 cars ore; Gemini, 17 cars ore; Dragon Iron Mine, 27 cars ore.

**Eureka Mill.**—Manager Fox, of the Eureka Hill Company, is not quite so confident of the rapid moving of ore and increased tonnage from the camp as is expected at this period by many as the result of the lowered rate and smelter charges. The 100-stamp mill of the Eureka Hill Company may offer some sort of relief to those properties adjacent who have milling ores and to whom the mill, with the addition of the tariff rate, may offer relief.

**Swansea.**—The improvements, consisting of the re-timbering of the main shaft of the company's property at Silver City, which recently suffered a loss by fire, are completed. The management is again ready to do business. Manager Geddes reports that many seem to have the idea that they were to be the only ones who would receive any benefit from the reduction of the railroad tariff. He states that he has been unable to see any relief that shall enable the company to resume shipments under the present conditions. The Swansea, as stated, does not get the benefit of the \$1.25 rate, because of an iron excess in the ore.

##### SALT LAKE COUNTY.

(From Our Special Correspondent.)

**Bingham Shipments.**—Cars reported at the sampler during the week ending May 24 have been 9 for Neptune.

**Butterfield.**—Receiver George W. Keel has filed a petition in the Third District Court asking that he be authorized to advertise the property for sale, and to report the bid to the court. It is stated that the company owes about \$150,000, and has but \$5,500 on hand, and recommends that the property be sold as soon as possible to liquidate the debts.

**Highland Boy.**—During the week ending May 24 the management of the Highland Boy smelters have sent to the Eastern refineries 4 cars copper bullion, approximating 240,000 lbs.

**United States Mining Company.**—Steam piping that is to be used in the new smelters is all in transit, as reported by Mr. Fisher, superintendent of construction. The last car of material for the blowers will be started next week. Entire balance of material for construction is promised by January. It is stated also by the management that nothing but delays on

the eastern end can prevent the completion on schedule time. The management of the mines has retired about 80 men temporarily; the only force which is retained will be employed in the old Jordan territory. It is stated that the men laid off will probably be given work on the tramway. The mines will probably remain idle until the blowing in of the new smelter, which will probably be in September.

##### SUMMIT COUNTY.

(From Our Special Correspondent.)

**Park City Shipments.**—During the week ending May 24 the camp has produced a total of 4,858,350 lbs. ore, which is divided among the main producers as follows: Daly-West, 3,183,850 lbs.; Ontario, 1,225,760 lbs.; Anchor, 434,650 lbs.; Silver King, 1,674,500 lbs.

**Mackintosh Sampler.**—The management of the Mackintosh Sampler has approved plans that have been submitted for a new sampler which is to cost \$30,000. Contract also for the mechanical equipment has been awarded, and the completion will be rushed forward as fast as possible. The new plant has been designed by J. B. Fleming, who designed the sampler in use at the Silver King. Contract for the machinery, costing about \$21,000, was awarded to the Allis-Chalmers Company through its agent, H. V. Croll. The sampler at the new mill will have a capacity for handling 500 tons ore daily, and will be under the personal supervision of Mr. Fleming and Manager Reed. It is anticipated to have it ready inside of 4 months from the time the construction first begins.

##### TOOELE COUNTY.

(From Our Special Correspondent.)

**Stockton Shipments.**—During the week ending May 24 the camp reports at the sampler with 19 cars of ore and concentrates divided as follows among the producers: Ophir Hill, 12 cars concentrates; Signal, 2 cars ore; Hidden Treasure, 5 cars ore.

**Mono.**—The new concentrator that has been in process of construction has been completed. All that remains now to put the mill in commission is the completion of the tramway. Concentrator is furnished with two Wilfley tables for present needs, and can be added to if required. The tramway spans the distance of 900 ft., and affords the most economical method of bringing the ores from the mines.

**Sacramento.**—Quicksilver is said to have been discovered in late workings of this company in its property at Mercur. The discovery of this ore with values in quicksilver and gold was made in a cross-cut from the main tunnel level and along a porphyry dike.

##### VERMONT.

##### BENNINGTON COUNTY.

**Readsboro Mining Company.**—This company has been organized to operate supposed gold mines in Readsboro and Whittingham. Mining has been done in that section at intervals for the past 30 years, but without success, though traces of gold have been found. The new company has \$5,500,000 capital stock. Gen. J. G. McCullough, of North Bennington, is president.

##### WASHINGTON.

State Coal Mine Inspector C. F. Owen says the extensive use of oil for steaming is working a great hardship on Washington coal mines, and that the output for the present year will fall below that of last. California has been the principal market for Washington coal, and the use of oil for steaming has become quite general there. In addition to the railroads, street railways, ferryboats, manufactories, foundries, rolling mills and factories have quite generally turned to oil. The Washington coal trade in the Hawaiian Islands, according to Mr. Owens, has also been injured through the use of oil. The lignite or low-grade coals suffer the most from the increased consumption of oil.

##### OKANOGAN COUNTY.

**Oregon Group.**—Work has been started on this group six miles west of Chesaw. Charles Durr is manager. Some work was done last season.

##### WEST VIRGINIA.

**United States Oil Company.**—A special meeting of stockholders is called for June 2 at Portland, Me., to vote to change the name of the company to the United States Coal and Oil Company, to increase the number of directors from 9 to 11, and to increase the capital stock by 90,000 shares of a par value of \$25 each, so that the capital stock shall amount to \$6,250,000 (250,000 shares).

In a letter to stockholders it is stated that the directors have for some time believed that it would be advantageous if some more permanent commodity than oil could be added to the business, as the charter of the company provides for the production of coal, as well as of oil. The Island Creek Coal Company, of West Virginia, with a capital stock of \$3,500,000 and no debts, owns in Logan and Mingo counties about 30,000 acres of bituminous coal lands. The

title to about 25,000 acres is held in fee, and in the balance the coal company owns the coal and all mineral rights. The properties have been examined and reported upon by mining and coal engineers chosen by leading coal operators. For the purpose of connecting this property with the Norfolk & Western the Island Creek Railroad Company has been organized with \$300,000 capital stock. It will be 10 miles in length, and its entire capital stock will be owned by the coal company. The coal company has arranged to provide not only the \$300,000 in cash required to construct the railroad, but also \$500,000 in cash which has been estimated by the engineers as sufficient to equip and open up the coal property for an annual production of 2,000,000 tons, which can be enlarged as the business may warrant. The coal company has been financed without calling upon the oil stockholders for any assistance and without the issue of any bonds. The directors have arranged to acquire all the capital stock of this company, and in pursuance of that plan have exchanged the treasury stock of the oil company for an equal amount of stock of the coal company. The oil company has the option to make a like exchange, par for par, for the balance of the coal company stock, and thus to become the sole owners. To carry out this plan it will be necessary for the stockholders to authorize an issue of 80,000 shares in addition to the already issued stock of this company. (Ten thousand shares will remain in the treasury.) Mr. Z. T. Vinson, of Huntington, W. Va., counsel for the Baltimore & Ohio Railroad, and one of the directors of the Island Creek Coal Company, has been elected a director of the oil company, as has Mr. Albert F. Holden, of Cleveland, Ohio, managing director of the Island Creek Coal Company.

##### M'DOWELL COUNTY.

A contract has been let to McCann & Co., of Greensburg, Pa., to build 600 coke ovens on the Illinois Steel Company's property on Tug River.

##### WYOMING.

##### CARBON COUNTY.

**Northern Consolidated Copper Company.**—It is reported that this company will be formed with a capital of \$10,000,000, to take in the Ferris-Haggerty copper mine, the Boston-Wyoming Smelter and several adjacent properties.

#### FOREIGN MINING NEWS.

##### AFRICA.

##### ERYTHREA.

Governor Martini, of this Italian colony in Abyssinia, has reported to the Government the discovery near Asmara of a gold mine which evidently was worked by the natives centuries ago. There are seven long galleries and other workings, together with tools, etc. All of these will be of the greatest interest to antiquarians. As there appears to be gold left, the Government proposes to resume the long-suspended work.

##### RHODESIA.

The gold production for April is reported at 17,559 oz. crude. For the four months ending April 30, the total was 63,609 oz. crude, against 52,311 oz. for the corresponding period in 1901; an increase of 11,298 oz., or 21.6 per cent. The total this year was equal to 56,612 oz. fine gold, or \$1,170,170.

##### TRANSVAAL.

The output of the Witwatersrand mines working in April is reported by the Chamber of Mines at 119,558 oz. fine gold. For the four months ending April 30 the total was 375,461 oz., or \$7,760,779. Last year there was no production in the corresponding period.

Reports received from different operating companies for the month of April show results as follows: Bonanza, 7,377 tons crushed; gold from mill, 4,575 oz.; tailings, 2,608 oz.; total, 7,183 oz., or 0.97 oz. per ton; profit for month, £20,000. Crown Reef, 11,459 tons milled; gold from mill, 4,511 oz.; tailings, 2,095 oz.; slimes, 266 oz.; total, 6,872 oz., or 0.60 oz. per ton; revenue per ton, \$12.23; profit, \$6.65; total profit, £15,894. Jumpers' Deep, 60 stamps, 9,842 tons milled; gold from mill, 1,626 oz.; tailings, 688 oz.; slimes, 135 oz.; total, 2,450 oz., or 0.25 oz. per ton; loss for the month, £2,450. Robinson, 60 stamps, 7,212 tons milled; gold from mill, 5,205 oz.; from tailings cyanided, 1,438 oz.; from concentrates by chlorination, 756 oz.; total, 7,399 oz., or 1.03 oz. per ton; profit for month, £20,000. Rose Deep, 75 stamps, 11,600 tons milled; gold from mill, 2,748 oz.; from tailings, 1,965 oz.; from slimes, 181 oz.; total, 4,895 oz., or 0.42 oz. per ton; profit for the month, £8,400; Crown Deep, Limited, 65 stamps working. Tons crushed, 9,503; gold from mill, 2,370 oz.; from tailings by cyanide, 1,727 oz.; from slimes, 205 oz.; total, 4,302 oz., or 0.45 oz. per ton. Profit for month, £7,150. Ferreira Deep, 40 stamps. Tons crushed, 5,872; gold from mill, 2,330 oz.; tailings, 997 oz.; slimes, 290 oz.; total, 3,618 oz., or 0.62 oz. per ton. Profit, £7,900. Geldenhuis Deep,



130 stamps. Tons crushed, 17,350; gold from mill, 5,079 oz.; tailings, 2,436 oz.; slimes, 336 oz.; total, 7,851 oz., or 0.45 oz. per ton. Profit, £16,300. Geldenhuis Estate, 60 stamps. Tons crushed, 8,955; gold from mill, 2,584 oz.; tailings, 1,597 oz.; slimes, 380 oz.; by-products, 43 oz.; total, 4,604 oz., or 0.53 oz. per ton. Profit, £10,170. Glen Deep, 30 stamps. Tons crushed, 5,500; gold from mill, 976 oz.; tailings, 1,033 oz.; slimes, 97 oz.; total, 2,107 oz., or 0.38 oz. per ton. Profit, £2,500. Nourse Deep, 50 stamps. Tons crushed, 6,828; gold from mill, 1,123 oz.; tailings, 734 oz.; slimes, 73 oz.; total, 1,931 oz., or 0.28 oz. per ton. Profit, £500.

**Crown Reef Gold Mining Company.**—This company reports for the quarter ending March 31 that 40,756 tons of rock were hoisted, of which 9,573 tons were sorted out as waste, leaving 31,243 tons of ore. In the mill 65 stamps were used, running 86 days, 19 hours; the average duty being 5.6 tons per stamp per day. In the cyanide works 25,483 tons of tailings were treated, and in the slimes plant 6,123 tons. The gold yield was, from mill, 11,366 oz.; cyaniding, 5,243; slimes, 528; total, 17,137 oz. fine gold, or 0.54 oz. per ton crushed. The receipts and costs for the quarter were as follows, the averages per ton being reduced to United States currency for purposes of comparison:

	Amount.	Per ton.
Gold produced.....	£72,355	\$10.99
By-products sold.....	588	0.09
Total .....	£72,943	\$11.08
Mining and development.....	£17,056	\$2.59
Milling .....	8,286	1.26
Cyanide and slimes plant.....	6,884	1.05
General charges.....	9,234	1.40
Total expenses.....	£41,460	\$6.30
Profit .....	£31,483	\$4.78

Additions to plant, amounting to £1,125, are included in the general charges.

CANADA.

BRITISH COLUMBIA.

One of the worst coal mining disasters in the history of British Columbia occurred at the Coal Creek mines of the Crow's Nest Pass Coal Company at 7 o'clock the evening of May 22, when from 125 to 150 men met almost instant death in mines Nos. 2 and 3. The explosion occurred in the depths of No. 2, and not a man in that mine escaped to tell the tale. From No. 3 workings, which are connected with No. 2, about 21 men escaped.

The first intimation of the disaster which those on the outside received was a rush of coal dust and fire to a height of over 1,000 feet above the fans. Word was immediately sent to Fernie, 5 miles from the mines, and within 12 minutes from the time the accident occurred volunteer-relief parties were at work. Every few minutes the men would collapse and were borne to the outer air and their places were quickly filled by volunteers. The first body recovered was taken from No. 3 mine about 11 o'clock and was that of a lad of 13. Several hours elapsed, and then three more bodies were recovered. None of the victims gave the slightest sign of life and were removed to the wash house. At 4 a.m. the relief parties had penetrated so far that the gas became unbearable and operations had to be suspended for one hour or two in order to let the mine clear of the after damp. The rescue parties were divided into four-hour shifts under the direct supervision of General Superintendent Lewis Stockett and Superintendent Drinnau, and the work was pushed as rapidly as the ventilation could be restored. With the exception of the score or so of men who escaped through the No. 3 workings, all of the men in the mine at the time of the explosion were killed, so that the work of the rescuers was directed towards the recovery of the bodies.

A description of the Crow's Nest coal-fields, by Mr. William M. Brewer, was published in the ENGINEERING AND MINING JOURNAL of April 19. In this article Mr. Brewer refers to the unsystematic manner in which the mines were worked prior to their taking over by the present management early in 1901. Since that time, under the general superintendency of Mr. Lewis Stockett, who has had many years' experience in the management of the Great Northern Railway's coal mines at Sand Coulee and Cottonwood, near Great Falls, Montana, the mines have been developed in a thoroughly up-to-date and systematic manner and the ventilation has been considered as perfect as modern skill could devise. Mr. Brewer visited No. 2 mine (the one in which the explosion occurred) in March last, and found the ventilation good at the headings. The fan house for ventilating Nos. 2 and 3 workings is located above an upcast shaft sunk to the vein on the south side of Coal Creek. At the time of Mr. Brewer's visit the fan, a Wilson, was passing 125,000 cubic feet per minute. This would appear to be amply sufficient and would certainly meet the requirements of any of the statutes relating to mine ventilation in the United States. These mines, however, appear to have been liable to explosions from two causes. Mr. Brewer reported that the coal was soft and made a great deal of dust. At the same time the coal was

full of gas, in consequence of which no open lamps were allowed in the mines, the miners being supplied with safety lamps.

It would seem therefore that all possible precautions against accidents of this kind had been taken. The actual cause of the disaster will probably never be ascertained. It has been suggested that a cave-in in the main tunnel had closed off the ventilation and thus left the mine beyond the cave-in closed for the accumulation of gas which was exploded by a broken lamp or a shot in the workings. It has also been suggested that some of the headings had been carried forward without seeing that the means for ventilating were brought ahead with them. Again, it is possible that the gas may have been exploded by a spark from the electric wires which were strung through the mine, the main tunnels being lighted by electricity and the main haulage system being operated by electric locomotives.

ONTARIO—RAINY RIVER DISTRICT. (From Our Special Correspondent.)

Increased activity is noticeable, and within the last few days several properties have changed hands, while reports tell of development work being vigorously prosecuted. The Foley Mine has been sold to a company of Michigan copper operators, who will enlarge the mill from 20 stamps to 40.

The Olive Mine, in the same district, which has been closed for some time, will resume work this month.

Messrs. Hunter, of Duluth; O'Grady, Bryan and White, of Chicago, are negotiating for the purchase of the Graham-McKellar iron properties on the Atikokan Range.

Mr. George Wagner, of the Breitung Iron Company, whose mine is situated about 25 miles from Sault Ste. Marie, on the newly constructed Algoma Central Railway, reports that a tunnel driven 289 ft. into a side hill reveals ore assaying 55 per cent. This company will supply ore to the Clergue Steel Works at the Sault.

**Ranson Copper Mining Company of Ontario.**—This company has just been incorporated with a capital stock of \$3,000,000. Development work will be done on purchases which the company has made in this district.

**Superior Copper Company.**—Three shafts are now open, No. 1 being down 70 ft., No. 2 about 50 ft., and No. 3 about 30 ft. It is only 4 miles from the Algoma Central Railway. During the month a new air compressor and hoisting plant have been installed.

DUTCH EAST INDIES.

BORNEO.

**Kahajan Mine.**—The output of this mine for March is reported at 14,877 florins.

SUMATRA.

(From an Occasional Correspondent.)

**Redjang-Lebong Gold Mining Company.**—The extraction at this company's mill in March was 2,254 oz. gold and 12,651 oz. silver. Some improvements in the slimes plant are now under consideration, but it will be some time before they can be executed. The changes, it is expected, will increase the output considerably.

MEXICO.

CHIHUAHUA

(From Our Special Correspondent.)

**Compania de Hacero.**—Work on the manganese properties of the Compania de Hacero, of Monterey, near this place, is being pushed, and is showing good results.

**Quebredillas.**—This mine, on the famous Veta Colorado, shipped 200 tons of high grade ore last week.

**Red Hill.**—Machinery for the Red Hill Mine is arriving and being rapidly put in place.

**San Jose del Carman and Guadalupe.**—These mines were this week purchased by William V. Pettit. The owners of the property were represented in the transaction by J. J. Weisel. The properties are among the old mines of the district, showing the old Spanish working, as well as having been a producer of note in the past few years. Work is to commence on the two properties at once, and Parral will have another producer added to its list.

**Santa Barbara District.**—A sale of a large group of mines, located in the Santa Barbara District, was closed this week, the purchasers being Eastern capitalists, represented locally by Mr. E. M. Parish. The property consisted of 120 pertinencias, and composed the following named mines: La Cobriza, San Rafael, La Aurora, Las Amas, Perros Bravos, San José de Gracia and El Pleito. The amount of the cash transaction cannot be ascertained, but it is said to be large, yet reasonable for the properties. Development work is to begin at once and pushed with vigor, and the entire district will be much benefited by this sale.

NEW ZEALAND.

The Mines Department reports the exports of gold and silver from New Zealand for March and the three months ending March 31 as below in ounces:

	Gold.		Silver.	
	1901.	1902.	1901.	1902.
March .....	40,002	24,337	35,208	48,364
Three months.....	195,283	98,729	117,103	133,581

This shows a decrease in gold this year of 16,554 oz., and an increase in silver of 16,478 oz. The gold bullion exported this year was equal to 88,688 oz. fine gold, or \$1,833,171. The greater portion of the silver was from the mines in the Ohinemuri section of the Hauraki mining district.

SOUTH AMERICA.

CHILE.

**Salar del Carmen Nitrate Syndicate.**—The report for the year ending December 31, 1901, shows good results. The gross receipts were £47,320 (\$236,600), showing an increase of over 37 per cent as compared with 1900. After providing for the debenture interest and redemption account there was a surplus of £26,076 (\$130,380). A dividend of £26,076 (\$130,380). A dividend of 10 per cent has been paid, and £15,000 (\$75,000) has been carried to reserve, while £3,000 (\$15,000) has been written off for depreciation of plant. The output of the company is again fixed at 600,000 qtls. The cost of production, says the report, should not exceed 4s. 8d (\$1.12) per qtl.

MINING STOCKS.

(Complete quotations will be found on pages 782 and 783 of stocks dealt in at):

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

New York. May 29.

For a short time it looked as though the copper shares had put on a new record by advancing, but at the close this week, they are again softening in value. It is interesting to note here that outside of the regular list several new copper properties in telescopic distance of well-known mines, are being quoted through advertisements in the daily newspapers. All sorts of prices are asked for the shares, of course, always at rock-bottom. That the companies are over-capitalized may be taken for granted, and that many of these prospectuses contain gross inaccuracies will not be disputed. Therefore, a careful examination of the legitimacy of the company and intrinsic worth of its property is necessary before investing, even if the promoters offer to let you in on the ground floor.

In the regular coppers, Amalgamated was rather quiet, receding from \$71 to \$68½, and Anaconda from 118½ to 116 per cent (\$29½@32). On curb Greene Consolidated, of Mexico, weakened, notwithstanding the efforts of its supporters to maintain the recent advance. It sold down to \$27½. A small business has been done in United, of Montana, at \$36½@36¼. Tennessee sold at \$11¼@12¼. British Columbia at \$9½@8¾, Montreal & Boston at \$2½@2¾, Union of North Carolina at \$3¾@3¾, and Gold Hill at \$1½@1¼.

Ontario Silver of Utah is higher at \$8¼. Few Cripple Creek, Colo., stocks show any trading. Sales of Portland have been made at \$1.75, and of Isabella at 33@32c.

Comstock stocks are feverish. Consolidated California & Virginia sold off 15c. at \$1.35, Mexican at 55c., and Potosi at 37c.

Boston. May 27.

(From Our Special Correspondent.)

The market has been the essence of dullness and no one dares predict when the turning of the lane will be reached. The copper share market is an anomaly. It is admitted by all that the underlying conditions have not been better for years for a bull movement in this class of securities than at the present time. The metal is certainly in demand and the consumption is increasing with supplies diminishing. The price is advancing, yet but little interest is manifested in the share market. There is a belief, however, in some circles that after June 1 something will arise to put more animation into the market.

The talk of an agreement among the large producers is yet premature. The assertion is made that the Calumet & Hecla people, the Rothschilds and others will not do business with the Amalgamated Company until some definite agreement has been reached with Heinze. In other words, the first named people do not care to buy into litigation. When this is out of the way some definite agreement will be arranged among the large producers.

The United States Oil Company is out with a circular stating that the Island Creek Coal Company, of



West Virginia, has been purchased and oil stockholders will hold a special meeting June 2 to take action and ratify this purchase. Oil officials allow that the prospects are not flattering in the oil business alone, and as long as the company's charter allows coal mining the management has hit upon this scheme. In this manner some new and powerful interests have become identified with the property. The United States Oil Company will reorganize under the name of the United States Coal and Oil Company. The capital will be increased 90,000 shares, of which 80,000 will be used for payment of stock of the coal company. The total capitalization will then be 250,000 shares, par \$25. The increased stock has been sold at \$15 per share without calling upon present shareholders. One-half the amount has been called and the balance will be payable July 1. The directors will also be increased from 9 to 11. The stock has been firm at from \$16.75 to \$17.25.

Santa Fe Mining has dropped to \$1.87½ on heavy selling, said to be for the late Leonard Lewisohn's estate. The mines are closed down and will be until there is an improvement in copper prices. A 15-cent copper market would enable the company to operate at a profit. Mohawk has been active, advancing \$2.75 to \$43.50. This has been practically the most active stock on the list. Nothing as yet has come to hand to account for the strength. Adventure has been quiet at from \$23.12½ to \$24.25 and Mass from \$21.50 to \$20.

Dominion Iron and Steel has advanced \$1.75 to \$56. The Dominion Coal Company has been taken over by the Iron and Steel Company and it has been decided that the royalty payable by the Steel Company on the coal output in excess of 3,500,000 tons per annum be reduced from 15 to 7½ cents per ton. United States Mining hovers around \$21. The company will suspend underground operations until the smelter is completed. There are about 3,750,000 tons of ore in sight. United Copper certificates of stock will issue June 2 it is stated.

The directors' meetings of both the Tamarack and the Osceola companies were held May 28, but no dividend was declared by either company. It is said that statements will be issued explaining the reasons for passing the dividends. No further explanations were needed, however, than the reports made by the two companies for 1901.

Colorado Springs. May 22.

(From Our Special Correspondent.)

After a week of considerable activity in the mines list, the market weakened to-day on several of the leaders; the level of prices, however, remaining about as a week ago. The feature of the market was the sudden up-swing of Isabella; these shares going rapidly from 29c. on May 16 to 36 on the 19th, from which point the price has gradually sagged, closing at 30½c. The advance was caused by the development work which is being done in the eleventh level on the new ore body. The shoot has, however, been determined to be one of limited dimensions, and until something more has been disclosed there is no immediate reason for an advance in these shares. The mine, however, is undergoing considerable development which may result in a surprise at almost any time.

Elkton shares declined during the week from 65 to 60c. The explanation of this is to be found in the examination being made at this time of the water situation in the lower level of the mine. Doctor-Jack Pot fell from 27 to 23c. owing to the fact that the grade of the ore in the seventh level is said to be below what it was in the level above. A new strike of some importance has been made in another quarter of the mine, but it is still too early to predicate much regarding it. El Paso sold from 49 to 51c. during the week. There is not likely to be any material change in these shares until the new equipment is installed and mining in the lower levels is resumed. Portland shares were in little demand during the week, although showing some strength. On May 19 they sold up to \$1.87, closing at \$1.85.

Salt Lake City. May 24.

(From Our Special Correspondent.)

The week just closing has been a disastrous one. The whole list, with one or two exceptions, shows a much lower scale in prices. The total sales for the week were 247,958 shares, which is 100,000 short of the week before. Ajax marketed this week 12,600 shares, prices varying from 36 to 43c., 5 points lower than last week. The Carisa sales have been around 30 and 31c., dropping to 29c. at close; showing a total of 36,900 shares for the week. Consolidated Mercur furnishes 4,200 shares this week at prices varying from \$1.90 to as low as \$1.84½, showing a gain of 5 points over last week. Daly, of Park City, marketed 50 shares at \$1.90. Daly-West reports 261 shares at \$44@44.50. Daly-Judge has made its appearance, and marketed 200 shares at \$6.50@7. As very little of this stock will find its way to the boards, it is anticipated that a much higher price will result. Grand

Central still ranges around \$3, dropping to as low as \$2.90 for 100 shares. Total sales, 300 shares.

Lower Mammoth is on the retreat; it opened at \$1.43, and has been tumbling down every day till at the close it touched \$1.18, marketing 4,100 shares. As compared with last week Mammoth has retreated 4c., with but 1,000 shares sold, around \$1.18. May Day still remains steady at 25@27c.; 32,200 shares sold. Star Consolidated remains at about the same prices, but with much lighter business this week. It opened at 24½, closing at 21½c. Swansea registers an advance of 19 to 20c. Last week's prices ranged from \$1.10 to \$1; but advanced this week to \$1.29@ \$1.20, and these prices succeeded in bringing out only 500 shares.

South Swansea has remained steady at 40@43c., marketing 9,700 shares. Uncle Sam fell 4c. from last week on sales of 34,900 shares. Yankee Consolidated has been steadily dropping for the last three weeks. Last week's closing was \$1.56. It opened Monday at \$1.70, and on Friday fell as low as \$1.07½, reacting on Saturday to \$1.15, with its total sales of 10,500 shares for the week.

California remains at the same prices as last week on sales of 125,347 shares. Century dropped 7c., and showed sales of 13,700 shares at 50@59c.

San Francisco. May 24.

(From Our Special Correspondent.)

The market has been quite active this week, and stocks have sold well. Ophir continues to contest the lead of the market with Consolidated California. The market has broadened, the Middle Comstock and Gold Hill shares having been strong, as well as the North End stocks.

Some quotations noted are: Consolidated California & Virginia, \$1.50; Ophir, \$1.45@1.50; Mexican, 63@65c.; Potosi, 33@35c.; Yellow Jacket, 22c.; Sierra Nevada, 24c.; Chollar, 18c.; Gould & Curry, 14c.

The boilers of the Gould & Curry old steam hoist and pump plants that are now useless have been shipped to San Francisco, having been sold for old junk.

Articles of incorporation of the Nevada Construction Company have been filed at Carson, Nev. The company is capitalized for \$100,000, divided into 1,000 shares, of the value of \$100 each, and the directors for the first six months include William E. Sharon, of Virginia City, Nev.; Chas. A. Lux, of Clyde, N. Y., and J. N. Gardner, of New York City. The objects for which the concern is incorporated include the installation of electric power and electric lights in Tonopah and the building and operation of smelters, mills and mines.

On the Oil Exchange trading was large, but with a slight tendency to lower prices. San Joaquin Oil and Development sold at \$8; Kern, \$5; Sterling, \$1.80@ \$1.90; Shamrock, 65c.; Caribou, 63c.; Junction, 24c.; Oil City, 18c.; Monarch, 17c. Sterling continued to be a special favorite, and transactions in it were large.

London. May 15.

(From Our Special Correspondent.)

The mining market continues at a very low ebb. Hardly anything is being done in South Africans, as everybody is waiting for the result of the peace negotiations. The average city man fears that the demands of the Boers will prevent a general surrender and that fighting will continue indefinitely. Any bargaining and concessions to the Boers would be unsatisfactory and would tend to depress the market. If the outcome of the present negotiations should be a general surrender on the British Government's terms with British supremacy unimpaired, there is no doubt that we should all see a boom on the Stock Exchange. There is no room for any great increase of activity in Rand or diamond shares, but there are many other mineral districts in the Transvaal waiting for development and almost every promoting house has properties of this sort ready to place before the public.

The weakness in West Australian continues unabated and the shares in all the big producers are suffering from bear attacks. Rumors about pinching out of important lodes are plentiful and shareholders are being made nervous. Most of the rumors are obviously concocted, but as the bears have been proved to be true prophets in previous cases their present statements and allegations naturally cause uneasiness. A few weeks ago I mentioned that the cabled report of Bewick, Moreing & Co. on the property of Lake View Consols had caused a slump in West Australians and there is no doubt that this incident has been the opportunity of the bears. The detailed report has now arrived by mail and it gives a better idea of the property than has hitherto appeared. The ore reserves consist of about 50,000 tons, of which half average \$30, varying from \$25 to \$40, while the other half averages about \$15. There is also a block of about 750 tons that contains \$80 gold per ton. It is estimated that there is another 20,000 tons of ore within

easy development, so that the ore at present known is sufficient to provide 6,000 tons of ore per month. Unfortunately a comparatively barren zone has been disclosed under the two principal ore bodies. There is, however, no sign of any geological change in either place, so that the mine cannot be said to be exhausted. It is recommended that developments and exploring work should be done on an extensive scale, as it is well within the range of possibility that new ore bodies will be disclosed.

The present position of the Etruscan Copper Estates, Limited, is a remarkable one. I mentioned last week that the directors had obtained Mr. Moreing's, Mr. Frecheville's and Mr. Alexander Hill's reports on the property, and that these reports were very adverse and in fact showed that the ore was of far too low grade to make it worth working. The directors called a meeting of shareholders to discuss the situation, and one would have expected a lively scene, with much indignation on the part of aggrieved shareholders. Strange to say, the shareholders followed the lead of the directors in making light of these engineers' reports, and decided that the only way of deciding "when doctors disagree" is to start and work the property on a large scale, and thus prove its value by actual practice. It is somewhat disconcerting to find one's report so lightly treated, so Mr. Moreing made an offer to the directors to pay for another examination by an acknowledged mining man to be chosen by the Institution of Mining and Metallurgy, by the Lord Mayor of London, or by some commercial firm of standing. If this further report did not confirm Mr. Moreing's opinion he would pay a large sum to a charity as well as pay all expenses and apologize all round. The directors, however, say they have had enough of expert reports. They have six or eight in their favor and three against, and they don't think another would make much difference. Without wishing to give offense to either party, I cannot refrain from remarking that the reports in the property's favor are to some extent naturally biased in the company's favor, while any expert nominated by people suggested by Mr. Moreing would be open to the suspicion on the part of the directors and shareholders of being under the opposing influence. It would be far better for the directors to obtain a further opinion from some mining engineer acquainted with copper mines, unconnected in any way with either group. Such an engineer might easily be found in America, and the expenditure of a few thousand pounds in this way is a more common sense way of doing business than spending tens or hundreds of thousands working the mine. It is to be hoped that by some means or other the directors will be diverted from their present policy.

The long-delayed meeting of shareholders in Strat-

DIVIDENDS.

Name of Company.	Latest Dividend		Total to Date.
	Date.	Per Share.	
†Ala. Coal & Iron pf.....	June 2	1.75	\$43,750 \$481,250
*Bald Butte, Mont.....	June 10	.06	15,000 1,207,148
*Bunker Hill & Sull.....	June 4	.07	21,000 1,411,000
*Central Lead, Mo.....	June 15	.50	5,000 295,000
*Cherry Hill, Cal.....	June 15	.00¼	2,500 47,500
Chippewa Con., Colo.....	June 2	.00¼	1,250 1,250
*Daly-West, Utah.....	June 15	.40	72,000 204,500
†General Chemical com.....	June 2	...	74,103 849,140
*La Fortuna, Ariz.....	June 9	.05	12,500 1,163,500
†National Lead pf.....	June 16	1.75	260,820 12,405,200
†Ohio & Ind. Nat'l Gas.....	June 3	1.00	90,000 900,000
†Ontario, Utah.....	June 20	.30	45,000 14,827,000
†Phila. Gas pf.....	June 2	1.25	99,950 599,754
†Republic I. & S., pf.....	July 1	1.75	355,371 4,264,451
Shawmut Oil, W. Va.....	June 10	.50	25,000 125,000
*Silver King, Utah.....	June 10	.66¾	100,000 5,350,000
†St. Joseph Lead, Mo.....	June 10	.15	37,500 3,534,500
St. John Del Rey.....	June 10	.12	64,144 13,928,619
†Standard Oil.....	June 16	10.00	9,700,000 49,485,000
Thomas Iron, Pa.....	Aug. 1	4.00	100,000 200,000
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 .....	Nev. ..	May 25	June 20	.05
Andes .....	Nev. 56	June 18	July 18	.05
Annandale .....	Utah. ..	May 15	June 7	.00½
April Fool .....	Nev. ..	June 7	June 28	.05
Argentum-Junlata .....	Colo. ..	June 2	.....	.08
Beicher .....	Nev. ..	June 14	.....	.50
Champion .....	Cal. 73	June 9	July 2	.10
Emerald .....	Utah. ..	May 15	June 7	.00½
Eutonia .....	Utah. 11	June 7	June 30	.00½
Hale & Norcross .....	Nev. ..	May 27	June 20	.10
Jumbo .....	Utah. ..	May 16	June 4	.00 1-6
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	.00½
Occidental .....	Nev. 38	May 15	June 5	.05
Sierra Union.....	Cal. ..	June 2	.....	75.00
Silver Bow .....	Utah. 3	May 30	June 17	.00½
Silver King.....	Ariz. 24	May 27	June 24	1.00
Usona Oil.....	Cal. ..	June 7	.....	.01
Victor .....	Utah. 5	June 9	June 32	.03
Yellow Jacket.....	Nev. 11	May 10	June 19	.10



ton's Independence, Limited, was held this week. Nothing new with regard to the condition of the mine was disclosed, but Mr. Hammond, in his speech, defended his estimates and reports, and ridiculed the absurd statements emanating from Cripple Creek that he was purposely writing bear reports. He referred also to the published report of Mr. Maclaren, who recently examined the mine on behalf of some Scotch shareholders. Mr. Maclaren's report was much more favorable than Mr. Hammond's, but as nobody knows him his report does not count for much here. The company has over £80,000 cash in hand, and about half of it is to be used in further development, while the other half is to be kept for the purpose of acquiring other properties. There is at present sufficient ore in the mine to last for three or four months certainly and possibly for six months. The average extraction will be rather over 1 oz., and the costs are nowadays not over 65 per cent of that, so there should be profit for shareholders. The shares now stand at about 7s. 6d., and will probably go lower.

The long expected deal in Camp Bird, of Ouray, Colo., has at last come off. The negotiations between the Venture Corporation and the owner, Mr. Walsh, began two years ago, but owing partly to the troubles of Stratton's Independence, and partly to Mr. Walsh's terms being too high, the matter dropped for a time. During the last few months the syndicate headed by Werner, Beit & Co., and of which the Venture Corporation is the acting manager, has once more taken the matter up. An agreement has been come to as to purchase price, which will be very much lower than the original one, and the shares in the company have been allotted. It is not intended to make a public issue of the shares, but a prospectus will be issued for stock exchange purposes to enable the shareholders to dispose of their holdings. The mine has been very thoroughly examined by Messrs. John Hays Hammond, F. W. Bradley and Chester Beatty, and it is stated that there is ore in sight containing over \$5,000,000 in gold, of which half should be profit. These gentlemen believe also in the continuity of the deposit in depth.

COAL TRADE REVIEW.

New York. May 29.

ANTHRACITE.

The main question in the market is, of course, the probable duration of the strike. As to this one prediction is as good as another, and since the wise prophets put down a settlement at all sorts of dates, from three days to three months ahead, any man can take his choice. Much depends on the action of the firemen and pumpmen at the collieries. If they go out next week there will be trouble, as the companies will certainly take steps to keep the pumps going. At the present writing the men in the Wyoming Region seem inclined to keep at work, but those in the Lehigh and Schuylkill regions are in favor of going out. The question will be decided by next Monday.

The strike question is fully discussed in the editorial correspondence given on another page. The agitation in some papers as to Government action on the so-called "Anthracite Trust" does not amount to anything, since there is really no trust or agreement to investigate. No law can prevent ownership of stock interests in different companies; and such ownership is the only thing approaching a trust which actually exists.

As to stocks, there is no doubt that supplies in the large seaboard cities are running low, and that large consumers will have to resort to bituminous coal for a time. This is already being done where possible. Retail dealers are putting up prices wherever they can, as a matter of course. In Chicago and other Western cities, consumers seem to be paying no attention to the strike.

There is no doubt on one point, and that is that when the strike ends there will be a call on the railroads which will tax their facilities to the utmost. It is to be hoped that they will be better prepared to meet it than the Western soft coal roads have been.

BITUMINOUS.

The Atlantic seaboard bituminous trade shows a heavy demand, consequent upon the buying by anthracite users, and partly also on the fictitious demand of regular consumers of soft coal, who fear their wants will not be satisfied. This has produced a duplication of orders in several shippers' hands, and though one or two may be filled, the balance will probably be cancelled. The car supply has been good, and this has helped things considerably; in fact, cars have run up to 85 or 90 per cent of the demand.

There has been much talk in regard to the bituminous miners striking, and it is understood that the Virginia and West Virginia miners have been ordered out June 7. The Virginia miners, it is believed, are

not organized, while in West Virginia only a portion are; so that the strike will likely be ineffective.

Trade in the far East is heavy, and everybody is striving to put in an extra cargo of coal. There is considerable coal on the way there, and so outside of the fictitious demand noted above the market is easy.

Trade along the Sound is very large, and more coal, especially of the poorer grades, is going there than to any other territory.

New York harbor trade is strong. This is the market in which the whole speculation is at present, and prices have risen from \$3 to \$4.25 per ton, though \$3.65@3.75 for Clearfield coal is considered about the market at this writing.

All-rail trade is calling for much coal. Stocks are fair, though nothing to brag about.

The car supply has kept up well, though producers could take more if the cars were allowed by the railroads.

Transportation from mines is good, coal running through about on schedule.

The vessels in the coastwise market, released by the anthracite shippers, are now being employed by the bituminous trade, in addition to those already in service.

Current rates of freight from Philadelphia are as follows: Boston, Salem, and Portland, 95@81; Providence, New Bedford and the Sound, 75@80c.; Wareham, Newburyport, Saco, Gardiner and Bangor, \$1@ \$1.10; Portsmouth and Bath, 95c.@\$1. From the lower ports rates are 5@10c. higher.

Birmingham. May 26.

(From Our Special Correspondent.)

All the mines are active, and the railroads are supplying all demands for cars with which to promptly move the product. There is a big need for coal at the furnaces and coke ovens, the latter in particular working hard to keep up with demands on them. The coke production is none too great—in fact, the consumers are urging delivery of the product all the time. The domestic demand for coal is fairly good, and it is believed that the hold-up during the summer will not be as pronounced as it has been usually in the summer. It is intimated that by fall the production in this State will have been increased 20 per cent at least. The new mines of the Sloss-Sheffield Steel and Iron Company, at Flat Top Mountain, in Walker County, will be in full operation by September.

Chicago. May 26.

(From Our Special Correspondent.)

Uncertainty, apprehension and suspension of business, so far as new orders are concerned, characterize the coal market here. The doubt of last week as to the strike of miners and its consequences continues. Yet the trade is fairly busy, filling the heavy orders entailed by the congestion of traffic and scarcity of coal last winter. Anthracite is unchanged from the price of \$5.60 fixed for May. Bituminous grades are also practically at the same prices, to-day's quotations being: Smokeless egg and lump, \$3.25; smokeless nut, \$3; smokeless mine-run, \$3; Hocking, \$3 net; West Virginia, \$3.12 net; Youghiogheny, \$3.20 net; Indiana block, \$2.45; Indiana semi-block, \$2.10; Clinton lump, \$1.95; Indiana lump, \$1.80; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2; smithing coal (now in fair supply), \$3.40.

Cleveland. May 27.

(From Our Special Correspondent.)

The shippers of coal on the lakes have almost been driven to the point of desperation by the shortage of cars with which to handle their coal supply on the lakes. Up to this time it has been estimated that the shippers have never exceeded in their receipts 25 per cent of the coal which they ought to have had. At the beginning of this week it looked very much as if the conditions were going to mend, but the most favorable reports did not bring the total shipment of any one concern up to 50 per cent of what was going forward this time a year ago. As a result the boats which are carrying the coal are bunched all along the south shore of Lake Erie and are eating up valuable time while waiting for their cargoes. At some of the ports boats are being held as high as two weeks in instances. Added to this one of the docks is broken down and will not be in shape to run for another week, which will delay business for that length of time and more seriously cripple the coal industry. In some instances the shippers have importuned the railroads to give them better supply and more equipment, and in response a few cars have been sent back to the mines without ore loads, which has created complaints in the ore shipping circles. It seems as if the coal-carrying railroads have cars enough, but having them filled have not enough locomotives with which to haul the trains. Under the circumstances the rates are steady, although not very firm. The shippers, however, could not break them down if they would, because they have not enough

coal for that sort of a manoeuver. The rates hold firm at 30c. from Duluth and 45c. to Milwaukee.

Pittsburg. May 28.

(From Our Special Correspondent.)

Coal.—Shipments are better this week, the car service having improved. A large tonnage was sent to lake ports for the Northwestern markets and indications are favorable for filling all contracts this season. The strike on the West Penn Railroad is still on and is being bitterly contested by both sides. The Cornell Coal Company secured an injunction restraining the strikers from interfering with the new men employed at Hite. At Blairsville about 150 miners are still at work, and the miners have established a camp and engaged a brass band. The non-union men are serenaded on their way to and from the mines, but this form of intimidation will likely be stopped by the coal companies, who will apply to the courts for an injunction. All of the railroad mines are in operation but a few of the river mines are not running full. While the demand seems to be increasing there are no indications of an advance in prices.

Connellsville Coke.—There was an improvement in both production and shipments last week and the furnaces were better supplied than for several months. Prices are firm at \$2.25 for furnace and \$2.75@3 for foundry. The strike in the anthracite region has increased the demand for Connellsville coke and a number of large shipments were made to Eastern markets. The Courier, in its last issue, gives the production for the previous week at 246,701 tons, an increase of over 25,000 tons. The shipments aggregated 12,213 cars, distributed as follows: To Pittsburg and river tripples, 4,127 cars; to points west of Pittsburg, 5,717 cars; to points east of Connellsville, 2,369 cars. This was an increase of 564 cars.

San Francisco. May 22.

(Special Report of J. W. Harrison.)

Since the steamer *Sonoma* left there have been the following arrivals of Australian coal: *Corunna*, 3,103 tons; *Mario*, 2,042 tons; *Paramita*, 2,070 tons; *Crompton*, 4,353 tons; total, 12,568 tons. There are 34 vessels already named for loading Australian coal, for future delivery here. These vessels have a carrying capacity of over 90,000 tons. This shows an increase of 6,000 tons since the first of the month. It is very singular that with the extremely low prices now ruling for colonial freights, four new names should be added to the loading list. The last rates named are far lower than for several years past, and the present depressed condition of the coal market here, and for future deliveries, give little hope for any improvement. Our coast collieries are gradually drawing off their carriers, which is leading to a further depression in coal freights from the north. The main cause of the discouraging conditions now existing in the fuel line, is solely attributable to the inroads being made by fuel oil, the prices for which remain unchanged. The quantity of oil now being extracted is very largely in excess of the demand. Several large refineries in course of construction, will, eventually, relieve the market from a large proportion of the overplus now being taken out. The *Mario* from Newcastle is discharging a cargo of Dudley coal. Its appearance indicates that it will prove to be a first-class household coal.

Foreign Coal Trade. May 29.

What is believed to be the first cargo of Pocahontas coal sent to Chefoo, China, is reported this week, amounting to 2,750 tons.

Continental business is moderate, and charters from Atlantic ports are at rather low rates, especially to the Mediterranean countries. These rates on time sailings run from 7s. 6d. to 7s. 10½d. (\$1.80@1.89).

West Indian trade is slower, owing partly to the disastrous volcanic eruptions and the general uncertainty felt in the chain of smaller islands.

Exports of coal and coke from the United States for the four months ending April 30 are reported by the Bureau of Statistics of the Treasury Department as below, in tons:

	1901.	1902.	Changes.
Anthracite .....	525,572	441,000	D. 84,572
Bituminous .....	1,997,167	1,661,936	D. 335,231
Total, tons.....	2,222,739	2,102,936	D. 119,803
Coke .....	135,627	131,337	D. 4,290
Totals .....	2,358,366	2,234,273	D. 124,093

The decrease in anthracite this year was 16.1 per cent.; in bituminous, 2.1 per cent.; in the total coal, 5.4 per cent. The decrease in coke was 3.1 per cent. The distribution of the coal exports was as follows:

	1901.	1902.	Changes.
Canada .....	1,430,582	1,402,446	D. 28,136
Mexico .....	190,105	180,258	D. 9,847
Cuba .....	139,451	155,706	I. 16,255
West Indies.....	140,884	135,164	D. 5,720
Europe .....	164,721	115,110	D. 49,611
Other countries.....	158,996	114,252	D. 42,744
Totals .....	2,222,739	2,102,936	D. 119,803



The falling off in exports to Canada was reduced by large shipments in April. Cuba was the only country to which an increase in shipments was made. Those to European countries show a decrease of 30.1 per cent this year.

The exports of coal from Belgium in the first three months of this year were 1,086,092 tons, as compared with 1,049,596 tons in the corresponding period of 1901. March figured in these totals for 322,253 tons, as compared with 354,782 tons in March, 1901. The exports of Belgian coal to France in the first three months of this year were 849,471 tons, as compared with 832,650 tons in the corresponding period of 1902.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of May 16, that the general tone of the Welsh coal market is very firm and the best descriptions of Cardiff coal are difficult to obtain during this month. Smalls are irregular. Quotations are: Best Welsh steam coal, \$3.96@4.08; seconds, \$3.84; thirds, \$3.54; dry coals, \$3.30; best Monmouthshire, \$3.42@3.54; seconds, \$3.24; 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 is rather quieter again, owing to the approaching holidays. Mediterranean rates are maintained. East, nothing doing. Some rates quoted from Cardiff are: Marseilles, \$1.50; Genoa, \$1.44; Naples, \$1.44; Singapore, \$2.76; Las Palmas, \$1.56; St. Vincent, \$1.74; Rio Janeiro, \$3.00; Santos, \$3.36; Buenos Ayres, \$3.24.

### IRON TRADE REVIEW.

New York. May 29.

Comparative quiet prevails, as far as new business is concerned. Most producers are sold up for the rest of the year, and there is still some hesitation over contracts running into 1903, in spite of the action of the large companies. Meantime trade is largely in orders which want early deliveries, and the prices for these are based largely on buyers' necessities.

Foreign pig iron and steel billets are offered quite freely by importing houses, and considerable business is in sight, as sellers seem to be disposed to take more reasonable views as to prices than they did a short time ago.

Imports of pig iron reported by the Treasury Department for the four months ending April 30 were 52,441 tons, against 8,646 tons in the corresponding period in 1901. Imports of steel billets and blooms were 26,106 tons, against 2,350 tons last year.

Birmingham. May 26.

(From Our Special Correspondent.)

There is very little iron to be had now at any price, and small lots are being delivered to regular customers at the expense of others. The production in this section remains steady, but there is delay in the increase.

The supply of raw material for the furnaces in this district is sufficient as to ore, coal, limestone and coke. Considerable attention is being given to the ore production in the State.

The following quotations are given: No. 1 foundry, \$16.50; No. 2 foundry, \$16; No. 3 foundry, \$15.50; No. 4 foundry, \$15; gray forge, \$14; No. 1 soft, \$16.50; No. 2 soft, \$16.

In steel and finished iron and steel circles there is no hesitation. The steel plant at Ensley belonging to the Tennessee Coal, Iron and Railroad Company is having its usual production. The little steel plant of the Republic Iron and Steel Company at the Birmingham rolling mills is once more in operation after an idleness of a fortnight and longer, caused by damage done by a storm, the stacks being blown down. This plant manufactures something over 100 tons of steel a day which is used in the rolling mills. The rolling mills are doing well considering the warm weather which has set in. The stock houses at the rolling mills are not well filled, though there is some stock on hand.

The foundries and machine shops in the Birmingham District are busy, with order books well filled and the prospects bright.

Scrap iron is still high in price and not plentiful.

Chicago. May 26.

(From Our Special Correspondent.)

There is practically no change in the pig iron market from the conditions noted last week. Sales are perhaps a little slacker, owing to the uncertainty regarding the coal strike and the possibility of far-reaching consequences. Further, there seems something of apprehension on the part of both buyers and sellers of iron that trade conditions are approaching a crisis and that it is not wise to load up too heavily for the future. Many sellers, indeed, would be glad to see a general curtailment of the practice of buying eight or nine months ahead of deliveries: the custom, it is felt, has grown beyond its proper limits and needs reform-

ing so as to cut down the time between sales and deliveries. In short, the speculative element attaching to such contracts seems too great for the safe and sound transaction of business.

Northern iron remains at \$21.50@22 for No. 1; \$21@21.50 for No. 2, and \$20.50@21 for No. 3. Southern is still a good deal of an enigma as regards actual sales, but reliable information places it in the neighborhood of \$20@21 for No. 2, with No. 1 from 50c to \$1 higher. All sales are still mainly for the last quarter of 1902; there is little disposition to run over into next year.

There is still a good supply of coke, though the ovens are refusing to take new orders until strike matters are settled. Connellsville is coming forward more slowly than West Virginia coke. The price remains \$5.25.

Cleveland. May 27.

(From Our Special Correspondent.)

Iron Ore.—The shippers of iron ore are now convinced that the delays to which the boats have been subjected of late have cut down the total for this month until it will fall materially below previous estimates. They hoped to move 4,000,000 tons, but the total will fall far below that mark, probably amounting to 33 per cent. The shortage of cars has been the cause that held the ore back, as the boats have been unable to get unloaded oftentimes inside of a week. The shippers have not touched the rates, being prompted to leave them alone upon the knowledge that the vessel owners are suffering severely through the delays at the docks. The rates of carriage remain at 75c. from Duluth; 65c. from Marquette and 55c. from Escanaba.

Pig Iron.—The furnacemen are placing their hope of continued activity in production in the Valley in a promise to compromise labor difficulties by paying the men more money than they are obtaining now, while refusing to grant them the eight-hour shift instead of the twelve, which change they requested and based their proposition to strike upon. The outcome is uncertain, but the result will be known before the end of the week. Foundry grades are selling well with a little material showing up for third and fourth quarter deliveries, the price holding at \$21 in the Valleys for No. 2 Bessemer; sales have been made on small lots at \$21.75 Valley furnace, while basic is quoted at about the same price, the lots disposed of being small. Southern foundry No. 2 is quoted at \$17, Birmingham, with some iron offered for fourth quarter delivery.

Finished Material.—The structural steel mills are divided as to price. Some are holding out for lower prices and are making sales for next year accordingly. Some of the Eastern mills which have a small uncovered capacity for this year are making sales now at from 2½@3c. and are getting plenty to do. Store quotations range from 2½@3¼c. according to the cut. The demand for plates has kept up and the mills not having any material to sell, due to the shortage of steel, the jobbers are doing most of the selling and are getting lots of business. They have sold up their contracts for the entire second quarter. The mill sales are all now on the basis of 1.80c. The market has heard many inquiries for light rails and there has been a boom. The price has gone soaring up to \$39, several advances having been previously recorded and the material is getting scarce with the demand very active. It seemed for a while as if the producing capacity was about to be added to, but the new Valley mill did not get started as soon as expected and the users of the lighter rails will have to wait a while or pay the price which those who have them ask. There is also a demand for heavier rails and some few sales. Bars are about off the market, but the basing price of 1.60c. Pittsburg is continued. Sheets are in demand also, especially black sheets, and the prices are firm at 2.50c. for No. 10 as a basis up to No. 16 and 3.50c. on No. 27 as a base from No. 17 to No. 28.

Old Material.—The market this week has seen a great picking up in the demand for mill scrap and the dealers are finding that it is rather hard to obtain. The market is strong and active, but without change of any sort.

Philadelphia. May 28.

(From Our Special Correspondent.)

Pig Iron.—A cloud of hesitancy or uncertainty or something else has spread over the sky as it were and brokers and makers of pig iron talk with more reserve and have practically no information to give, except quotations, which, after all, are only nominal and may be given at \$21.50 for best No. 1; \$20@20.50 for No. 2; \$19.50@20 for No. 2 plain; \$19 for best gray forge and \$18 for ordinary. Basic ranges somewhere from \$19 to \$20. There are a good many rumors floating around about big transactions in the Western end of the State, as well as transactions in Alabama iron, which may disarrange a good many calculations. The actual business in sight shows that a good many small lots of foundry iron are selling for early delivery, i. e., delivery during the summer. The situation in the anthracite region

upsets all calculations. Opinions differ as to the outcome and the best policy to pursue. As regards forge iron there is a hesitancy to do anything. If the mills cannot get coal they will not want pig. On the other hand, if the furnaces cannot get coal there will be no pig to sell. So one offsets the other. The fundamental situation, however, is just about the same, namely, that there is an enormous consumption and an enormous demand and the tendency to buy ahead is still apparent.

Billets.—Efforts are being made to obtain supplies of billets from abroad, but those who are concerned absolutely refuse to give any information. Quotations for German steel are given at \$30@31. There are several buyers here who are anxious to place orders either at home or abroad and negotiations are in progress to that end.

Bar Iron.—Bar iron is higher than it was a week ago and quotations are nominally 1.90c. for steel bar and 2c. for best refined iron. These do not represent the prices that have been paid within a day or two for very prompt deliveries. Storekeepers are hustling about to get immediate supplies, but are not succeeding. It was rumored to-day that two bar mills would likely close down Saturday. Other bar iron interests represented here say that work will be continued right straight along. A great deal of soft coal is coming East and arrangements are being consummated every day for further supplies.

Sheets.—The retail demand for sheets is even better than a week ago, but the buyers for some reasons are satisfied with very small quantities. In some quarters on buyers' side it was intimated to-day that there would be a cut in sheets, but there seems to be no reason for it. On the other hand, parties representing makers say that there is more likelihood of an advance.

Pipes and Tubes.—Pipes and tubes have advanced owing to the rushing in of several orders for large quantities, part of which have been taken care of in the Western end of the State.

Skelp Iron.—There is an urgent demand for skelp, both large and small lots, and only a portion of the business was placed this week that was offered. The advance in skelp accounts for the urgent demand.

Merchant Steel.—A moderate amount of business is being done every day not only in our local territory, but parties from the East are making efforts through local representatives here to obtain some supplies for August. Those who represent merchant mills here say the summer demand for merchant steel will exceed anything ever known. The statement is based on the fact that large and small consumers of steel east and west are expected to place a large amount of business for forward delivery.

Plates.—Agitation for an advance in plate has led to quite a run of small orders from local consumers for immediate requirements, i. e., for the next three months. Prompt deliveries are sold at bonus prices, which are not quotable. Current quotations mean nothing.

Structural Material.—A good deal of inconvenience is resulting to small builders, contractors and others, in the first place from delays in getting supplies, and second, from the uncertainty of obtaining deliveries during June and July according to contracts placed. Quite an effort is being made to obtain supplies from abroad, but with what luck it is impossible to say owing to the secrecy with which all such dealings are surrounded. Beams and channels are quoted nominally 2.25@2.60c.; angles, 2.40@2.60c.

Steel Rails.—The announcement will soon be made of large transactions in foreign rails for American delivery. A good many light sections are being ordered, as well as girder rails, but these statements seem to be in contradiction to the statement made a week or two ago that no large orders were being placed.

Scrap.—The scrap situation is unexpectedly quiet. The trouble is there is no scrap to be had. The high prices at which scrap gatherers hold supplies in checking trade. The only thing they are now dealing in is in promises. There is a great deal of scrap wanted, but it is probable that negotiations will stand where they are until some light is thrown on the situation. Dealers in scrap are scurrying around looking up possible supplies and figuring with sellers and buyers, but there is no actual business worth while referring to just now. Quotations are nominally about as follows: Heavy melting steel, \$21.50; machinery cast, \$18; railroad scrap, \$25; old car wheels, \$20; iron axles, \$28.50; steel axles, \$26.

Pittsburg. May 27.

(From Our Special Correspondent.)

Pig iron prices continue to advance, while prospects for securing deliveries decrease. The general iron and steel market is quiet this week. All the heavy contracts for the year have been placed and there is nothing to do but keep the mills in steady operation and fill all the orders on the books. No one is look-



ing for new business. It is possible in some lines to accept small orders and while there will be no advance in prices of finished steel products, premiums are asked for car-load lots and for special deliveries. There may be a meeting of the plate pool next month, but it is probable that it will again be postponed and not be held until fall, as there is practically nothing to be done. The meeting of the beam pool also may be deferred until later in the year, as the product of all the mills has been sold up to January 1 and there can be no advance in prices. The United States Steel Corporation is the only concern that has actually taken any orders for structural material for delivery next year at present prices. One other interest has accepted a large amount of business and this week issued notices that specifications must be in by January 1. It is not believed that all orders will be filled until early in the coming year. There is practically no domestic steel offered and the nominal price is the highest of the year. Orders for foreign steel are still being placed, but the time of delivery cannot be guaranteed, as it is difficult to get vessel room. But for the delay in shipment foreign billets could be laid down in Pittsburg at \$32 and sheet bars at \$32.50. The wire and wire nail market is not as strong this week. All the big contracts have been placed and there is but little business being offered.

Several thousand tons of bessemer pig iron were sold at fully \$1 a ton higher than the price asked a week ago. It is reported, but not confirmed, that the United States Steel Corporation is negotiating for 100,000 tons of bessemer pig iron for delivery in the second quarter of next year. The furnaces have been getting out the full production, as there has been no difficulty in securing all the coke needed. Nothing has yet been done by the furnace owners toward averting the strike of the workers scheduled to begin on Monday. Unless some action is taken this week there seems to be no doubt but that most of the furnaces in the Mahoning and Shenango valleys will be tied up. One of the leaders of the American Federation of Labor who has charge of the movement said to-day that President Samuel Gompers is in communication with the officers of the National Civic Federation and will endeavor to arrange a conference. Furnace owners insist that there can be no settlement unless the demands for a three-turn system are withdrawn. Owing to the serious results that would follow a strike it is believed the manufacturers would consent to a compromise by advancing wages. The present scale was made when pig iron was selling at \$25 a ton and no reduction was offered when the price dropped to \$12.50 a ton. The production of the merchant furnaces in the Mahoning and Shenango valleys is about 3,000 tons a day. This does not include the large tonnage of the United States Steel Corporation and the Republic Iron and Steel Company. A great deal of Southern foundry iron is coming into this market, but it is all on orders placed several months ago. No new contracts have been made this week, as No. 2 is quoted at \$20.15 delivered at Pittsburg.

The supply of scrap is better, but prices have not yielded any. The increase in the production of basic open-hearth steel has increased the demand for scrap. Heavy melting stock is quoted at \$20.50@21; No. 1 cast scrap at \$18@18.50 and No. 1 wrought iron scrap at \$22. The conference on the iron wage scale between representatives of the Republic Iron and Steel Company and the Amalgamated Association of Iron, Steel and Tin Workers opened at Columbus to-day. The workers will endeavor to secure the adoption of a number of additional foot notes. The result will not affect the operation of the mills, as the main features of the scale have been agreed upon.

The West Carnegie Sheet Steel Company, which was formed several months ago, has just let contracts for a basic open-hearth steel plant, a blooming and sheet bar mill and a sheet plant of six mills. The works will be erected two miles west of Carnegie, which is 12 miles west of Pittsburg on the Pittsburg, Cincinnati & St. Louis Railroad.

**Pig Iron.**—Bessemer pig iron in lots aggregating from 5,000 to 6,000 tons sold during the week for delivery throughout the year at prices ranging from \$20.50@21.50, Valley furnaces. Gray forge has advanced to \$20.75 Pittsburg, for prompt shipment, and \$20.25 for future delivery. About 1,000 tons were sold. Foundry iron is scarce and but few sales were made. No. 2 is quoted at \$21@22, Pittsburg, for the second half and a higher price could be had for early delivery. A sale of 1,000 tons of basic iron was made to-day at \$21, Valley furnace. It is reported that the United States Steel Corporation has just closed a deal for about 25,000 tons of Southern gray forge for the Valley mills of the American Steel Hoop Company. The price is \$15, Birmingham, or \$18.75 delivered.

**Steel.**—A typographical error in last week's issue put bessemer steel billets at \$33. It is impossible to buy at less than \$35 and it is believed a higher price could be had for delivery before July 1. There is no change in prices of finished steel.

**Sheets.**—There is a slight falling off in the demand and 3.05c. for No. 28 gauge in large lots can be done. Galvanized sheets are still quoted at 4.47c. for No. 28 gauge.

**Ferro-manganese.**—Domestic 80 per cent is still quoted at \$52.50 and the foreign product can be had at \$48 to \$50.

**New York. May 29.**

**Pig Iron.**—Iron for summer delivery is still hard to get, owing to furnaces in the Lehigh region running short of anthracite. Considerable foreign iron is coming in. Prices are unchanged. We quote for tide-water 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. Some Southern pig has been sold on special terms.

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

**Plates.**—Demand is 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 inquiry for light rails and some high prices are noted. Deliveries will run into 1903. Standard sections are still nominally quoted at \$28 at Eastern mills; light rails at \$32@36, 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.

**Cartagena, Spain. May 10.**

(Special Report of Barrington & Holt.)

**Iron and Manganiferous Ores.**—Since our last report 7 cargoes of iron and manganiferous ore have been shipped from here. The demand for ores to all quarters continues brisk and prices are unaltered. Freights continue favorable to shippers as far as the United Kingdom is concerned, but for the United States the rates remain high and tonnage difficult to obtain. The 7 cargoes for the week made a total of 21,450 tons; total to date, 135,200 tons.

Quotations for iron ores are as follows, per ton, f. o. b. shipping port: Ordinary 50 per cent Portman ore, 6s. 6d.@6s. 9d.; low phosphorus—under 0.03 per cent—7s@7s. 6d.; special ore, 50 per cent and 3 per cent manganese, 8s. 6d.; specular ore, 58 per cent iron, 90; magnet ore, 60 per cent iron, 11s. 6d. for lumps and 9s. 3d. for smalls.

Manganiferous ores are quoted as follows: No. 1, 20 per cent iron and 20 per cent manganese, 14s. 3d.; No. 1B, 25 iron and 17 manganese, 11s. 3d.; No. 2, 30 iron and 15 manganese, 10s. 3d.; No. 3, 35 iron and 12 manganese, 9s. 6d.

**Iron Pyrites.**—The quotation for iron pyrites, 40 per cent iron and 43 per cent sulphur, is 11s. per metric ton, f. o. b. Cartagena.

**CHEMICALS AND MINERALS.**

(For further prices of chemicals, minerals and rare elements, see page 784.)

**New York. May 29.**

**Heavy Chemicals.**—Fear of a shortage in the fuel supply, owing to the coal miners' strike, has strengthened spot prices, but deliveries on contract are being made at the old figures. There is further contracting for domestic high-test alkali for next year's delivery at 75@77 1/2c. per 100 lbs., f. o. b. works, and for 1903-4 domestic high-test caustic soda at \$1.85@1.87 1/2c. per 100 lbs., f. o. b. works. Sodium sulphate is in very good request at 80@82 1/2c. per 100 lbs., delivered in the gas belt. Sal soda is active. Bleaching powder has improved, as stocks on dock have been pretty well cleaned up. Nothing new in chlorate of potash. Brunner, Mond & Co., of Great Britain, recently paid a final dividend for 1901, making 32 1/2 per cent for the year, against 35 per cent for 1900. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 85@87 1/2c. for prompt shipment, and 75@77 1/2c. for forward; caustic soda, high-test, \$1.92 1/2@1.95 for early delivery, and \$1.85@1.87 1/2c. 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 forward 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, 92 1/2@95c.; 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 1/4, according to make.

**Acids.**—Contract deliveries have improved, while prices continue firm. Good sales of blue vitriol for early delivery are noted at quotations below. In the 4 months ending April 30 exports of copper sulphate from the United States aggregated 24,228,157 lbs., against 37,498,764 lbs. in the corresponding period last year, showing a decrease of 3,270,607 lbs. This falling off is due principally to the curtailed demand in Italy and France, owing partly to high prices.

The exports from Great Britain in the 4 months ending April 30 were 55,558,720 lbs., valued at £492,759 (\$2,463,795), as against 57,626,240 lbs., valued at £610,003 (\$3,050,015). The decrease this year is equal to 2,067,520 lbs., or about 4 per cent, while the average value per 100 lbs. has fallen about 87c., from \$5.30 to \$4.43. Part of this reduction has resulted from keen competition with American export.

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.

Blue Vitriol.....	\$4.50@4.62 1/2	Oxalic, com'l....	\$4.60@5.00
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg.,	bulk, ton.....
Muriatic, 20 deg.	1.62 1/2		13.50@15.50
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg.	1.00
Nitric, 36 deg....	4.00	Sulphuric, 60 deg.,	bulk.....
Nitric, 38 deg....	4.25		18.00@20.00
Nitric, 40 deg....	4.50	Sulphuric, 66 deg.	1.20
Nitric, 42 deg....	4.87 1/2		bulk.....
			21.00@23.00

**Brimstone.**—The spot market shows no change, but futures are easier, owing to the anticipated reduction in prices when the melting season opens in Sicily. This reduction is retaliatory, as the syndicate is obliged to meet the lower prices of the dissidents. On spot best unmixed seconds sell at \$23@23.25 per ton, and, although shipments are quoted at \$22.25, consumers offer less. Best thirds can be had at \$2.30 per ton less than seconds. Imports of brimstone into the United States in the 4 months ending April 30 were 59,900 tons, against 49,238 tons last year; showing an increase of 10,662 tons, credited to the paper pulp mills.

Concerning the brimstone market in Sicily during the month of April, Messrs. Emil Fog & Sons, of Messina, advise us as follows: The position of the market has not changed. Seconds are slightly easier, but thirds have improved about 1s. Current thirds were in good demand; some tests were highly satisfactory, showing only 4 1/2 per cent impurities, but care must be taken to ask for special warehouses. Stocks are some 75,000 tons more than same time last year. This fact imparts a most discouraging tone to the market. Still bears are very cautious in selling futures, owing to the entire control exercised by the Anglo-Sulphur Company. For delivery after beginning of the new melting in September-October, contracts might be closed with dissidents at about 2s. less than for prompt. Notwithstanding lower freights the demand from the United States was slow during April, but we notice some improvement in the demand for refined and ground brimstone despite the advance in prices at Catania. We quote f. o. b.: Best unmixed seconds, 83s. 9d.; best thirds, 74s. 9d.; current thirds, 70s. 9d.; refined block, 87s.; refined roll in 3 cwt. casks, 96s.; flowers, pure, in bags, 102s. 9d.; flowers, current, in bags, 97s. Freights are easier. We quote: New York, 7s.; Boston, Baltimore or Philadelphia, 7s. 6d.; a whole steamer to Portland, 7s.; Baltic ports, 9s.

**Pyrites.**—Ocean freight rates from Huelva, Spain, continue strong, the latest charter being on a basis of 10s. 6d. (\$2.52), early sailing. This week the Pennsylvania Salt Manufacturing Company imported at New York 3,863 tons Spanish copper pyrites, which will be consumed and not sold. The total imports of iron and copper pyrites into the United States in the 4 months ending April 30 amounted to 137,620 tons, against 119,000 tons in the same period last year; showing an increase of 18,620 tons.

Concerning the domestic production, it is learned that contracts take up almost the entire quantity. In Alabama work is active, especially in Clay County, where Swift & Co., the Chicago packers and fertilizer makers, have fully 170,000 tons of good pyrites ready for shipment. A new concern, in the same county, is the Garnet Smelting and Developing Company, which is an off-spring of the Southern Industrial Company. Elaborate preparations are being made to work this property, and the money will be obtained from the sale of \$500,000 first mortgage bonds of the Garnet Company. 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.

**Sulphate of Ammonia.**—Firmness abroad has reacted on this market so that sellers quote \$3.12 1/2 per 100 lbs. for gas liquor to arrive, while futures are \$3.10.

**Nitrate of Soda.**—Since our last report the market has turned for the better, and importers anticipate a stronger position all around. The European consumption recently has improved, and the situation is



brighter, though heavy stocks, and the Hamburg failure are still depressing. All sorts of rumors emanate from the bearish element abroad, who predict a smaller consumption in the current year. There seems to be less interest in future dealings. In New York brokers have strengthened their views, owing to a higher coast market, and are quoting \$1.95 per 100 lbs. for distant shipments, whereas last week they were anxiously soliciting orders on a basis of \$1.92½, and even less. The spot market, in consequence of heavy arrivals recently, is lower at \$2.10, but consumers generally look for a still lower range of prices. It is certain many of them have sufficient stocks on hand to keep them going until the market reacts. Meanwhile importers are not pressing sales, as they feel the combination on the coast will support the market.

The nitrate producers' combination in Chile has fixed the exports for the year, from April 1, 1902 to March 31, 1903, at 30,500,000 qtls., the shipments of each producer during the 9 months, from April to December, 1902, being limited to 85 per cent of his quota. These figures are only provisional, as they will likely be revised by the first week in July. In the first year of the combination, from April 1, 1901 to March 31, 1902, the production was based on exports of 31,273,000 qtls., while the allotment of exports from April to December, 1901, was 75 per cent of the producers' quota. The reduction of 773,000 qtls. in the agreed exports for 1902-1903 was made necessary by the curtailed consumption in Europe, owing to high prices.

The scheme to centralize the sales of nitrate so as to control the market as well as the production, is being debated again abroad by those who first favored it in 1899. One reason why centralization has not yet been adopted is "because the producers do not attend sufficiently to their own interests, and that some people who have influence in the trade do not consider it to be to their own interest to assist this scheme."

Concerning the market in Chile, Messrs. Jackson Brothers, of Valparaiso, advise us under date of April 19 as follows: We have again had a very dull fortnight owing to unfavorable advices from Europe regarding the continued decrease in consumption. Producers have shown more disposition to sell, but still maintain former prices, the result being that only about 80,000 qtls. have changed hands for prompt delivery; no interest, however, has been shown on the part of exporters for forward deliveries. The production during March is cabled as 2,080,000 qtls., making a total of 6,038,000 qtls. for the first quarter of this year, against 5,939,000 qtls. for the same period in 1901. The consumption of the world for the same term is 9,892,000 qtls., against 11,489,000 qtls. in 1901. We quote 95 per cent April-June, 6s. 8½d.; July-December, 6s. 9½d.; and 96 per cent, 6s. 1d. @ 6s. 10½d. for any delivery, all ordinary terms, sellers. The price of 6s. 8½d., with an all round freight of 17s. 6d., stands in 8s. 4¼d. per cwt., net cost and freight, without purchasing commission.

**Phosphates.**—Small stocks and increased demand for superphosphates in Europe has favored better buying of phosphates, notably high-grade rock for future shipment. Prices are steady. Recent charters are noted from Tampa to La Pallice, France, at 14s. (\$3.36), and from Coosaw, S. C., to the United Kingdom at 11s. 6d. (\$2.76), the latter sailing in June-July.

Shipments of phosphates from Charleston, S. C., in April amounted to 3,389 tons, all domestic, showing an improvement over previous months.

Exports of Florida, Tennessee and South Carolina phosphates in the 4 months ending April 30 amounted to 224,437 tons, against 232,304 tons in the same period last year, showing a decrease of 7,867 tons.

We quote phosphate prices below:

Phosphates.	Per ton F. o. b.	C. i. f. U. Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (17@80%)	\$.65@7.00	6¼@6½d.	\$0.75@10.53
*Fla. land pb. (68@73%)	3.00@3.25	4¼@5d.	6.65@ 7.00
*Fla. Peace Riv. (58@63%)	2.25@2.50	4¼@5d.	5.70@ 6.00
†Tenn., (78@80%) export	3.75	5½@6d.	8.58@ 9.36
†Tenn., 78% domestic	3.00@3.25		
†Tenn., 75% domestic	2.75@3.00		
†Tenn., 73@74% domestic	2.40		
†Tenn., 70@72% domestic	2.10@2.25		
†So. Car. land rock	3.25	4¼@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.

METAL MARKET.

New York. May 29

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.
<b>Gold.</b>				
Exports....	\$4,916,965	\$2,844,204	\$14,045,205	\$18,167,347
Imports....	2,249,038	1,864,767	16,894,363	7,563,507
Excess. E.	\$2,667,927	E. \$979,437	E. \$3,150,812	E. \$10,603,840
<b>Silver.</b>				
Exports....	\$4,959,047	\$3,739,800	\$19,478,721	\$15,502,253
Imports....	2,370,114	2,051,251	10,455,207	8,469,730
Excess. E.	\$2,588,933	E. \$1,688,549	E. \$9,023,514	E. \$7,041,523

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 29 and for years from January 1, 1902, 1901 and 1900:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week...	\$7,164	\$15,197	\$547,915	\$13,541 E.	\$321,341
1902.....	16,462,165	1,088,076	12,543,057	496,249 E.	27,420,837
1901.....	20,411,990	1,125,503	14,366,435	1,637,632 E.	31,555,230
1900.....	14,370,265	1,394,088	16,354,211	1,856,081 E.	27,474,337

The gold exported this week went to the West Indies; the silver was destined principally to London. Imports were from Central America and the West Indies.

Financial Notes of the Week.

Business continues fairly steady. There are some indications of caution, however, and these are mainly found in avoidance of the speculative markets by business men. The latter are left for the present mainly to professional traders, with the usual consequences. The iron and other markets show great activity, as for some time past. Money in New York is more abundant and rates are lower.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending May 24 gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$792,921,000	\$558,872,000	\$870,483,300
Deposits .....	876,610,300	941,116,900	931,751,000
Circulation .....	21,959,500	31,104,700	31,170,800
Specie .....	166,712,400	180,067,200	171,923,000
Legal tenders.....	71,252,500	76,501,000	75,316,200
Total reserve.....	\$237,964,900	\$256,508,200	\$247,239,200
Legal requirements.....	219,152,575	235,279,225	232,937,750
Balance surplus.....	\$18,812,325	\$21,228,975	\$14,301,450

Changes for the week, this year, were increases of \$3,097,200 in specie, \$1,755,000 in legal tenders, and \$5,954,925 in surplus reserve; decreases of \$8,546,600 in loans and discounts, \$4,410,900 in deposits, and \$102,400 in circulation.

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

	—1901—		—1902—	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd..	\$180,097,200	.....	\$171,923,000	.....
England .....	176,450,040	.....	175,220,325	.....
France .....	489,690,055	\$222,168,835	510,640,065	\$222,556,600
Germany .....	170,485,009	78,585,000	193,790,000	71,675,000
Spain .....	70,010,000	78,400,000	70,575,000	92,610,000
Neth'ls .....	26,244,000	28,610,500	23,947,500	33,247,000
Belgium .....	14,625,000	7,335,000	15,873,335	7,936,665
Italy .....	75,620,000	9,552,000	80,380,000	11,019,000
Russia .....	353,415,000	36,645,000	370,275,000	44,555,000

The returns of the Associated Banks of New York are of date May 24, and the others May 22, 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.

Offerings of silver have been moderate, and the market has easily taken the output. Special Indian orders for May delivery toned up the price to 24d. These having been filled, the market would have

fallen more than it actually did but for speculative purchases.

The United States Assay Office in New York reports receipts of 43,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to May 15 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India .....	£3,108,210	£2,967,825	D. £140,385
China .....	339,125	16,500	D. 322,625
The Straits.....	79,976	250	D. 79,726
Totals .....	£3,527,311	£2,984,575	D. £542,736

Arrivals for the week, this year, were £78,000 in bar silver from New York, £10,000 from Chile, and £5,000 from Australia; total, £93,000. Shipments were £81,240 in bar silver to Bombay, and £47,500 to Calcutta; total, £128,740.

Indian Exchange has been steady, the Council bills offered in London having been taken at an average of 15.9d. per rupee. The demand for bills was not very large, however. The demand for silver for India shows some increase.

The foreign merchandise trade of France for the 4 months ending April 30 is reported by the Ministry of Commerce as below:

	1901.	1902.
Imports .....	Fr. 1,490,289,000	Fr. 1,548,638,000
Exports .....	1,297,916,000	1,390,985,000
Excess, imports.....	192,373,000	157,653,000

This shows an increase of 58,349,000 fr. in imports; an increase of 93,069,000 fr. in exports; and a resulting decrease of 34,720,000 fr. in the balance of imports.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$0.41½	\$0.44
Peruvian soles and Chilean pesos.....	.37½	.41½
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	3.88
Twenty marks.....	4.74	4.85
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

May	Silver		Copper		Spelter					
	Sheeting Exchange	N. Y. Cts.	Lake Cts. per lb.	Electrolytic per lb.	London Tin, cts. per lb.	Lead per lb.	N. Y. per lb.	St. L. per lb.		
23	4.86½	51½	24	12½	12½	55	30½	4.05 @ 4.10	4.75	4.50
24	4.86½	52½	24½	12½	12½	55	30½	4.05 @ 4.10	4.75	4.50
26	4.86½	51½	24	12½	12½	55	30½	4.05 @ 4.10	4.75	4.50
27	4.86½	51½	24½	12½	12½	55	30½	4.05 @ 4.10	4.75	4.50
28	4.86½	51½	24½	12½	12½	55	30½	4.05 @ 4.10	4.75	4.50
29	4.86½	51½	24½	12½	12½	54	30½	4.05 @ 4.10	4.75	4.50

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures.

**Copper.**—The market continues firm. A large business has been done, and some of the principal producers are sold out for the next few months. In fact, it appears there is little copper over for early shipment. In consequence of the bear manipulations in the London standard market, European consumers have not yet bought very heavily, and buying here became somewhat hesitant when the London market receded.

It is believed, however, in well-informed circles that the movement in London is of only a temporary nature, and it is pointed out that for some time past the difference between speculative sorts, standard and electrolytic copper, has been unnaturally small, and now that the electrolytic copper, which had been put into warehouses for delivery on standard contracts, has been disposed of, it is to be expected that a wider margin will be established.

We quote lake copper 12½@12½c.; electrolytic in cakes, wirebars or ingots, 12½@12½c.; cathodes, 11½@12c.; casting copper, 12¼c.

The London market, which ruled at £55 for both spot and three months' delivery during Friday and the early part of this week, declined to £53 17s. 6d. on Wednesday, and closed on Thursday at £54 for both deliveries.

For refined and manufactured sorts, we quote: English tough, £57@£57 10s.; best selected, £58@£58 10s.; strong sheets, £59; India sheets, £66; yellow metal, 6¼d.



Exports of copper from New York and Baltimore in the week ending May 28, are reported by our special correspondents as follows: Great Britain, 665 tons; Germany, 386; Holland, 1,353; France, 1,591; Belgium, 105; Austria, 50; Vera Cruz, 3; total, 4,153 tons. Imports were 317 tons copper, and 3,456 tons ore.

Imports of copper into the United States for the four months ending April 30 are reported by the Bureau of Statistics of the Treasury Department as below, in long tons:

Table with 3 columns: 1901, 1902, Changes. Rows: Copper ore and matte, Fine copper.

As the report does not distinguish ore and matte, it is impossible to estimate the total fine copper represented in these imports. The statement of the Bureau gives exports for the same period as follows, also in long tons:

Table with 3 columns: 1901, 1902, Changes. Rows: Copper ore, Metallic copper.

Mr. John Stanton's statement, heretofore published, gives the total exports in fine copper at 28,123 long tons in 1901 and 67,656 tons in 1902; an increase of 39,533 tons this year.

Tin.—The market has been exceedingly dull. Consumers are covered for the moment, and have been holding off in view of the somewhat lower cables from London. At the close we quote spot at 30 1/2c.; June delivery, 29 3/4c.; July, 29 1/2c.

The London market, which closed last Thursday at £136 5s. for spot and £131 15s. for three months, was on Friday £136 10s. spot and £133 15s. three months. On Monday it was 5s. lower for spot and 10s. lower for three months, and on Tuesday it was down to £135 15s. spot and £132 5s. three months. On Thursday it closed at £136 for spot and £133 for three months.

Imports of tin into the United States for the four months ending April 30 are reported as follows, in long tons of 2,240 lbs.:

Table with 3 columns: 1901, 1902, Changes. Rows: Straits, Australia, Great Britain, Holland, Other countries, Totals.

The total increase this year was 13.3 per cent. The gain was in imports direct from the East, those made through London showing a decrease.

Lead.—The market is active at last prices, and we quote 3.97 1/2@4.05c. St. Louis and 4.05@4.10c. New York.

The foreign market is slightly lower, Spanish lead being cabled as £11 5s.@£11 7s. 6d., and English lead at £11 10s.@£11 12s. 6d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is firm and unchanged. Missouri brands sell at 3.97 1/2c., while argentiferous lead brings 4.05c.

Imports of lead in all forms into the United States and re-exports of imported lead for the four months ending April 30 are reported by the Bureau of Statistics of the Treasury Department as below, in short tons.

Table with 3 columns: 1901, 1902, Changes. Rows: Lead, metallic, Lead in ores and base bullion, Total imports, Re-exports, Balance.

Of the total imports this year 33,059 tons, or 86.9 per cent, were from Mexico, and 3,626 tons, or 9.5 per cent, from Canada. In addition to the re-exports given above there were 1,522 tons of domestic lead exported this year, against 2,318 tons in the corresponding period last year.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 10, as follows: The price of silver during the week has been 12.75 reales per oz. The exchange has gone up by 15 centimos, making it 34.48 pesetas to £1. The local quotation for pig lead on wharf has been 64.75 reales per quintal, which on above exchange is equal to £10 10s. 3d. per ton of 2,240 lbs. f. o. b. Cartagena. Exports of pig lead have been: 1,227,450 kgs. to Newcastle; 900,000 kgs. to London; 138,216 kgs. to Marseilles; total, 2,315,666 kgs.

Spelter.—The strike which is threatened in the producing district still hangs over the market, and in consequence smelters are chary of selling. Should the strike be declared, production will certainly be seriously interfered with. Little business has been done. We quote St. Louis at 4 1/2@4 3/4c., and New York at 4 3/4@5c.

The foreign market is somewhat lower, good ordinaries being quoted at £18 5s. and specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: The

boom in spelter continues and latest sales are on the basis of 4.55@4.60c., East St. Louis for prompt and June delivery. Future metal could probably be had for less.

Exports of spelter, or metallic zinc, from the United States for the four months ending April 30 are reported at 1,572 short tons, against 1,729 tons for the corresponding period in 1901; a decrease of 155 tons, or 9 per cent. Exports of zinc ore were 12,370 tons, against 11,905 tons last year; an increase of 465 tons, or 3.9 per cent.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 10, that prices are firmer, sales having been made on a basis of 9@10 reales per quintal, on a basis of 30 per cent ore, at mine. Exports for the week were 1,450 tons blende to Antwerp.

Antimony.—We quote Cookson's 9 3/4@10c.; Hallett's, 8 1/4c.; Hungarian, Italian, Japanese and United States Star, 8c.

Imports of antimony into the United States for the four months ending April 30 are reported as follows, in pounds:

Table with 3 columns: 1901, 1902, Changes. Rows: Metal and regulus, Antimony ore.

There was a considerable increase in metal, but a falling off in ore.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

Exports of nickel, nickel oxide and nickel matte from the United States for the four months ending April 30 were 1,087,576 lbs., against 1,815,315 lbs. for the corresponding period in 1901; a decrease of 727,739 lbs., or 40.1 per cent, this year.

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 iron in large quantities, is worth 82c. per gram.

Imports of platinum into the United States for the four months ending April 30 were 2,436 lbs., against 2,192 lbs. for the corresponding period in 1901; an increase of 244 lbs., or 11 per cent, this year.

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 slightly lower, \$45.50@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.

The receipts of quicksilver at San Francisco in April, 1902, amounted to 1,821 flasks, against 1,941 flasks in April, 1901. The exports by sea in April, 1902, amounted to 565 flasks, against 659 flasks in April, 1901.

Exports of quicksilver from all United States ports for the four months ending April 30 were 253,678 lbs., against 344,055 lbs. for the corresponding period in 1901; a decrease of 90,377 lbs., or 26.2 per cent, this year.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Table with 3 columns: Aluminum, Per lb., Ferro-Tungsten (37%), Per lb. Rows include various metal grades and alloys.

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

Average Prices of Copper.

Table with 6 columns: Month, Electrolytic, New York, Lake, London Standard, 1901. Rows: January, February, March, April, May, June, July, August, September, October, November, December, Year.

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 Metals per lb., New York.

Table with 6 columns: Year, Tin, 1901, Lead, 1901, Spelter, 1901. Rows: January, February, March, April, May, June, July, August, September, October, November, December, Year.

Average Prices of Silver, per ounce Troy.

Table with 6 columns: Month, London, N. Y., London, N. Y., London, N. Y. Rows: January, February, March, April, May, June, July, August, September, October, November, December, Year.

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

LATE NEWS.

ARIZONA.

COCHISE COUNTY.

(From Our Special Correspondent.)

Mine and Smelter Supply Company.—This company, of El Paso, Tex., has received the contract for the erection of the new converter plant which will be installed by the Copper Queen Company, of Bisbee, at Douglas, in connection with the new smelter there. Superintendent Walter Douglas, who has lately returned from New York, purchased some of the machinery in that city, which will be forwarded to Douglas. The Mine and Smelter Supply Company also has a contract for its installment of the new smelter plant at Douglas for the Calumet & Arizona Company.

Tombstone Consolidated Mines Company.—The machinery for this company is arriving daily, and several teams are kept busy transferring it from the railroad to the mines. Some 10 or 12 car-loads have arrived, and fully 35 more car-loads are due.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Black Hill.—This new gold and silver prospect, near Chloride, is developing into a mine very fast. The owners are A. H. Dryden and William Nelson.

New Smelter.—K. Staahlgren, the contractor of this new 50-ton Vulcan smelter, has arrived from San Francisco, and placed a force of men at work. It is to be completed by the middle of July.

PINAL COUNTY.

(From Our Special Correspondent.)

Thomas Buchanan, of Desert Well, has just returned to Phoenix with Ed. Peck, mining expert, from Andy Lauenbacher's new copper find, in the foothills of Superstition Range. He states that it appears to be an extensive deposit. It is situated about 25 miles north of Florence, and about 8 miles from Whitlow Station. Mr. Peck is the original discoverer of the noted Peck mines of Yavapai County.

Buckeye.—A 7-ft. vein of copper ore has been opened up on this mine, at Troy.

YAVAPAI COUNTY.

(From Our Special Correspondent.)

Copper Basin Gold and Copper Mining Company.—This company has a force of men cross-cutting the ore body encountered at the 100-ft. level. The company is now making preparations to put up a hoist, and other machinery will be added as required. The main office of the Copper Basin Company is in Prescott.

Picacho Blanco Mining Company.—News has reached Phoenix of a mining deal by which a New York syndicate secures a group of mines in the White Picacho District, about 8 miles east of Wickenburg, the purchase price being reported at \$800,000. The New York men, headed by T. E. Otis, will incorporate as the Picacho Blanco Mining Company. They secured a controlling interest in the Exposition Mining Company; a controlling interest in the stock of the San Domingo Gold and Copper Company, which has been operating the Tribly, Bell Gold and White Cloud mines; also a group of claims adjoining the Tribly and White Cloud, besides the entire interest of Willis B. Troy.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices from May 22 to May 28. Includes companies like Acacia, Alamo, Amalgamated, etc.

\*Per cent.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations for New York, listing companies like Am. Agr. Chem., Am. Car & Fdy., etc.

Total sales, 581,337 shares. \*Ex-dividend.

PHILADELPHIA, PA. \$

Table of stock quotations for Philadelphia, PA, listing companies like Am. Alkali, Am. Cement, etc.

Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 4,302 shares. †Ex-privileges.

MEXICO.

May 17.

Table of stock quotations for Mexico, listing companies like Durango, Ca. Min. de Penoles, etc.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Adventure Con., Aetna Cons., etc.

Official Quotations Boston Stock Exchange. Total sales, 138,443 shares. †Ex-dividend

ST. LOUIS, MO.\*

May 26.

Table of stock quotations for St. Louis, MO, listing companies like Adams, Am.-Nettie, etc.

\*From our Special Correspondent.

SPOKANE, WASH.\*

May 23.

Table of stock quotations for Spokane, Wash., listing companies like American Boy, Black Tail, etc.

Total sales 36,000 shares. \*Reported by Hunner & Harris.

SALT LAKE CITY.\*

May 24.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Anch., etc.

\*By our Special Correspondent. Total number of shares sold, 347,958.



STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

LONDON.

May 17.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., and their prices for various dates from May 19 to May 24.

Table of stock quotations for London, listing companies like Anaconda, Copiapo, De Lamar, and their prices, including authorized capital and last dividend information.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. \*Ex-dividend.

PARIS.

May 7.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Firminy, Huta-Bank, and their products and prices.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, Olive, British Columbia, and their prices.

MONTREAL, CANADA.

May 26.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, Can. Gold Fields, and their prices.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasives—		Cust. Meas.	Price.	Barium—		Cust. Meas.	Price	Graphite—Am. f.o.b. Prov-		Cust. Meas.	Price	Paints and Colors—		Cust. Meas.	Price
Carborundum, f.o.b. Niagara Falls, Powd., F. F. FFF.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.02 <sup>3</sup> / <sub>4</sub>	dence, R. I. lump.	sh. ton		\$8.00	Metallic, brown	sh. ton		\$ 19.00
Grains	"		.10	Sulphate (Blanc Fixe)	"		.02	Pulverized	"		30.00	Red	"		16.00
Corundum, N. C.	"		.07@.10	<b>Barytes</b>				German, som. pulv.	lb.	.01 <sup>3</sup> / <sub>4</sub> @.01 <sup>1</sup> / <sub>2</sub>		Ocher, Am. common	"		9.25@10.00
Chester, Mass.	"		.04 <sup>1</sup> / <sub>2</sub> @.05	Am. Crude, No. 1	sh. ton		9.00	Best pulverized	"		.01 <sup>1</sup> / <sub>2</sub> @.02	Best	"		21.25@25.00
Barry's Bay, Ont.	"		.07 <sup>1</sup> / <sub>4</sub> @.09 <sup>1</sup> / <sub>4</sub>	Crude, No. 2	"		8.00	Ceylon, common pulv.	"		.02 <sup>3</sup> / <sub>4</sub> @.03 <sup>1</sup> / <sub>4</sub>	Dutch, washed	lb.		.04 <sup>3</sup> / <sub>4</sub>
Crushed Steel, f.o.b. Pittsburg	"		.05 <sup>3</sup> / <sub>4</sub>	Crude, No. 3	"		7.75	Best pulverized	"		.04@.08	French, washed	"		.01 <sup>1</sup> / <sub>4</sub> @.01 <sup>3</sup> / <sub>4</sub>
Emery, Turkish flour, in kegs	"		.03 <sup>1</sup> / <sub>4</sub>	German, gray	"		14.50	Italian, pulv.	"		.01 <sup>1</sup> / <sub>4</sub>	Orange mineral, Am.	"		.07 <sup>1</sup> / <sub>4</sub> @.08
Grains, in kegs	"		.05@.05 <sup>1</sup> / <sub>4</sub>	Snow white	"		17.00	<b>Gypsum</b> —Ground	sh. ton	8.00@8.50		Foreign, as to make	"		.08 <sup>3</sup> / <sub>4</sub> @.11 <sup>1</sup> / <sub>4</sub>
Naxos flour, in kegs	"		.03 <sup>1</sup> / <sub>4</sub>	<b>Bauxite</b> —Ga. or Ala. mines:				Fertilizer	"		7.00	Paris green, pure, bulk	"		.12
Grains, in kegs	"		.05@.05 <sup>1</sup> / <sub>4</sub>	First grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.03 <sup>1</sup> / <sub>4</sub> @.05 <sup>1</sup> / <sub>4</sub>
Chester flour, in kegs	"		.05@.05 <sup>1</sup> / <sub>4</sub>	Second grade	"		4.75	English and French	"		14.00@16.00	Foreign	"		.03 <sup>3</sup> / <sub>4</sub> @.08
Grains, in kegs	"		.05@.05 <sup>1</sup> / <sub>4</sub>	<b>Bismuth</b> —Subnitrate	lb.		1.40	<b>Infusorial Earth</b> —Ground				Turpentine, spirits	gal.		.47 <sup>1</sup> / <sub>4</sub>
Peekskill, f.o.b. Easton, Pa.	"		.01 <sup>1</sup> / <sub>2</sub>	Subcarbonate	"		1.65	American, best	"		20.00	White lead, Am., dry	lb.		.04 <sup>1</sup> / <sub>4</sub> @.04 <sup>3</sup> / <sub>4</sub>
flour, in kegs	"		.01 <sup>3</sup> / <sub>4</sub>	<b>Bitumen</b> —"B"	"		.09 <sup>1</sup> / <sub>2</sub>	French	"		37.50	American, in oil	"		.05 <sup>1</sup> / <sub>4</sub> @.05 <sup>3</sup> / <sub>4</sub>
Grains, in kegs	"		.02 <sup>1</sup> / <sub>4</sub>	"A"	"		.05	German	"		40.00	Foreign, in oil	"		.07 <sup>1</sup> / <sub>4</sub> @.09 <sup>1</sup> / <sub>4</sub>
Crude, ex-ship N. Y.: Ab-				<b>Bone Ash</b>	"		.02 <sup>1</sup> / <sub>4</sub> @.02 <sup>3</sup> / <sub>4</sub>	<b>Iodine</b> —Crude	100 lbs		2.45	Zinc, white, Am., ex dry	"		.04 <sup>3</sup> / <sub>4</sub> @.04 <sup>3</sup> / <sub>4</sub>
bott (Turkey)	lg. ton	26.50@30.00		<b>Borax</b>	"		.07 <sup>3</sup> / <sub>4</sub> @.07 <sup>1</sup> / <sub>2</sub>	Nitrate, com'l	"		.05	American, red seal	"		.06 <sup>1</sup> / <sub>2</sub>
Kuluk (Turkey)	"	22.00@24.00		<b>Bromine</b>	"		.40	True	"		.04	Green seal	"		.07
Naxos (Greek) h. gr.	"	26.00		<b>Cadmium</b> —Metallic	"		1.40	Oxide, pure cuppers col	"		.05@.10	Foreign, red seal, dry	"		.05 <sup>1</sup> / <sub>4</sub> @.06 <sup>1</sup> / <sub>4</sub>
Garnet, as per quality	sh. ton	25.00@35.00		Sulphate	100 lbs.	2.00@2.50		Purple-brown	"		.02	Green seal, dry	"		.06 <sup>1</sup> / <sub>2</sub> @.06 <sup>3</sup> / <sub>4</sub>
Pumice Stone, Am. powd.	lb.		.01 <sup>3</sup> / <sub>4</sub> @.02	<b>Calcium</b> —Acetate, gray	"		1.30	Venetian red	"		.01@.01 <sup>3</sup> / <sub>4</sub>	<b>Potash</b>			
Italian, powdered	"		.01 <sup>1</sup> / <sub>4</sub>	"brown	"		.90	Scale	"		.01@.03	Caustic, ordinary	"		.047@.06
Lump, per quality	"		.04@.40	Carbide, ton lots f.o.b. Niagara Falls, N. Y. or Jersey City, N. J.	sh. ton	75.00		<b>Kaolin</b> —(See Clay, China.)				Elect. (90%)	"		.06 <sup>1</sup> / <sub>2</sub>
Rottenstone, ground	"		.02 <sup>1</sup> / <sub>4</sub> @.04 <sup>1</sup> / <sub>4</sub>	Carbonate, ppt.	lb.		.05	<b>Kryolith</b> —(See Cryolite.)				<b>Potassium</b>			
Lump, per quality	"		.03@.20	Chloride	sh. ton	9.00@10.00		<b>Lead</b> —Acetate, white	"		.07 <sup>3</sup> / <sub>4</sub> @.08	Bicarbonate cryst.	"		.03 <sup>1</sup> / <sub>4</sub>
Rouge, per quality	"		.10@.30	<b>Cement</b>				Brown	"		.06	Powdered or gran.	"		.14
Steel Emery, f.o.b. Pittsburg	"		.07	Portland, Am., 400 lbs.	bbbl.	1.70@1.90		Nitrate, com'l	"		.06 <sup>1</sup> / <sub>2</sub>	Bichromate, Am.	"		.08 <sup>1</sup> / <sub>2</sub> @.08 <sup>3</sup> / <sub>4</sub>
<b>Acids</b>				Foreign	"	1.65@2.25		"gran.	"		.08 <sup>1</sup> / <sub>2</sub>	Scotch	"		.08 <sup>3</sup> / <sub>4</sub> @.09
Boric, crystals	"		.10 <sup>1</sup> / <sub>4</sub> @.11	"Rosendale," 300 lbs.	"	.75		<b>Lime</b> —Com., abt. 250 lbs.	bbbl.		.80	Carbonate, hydrated	"		.04@.04 <sup>1</sup> / <sub>4</sub>
Powdered	"		.11 <sup>1</sup> / <sub>4</sub> @.11 <sup>3</sup> / <sub>4</sub>	Slag cement, imported	"	1.65		Finishing	"		.90	Calcined	"		.03 <sup>1</sup> / <sub>2</sub> @.03 <sup>3</sup> / <sub>4</sub>
Carbonic, liquid gas	"		.12 <sup>1</sup> / <sub>4</sub>	<b>Ceresine</b>				<b>Magnesite</b> —Greece.				Chromate	"		.35
Chromic, crude	"		.20	Orange and Yellow	lb.	.12		Crude (95%)	lg. ton	6.50@7.00		Cyanide (98@99%)	"		.23
Hydrofluoric, 36%	"		.05	White	"	.13 <sup>1</sup> / <sub>4</sub>		Calcined	sh. ton	14.00@15.00		Kalmit	lg. ton	9.05	
48%	"		.05	<b>Chalk</b> —Lump, bulk	sh. ton	2.50		Bricks	M	170.00		Manure salt, 20%	100 lbs.	.66	
60%	"		.11	Ppt. per quality	lb.	.03 <sup>3</sup> / <sub>4</sub> @.06		Am. Bricks, f.o.b. Pittsburg	"	175.00		Double Manure salt, 48@53	"	1.12	
Sulphurous, liquid anhy.	"		.05	<b>Chlorine</b> —Liquid	"	.30		<b>Magnesium</b>				Muriate, 80@85%	"	1.83	
<b>Alcohol</b> —Grain	gal.		2.45	Water	"	.10		Carbonate, light, fine pd.	lb.		.05	95%	"	1.86	
Refined wood, 95@97%	"		.60@.65	<b>Chrome Ore</b>				Blocks	"		.07@.03	Permanganate	lb.	.09 <sup>1</sup> / <sub>4</sub> @.10 <sup>1</sup> / <sub>4</sub>	
Purified	"		1.20@1.50	(50% ch.) ex-ship N. Y.	lg. ton	24.75		Chloride, com'l	"		.01 <sup>3</sup> / <sub>4</sub>	Prussiate, yellow	"	.13 <sup>1</sup> / <sub>4</sub> @.14	
<b>Alum</b> —Lump	100 lbs.		1.75	Sand, f.o.b. Baltimore	"	33.00		Fused	"		.20	Red	"	.26	
Ground	"		1.80	Bricks, f.o.b. Pittsburg	M	175.00		Nitrate	"		.80	Sulphate, 80%	100 lbs.	2.11	
Powdered	"		3.00	<b>Clay, China</b> —Am. com., ex-				Sulphate	100 lbs.		.75@.95	96%	"	2.14	
Chrome, com'l.	"		2.75@3.00	dock, N. Y.	lg. ton	8.00		<b>Manganese</b> —Powdered,				Sylvinit	unit	.35 <sup>1</sup> / <sub>4</sub>	
<b>Aluminum</b>				Am. best, ex-dock, N. Y.	"	9.00		70@75% binoxide	lb.	.01 <sup>1</sup> / <sub>4</sub> @.01 <sup>1</sup> / <sub>2</sub>		<b>Quartz</b>			
Nitrate, com'l.	lb.		1.50	English, common	"	12.00		Crude, pow'd.	"			Salt—N. Y. com. fine	sh. ton	2.00	
Oxide, com'l, common	"		.06 <sup>1</sup> / <sub>2</sub>	Best grade	"	17.00		75@85% binoxide	"	.01 <sup>1</sup> / <sub>2</sub> @.02 <sup>1</sup> / <sub>4</sub>		N. Y. agricultural	"	1.50	
Best	"		.20	Fire Clay, ordinary	sh. ton	4.25		85@90% binoxide	"	.02 <sup>1</sup> / <sub>4</sub> @.03 <sup>1</sup> / <sub>4</sub>		<b>Saltpetre</b> —Crude	100 lbs.	3.20@3.37 <sup>1</sup> / <sub>4</sub>	
Pure	"		.80	Slip Clay	"	5.00		90@95% binoxide	"	.03 <sup>1</sup> / <sub>4</sub> @.05 <sup>1</sup> / <sub>4</sub>		Refined	"	4.25@4.62 <sup>1</sup> / <sub>4</sub>	
Hydrated	100 lbs.		2.90	<b>Coal Tar Pitch</b>	gal.	.08		Carbonate	"	.16@.20		<b>Silica</b> —Best foreign	lg. ton	10.00@11.00	
Sulphate, pure	"		1.50@2.00	<b>Cobalt</b> —Carbonate	lb.	1.75		Chloride	"	.04		Ground quartz, ord.	sh. ton	6.00@8.00	
Com'l.	"		1.15@1.25	Nitrate	"	1.50		Ore, 50%, Foreign	unit	.20@.21		Best	"	12.00@13.00	
<b>Ammonia</b>				Oxide—Black	"	2.28@2.30		Domestic	"	.30		Lump quartz	"	2.50@4.00	
Aqua, 18°	lb.		.03	Gray	"	2.28@2.40		Marble—Flour	sh. ton	6.00@7.00		Glass sand	"	2.75	
18°	"		.06 <sup>1</sup> / <sub>2</sub>	Small, blue ordinary	"	.20		Mercury—Bichloride	lb.	.77		Silver—Chloride	oz.	65	
20°	"		.06 <sup>3</sup> / <sub>4</sub>	Best	"	.08		N. Y. gr'nd, coarse	"	.03@.04		Nitrate	"	35	
20°	"		.05 <sup>1</sup> / <sub>4</sub>	<b>Copperas</b>	100 lbs.	.30@.35		Fine	"	.04@.05		Oxide	"	85@1.10	
<b>Ammonium</b>				Chloride	lb.	.18@.19		Sheets, N. C., 2x4 in.	"	.30		<b>Sodium</b>			
Carbonate, lump	"		.08 <sup>1</sup> / <sub>4</sub> @.08 <sup>3</sup> / <sub>4</sub>	Nitrate, crystals	"	.35		3x3 in.	"	.80		Bichromate	lb.	.06 <sup>1</sup> / <sub>4</sub>	
Powdered	"		.09@.09 <sup>1</sup> / <sub>4</sub>	Oxide, com'l.	"	.19		3x4 in.	"	1.50		Chlorate, com'l.	"	.07 <sup>1</sup> / <sub>4</sub> @.07 <sup>3</sup> / <sub>4</sub>	
Muriate, grain	"		.05 <sup>1</sup> / <sub>4</sub>	<b>Cryolite</b>	"	.06 <sup>1</sup> / <sub>2</sub>		4x4 in.	"	2.00		Hyposulphite, Am.	100 lbs.	1.90@1.65	
Lump	"		.08 <sup>1</sup> / <sub>4</sub>	<b>Explosives</b>				6x6 in.	"	3.00		German	"	1.70@1.90	
Nitrate, white, pure (99%)	"		.12	Blasting powder, A	25 lb. keg	2.65		<b>Mineral Wool</b>				Peroxide	lb.	.45	
Phosphate, com'l.	"		.09	"Rackarock," A	"	1.40		Slag, ordinary	sh. ton	19.00		Phosphate	"	.02 <sup>1</sup> / <sub>4</sub> @.03	
Pure	"		.12	"Rackarock," B	"	.25		Selected	"	25.00		Prussiate	"	.10 <sup>1</sup> / <sub>4</sub> @.11	
<b>Antimony</b> —Glass	"		.30@.40	Dynamite (20% nitro-glycerine)	"	.10		Rock, ordinary	"	32.00		Silicate, conc.	"	.03	
Needle, lump	"		.05 <sup>1</sup> / <sub>4</sub> @.06	(30% nitro-glycerine)	"	.14		Selected	"	40.00		Com'l.	"	.01	
Powdered, ordinary	"		.05 <sup>3</sup> / <sub>4</sub> @.07 <sup>1</sup> / <sub>4</sub>	(40% nitro-glycerine)	"	.15		<b>Nickel</b> —Oxide, No. 1	lb.	1.00		Sulphate, com'l.	100 lb.	.77 <sup>1</sup> / <sub>4</sub>	
Oxide, com'l white, 95%	"		.09 <sup>1</sup> / <sub>4</sub>	(50% nitro-glycerine)	"	.16 <sup>1</sup> / <sub>2</sub>		No. 2	"	.60		Sulphide	lb.	.01 <sup>1</sup> / <sub>4</sub>	
Com'l white, 99%	"		.12	(60% nitro-glycerine)	"	.18		Sulphate	"	.20@.21		Sulphite crystals	"	.02 <sup>1</sup> / <sub>4</sub>	
Com'l gray	"		.07	(75% nitro-glycerine)	"	.21		<b>Oils</b> —Black, reduced 29 gr.:				<b>Sulphur</b> —Roll	100 lbs.	1.85	
Sulphuret com'l.	"		.16	Glycerine for nitro (32-2-10° Be.)	"	.13 <sup>3</sup> / <sub>4</sub> @.13		25@30, cold test	gal.	.09 <sup>1</sup> / <sub>4</sub> @.10 <sup>1</sup> / <sub>4</sub>		Flour	"	1.90	
<b>Arsenic</b> —White	"		.03 <sup>1</sup> / <sub>4</sub> @.03 <sup>3</sup> / <sub>4</sub>	<b>Feldspar</b> —Ground	sh. ton	8.00@9.00		15, cold test	"	.10 <sup>1</sup> / <sub>4</sub> @.11 <sup>1</sup> / <sub>4</sub>		Flowers, sublimed	"	2.15	
Red	"		.06 <sup>1</sup> / <sub>4</sub> @.07	Flint Pebbles—Danish, Best	lg. ton	14.75		Zero	"	.11 <sup>1</sup> / <sub>4</sub> @.12 <sup>1</sup> / <sub>4</sub>		<b>Talc</b> —N. C., 1st grade	sh. ton	13.75	
<b>Asphaltum</b>				French, Best	"	11.75		Summer	"	.09 <sup>1</sup> / <sub>4</sub> @.09 <sup>3</sup> / <sub>4</sub>		N. Y., Fibrous, best	"	10.20	
Ventura, Cal.	sh. ton		32.00	<b>Fluorspar</b>				Cylinder, dark steam ref.	"	.08 <sup>1</sup> / <sub>4</sub> @.10 <sup>1</sup> / <sub>4</sub>		French, best	100 lbs.	1.25	
Cuban	lb.		.01 <sup>1</sup> / <sub>4</sub> @.03 <sup>1</sup> / <sub>4</sub>	Am. lump, 1st grade	sh. ton	\$14.40		Dark, filtered	"	.11 <sup>1</sup> / <sub>4</sub> @.15 <sup>1</sup> / <sub>4</sub>		Italian, best	"	1.62 <sup>1</sup> / <sub>4</sub>	
Egyptian, crude	"		.05 <sup>1</sup> / <sub>4</sub> @.06	2d grade	"	13.90		Light filtered	"	.14 <sup>1</sup> / <sub>4</sub> @.17 <sup>1</sup> / <sub>4</sub>		<b>Tar</b> —Regular			