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THE VOLCANIC convulsions, which have just laid waste the islands of Martinique and St. Vincent, are too recent to permit of any study by geologists; in fact, we do not yet know their full extent, and the eruptions are not at an end. The extraordinary loss of human life—the greatest on record from a similar cause—is the result most to be regretted. The convulsions are the most serious known in modern times, with the exception of the Krakatoa eruption in 1883; and that caused a comparatively small loss of life, taking place on a desolate island in the Straits of Sunda and not in a densely peopled country like Martinique.



IN OUR issue of April 5, we referred to the Mond process for extracting nickel as being not so great a success as the projectors anticipated. We are informed that as the new works at Clydach, in Glamorgan, South Wales, are not yet completed, the process has not been fully tested on the large commercial scale contemplated when the company was formed in September, 1900, to operate the process. The works should be started in a few months, and as the process is a novel one, some considerable time will necessarily elapse after starting before the actual value of the process can be demonstrated.



A REPORT recently issued by the State Department estimates that at least \$200,000,000 of capital from the United States is invested in Mexico. The exact figures, are of course, impossible to ascertain; but we have frequently called attention to the large amounts which were being put into mining and other enterprises in Mexico. In mining especially our sister Republic presents a most inviting field for enterprise, and our people have not been slow to take advantage of it. These investments are benefits to both nations, giving them mutual interests which tend strongly to the promotion of friendship and understanding. We hope shortly to refer to this subject in detail.



THE PRODUCTION of zinc by the electrolytic process devised by the late Dr. Hoepfner at Brunner, Mond & Company's works at Northwich, England, is now about 1,000 tons a year. The process is admittedly a troublesome one in many ways, and but for the fact that the product is of a high degree of purity, and for this reason is in demand at an increased price, it is doubtful whether it would continue in existence. Practically the whole output is supplied to cartridge manufacturers, who use it in preparing special copper-zinc alloys. The process is of some importance to the firm, as it helps in the recovery of chlorine from calcium chloride, which at present is a waste product in the ammonia-soda process. The process, however, will in all probability never have a very wide application.



THE ADVICES from Beaumont, Texas, indicate that there has been a decided decline in the pressure which produced the record-making "gushers." The present conditions are demoralizing the speculating element, but the conservative operators are said to view the situation with equanimity and to see no cause for alarm. But some of the companies heavily

capitalized on one thirty-second or one sixty-fourth of an acre and owning one well which cost, say, \$5,000 or \$10,000, are believed to be "up against" a difficult proposition. These are endeavoring to persuade the public that the pressure is as great as ever. To every one familiar with the oil-producing industry the falling off in the pressure is a perfectly natural consequence of the unrestrained exploitation of the field. It will doubtless have a salutary effect. The industry will now get down to a business-like basis, and into the hands of conservative organizations. It was not until this happened that stability of prices or profitable operations could be established.



ONE OF the evidences of our increasing trade with South Africa is the number of steamers advertised at present as sailing from New York to African ports. For some years such steamers have been sailing at irregular intervals, as business demanded; at present there is a regular line with monthly departures, besides several "tramp" steamers in the trade. The boats of the regular line stop at Cape Town, East London, Port Elizabeth, Natal and Delagoa Bay, the trip to the last named port taking about 30 days. To Cape Town the time is little longer than that taken by the steamers from London. We hear no complaint of lack of freight; the only difficulty experienced is in unloading at the African end, or rather in the railroad transportation from the ports to Johannesburg or other points in the Transvaal. So much of the railroad capacity is still taken up by the transportation of military supplies, that commercial freight is subject to many delays. Notwithstanding the drawbacks, the steamship service seems to be on the increase, which indicates a growing trade, that may be developed to very large proportions when peace is finally restored.



THE FIRST really important judicial statement as to the Whitaker Wright methods of promotion has recently been made in the High Court in London. A shareholder was suing Mr. Whitaker Wright for damages for losses caused by the flotation of the Standard Exploration Company. He alleged that the prospectus concealed vendors' profits, and that certain statements as to options were untrue. The judge found for the plaintiff and characterized the prospectus as false and misleading. Mr. Whitaker Wright has appealed, and in the meantime English newspapers are prevented from commenting on the case. One of the points of the prospectus that was judged to be false was the statement that the company had secured valuable options on the Pandé Basin, said to be a phenomenally rich gravel property on Baranoff Island, Alaska. It appears that no record of such an option is to be found in the books of the company, so its existence is presumed to have been confined to Mr. Whitaker Wright's imagination. At the time of flotation this alleged option was sceptically referred to in our London correspondences, and later on Mr. Wright airily told the shareholders that the option had not been exercised, and that he had never known whether it was worth a cent or not. It was noted as a sample of Whitaker Wright finance. While there is an appeal pending it is impossible to say or do anything

further in the matter, but if the present judge's opinion is upheld in the higher court it is obvious that something further will be done.

We may add that the Pandé Basin property is no more heard of, though some good men were deceived at the time by its promoter's assertions. The story of this property has heretofore been told in our columns.



THE ANTHRACITE LABOR SITUATION.

The positions of the anthracite operators and miners regarding the points at issue in the labor controversy remain unchanged from last week. A general convention of delegates of the United Mine Workers assembled at Hazleton on May 14. It is generally understood that the strike sentiment has been strongest in the Lackawanna and Wilkes-Barre regions, while in the Schuylkill and Lehigh the feeling is less radical. This is largely because of the greater aggressiveness of the labor leaders in the northern field. President Mitchell of the mine workers has maintained a conservative attitude, and is probably opposed to a strike at this time when all conditions favor the operators. It is said that the miners in their recent conferences with the operators before the Conciliation Committee of the National Civic Federation asked for an eight-hour day, with the same wages as now paid for 10 hours, a ten per cent increase in wages for all day labor and a five per cent increase for contract mining; in addition they asked that a minimum wage scale be established and that all coal be weighed as it comes from the mine. The operators, it is said, maintained that the financial condition of the large mining and transportation companies did not justify any increase in mining costs unless accompanied by a corresponding increase in the price of coal and that public sentiment and the competition of bituminous coal rendered an increase in the price of anthracite unadvisable.

As we pointed out last week, what should be purely a business question has been distorted by political considerations, and the actual facts concerning the miners and their earnings have not been given to the public. It was to be hoped that the miners before deciding to strike would make a plain statement of their demands and give the facts regarding their present earnings as compared with their earnings three or four years ago. The operators could have stated their side, and the public would have an opportunity to decide on the merits of the case. It is our opinion that the miners have never been as well off as they are to-day, and that if the points at issue were plainly stated, public sentiment would be against the radical demands reported to have been made by the miners.

In case of a strike at this time there will probably be an increase in retail prices for coal throughout the country, since retail dealers generally have small supplies on hand; but such an advance will probably affect the public slightly since in the rural districts wood is largely used for fuel during the summer, and in villages and cities oil and gas. The chief sufferers will be the users of steam sizes of anthracite, particularly in large cities, such as New York, that have smoke ordinances; but bituminous coal which has been hard to get along the Atlantic seaboard, is now in better supply than it has been, and many industrial concerns that use the steam sizes of anthracite might get along on bituminous. The outlook for a strike is certainly much worse than a week ago, but it is quite likely that at the last some compromise measures may be adopted. All the anthracite mines have been closed, pending the decision of the Hazleton convention, and will probably remain closed

some time if a strike is ordered. Yet the miners are not all in favor of remaining idle indefinitely, and if a strike comes it may resemble that of the steel workers last summer, and not last as long as some people anticipate.



COAL MINE ACCIDENTS IN PENNSYLVANIA.

The advance report of the Bureau of Mines of Pennsylvania for 1901, referred to in last week's issue, furnishes some interesting statistics of the accidents in the coal mines of that State in 1901. The total number of employees killed in the mines during the year was 814, while 1,899 in addition were injured; making a total of 2,713 casualties reported. These accidents are reported separately for the anthracite and the bituminous fields, which is desirable, considering the widely differing nature of the mines in those fields.

The report for the anthracite field—in which a total of 59,905,951 tons was mined—is given in the following table, in comparison with that for 1900:

	1900.	1901.	Changes.
Total persons employed..	143,826	147,651	I. 3,825
Average days worked....	171	194.5	I. 23.5
Approximate total days work	24,594,246	28,718,120	I. 4,123,874
No. of persons killed....	411	573	I. 162
No. of persons injured...	1,057	1,243	I. 186
Total casualties.....	1,468	1,756	I. 288
No. killed per 1,000 employed	2.86	3.47	I. 0.61
No. injured per 1,000 employed	7.35	8.42	I. 1.07
Total casualties per 1,000	10.21	11.89	I. 1.68
No. killed per 1,000 days' work	0.017	0.018	I. 0.001
No. injured per 1,000 days' work.....	0.043	0.043	I. ...
Total casualties per 1,000	0.060	0.051	I. 0.001

At first sight there appears to have been a large increase—25 per cent in deaths and 18 per cent in injuries—but this is materially reduced when the average per 1,000 employees is obtained. If we carry the comparison further, to the averages per 1,000 days' work, the increase practically disappears, and the figures for the two years are substantially the same. It is somewhat disappointing that they should have been the same and not lower; but there have been no conditions to effect any material change. While there were no accidents involving many casualties, work has been pushed actively in most of the collieries, and this is usually a condition involving some neglect of the usual precautions.

The preliminary statement does not give the causes of the accidents, and for these we must wait the full report.

The accidents in the bituminous coal districts are shown in the following table, also in comparison with 1900:

	1900.	1901.	Changes.
Total persons employed..	109,018	117,602	I. 8,584
Average days worked....	219	216.25	D. 2.75
App. total days' work....	23,874,942	25,431,433	I. 1,556,491
No. persons killed.....	265	301	I. 36
No. persons injured.....	584	656	I. 72
Total casualties.....	849	957	I. 108
No. killed per 1,000 employed	2.43	2.56	I. 0.13
No. injured per 1,000 employed	5.36	5.58	I. 0.22
Total casualties per 1,000	7.79	8.14	I. 0.35
No. killed per 1,000 days' work	0.011	0.012	I. 0.001
No. injured per 1,000 days' work.....	0.024	0.026	I. 0.002
Total casualties per 1,000	0.035	0.038	I. 0.003

Here again we find a considerable increase in the number of casualties, which is also reduced to very small proportions when the averages per 1,000 employees and 1,000 days' work are calculated. Here,

too, the conditions were practically the same as in the anthracite field, and the increase in accidents was nearly parallel to that in the number of employees. In busy times the increase in accidents is very apt to be greater, as there are often many inexperienced men at work.

The proportion of accidents in the bituminous mines is very much less than in the anthracite region. Last year the final averages showed a ratio of deaths 50 per cent higher and of injuries 65 per cent higher in the anthracite country than in the bituminous region. The explanation is found in the fact that the anthracite collieries are generally deeper, more fiery and more difficult to work than those in the bituminous field; while the latter also include a much greater proportion of new openings, carefully made and ventilated, and furnished with the latest appliances.



MARKET CONDITIONS.

Conditions in the iron market continue practically the same as those we have reported for two or three weeks past. In raw materials there is still some search for pig iron and billets by smaller concerns whose supplies have run short, but comparatively little new in the way of large contracts. Premiums continue to be paid for early deliveries, especially of pig iron. There has been some talk of speculative re-selling, but this appears to be doubtful. In finished material the demand continues very large, the special call just now being for structural steel in moderate sized lots for builders. For these, a considerable advance is charged on quoted prices, the premiums depending upon the necessities of the buyers. There is nothing specially new to report concerning imports, though advices from the other side indicate that the German furnaces and steel makers are building considerable hopes upon the sale of pig iron and billets to American buyers. At present, however, they are disposed to spoil their market by refusing to make concessions, but these may come later.

The Western coal market continues to depend mainly upon the railroads. The rush of coal to the Lake ports has been seriously impeded by the short supply of cars and motive power, and shippers are finding a great deal of fault because of the slowness of the roads meeting their demands. It certainly appears as if the carriers had done much less than they might during the past winter in the way of supplying themselves with the required equipment. The movement of coal on the lakes has been delayed by slow deliveries at the ports and a number of vessels have given up waiting for cargoes and have gone up to Lake Superior light. The demand for coal in the Northwest is strong and the delay in shipment is causing a good deal of inconvenience. Outside of the lake trade the conditions are very much the same. Shippers are full of orders and, as a rule, are selling the coal mined faster than they can get it carried to the consumer.

The seaboard bituminous coal trade shows about the same conditions that we reported last week. Orders are being worked off and the trade is gradually getting down to a good running basis for the summer. Coastwise vessels are still in rather short supply, and, as a rule, are loaded as fast as they get into port.

The anthracite trade is practically at a standstill, everything depending on the strike conditions, which are discussed in another article.

In the metal markets copper shows some improvement. Business has been fair and the leading seller shows some disposition to advance prices, reversing its policy of the past few months. Consumption remains large, and although buying just now is only

moderately active, there is no doubt that the stocks in consumers' hands are being worked off. A fair demand for export is also noted.

In other metals business continues good. The demand for tin is steady and prices are well supported. Lead shows no change either in price or demand and very much the same can be said of spelter. Business conditions are generally good, and should there be any further improvement in copper, the metal markets may be considered strong. Silver, however, remains very weak.



DEEP MINING IN THE TRANSVAAL.

The criticism of the valuable paper presented before the American Institute of Mining Engineers by Mr. John Hays Hammond on "Deep Mining in the Transvaal," which was presented by Mr. Thomas H. Leggett at the meeting in Philadelphia this week, is given in full on another page. It will be found a valuable contribution to an exceedingly important subject; and it is further interesting as showing the different points of view adopted by two eminent mining engineers both thoroughly acquainted with the region and with the work which has been done there. Part of the divergence of their views must be expected as the result of the personal equation, that is, of the different temperaments and habits of thought which will always find place in an article of this kind. On some points Mr. Leggett is inclined to take a more sanguine view than Mr. Hammond, while upon others, the reverse is the case. A careful comparison of their views will probably enable the reader to form a very correct idea of the actual condition and future prospects of the Transvaal.

Upon one point there is no room for a variation of opinion. There can be no doubt that within a year from the final pacification of the country—of which there now seems to be a fair prospect—the Transvaal will resume its place as the leading gold producer of the world, and that an output of, at least \$100,000,000 a year in gold may be expected for some time to come.

It will be noted that Mr. Leggett is inclined to give the Witwatersrand mines a longer life than Mr. Hammond, although he does not express any decided opinion as to the depth to which mining can be practically or profitably extended. As to this question, the extraordinary nature of the banket deposits of the Transvaal enables us to form a much more definite opinion than in any other known gold mining district, and it will be noted that the difference of opinion as to time does not extend to more than 5 or 10 years.

On this point it seems to us that the final decision will depend rather upon the financial than the technical points involved. It will not be a question as to whether it will be possible to take ore from the Johannesburg reefs to a depth of 7,000 or 8,000 feet; the main point will be whether at these great depths operations can be conducted at a profit. This point was very carefully discussed in Mr. Denny's recent work on "Deep Mining on the Witwatersrand," but there is still much to be said on the question, and the probability is that actual experience will be needed to decide it.

One point which has not been mentioned so far in the discussion, but to which attention will undoubtedly be called later, is the amount of taxation which will be required for the support of the new Colonial Government and for the payment of that share of the expenses of the war which the British Government will eventually be compelled by public opinion to impose upon the mining interests. While the change of government will undoubtedly result in a saving in mining costs from the abolition of monopolies, the re-

duction in railroad rates and the possible reduction in wages, there will be for years to come heavy taxation in other forms. Already we hear bitter complaints from Johannesburg as to land taxes, stamp taxes and other impositions levied by the new government. Part of this, perhaps, is the natural opposition to any form of taxation which we find everywhere, but it goes to show that the mines will not, and cannot, escape from payments which in the end may be as great, or possibly greater, than the profits paid to the Netherlands Railway and the Dynamite Trust. The pacification and reorganization of the Transvaal will be a costly work, extending over years of time, and the mines cannot escape their payment of by far the greater share of this cost.

The problem of the future in South Africa will be to devise the most stringent reduction in costs in every direction; to operate with large capital and on a great scale. In this way only can the probable great production of gold be made to give a profit to the producers.

THE NACOSARI GAS PRODUCER PLANT.

In the ENGINEERING AND MINING JOURNAL May 11, 1901, there was described a gas producer and engine plant erected at the Nacosari copper mines in Mexico, by the Loomis-Pettibone Company. In a paper read by Dr. James Douglas before the Iron and Steel Institute in London, some interesting details are given of the operation of this plant, which we take from the paper as follows:

As it is bituminous coal that is generally used in the generator and then coked, the gas thus obtained is of excellent quality; after having passed down through the hot fuel bed is free from tar, and may readily be conveyed through pipes to any required distance. Instead of making water-gas in every alternate stage for the same length of time as producer-gas, the generator may be worked on producer-gas alone, steam being then admitted at various points, while the exhauster is running and the operation of making producer-gas is going on. It is therefore not requisite to alternate the action of the generators so frequently as every 4 to 6 minutes; but only so much water-gas need be made as may be called for by the requirements of the work to which the process is applied.

The process is modified at the Nacosari works with a view of making a uniform gas of calorific power higher than producer-gas and lower than water-gas. This is effected by introducing very little steam with the air, and drawing the steam and air almost continuously downward through the incandescent fuel. Every half-hour or so the heat of the burning fuel becomes excessive, the feed port is closed, and steam alone in a larger volume is drawn through the layer of fuel. In 2 or 3 minutes the temperature is sufficiently reduced to permit of the door being reopened and the mixed air and steam being supplied to the charge. The charge of coal, when mineral fuel is used, need not be more than 5 or 6 feet in thickness; and as the most active combustion occurs in the upper layer of the charge, clinkers form on the surface rather than on the grate bars. When using Western coals high in ash, this involves letting out the fires and cleaning out one set of generators weekly. The effect of thus drawing the gas, whether water-gas or producer-gas, through a layer of incandescent fuel, is to decompose the tar and all volatile products of combustion so perfectly that little more than a trace escapes to the scrubber, and none reaches the gas engines, which are situated 400 feet from the gas holders.

When using wood, a layer of incandescent fuel, coke or charcoal, must be ignited on the grate bars of the generator before the feeding of wood billets commences. The Nacosari generators, having been designed for coal fuel, are only 6 feet 9 inches internal diameter, and it is found desirable to cut the green wood into lengths of 18 inches, which are fed in the

same way as coal through the open port. The wood at Nacosari consists of inferior oak, and is fed without previous drying into the generators. The feeder, who can see the surface of the charge perfectly, is careful to prevent the formation of cavities, whether the fuel is wood or coal. When using wood, a stack of billets cut into smaller lengths is at hand on the feed floor for the purpose of correcting irregularities in the surface of the charge. When using wet wood the mixed water and producer gas is made without the injection of any steam, the water in the freshly cut wood supplying the necessary steam.

A series of tests of the producer-gas from coal, extending over several days, gave an average analysis as follows: H, 19.90; CO, 13.04; CH₄, 2.57; CnH_nN, 0.33; CO₂, 16.00; O, 0.10; N, 48.00. The calorific test gave an average, reduced to 62° F. and sea-level, of 136.36 British thermal units. A number of tests made on wood-gas gave a maximum of 123.9 British thermal units actual, equivalent to 146.5 thermal units when reduced to 62° F. and sea-level; and a minimum of 104.8 units actual, or 122.4 reduced.

The efficiency of the mixed gases, whether made from wood or coal, is substantially the same in the gas engines. The engines are direct belted to generators, which give continuously, with wood or coal gas, 48 kilowatts per generator, equal to 70 brake horse power per engine. The capacity of the engines is reduced, due to the works being at an elevation of 3,500 feet above the level of the sea. A gas as high in hydrogen as the wood-gas would give much trouble from back-firing in the engine. No inconvenience, however, is experienced on that score, which is probably due to the retarding influence of the high percentage of carbonic acid.

The exact quantity of gas generated per ton of coal and ton of wood has not been measured, but the consumption, per horse-power hour, of coal carrying about 20 per cent of ash, accurately measured electrically, is 1.5 pounds, while the consumption of wood is almost exactly 3 pounds per horse-power hour.

PETROLEUM IN WESTERN AUSTRALIA.—A mineral oil deposit is said to have been discovered near the mouth of the Warren River, in Western Australia. The Government has allotted an area of land to the prospectors.

PIG IRON PRODUCTION IN GERMANY.—The output of the German blast furnaces in March was 662,713 metric tons of pig iron, being 65,379 tons more than in February, and only 9,882 tons less than in March, 1901. For the three months ending March 31 the output was as follows, in metric tons:

	1901.	1902.	Changes.
Foundry iron.....	384,808	402,251	I. 17,443
Forge iron.....	388,270	307,439	D. 80,831
Bessemer iron.....	115,689	94,716	D. 20,963
Thomas (basic) pig.....	1,103,248	1,112,329	I. 9,081
Totals	1,992,015	1,916,735	D. 75,280

The loss this year has been wholly in forge irons and bessemer pig, foundry and basic irons showing gains.

SPITZBERGEN COAL DEPOSITS.—According to the *Thjems Adr*, a company of Drontheim, Norway, which owns coal deposits in Spitzbergen, proposes to incorporate a joint-stock company with a capital of 350,000 kroner (\$93,800). As soon as 250,000 kroners (\$67,000) have been subscribed the company will start work. The shipping of the coal will take place in the summer. The company intends to construct a rope tramway capable of carrying 60 tons per hour. It is calculated that the coal can be delivered at Drontheim at a cost of from 7.27 to 8.85 kroner (\$1.95 to \$2.37) per ton. Freight rates are about 67 cents per ton. It is believed that the mines will give an annual production of 25,000 tons. Later on, 50,000 tons should be yearly produced. The deposits in some places are not less than 9 feet thick.

THE PHILADELPHIA MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS

SPECIALLY REPORTED.

The eighty-second meeting of the American Institute of Mining Engineers was called to order in the lecture room of the Manufacturers' Club, Philadelphia, Tuesday afternoon, May 13, at 3 o'clock. The session began with an informal address by ex-President John Birkinbine, chairman of the local committee, who stated that the somewhat usual custom of having an address of welcome by city dignitaries was, in the present occasion, dispensed with. He assured the members of a hearty welcome and on behalf of the Manufacturers' Club presented the use of the club-house to the Institute for holding sessions and as a general assembly place during the meeting. Each member upon arriving was requested to register and was presented with a neat numbered badge, the programme of the local arrangements and tickets for the excursions and entertainments provided.

President E. E. Olcott responded to Mr. Birkinbine's welcome in a few well chosen words, and then proceeded with the regular business of the session, the first of which was a tribute to the memory of Clarence King, whose death occurred in December last. Few more eloquent eulogies on deceased members of the Institute have been pronounced. Dr. Raymond had secured from King's old friends and comrades, Messrs. James T. Gardner, S. F. Emmons, and James D. Hague a number of personal reminiscences of King, all of which, together with some of Dr. Raymond's, will be combined into a biographical sketch to be printed later in the *Transactions*. Mr. Raymond's address at the session was almost entirely extemporaneous, but it was delivered with his accustomed oratorical effect. The principal feature brought out was the wonderful power exercised by King over men, whether enlightened, savage, or members of Congress, and his extraordinary powers of divination. His ability to judge a man, an animal and a geological problem was one of his great traits, and with them all a nature full of humor, kindness, and sincerity. These various charms which made him a real king among men were illustrated by anecdotes, some bright and humorous, some of daring and danger, some essentially of pathos. In closing his address Dr. Raymond said that an ambition for learning and progress such as was possessed by Clarence King did not end with the life of his body. "An avalanche that has gone a mile cannot be stopped by a tombstone."

The second paper on the programme was on the "Use of Ordinary Cameras in Accurate Photographic Surveying," by Mr. Howard W. DuBois, of Philadelphia. Mr. DuBois, who spoke without notes, illustrated his paper with lantern slide pictures and showed how with a carefully constructed camera a system of triangulation could be carried on, and a mountainous region mapped with a great deal of accuracy.

The concluding paper of the session was a description of a method of making puddled iron by the use of mechanical means, by Mr. James P. Roe, of Pottstown, Pa. This was an exceedingly interesting paper and called out quite a lively discussion which was participated in by Messrs. John F. Wilcox, Wm. R. Webster, Dr. Raymond and Mr. Olcott. The session adjourned at 5.30 P. M.

The evening session began at 8.15 and was limited to one hour. It was devoted to the presidential address by Mr. E. E. Olcott, and a paper on the Cement Industry, by Mr. Richard L. Humphrey. Mr. Olcott selected for his subject the industrial combinations and their effects on individual effort, the tendency towards secretiveness as regards processes and methods and the ultimate results of such action.

In concluding the president spoke as follows, on the effect of combinations on the work of the Institute: "Our own and similar scientific institutes are largely dependent for valuable contributions on the young workers, sometimes the geniuses, formers of advance thought, sometimes the diligent plodders and methodical workers who note every detail and put

it in sufficiently good form to make it interesting to others. The usual management of monopolies, or great trusts, directed by a governing committee, perhaps with a president receiving a princely salary, gives its subordinate technologists to understand that descriptions and information are not to be given out, excepting with the previous examination and approval of the committee or the president. They or he, as the case may be, lay more stress on the necessity for secretive methods than on any possible advantage from reciprocity of ideas from other workers. The average rich director in a huge organization thinks more of keeping private the process in use than of improvements. The highly paid and usually overworked president is sometimes afraid of the bright man under him who wants to publish descriptions of the company's processes, or if he has a more liberal spirit and a more kindly disposition towards his subordinates, the limitations of physical endurance make it impossible for him even to look over proposed descriptions. For sheer lack of time the draft proposed for publication lies unread till the only reply that can be made is by negative. The result too often, from one cause or another, is the discouragement of the aspiring youth who wants to write up the processes. He has viewed seeing himself in print as the surest stepping-stone to professional advancement and becomes more or less discouraged. This is the worst possible condition for any man. We all remember the Western advertisement, 'Wanted—an experienced man in my business. No discouraged man need apply.'

"To repeat the idea, the master minds in monopolies are too apt to see safety in secretiveness, being content to let well enough alone; they forget that it is to the young and subordinate men who have time, strength and opportunity to study details that they must look for radical improvement. The young men being restricted in their liberty of publication lose one great incentive to effort. They themselves may not advance to their full capacity, or may secretly resent the curb on liberty of full speech and look for the first chance for changing employment. It is lamentable how many young men holding important trade and manufacturing secrets are eager for a chance to go into new companies. It does not augur for the best that the great corporations detract from the aspirations of the young scientists. Publicity is certainly a spur to progress. Competition is the life of trade. Give to your professional peers results and receive from dozens or hundreds of them details of what they have done. We are not making these reflections in any but the most kindly of spirits. It is not from lack of charity or ultra conservatism alone that the results noted spring, but largely from the high pressure under which the master minds of the day are working."

As the following day was to be spent in visiting the Edison Cement Works at Phillipsburg, N. J., Mr. Humphrey's paper was especially interesting. It gave in brief the history of cement making from the earliest time (4,350 B. C.) to the present date, and particularly illustrated the great strides made by the United States in recent years. Lantern slide views of old and modern methods, of the recent applications in structural work, and of diagrammatic charts brought out the wonderful growth of this industry during the last few years, and substantiated Mr. Humphrey's claim that this was a cement age.

Upon the conclusion of Mr. Humphrey's paper some of the veterans were given an opportunity to relate some of their reminiscences in imaginary camp-fire style, although the large number of young members and ladies present seemed to somewhat retard the flow of the talk on old times. The occasion was introduced by Mr. Birkinbine, the local chairman, who naturally called upon Dr. Raymond to begin, as he was one of the original members and practically the organizer of the Institute. He was followed by the one old-timer who seems to have found the Ponce de Leon spring of eternal youth, Pechin, late of Dunbar, but now of Buchanan. The first editor of the *Transactions*, Dr. Thos. M. Drown, in whose footsteps Dr. Raymond claims to have simply trodden,

added to the interest of the occasion and he was followed by Mr. Olcott, who concluded the camp-fire talk. By special request Mr. Olcott's remarks were principally devoted to the stricken islands of Martinique and St. Vincent, which he visited a few years since.

The meeting was then adjourned in order to enable the guests to indulge in music and dancing, and to partake of the collation mercifully provided by the local committee.

PROGRAMME OF THE MEETING.

The account of the first day's proceedings is given above. The programme for the remaining days, as arranged by the local committee, will be found below:

Wednesday, May 14.—The day will be devoted to a visit to the Edison Cement Works, near Phillipsburg, N. J. A special train will leave Broad Street Station of the Pennsylvania Railroad at 8.55 a. m., stopping at Germantown Junction at 9.05. The party will return to Philadelphia by early evening.

Wednesday evening, May 14, at 8 o'clock.—A joint session of the Institute and the Franklin Institute, for papers and discussions at the Manufacturers' Club. At this session papers Nos. 5 and 7 on the list were presented in oral abstract, with illustrations by lanterns and otherwise. A number of others papers were presented by title.

Thursday morning, May 15, 10 o'clock.—A session at the Manufacturers' Club for papers and discussion. The papers assigned to this session relate to Specifications for Steel Forgings and Castings by William R. Webster, Philadelphia, and for Steel Rails, by William R. Webster, Philadelphia.

At this session, the discussion of specifications for steel forgings and castings was to take precedence of other topics.

Thursday afternoon, May 15, 1.30 o'clock.—Lunch served at Houston Club, University of Pennsylvania, followed by a session of the Institute in Houston Hall for papers and discussions.

Opportunity afforded for visits to the Museums, the Library, the new Morgan Physical Laboratory, the Engineering Laboratory and other departments of the University.

Thursday evening, May 15, 8.30 o'clock.—A reception to the officers, visiting members and guests of the Institute at the Academy of the Fine Arts, Broad and Cherry streets.

Friday, May 16.—Devoted to an excursion on the Delaware River, including visits to the shipyards of the William Cramp & Sons Ship and Engine Building Company, the New York Shipbuilding Company and the League Island Navy Yard, with planked shad luncheon. A steamer was to leave Arch Street Wharf at 9:45 A. M., returning in the evening.

Members who desired to visit local manufacturing establishments or public institutions during the days covered by the meeting of the Institute arranged to do so through the Committee on Arrangements. Parties were to be organized for such visits by the committee.

The local committee of arrangements is composed of the following gentlemen: John Birkinbine, chairman; Edward H. Sanborn, secretary; George F. Baer, Cyrus Borgner, Arthur Brock, Theron I. Crane, George C. Davis, James M. Dodge, Theo. N. Ely, E. C. Felton, F. Lynwood Garrison, H. L. Halderman, E. V. D'Inwilliers, Jawood Lukens, E. H. McCullough, Henry G. Morris, Henry G. Morse, T. D. Rand, Percival Roberts, Jr., P. G. Salom, Richard H. Sanders, C. E. Stafford, Henry T. Townsend, S. M. Vauclain, John P. Wetherill, Walter Wood.

PAPERS.

The following papers were accepted for this meeting:

1. Presidential Address, by E. E. Olcott, New York City.
2. Biographical Notice of Clarence King, by R. W. Raymond, James T. Gardiner, S. F. Emmons and James D. Hague, New York City.
3. The Use of Ordinary Cameras in Accurate Photographic Surveying, by Howard W. DuBois, Philadelphia, Pa.

4. The Cement Industry, by Richard L. Humphrey.
5. The Development of the Bessemer Process for Small Charges, by Bradley Stoughton, New York City.
6. The Effect of Re-heating upon the Coarse Structure of Over-heated Steel, by Karl F. Goransson, Sandviken, Sweden.
7. Steel Rails: Relations Between Structure and Durability, by Robert Job, Reading, Pa.
8. The Oil Fields of Texas, by Robert T. Hill, Washington, D. C.
9. The Metallurgy of Titanium, by Auguste J. Rossi, New York City.
10. Specifications for Steel Forgings and Steel Castings, by William R. Webster, Philadelphia, Pa.
11. The Present Situation as to Specifications for Steel Rails, by William R. Webster, Philadelphia, Pa.
12. Puddled Iron and Mechanical Means for Its Production, by James P. Roe, Pottstown, Pa.
13. The Original Southern Limit of the Pennsylvania Anthracite, by B. S. Lyman, Philadelphia, Pa.
14. The Calculation of the Weights of Castings with the Aid of the Planimeter, by Clarence M. Schwerin, New York City.
15. The Camp Bird Mine, Ouray, Colorado, and the Mining and Milling of the Ore, by C. W. Purington, Brookline, Mass., and Messrs. Thos. H. Woods and Godfrey Doveton, Ouray, Colorado.
16. Basaltic Zones as Guides to Ore-Deposits in the Cripple Creek District, Colorado, by E. A. Stevens, Victor, Colorado.
17. Igneous Rocks and Their Segregation (Differentiation) as Related to the Occurrence of Ores, by Josiah Edward Spurr, Constantinople, Turkey.
18. Lode-Structure at Cripple Creek and Kalgoolie, by T. A. Rickard, Denver, Colorado.
19. Diatom-Earth in Arizona, by William P. Blake, Tucson, Arizona.
20. The Tombstone, Arizona, Mining District, by John A. Church, New York City.
21. The Mineral Crest or the Hydrostatic Level Attained by the Ore-Depositing Solutions in Certain Mining Districts in Great Salt Lake Basin, by Walter P. Jenney, Salt Lake City, Utah.
22. The Mining Industry of the Cœur d'Alene, Idaho, by James Ralph Finley, Colorado Springs, Colorado.
23. The Old Rossie Lead Mines, by C. H. Smyth, Jr., Clinton, N. Y.
24. Silver Mining and Smelting in Mongolia, by Yang Tsang Woo, Tientsin, China.
25. Gold Mining in McDuffie County, Georgia, by W. H. Fluker, Tatham, Ga.
26. Notes on the Cost of Hydraulic Mining in California, by William E. Thorne, Georgetown, California.
27. The Gold Fields of the State of Minas Geraes, Brazil, by Herbert Kilburn Scott, Leeds, England.
28. Notes on Brazilian Gold Ores, by Orville A. Derby, Sao Paulo, Brazil.
29. The Manganese Industry, by E. G. Williams, Colombia, Republic of Colombia.
30. The Reactions of the Ziervogel Process and their Temperature Limits, by Robert Henry Bradford, New York City.
31. An Improved Furnace-Bottom, by Henry A. Mather, New York City.
32. The Effect of Tellurium on Brass, by E. S. Sperry, Bridgeport, Conn.
33. Determining the Size of Hoisting Plants, by Edward B. Durham, Trenton, N. J.
34. Tests of Impact Water-wheels, by Prof. R. C. Carpenter, Ithaca, N. Y.
35. Some Principles Controlling the Deposition of the Hydro-Carbons, by George I. Adams, Washington, D. C.
36. Remarks Upon the Theory and Practice of Valuing Mines, by H. D. Hoskold, Buenos Ayres, Argentine Republic, South America.
37. The Auditing of a Mining Company's Accounts, by Charles V. Jenkins, Rossland, British Columbia, Canada.

38. Growth of Pig Iron Production During the Past Thirty Years, by John Birkinbine, of Philadelphia.

In addition to these papers the Secretary presented several written notes and criticisms on papers read at previous meeting.

We give below summaries of a few of the papers read. Others will be given in our succeeding issues.

SPECIFICATIONS FOR STEEL FORGINGS AND CASTINGS, BY WILLIAM R. WEBSTER.

In view of the good results which have followed the wide discussion of the rail specifications of the American Section of the International Association for Testing Materials, I now offer for discussion its specifications for steel forgings and steel castings. It is not necessary to emphasize the importance of reaching definite conclusions on these subjects. Engineers, consumers and manufacturers are alike interested in securing good, reliable, uniform steel.

In this connection I would call particular attention to the important paper read by Mr. C. H. Ridsdale, last September, before the Iron and Steel Institute, as bearing on them. The discussion of these specifications will be practically a continuation of our former discussions on "The Physics of Steel."

We have passed through a period in which the chemical composition of steel has received the greatest prominence; but failures of steel forgings and castings of the best chemical composition have shown that we could not control the quality of the finished product by the chemical composition alone. It must be admitted that differences in the physical properties of the steel, greater than those due to small variations in composition are produced by heat treatment both in connection with the mechanical work of forging and otherwise. The present result is a strong tendency to deem the heat treatment more important than the chemical composition. I think the mean course is the safer. We should give them equal importance; for we know that to produce the best results we must start with a good uniform material, and employ also, under intelligent supervision, the best methods of manufacture and subsequent working.

The annealing of forgings and castings is much neglected. The manufacturers who are doing the highest class of work for our Government and other customers, under rigid specifications, assert that all such work should be annealed. Other manufacturers of a cheaper class of work claim that annealing is not necessary, and, in some cases, even go so far as to say it is injurious. They adduce results to prove their assertions. But it is only necessary to repeat the annealing under proper conditions to prove that the source of such alleged injury was in the method of annealing used. In many cases attempts are made to anneal forgings that have been finished at too high a temperature without first allowing them to cool down below the critical point. This is merely slow cooling, and makes the material much worse than it would be if allowed to cool in the air.

In consideration of such controversies, I would suggest that discussion be directed towards the heat treatment of steel, with an endeavor to decide some of the disputed points, and thus to improve the methods of manufacture.

Appended to this paper are the specifications adopted by the American Section, to the publication of which we recently referred.

SPECIFICATIONS FOR STEEL RAILS.

BY WILLIAM R. WEBSTER.

In this paper the writer refers to his paper presented at the Richmond meeting, and adds that in March, 1901, he addressed the American Society of Civil Engineers, requesting the appointment of a committee to investigate and report on standard rail sections, and giving the reasons why the matter should be taken up.

After careful consideration, the board of directors of the society, believing that the reasons in favor

of the appointment of the proposed committee outweigh those against such appointment, made the following recommendation:

That a special committee be appointed, as provided in the constitution of the Society, for the following purposes:

"To report upon the results obtained in the use of rails of the sections presented to the Society in annual convention, August 2, 1893, by a special committee appointed for that purpose.

"2. To report whether any modification of any said section is advisable, and, if so, to recommend such modification.

"3. To report upon the recognized practice as to chemical composition and mechanical treatment used in the manufacture of rails, and the manner of inspection of the same.

"4. To report upon the advisability of the establishment of a form of specification covering the manufacture and inspection of rails.

"5. If found advisable, to recommend a form of specification for the manufacture and inspection of rails."

This report was discussed; and the result of the subsequent ballot was greatly in favor of the appointment of the committee. This has recently been made; and the committee has been instructed to report on the five points recommended by the board.

There is no intention to change the section of the rails, if the mills, by changing their methods of rolling, can produce better structural results in heavier rails. On the other hand, if this cannot be done, and if, by a change of section, the manufacturers can produce a much better rail, the engineers are willing to meet them half-way, and decide the matter on its merits.

At their annual meeting in Niagara Falls, in June last, the American Section of the International Association for Testing Materials adopted their rail specifications.

On October 1, 1901, the Pennsylvania Railroad Company embodied in its new rail specifications the minimum shrinkage clause for a 30-foot rail, as follows: "The number of passes and speed of train shall be so regulated on leaving the rolls at the final pass the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot saws of more than $5\frac{1}{2}$ inches for 85 pound and $5\frac{3}{8}$ inches for 100 pound rails; and no artificial means of cooling the rails shall be used between the finishing pass and hot saws."

The company also made a new departure in the chemical composition of the steel, decreasing the carbon and manganese when the phosphorus is over 0.07 per cent, in order to give steel of equivalent hardness and avoid getting the steel too hard and brittle. The clause is as follows: "The steel of which the rails are rolled shall contain not less than 0.40 nor more than 0.55 per cent of carbon, where the phosphorus exceeds 0.07 of 1 per cent. Where the phosphorus is 0.07 per cent or less, the carbon shall not be less than 0.45 nor more than 0.60 per cent. The manganese in no case shall exceed 1.20 per cent; and where the phosphorus exceeds 0.07 per cent the manganese shall not be higher than 1 per cent. Also, in no case shall the phosphorus exceed 0.10 per cent.

In addition to the above, the company now advocates higher carbons, since its drop tests show that rails finished at a lower temperature give a greater deflection than formerly, when finished at the higher temperature. It also finds that higher carbons can be used with safety when the proper check is kept on the lower finishing temperature. It specifies a deflection of not more than $3\frac{3}{4}$ inches for 100-pound rails after the first blow.

In March, 1902, the Rail Committee of the American Railway Engineering and Maintenance of Way Association reported to the annual convention several modifications in rail specifications, the most important of which were a drop test from each heat of steel, instead of one from each fifth heat, and the introduction of a minimum shrinkage clause. They did not specify the amount of shrinkage, as they desire to

investigate the matter further. The height of drop specified for the heavier weights of rails was thought by some of the members to be too small in comparison with the height for the lighter rails. This point will be investigated and reported on.

The specifications, with the modifications referred to (and some other minor ones), were adopted by the association as its standard rail specifications.

The next step will be for Committee No. 1 of the American Section of the International Association for Testing Materials to take up for consideration the modifications of its specifications made at Chicago, and report them at the annual meeting in Atlantic City, N. J., on June 12, 1902. A cordial invitation will be extended to the members of all committees and associations who have discussed these rail specifications to attend and take part in the discussion. There is little doubt that the modified specifications will be approved by the American Section.

I have stated the present situation in detail, because the subject is one of the most important now before us, and contributions from all quarters will be pertinent, useful and welcome. The work thus far done will naturally form a basis for the new rail committee of the American Society of Civil Engineers, which has been directed to report a form of rail specification covering both the manufacture and the inspection of rails. That body will, no doubt, improve on the present specification, and bring matters up to date in every particular. When this has been done, the other societies will, no doubt, accept the result; and it is not too much to expect that we shall soon have in use American standard rail specifications reflecting credit upon all who have assisted in this important work.

Since the International Railway Congress meets at Washington, D. C., in 1904, there is no time to lose in the matter. The presentation on that occasion of such specifications, expressing a general agreement in American theory and practice, would, without doubt, greatly influence the action of the Congress in this department.

GOLD MINING IN THE TRANSVAAL.
BY THOMAS HAIGHT LEGGETT.

[With regard to the original paper by Mr. John Hays Hammond, of which this present is a criticism, the Secretary of the Institute makes the following special note: "The first pamphlet-edition of this paper was necessarily sent to press without revision by the author, who was out of the country. Moreover, the statistical tables which it contained had been compiled under his general direction, but from different sources; so that they presented small but annoying discrepancies. The present pamphlet-edition, approved by him and representing the paper as it will appear in Volume XXXI of the *Transactions*, is issued instead of a separate sheet of corrections. Meanwhile, however, a contribution, discussing the original pamphlet, has been received from Mr. Thomas H. Leggett, and will be published as received, though some of the statements and figures which it criticises have been changed by Mr. Hammond's final revision. (See 'postscript,' at the end of the paper.)

No further copies of the first pamphlet-edition of this paper will be distributed from this office; and members or others who have received it are requested either to destroy it (substituting the present revised edition), or to mark it in such a way as to show that it has been essentially modified by a later recension.—R. W. R.]

Mr. Leggett's criticism is given in full below, and should be read in connection with the original paper, which was presented at the Richmond meeting last year.

Mr. Hammond has given us a concise yet complete description of the Witwatersrand gold-fields, and the character of the operations which have resulted in their remarkable development. Of the many matters touched upon in his exhaustive description, there are a few that admit of further elucidation and possible correction. In mentioning these,

I follow, for the convenience of the reader, Mr. Hammond's titles.

Referring to the Lydenburg District, while it is quite true that there are some very rich gold-ores in the bedded veins of that section, these are now being worked on a very much larger scale than formerly, and the yield is no longer in ounces, as it used to be. The product for 1898 from four companies, operating 135 stamps, was at the rate of 14.09 penny-weights of gold bullion per ton, or about 0.7 ounces of bullion, and not 1.42 ounces gold, as stated. The seven companies operating in the De Kaap gold-fields in 1898 ran 200 stamps (not 180) to produce 89,760 ounces of bullion.

I. Mining Titles in the Transvaal.—The excellent character of the mining law of the Transvaal is worthy of more than passing notice. So clear and well-defined is it, that while every square foot of ground is taken up for a length of nearly 40 miles by a width of from 2 to 3 miles, lawsuits between adjoining properties are practically unknown; and, as a result, the mining-law expert does not exist on the Rand. The lawsuits that have arisen in connection with titles have been chiefly in settlement of disputes as to priority in the pegging or location of claims. Encroachments of the mine-workings of one company upon the property of a neighbor have been very rare, and when such do arise they are invariably settled without recourse to litigation.

It is quite true that "certain oppressive features of ground-taxation, monopolies, etc., form no part of the Mining Law proper;" but it is not quite clear just what the "oppressive features of ground-taxation" were that are said to have borne "with special weight on the mining industry." In the *Report* of Sir David Barbour on "The Finances of the Transvaal and the Orange River Colony," presented to both Houses of Parliament in June, 1901, it is stated (Art. 27): "The total receipts from prospectors' and diggers' licenses came to £389,643 in 1898, out of which £178,203 was paid to land-owners, giving a net receipt by the State of £211,440."

As the value of the gold output of the Transvaal for 1898 was stated by the Johannesburg Chamber of Mines to be £16,044,135, the above tax represents about 1.25 per cent of this gold output, or, compared with the value of the mineral land upon which it was levied, as it more properly should be, it would represent but a very small fraction of 1 per cent, since that value would exceed a hundred millions sterling.

Sir David Barbour further says (Art. 28): "The payment on a prospector's license being 5 shillings a month, and on a digger's license 20 shillings, it is to the advantage of the mining companies to hold their claims under prospecting licenses as long as possible; and I have reason to believe that a considerable sum is lost to the State, owing to the mines taking out fewer diggers' licenses than they ought to do. Attention should be paid to this matter, etc. . . . On all 'mynpachts' the Government is entitled to claim at any time 2.5 per cent on the gross production of gold instead of 10 shillings per morgen, but this provision has not hitherto been enforced." The italics are mine.

Under the head of "Land Tax" (Art. 30), Sir David Barbour says "the direct taxes on land are very light." According to the evidence of this impartial English expert, therefore, it seems that the facts do not warrant the use of the word "oppressive," but quite the contrary. Indeed, it would be more correct to describe the admittedly reasonable ground-taxation as "unequal," inasmuch as the mining licenses bear somewhat heavily on the prospector and small holder of claims, and perhaps too lightly upon the mining companies and rich corporations. The chief monopoly bearing directly upon the mining industry is that of dynamite. According to the State Mining Engineer's reports and other available data, explosives, including fuses and detonators, represent about 9.66 per cent of the working-costs of the mines. A free market in dynamite would have effected a saving of about 3 per cent of these working-costs. The reduction of 20 shillings per

case, granted October 31, 1901, by virtue of which the old dynamite monopoly is allowed to continue operations, will effect a reduction of working-costs of about 2 per cent.

On page 2 the statement is made that "a reef-claim (lode-claim) is 100 Cape feet (103.3 English feet) on the strike of the reef, etc." This should read, "150 Cape feet (154.95 English feet), etc."

III. Historical and Commercial Notes—1. *Financial Conditions*.—In 1898 there were but 77 companies (not 79) "operating stamp-batteries" or other crushing-mills; and, of these, one closed down early in the year, having produced (presumably from its clean-up) but 109 ounces of gold, while another produced but 762 ounces from a single crushing of 2,000 tons of ore.

These companies produced 4,295,609 ounces of gold bullion, 841.4 fine, equal to 3,614,385 ounces of gold, worth £15,141,376. Forty-one of them distributed the stated amount (£4,847,505) in dividends, being 8.6 per cent on their market capitalization, or 26.2 per cent of their issued capital (£18,512,000) at par. I am unable to obtain the figures of nominal and market capitalization of these 77 companies arrived at by Mr. Hammond, namely, £34,000,000 and £92,700,000 respectively, my results being as follows:

	Capitalization.		Dividend paid in 1898 represents.	
	At par.	At market price.	On par.	On market price.
77 Producing Companies—				
Nominal capital.....	£31,018,000	£82,555,000	15.6	5.9
Issued capital.....	29,454,000*	79,403,000	16.5	6.1
41 Dividend-paying Companies—				
Nominal capital.....	19,178,000	57,948,000	25.3	8.4
Issued capital.....	18,542,000	56,200,000	26.2	8.6

*Outstanding debentures amount to £2,080,000.

Mr. Hammond's interesting Table II., giving the gold product of the district, shows at a glance the enormous and rapid development of these gold-fields since 1890, when the cyanide process began to be successfully applied to the tailings. The "ounces" given are gold bullion; but it is satisfactory to know that this year the Johannesburg Chamber of Mines has decided to report the output in fine gold only, thus falling into line with the rest of the mining world in this particular.

It is interesting to note the increasing ratio that the dividends bear to the total gold produced annually, which works out from Table II as follows:

Year.	Percentage of Total Output Paid in Dividends.
1890.....	12.3 per cent.
1891.....	17.8 "
1892.....	20.7 "
1893.....	21.2 "
1894.....	22.1 "
1895.....	28.0 " ("Boom" year.)
1896.....	20.8 " (Reaction.)
1897.....	26.1 " (Normal growth.)
1898.....	32.0 "

So far as the writer is aware, no single gold-mining district in the world, working under such conditions, as to depth and character of deposit, as obtained on the Witwatersrand in 1898, has ever disbursed in dividends 32 per cent, or nearly one-third of its total yield of gold. The enormous increase in the output of gold during '97, '98 and '99 (in the latter year almost as much gold was produced in 9 months as in the full year of '98) amounting to £3,000,000 and £4,500,000 in '97 and '98 respectively, was the direct result of the equally great increase of stamping-capacity, which was as follows:

Year.	Total mining companies.	Average No. Mining cos. for full year.	Average No. of stamps.	Increase in No. of stamps.
1897	69	51	3,567	618
1898	77	63.5	4,765	1,198
1899	79	....	5,762	997

These facts speak volumes for the comparatively unhampered and generally healthful condition of the mining industry during these years.

2. Dividends.—Under this head, Mr. Hammond's method of arriving at the "Expenses per Ton" of ore crushed seems somewhat drastic. In a sense it is true that all disbursements, excepting those for dividends, are chargeable to "expenses," yet when one considers that debentures, both interest and

principal, are sometimes (the interest almost invariably) paid out of the mine profits, and that often the cost of machinery or other equipment acquired, of additional development work accomplished, and, occasionally, of water rights or other property purchased, is similarly paid, it is evident that these expenses cannot represent the actual working costs per ton of ore mined and milled.

A table compiled by the writer from the official returns of 65 companies operating in 1898 shows the average yield to have been 41s. 5.1d., the working cost 25s. 1.3d., and the profit 16s. 3.8d. per ton of ore crushed. For 1899 these returns are more difficult to obtain; but 42 companies showed, from January to August, inclusive, average working costs of 25s. 2.7d. per ton.

In Mr. Hammond's table of "Dividends and Expenses," I find it difficult to reconcile the "Dividends per Ton" with the column of total "Dividends" in his Table II. For instance, in the year 1895, 3,456,575 tons of ore paid dividends of 11s. 10d. per ton, amounting to £2,045,140, which is £153,803 less than the dividends given for that year in Table II., namely, £2,198,943, which would be equivalent to 12s. 8.6d. per ton. Similarly, in 1896, 4,011,697 tons were crushed; and the dividends are given as 7s. 7d. per ton, equal to £1,521,102, or £117,779 less than the correct amount, which is given in Table II. as £1,638,881, or 8s. 2d. per ton on the above tonnage. The year 1897, as calculated from the data given is only £20,970, or less than 1 penny per ton below the true dividend. The necessary increases of "Dividends per Ton" indicated will effect a corresponding reduction in the "Expenses per Ton" column.

Mr. Hammond says that "out of 85 producing gold mines," etc., in 1899, according to the Chamber of Mines' report, there were but 79 producing gold mines on the Witwatersrand, and, of these, two were closed early in January, after producing jointly but 282 ounces of fine gold for that year. Of the remaining 77 producing mines, only 36, or 5 less than in 1898, paid dividends,—largely for the reasons given by Mr. Hammond.

3. *Extent of Operations.*—During 1898, the number of stamps in operation was 1,000 smaller than is stated by Mr. Hammond, the correct number being 4,765; the number of white employees was 9,476 (not 9,746); and the average monthly wage of the native laborer was £2 9s. 9d. In 1899, the value of the total yield per ton of ore crushed was 41s. 1.8d., not "41.3 pence."

"A mining claim consists of a parallelogram 150 Cape feet wide, in the direction of the dip." This should read "in the direction of the strike," a claim being 400 Cape feet long in the direction of the dip.

4. *Economic Conditions.*—As already pointed out, the number of whites employed on the Rand in 1898 was 9,476. In his paper Mr. Hammond says that, "by reason of the rapidly increasing demand for labor and the obstacles interposed by the government, there has been a great deficiency of native labor." In 1896 there were 64,012 natives employed; in 1898 there were 88,627 natives, an increase in 2 years of 24,613, or a rate of influx of 1,023 natives per month—certainly not a bad showing. The chief "obstacle interposed" was the bad method of "touting" for natives adopted by the various companies, whereby their touts, or agents, among the Basutos, Shangans, etc., would bid against each other with the tribal chiefs, increasing the cost of the "boys" tremendously by the time they were landed in Johannesburg.

This has been so universally recognized on the Rand as the chief evil, that the newly reorganized Native Labor Department of the Johannesburg Chamber of Mines has laid down as its cardinal principle the abolition of all touts, except those employed by itself.

If the chief obstacles had been governmental, and not inherent in the nature of the country and character of the natives, it is fair to assume that Rhodesia would not have suffered for years past from a still more acute form of the labor trouble to such an ex-

tent that the authorities there are to-day earnestly advocating the introduction of Asiatic labor for their mines, mills, railway construction, etc. On this subject, Mr. Frank Johnson, writing upon "Rhodesia: Its Present and Future," says: "The periodical, if not constant, want of unskilled labor has, I am sure, seriously retarded the influx of capital. It is useless to disguise the fact that we have not sufficient natives in Rhodesia for our present requirements, even if they could be induced to work, which is impossible. The total native population—carefully estimated by the Native Commissioners—is not more than 449,000, of whom less than 80,000 are adult males between 15 and 60 years of age. The present requirements of the mines are, on an average, 14,000, while railway construction, public works, agriculture and domestic work require at least another 6,000. To supply even this amount of labor, it would be necessary for every adult male native to work three months in each year. Roughly, one-half of the adult natives work for an average of six weeks, thus providing only one-quarter of the present requirements. . . . The average native will no more work without some direct (and, I submit, necessary) form of compulsion, than will the average child voluntarily go to school and learn lessons. . . . Therefore, although much useful labor can be obtained in Rhodesia itself, and from neighboring territories, I am firmly convinced that the early and successful development of Rhodesian mines is entirely dependent upon the wholesale introduction—under proper safeguards and restrictions—of Asiatic labor. . . . Scarcity of native labor is no new difficulty in South Africa, and is not confined to Rhodesia. The Colony of Natal, with an area less than one-ninth the size of Southern Rhodesia, has a larger native population than Rhodesia, and yet Natal has had to fall back on Asiatic labor for the development of practically her entire resources."

The foregoing is an excellent picture of the labor conditions in South Africa, and shows very clearly where the chief obstacles lie, and why they should not be classed as governmental, but rather as inherent in the country. The Transvaal has a larger source of supply to draw from, in the Portuguese of East Coast territories, and, up to the present time, so far as the writer is aware, no attempt has been made to import Asiatic labor. Whether it may not come to this later, is another question.

In another place Mr. Hammond says that "white and native labor represent about 30 per cent of the working costs." From the annual reports of the former State Mining Engineer of the South African Republic; from mines with which I am connected; and from other reliable data in my possession, I find that white labor represents about 31.25, and native labor (including food) about 29.75, or, together, 61 per cent of the working costs.

In this connection, the following table which I have compiled from the State Mining Engineer's reports for several years, and from other reliable sources, may be of interest. The figures are, however, not absolutely up to date, since it has been impossible, thus far, to obtain similar data for the operations of the year immediately preceding the war.

	Percentage of working costs.
White labor.....	31.22
Native labor (including food).....	29.83
Explosives (dynamite, fuse, caps).....	9.70
Coal.....	3.22
Chemicals (cyanide, etc.).....	3.29
Tools, steel, shoes, dies, etc.....	4.05
Mining timbers, lumber.....	1.38
Candles and lighting.....	8.24
Sundries.....	100.00
Total.....	100.00

Regarding railway rates, it is to be regretted that Mr. Hammond quotes those of so long ago as 1896 and the early part of 1897, when later figures could have been obtained.

Mr. Hammond puts the coal rate at 3d. per ton per mile. This is 50 per cent too high; the rate being 2.03d., according to the authority just quoted, who says, "the coal rate on the Cape and Natal railways is 1-2d. per ton per mile." These, how-

ever, are all long hauls. "On the Netherlands Railway, the coal rate varies according to distance, and is on the zone system, which works out for a long distance, say Middelburg to Middle Vaal River, 173 miles, at 0.83d. per ton per mile, but on the line from Springs to Johannesburg, which would represent the bulk of the coal traffic, the rate is 2.03d."

The average coal haul to the Rand is 25½ miles. To-day, in England, on the Northeastern Railway, the average rate per ton-mile is 1.24d. for an average haul of 22¼ miles.

According to the legal adviser of the Johannesburg Chamber of Commerce, the following were the correct comparative rates in October, 1899:

Via.	Normal.	Per ton per mile.	
		Intermediate.	Rough Goods.
Cape.....	2.34d.	1.7d.	1.6d.
Orange Free State.....	2.34d.	1.7d.	1.6d.
Natal.....	3.24d.	2.28d.	2.21d.
Netherlands line, to Cape and Orange Free State.....	7.3d.	6.15d.	3.8d.
Natal.....	4.74d.	3.8d.	2.8d.

The average local rates for normal goods on the various systems for 150 miles were stated by the same authority to be as follows: Netherlands Railway, 6d. per ton per mile; Cape Railway, 4.3d. per ton per mile; Natal Railway, 4d. per ton per mile.

While not defending the very high charges of the Netherlands Railway, I believe it is characteristic of all new railways into mining camps to charge high freight rates. It is evident that substantial reductions had been made since the time of the rates quoted by Mr. Hammond. According to one authority, these reductions were equivalent, in the aggregate, to an annual saving of £200,000.

V. *Genesis of the Auriferous Banket.*—It is difficult to reconcile all of the phenomena in connection with the occurrence of gold in these "banket reefs," so as to make them fit any one of the theories of origin that have thus far been propounded; and this difficulty was ably set forth by Prof. L. de Launay in his excellent paper, presented June, 1896, to the Federated Institution of Mining Engineers, and entitled "Geological Description of the Gold Mines of the Transvaal (Witwatersrand, Heidelberg and Klerksdorp Districts)." I agree, however, with Mr. Hammond that the theory of subsequent infiltration or impregnation best accords with the majority of the observed facts.

VII. *Milling.*—In 1898, out of 75 stamp mills in operation (the two others being dry-crushing plants with rolls), 41, or 51.66 per cent, contained 60 stamps or less, while in 1899, out of 77 stamp mills in operation, 43, or 55.8 per cent, had but 60 stamps or less. It is natural that more than half the mills should be of this smaller type, since the mining area of the outcrop companies, which are the chief producers to-day, is, as Mr. Hammond points out, much smaller than that of the deep levels. Hence, 60-stamp mills can hardly yet be spoken of as "rare on the Rand."

In 1898 and 1899 there were but 5 stamp mills of 200 or more stamps in operation. Unquestionably, the tendency is towards large milling capacities of 200 stamps, and even more; but as this is dependent upon the mining area of the company concerned, such mills are chiefly confined to the deep-level properties, in the formation of which it is customary to combine, at the outset, a sufficient number of claims to permit the erection of large mills by the operators.

The extraction of gold by amalgamation on copper plates rarely falls as low as "50 to 60 per cent." In 1898 it was 66 and in 1899 65 per cent of the total output.

VIII. *Treatment by the Cyanide Process.*—With reference to concentration by hydraulic classifiers, Mr. Hammond says: "About 10 per cent. of the mill pulp recovered in this way consists of pyrites with coarse sand, a concentration of 4 to 1 being obtained."

Doubtless a concentration of 10 to 1 is here meant. The amount of concentrates produced by the spitzluten varies greatly at the different mines; for instance, at the Treasury it is 3.5; at the Consolidated Main Reef, 11.3; and at the Nourse Deep, 19.9 per cent; while, according to Mr. Hennen

Jennings, the average of seven Rand Mines' Subsidiaries for 1898 was 11.3 per cent of concentrates from this source.

The chief advantage of the double treatment of the tailings, which is now universally adopted on the Rand, lies not so much in "saturating the sands with the solution" as in their aeration after such saturation, obtained by their discharge (usually by shoveling) from the upper into the lower tank, thereby securing a more rapid and complete solution of the gold in the subsequent treatment.

The allusion to a 1 per cent solution of cyanide is doubtless a misprint for 0.1 per cent.

IX. The Future of the Witwatersrand Gold-Fields.—Under this head, Mr. Hammond says that, "within one year after the resumption of mining operations, an output of gold at the rate of over £20,000,000 annually may be reasonably estimated."

Mining operations were resumed in May, 1901. The output for November, 1901, was 39,075 ounces of fine gold from 550 stamps, or one-tenth the output of the Rand during the month of July and the month of August, 1899, from 5,950 stamps. Permission has just been granted to drop 100 additional stamps every week, at which rate it would take a little more than one year, or till January, 1903, to get all the stamps into operation that were crushing in 1899; and while it is reasonable to expect this rate to increase substantially as the months go by, it must also be remembered that many thousands of native laborers have yet to be secured, and that much difficulty has been experienced in this direction, largely owing to the unsettled condition of the outlying country.

In view of these facts, it is fair to assume that Mr. Hammond anticipates the estimated output of gold to be reached "within one year after the resumption of mining operations" upon the scale existing immediately prior to the war, as it is manifestly impossible for anything like even the old rate of product to be established by next May.

After speaking with well-founded confidence of the possibilities of working to the depth of 6,000 feet, and ultimately, perhaps, to 8,000 feet, Mr. Hammond remarks that in his opinion profitable operations upon a large scale will be carried on upon the Rand for a period of less rather than more than 25 years.

To one conversant with the Witwatersrand mines these two opinions seem greatly at variance with one another. Of the second row of deep-level mines there is at present but a single one that has reached the stage of crushing ore, namely, the Robinson Deep. The average depth of shaft on these mines is 2,611 feet, and several of them—as, for instance, the Knight Central, Limited, and the Jupiter—have lives of 30 years or more, when equipped with mills of 200 stamps.

While it is true that the lives of these unusually large mines may be reduced in the future by the disposal of a portion of their claims to neighboring companies, it is fairly certain that this second row of deep-levels alone will endure for more rather than less than 25 years; for it must be remembered that the lives of mines upon the Rand are estimated upon a very conservative basis; and of the few mines that have thus far been exhausted, all have lasted for several years beyond the calculated time of extinction, while others, nearing that point, are now known to have had their lives considerably underestimated.

It is the constancy of the error in one direction to which I wish to call attention.

Again, the development and equipment alone of mines requiring shafts from 4,000 to 5,000 feet in depth will take from 6 to 8 years, even at the rapid rate at which such work is accomplished in this district.

In view of the foregoing observations, and of the large area of mining-ground still to be exploited between the present second row of deep-level mines and the possible ultimate depths of 6,000 to 8,000 feet, I am forced to the conclusion that the duration of operations on a large scale upon the Rand has

been much under-estimated in placing it at rather less than 25 years.

Finally, Mr. Hammond estimates a reduction in working-costs of 6s. per ton, as the result of "economic reforms due to the establishment of a better government." As I have already shown, the working-costs on the Rand before the war were about 25s. per ton, hence a reduction of 6s. means a decrease of these costs by nearly 25 per cent—certainly a very remarkable saving, as the result of a change in government. It is the history of all large mining districts to cheapen costs as their age and productivity increase. Such a reduction is a natural and inevitable one, but it does not enter into the present question; in fact, it is definitely excluded from Mr. Hammond's prophecy.

I admit I cannot agree that such a net decrease will be effected by the causes Mr. Hammond cites, or indeed by any others in the near future. It is certain that some reductions will be obtained through governmental economic reforms, and that other and much more substantial ones will be effected through other means; but it is equally certain that the change in government and allied causes will result in increased charges upon, and therefore increased working-costs for, the mines; and it is not yet known to what extent the latter loss will offset the former gain. Certain of these charges are already known, while others are partially foreshadowed; and one may rest assured that their effect will be most appreciable.

An estimate to-day of the probable saving in working expenses on the Rand in the near future is an important matter, far-reaching in its effects. The mere statement that this reduction will amount to 6s. per ton through the causes named, carries no conviction; and I feel I must call upon Mr. Hammond to give chapter and verse for the faith that is in him.

POSTSCRIPT.

The postscript by Mr. Hammond, which is referred to in Dr. Raymond's note given at the opening of this paper, is as follows:

"The acute and friendly criticism of my friend Mr. Thomas H. Leggett, in his discussion of the first pamphlet edition of this paper, affects the statistics therein given and the views therein expressed. The latter I have not modified in this edition, except by making them, here and there, more explicit and clear, and guarding them from misconception. The former have been considerably changed (as the Secretary's Note, prefacing this edition, explains); the result sometimes agreeing, and sometimes disagreeing, with the corrections made by Mr. Leggett. The fact is, that, although my revision of them has been made independently of his figures—that is, I have not used his statements as my authority—nevertheless I have had the advantage of seeing his criticisms, and am grateful to him for calling attention to many discrepancies and inaccuracies, which, in my own careful re-examination, I might, indeed, have detected, but which, after receiving this aid from him, I could not possibly overlook. By comparing, paragraph by paragraph, the first pamphlet edition of this paper with the present pamphlet edition, and with the pamphlet edition of Mr. Leggett's contribution, it will be easy to see in what particulars I have adopted his figures, or, on the other hand (often guided by his criticism), have arrived at new results not identical with his. It may be added that the discrepancies between statistical statements in my first edition, or between any of those statements and the figures given by Mr. Leggett, or those contained in this edition, are not great enough to affect general conclusions. Nevertheless, I heartily recognize, even in matters not permitting perfect accuracy, the professional duty of being as accurate as possible; and I think every technical author ought to feel, as I certainly do, that a correction of facts or figures is not a hostile judgment, but a friendly service."

MANGANESE ORE IN INDIA.—*Indian Engineering* reports that manganese ore is now being

mined at Nagpore, and exported from Bombay. This production adds considerably to the quantity exported, which has heretofore come from the mines of Vizigapatam. Indications of manganese deposits have been found in the Bhandara and Balaghat districts, and explorations are being made.

AMERICAN COAL IN EGYPT.

BY CONSUL-GENERAL JOHN G. LONG.

I have in recent reports noted the rapidly increasing demand for American goods in Egypt and the establishment of a regular line of direct steamship transportation between New York and Alexandria. I now have to report further that the Egyptian Government administration has just consummated the purchase of three large cargoes of American coal, said to be about 15,000 tons, for its own use. The steamers to bring this coal to Egypt were chartered in England and will take the coal at Philadelphia, and, after discharging their cargoes at Alexandria, will return to Philadelphia with cargoes of sugar.

This news has excited much comment in Cairo, and the administration in question is severely criticised. It is claimed, by those who view this new departure with apprehension, that the quality of American coal cannot be compared with English coal, as there is about 75 per cent of dust and small in it, and that English coal is not only much better, but also much cheaper; and they express their amazement and say they are at a loss to understand the motive of the administration in making this purchase.

The cost in the United States is \$2.50 per ton and freight \$2.30 per ton, aggregating a little less than \$5 per ton delivered at Alexandria. This large transaction, it is stated in some of the local newspapers, has created quite a sensation in the coal trade in England. It may be regarded as the entering wedge in the development of a new market for American coal, and a hopeful indication that we are slowly, but most surely, gaining ground in Egypt, in spite of the peculiar difficulties and under conditions which, only a few years ago, seemed too discouraging to justify effort.

There has within the past few years been marvelous improvement in all Egyptian industries and a more satisfactory adjustment of her population to her resources. Financial stability has been fully restored and trade established upon sound and safe lines. The country is exceedingly prosperous and well governed, and affords a splendid market for American goods.

GERMAN INTERESTS IN MONAZITE IN BRAZIL.—United States Consul-General Richard Guenther, of Frankfort, informs the State Department, April 7, 1902, that the Brazilian Government has recently granted to a German, for 10 years, the exclusive right to develop the monazite-sand deposits along the coast of Brazil; and that a company is being organized at Berlin for the purpose of acquiring control of this privilege and for exploiting similar deposits elsewhere.

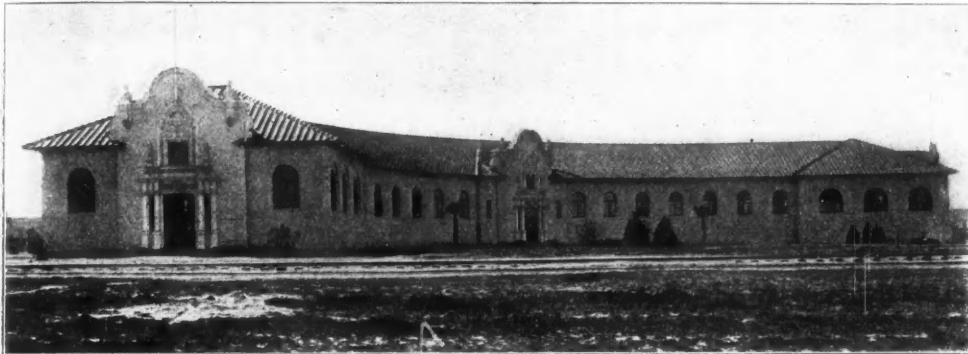
ELECTRIC FURNACE FOR THE LABORATORY.—A new form of electric resistance laboratory furnace has been invented by Professor Holborn, of Berlin, which permits temperatures up to 1,500° C. being attained with ease by use of the ordinary 110-volt electric supply. The furnaces are made in two forms, the first being adapted for heating crucibles, and the second for heating tubes 44 centimeters in length. In both forms of furnace the electric current is conducted through a resistance coil of platinum or nickel wire, wound round a thin porcelain tube or cylinder. The crucible or substance to be heated is placed within this latter, and the space between the outer side of the coil and the containing vessel is packed with asbestos or powdered quartz. Using nickel, the temperature of the furnace cannot be raised above 1,000° C. without damage to the coil but with platinum it is possible to attain a temperature of 1,500° C. with a current of 14 amperes and 110 volts.

MINING EXHIBITS AT THE CHARLESTON EXPOSITION.

By H. CONNOR BROWN.

The mining and mineral exhibits at the South Carolina Inter-State and West Indian Exposition in Charleston are, in very many cases, a repetition of exhibits seen last summer at the Pan-American Exposition in Buffalo. Sufficient new material has, however, been added to make a study of these exhibits instructive. Under the direction of James A. Dorsey, superintendent of the Mines and Forestry Building, aided by Arthur L. Parsons, they have been most attractively installed in the low semi-circular structure set aside for their reception.

Maryland, Missouri, Colorado, Washington and Georgia are represented here by the same exhibits



MINES AND MINERALS BUILDING AT CHARLESTON.

as at Buffalo, with a few additions, but not being so cramped here for space they show off to much better advantage.

In addition to the valuable exhibit of minerals belonging to Fayette P. Graves, of Doe Run, which was also shown at Buffalo, Missouri exhibits some ornamental terra cotta work in the shape of a huge relief of horses' heads. It is the work of the Winkle Terra Cotta Company, of St. Louis. A larger supply of St. Francois County granite has also been secured, together with a greater variety of specimens of mill products.

Colorado is represented here by the State Bureau of Mines, which exhibits a miscellaneous collection, more extensive than the one shown at Buffalo, of ores and ornamental stones.

The State of Washington is represented by an exhibit of its green and gray serpentine marble, manufactured at the quarries of the United States Marble Company, of Spokane. Large additions have been made to the exhibit shown at Buffalo, and here it is more suitably installed.

Georgia shows all its Pan-American exhibit, with the addition of three splendid 8-foot marble columns, one of gray, one of pink, and one of dark creole marble.

The most prominent place in the centre of the Mines Building is given to the State of North Carolina, which was not represented in the Mines Building at Buffalo. Here, under the direction of T. K. Bruner, secretary of the State Board of Agriculture, the State has filled five sections, with an exceptionally fine collection of North Carolina products. In the central pagoda are four large cases, which contain gems, gem stones, crystals, and native gold and silver. The quartz family is represented by amethysts, rose quartz, smoky quartz and various other specimens. Some beautiful beryls are shown. The corundum group is represented by a collection of rubies, sapphires, oriental topazes and oriental emeralds. The garnet group contains excellent specimens of the ordinary red, or pyrope garnet, the cinnamon garnet, the cherry red, the almandine, and the rhodolites. This collection has also the first hiddenite crystal ever found. Among the quartz crystals exhibited are two with peculiar basal terminations and modifications that were figured and described by the celebrated mineralogist, Von Roth.

One case contains fac-similes in plaster of five

of the largest gold nuggets ever found in North Carolina, besides a collection of about 50 ounces of nuggets from placer mines from Montgomery, Stanly, Cabarrus, Caldwell, and other counties. These largest nuggets weigh, respectively, 20, 10, 8½, 4½ and 3¼ pounds. A silver nugget, which weighs 36 ounces, from Silver Hill Mine, Davidson County, is also shown. All the native silver specimens are from the same place.

The iron ores include specimens of magnetite, hematite, limonite and sybarite. Specimens of pig iron from Cranberry furnaces are shown. Graphitic iron from this locality, tested by the United States Ordnance Department, has been declared to have the highest tensile strength of any on the market. Large sheets of mica, 12 by 14 inches, and worth \$12 to \$14 a pound, are here exhibited. Long-

fibered asbestos, such as found in four or five counties of the State, and a collection of monazite sands, used in the manufacture of Welsbach mantles, are shown. Particularly interesting is the exhibit of talc, which is shown as mined, and also cut up into pencil forms, such as tailors use, pulverized as an adulterant for flour and an ingredi-



NORTH CAROLINA EXHIBIT AT CHARLESTON.

ent of face powder. A large collection of building stones in the form of 8-inch cubes includes granites, ranging from white to black, green and brown gneisses, green, brown, and mottled serpentine, pink, black, and mottled marbles, a quartz porphyry, called leopardite, and many varieties of light and dark sandstone.

This exhibit also contains a miscellaneous collection of mineral curios, including garnets, alibites, tourmalines, wolframites, beryls, cyanites, rutiles, bronzites, etc.

The Standard Oil Company, which had such an elaborate exhibit at Paris and at Buffalo, is represented by a very pretty but much simpler exhibit at Charleston.

The exhibits made by the United States Geological Survey include collections of maps, books and transparencies; of sulphides, clays, bricks, coal, and phosphates. In the section assigned to the exhibit of the maps and literature of the Survey, a large relief map of the Yellowstone National Park and the Absaroka Range is a conspicuous object.

The exhibit contains other instructive maps, including maps of the Southern Appalachian Mountains, of Southern Montana, of the coal regions of West Virginia; of Pueblo, Colo., and vicinity. On the wall hangs a large relief map of the United States. An interesting map is one that shows ideal sections of an oil well with the relative positions of the oil sands, coal, and other strata from the Pittsburg coal to the fifth sand. A library of geologic folios and atlases, survey reports and files of the chief mining and mineral publications completes this particular exhibit.

A systematic collection of minerals particularly illustrating sulphides, has been arranged by Arthur L. Parsons under the direction of the survey, and installed in a handsome mahogany case. The survey exhibit of clays includes products of widely separated localities.

In a handsome triangular case the Survey has an attractive exhibit of gold, copper, and lead ores, the gold ores from the Gold Coin Mine at Cripple Creek, which have been loaned for the exhibit by the Woods Investment Company. The copper ores, which are mainly from Western localities, include all kinds, chiefly copper matte and roasted copper sulphides. The lead ores, which are mainly from New Mexico, Colorado, and Utah, are carbonates, sulphides and arsenates, with a good deal of argentiferous lead.

One of the most interesting exhibits arranged by the survey is a case of miscellaneous iron ores principally from the eastern mines in the Appalachian system. Here an interesting specimen owned by Dr. David T. Day finds a place. It is a piece of pig iron from the Spottiswood Furnace on the Rappahannock River in Spottsylvania County, Va. Here was lo-

cated the first blast furnace erected in the United States (probably in 1620) and the product was the so-called "Plantation Iron."

In this same case is an exhibit of Stein & Boericke, products showing the ores of molybdenum, uranium, tungsten, vanadium, chromium, nickel, and copper, and the following products: Metallic molybdenum, metallic tungsten, metallic chromium, metallic manganese, ferro-chrome, ferro-tungsten, and ferromolybdenum. Here, too, is a series of ores exhibited by the New Jersey Zinc Company from its mines at Franklin, N. J. The series consist of 16 specimens which show the ore as it comes from the mine, when crushed, sized, and dried, its various products, and the tails left after it has passed

through the electric separator. It is shown that the frankinite roasted yields white oxide of zinc, and that the residue left, consisting of iron and manganese oxide, is the raw material for the spiegel furnace. This same case also contains zinc ores from the Joplin District of Missouri, which show the different concentrates of zinc blende.

Another exhibit made by the Survey consists of 118 blocks of coal from all parts of the Union. It includes lignite, bituminous and anthracite coals. An exhibit of phosphate rocks and ground phosphate from South Carolina, Tennessee, and Florida has also been arranged by the Survey. It includes the crude material, dried, ground and in acid form.

One of the most conspicuous objects in the Mines Building is a large case in which Ward's Natural Science Establishment at Rochester has three exhibits, a genetic collection of rocks, a collection of rock-forming minerals and a normal school collection of minerals.

The Welsbach Company is said to be responsible for the presence here of a neat little case which contains a collective exhibit of iridosmium from all the localities where it has been found. The exhibit is designed to show the natural appearance of iridosmium and to stimulate the search for this mineral.

In this connection, an exhibit of platinum, iridosmium, and allied metals and their products made by Baker & Company, of Newark, N. J., is interesting. At the top of the case is a platinum nugget, worn smooth, from the Old Eagle Mine, Trinity County, California. The rest of the exhibit is made up of bottles of palladium and platinum sponge, Russian and Persian platinum, osmium, rhodium, and such combinations as potassium platinochloride, ammonium palladichloride, etc.

Edward G. Acheson's exhibit of electric furnace products was among the specialties transferred from Buffalo to Charleston. It includes carborundum and artificial graphite manufactured from petroleum coke and from anthracite coal. The case also contains specimens of aluminum, of silicon, and other products of the electric furnace. Aluminum carbide made by heating a mixture of alumina and carbon is exhibited, and also silicon-aluminum alloy. Graphitic oxide and pyrographitic oxide, obtained by decomposing graphitic oxide by heat, are included in the exhibit. Of greater commercial interest is a collection of graphite anodes and electrodes.

A fine array of corundum specimens from every known deposit in the world, collected and arranged by Dr. Joseph Hyde Pratt, and exhibited by the Pike Manufacturing Company of Pike Station, N. H., is worthy of special mention.

The Sills-Eddy Mica Company, of Chicago, displays a small wall panel of mica of a fine quality.

A Wetherill magnetic separator, geared, and hard at work, illustrates this method of magnetic separation.

The Drake Company, of Minneapolis, is represented by a couple of petrified logs from Chalcedony Park, Arizona, which have been sawed and polished to serve as table tops. So hard is this agatized wood, that a file will not scratch its polished surface.

To the general public the most interesting object in the Mines Building seems to be a Hibbard-Rodman-Ely safe made of manganese steel, and protected by a thick plate glass in front. The contents, which are illuminated by an electric light placed inside the safe, consist of a large gold nugget, valued at \$1,500, from Sierra County, California, and several smaller nuggets from the Klondike; gold from Leadville, Colo.; gold dust from California; a flask of chemically pure gold electrolytically deposited, and some wire silver from the Mollie Gibson Mine at Aspen, Colorado.

SAULT STE. MARIE CANAL TRAFFIC.

The official report of the Sault Ste. Marie Canal shows that during April 1,679 vessels passed through the locks to and from Lake Superior, carry-

ing 2,339,234 tons of freight; of which 1,952,550 tons were east bound and 386,684 tons west bound. Last year, owing to the later opening of navigation, there was practically no traffic in April.

The items of mineral freight this year were 44,328 tons anthracite coal; 303,030 tons bituminous coal; 1,492,051 tons iron ore; 4,262 tons pig and manufactured iron; 4,469 tons copper; 2,151 tons building stone; 42,365 barrels salt.

THE NICKEL MINES OF NORTHERN ONTARIO.

By A. McCHARLES.

The first year of the new century may be said to have been the beginning of a new and more progressive epoch in the development of the Sudbury nickel mines. For several years before then, all actual operations were confined to the mines and works of one company, and the output every season remained about the same. But in the spring of 1901 the fine smelting plant of the Mond Nickel Company was completed, and except a few weeks at the start, it has been running very successfully ever since, reducing from 150 to 200 tons of ore into high-grade matte every 24 hours. The Victoria or head mine of this company has proved to be a very large and valuable body of excellent ore, carrying about 6 per cent in combined nickel and copper, which is considerably above the paying point. Under Captain Hixon, a brother of the local manager, this mine has been exploited in a most systematic and intelligent way down to the fifth level in solid massive ore, and to one side of the main deposit or mine a large independent body of similar ore has been found with no apparent connection between them, and it is quite probable that such off-shoots may occur in some of the other mines of the district. The Mond Nickel Company has another good property in the township of Garson, 9 miles to the northeast of Sudbury, but on which only testing work has been done yet, for the want of a railway branch to it. Nothing can be done to a nickel mine except preliminary work without transportation facilities, and the cost of building railways in such a rocky country is somewhat high.

The Lake Superior Power Company (Clergue Syndicate of Sault Ste. Marie) has been opening up the Gertrude Mine in Creighton for a number of years without shipping or treating any ore, except a few car lots for experimental purposes. But this company purchased two other nickel properties in 1901, the Elsie Mine in McKim, and the Jarvis Mine near Lake Wahnapiatae. The three mines are all high-grade ore, and out of the first two nearly 15,000 tons of ore have been raised and put on the roast heaps during the past season. Most of the output of these mines, instead of being shipped to Sault Ste. Marie, as was originally intended, will be made into matte at the three-furnace smelting plant now being erected near the Gertrude Mine.

But the Lake Superior Power Company has also done an exceptional thing for the development of some of the principal nickel mines of the Sudbury District, in building the first section of the Manitoulin & North Shore Railway from Sudbury to the Gertrude Mine. This road when completed will traverse the main nickel range almost from end to end, and will be of incalculable benefit to the district at large. The first section, already built, is only 13 miles in length, but was carefully located to pass close by no less than six good mines, including the largest ore-body on the whole nickel belt, and though only three of these mines are being worked yet, the road is said to have paid well the first year. It is perhaps the most accommodating little railway on the American continent, and the train will stop to take on or let off even a single prospector or other traveler at any point along the line.

The last year of the existence of the Canadian Copper Company as an independent concern was by far the busiest and most progressive in its whole history of over 15 years in the Sudbury District.

The success of this company where so many other companies failed was due to several causes, but especially to its good luck in having the little Copper Cliff Mine to work from the very start, with its high-grade ore bringing up the ores of the company's other mines operated at the same time to the paying point. It is only fair to say, and not as in an obituary notice at all, that the business record of this good old company has been of the highest character for straight, honest dealing in every respect from first to last.

The capacity of the smelting plant of the Canadian Copper Company was nearly doubled during the past year, but was even then unable to treat the whole output of the company's mines, owing to the opening-up of the Creighton Mine, which is undoubtedly the greatest deposit of nickel-copper ore in the district. There are other mines of the same high degree of ore, though not so large. The history of this mine is rather interesting. One fall day in 1886, Henry Ranger, the veteran prospector, while out on his weary tramps, all alone, with only a blanket, some gruel and an old gun, in the southwest corner of the township of Snider, climbed a high granite bluff, and, peering around, saw, a short distance to the west, across a low, wet swamp, a monster red hill, running almost north and south. On going over to it he discovered the most valuable mining property in Ontario, and indeed the most valuable of its kind in the known world. But through the manipulations of other parties he lost his interest in this wonderful mine and never got a dollar out of it.

Toward the end of last year the first announcement was made of the formation of a nickel trust, and it is now known as the International Nickel Company. But no alarm has been felt in the Sudbury District over it—rather the reverse; and the change is even welcomed by most of the other mine owners. The holdings of the new company are large but not paramount, and so far only consist of the properties and works formerly owned by the Canadian Copper Company, and which do not comprise one-half of the workable ore deposits of the district; nor, with the exception of the Creighton Mine, are they any better in any way than an equal number of other mines and properties on the same belt, and belonging to other companies or still in the hands of private owners, and for sale.

The experimental plant erected at Worthington station for the Nickel-Copper Company of Hamilton, Ontario, to treat the ores of these mines, by a new self-roasting process, has proved a complete failure, and the mining operations of this company in the district have come to a like unfortunate end.

MINERAL PRODUCTION OF QUEBEC.

We are indebted to the report of Mr. J. Obalski, Inspector of Mines of Quebec, for the following table, giving the mineral production of that Province for the year 1901. The figures are in short tons, of 2,000 pounds, except where otherwise noted:

Product.	Wages paid.	No. workmen.	Quantity used.	Gross value.
Magnetic iron ore.....	\$1,200	10	1,000	\$2,000
Bog iron ore.....	28,978	120	14,489	28,978
Chrome iron	12,000	90	1,274	16,744
Copper ore	82,000	250	20,296	126,500
Galena	22,900	39	227	9,277
Asbestos	553,000	1,577	33,466	1,274,315
Asbestic .....	.....	.....	6,831	10,114
Mica (thumb trimmed)	35,000	150	76	36,000
Mica, raw .....	.....	.....	65	3,600
Ochre, calcined	7,500	51	1,253	14,595
Graphite, prepared	2,500	25	31	3,100
Graphite, raw .....	.....	.....	53	1,590
Feldspar	2,000	5	420	1,271
Sulphate of baryta.....	1,850	7	533	2,975
Phosphate .....	.....	.....	1,033	6,280
Gold (ounces)	7,838	35	80	1,440
Slate (squares)	6,400	40	3,170	12,252
Flag-stones (sq. yds.)..	1,944	8	3,000	2,700
Cement (barrels)	8,000	35	17,000	28,000
Granite	92,000	350	.....	146,000
Totals.....	\$865,110	2,792	.....	\$1,727,731

In addition to the figures above given the lime industry employed 350 men, the output being 1,000,000 bushels, valued at \$140,000. The brick-yards employed 1,200 men, turning out 120,000,000 bricks, valued at \$600,000. In the stone quarrying and

working 700 men were at work, the value of the stone being \$530,000. Adding these figures to the table gives a total of 5,042 workmen employed, with an aggregate value of output amounting to \$2,997,731.

There were two blast furnaces in operation during 1901, at Radnor and at Drummondville, using chiefly bog ore. The figures concerning these are: Ore mined, 14,449 short tons; ore smelted, 15,376 tons;

MOHAWKITE.

It will be remembered that the discovery of a new copper-arsenic mineral in the Mohawk Mine in the Lake Superior copper region excited some interest a year or two ago. From the report of the company for 1901 it appears that during the year 170 tons of this mineral were taken out and sold. The report says: "The little cross-fissures which carry the min-

erals a pound less than it was at that time, it follows that the value over refining charges and expenses of sale is also much less. It would seem that a net value of about \$75 a ton is all that it can be expected to realize under present market conditions. The occurrence of this ore was entirely unexpected, and its continuance or its value per ton in no way affects the mine proper."



EXHIBIT OF THE UNITED STATES GEOLOGICAL SURVEY AT CHARLESTON.

limestone used, 1,981 tons; charcoal used, 869,290 bushels; pig iron made, 6,876 tons, valued at \$137,510; number of men employed, about 130.

In his comments Mr. Obalski says that, from the administrative point of view, two important incidents occurred. In the first place, there was the amendment to the mining law which takes away from the surface proprietor the right of pre-emption on all lands patented since July 24, 1880; and, secondly, the creation of an assay office, at Montreal, in the laboratory of Mr. Milton L. Hersey. The change in the law was applied without difficulty and was well received by all concerned. The assay office has given excellent results, and has enabled many prospectors, in return for the payment of a very slight fee, to ascertain the true value of their discoveries. At the Quebec office, about 250 specimens were examined.

There has been great development in asbestos mining in the Eastern Townships and the works done and plants put in warrant the hope of a good output of chrome in Colrairie and of gold in Beauce, during the next year. Copper also seems to have assumed a little more importance, and there was reason to anticipate that the prospecting undertaken during the year would lead up to more extensive works; but the fall in the price of copper towards the end of the year will certainly impede the looked for development. Mica has passed through a difficult phase owing to the low prices offered by consumers. The other minerals of the Province were worked as in previous years. A new industry, from which much is expected, is in course of creation: it is that of compressed peat. A small establishment for the purpose was set up at Cacouna (county of Temiscouata), and yielded satisfactory results; but unfortunately it was destroyed by fire, last fall.

The protection of women and children and the safety of workmen has been sufficiently assured. Good order has reigned in the mining districts, and notably in the asbestos region, notwithstanding the large increase in the population during the year.

As far as information goes, there were 7 men killed and 3 seriously injured during the year in a population of 5,000 workmen; 6 hotel licenses were issued under the mining law, and the sale of intoxicating liquors in the mining districts is well controlled and watched by the police.

eral called mohawkite have been worked to some extent, but no large or continuous bodies of the ore have been discovered. It seems to occur in patches in close proximity to the Mohawk Lode, but although the ore-bodies are small, the vein seems to be persistent in depth.

"The special furnace plant erected to treat this

PIG IRON MAKING IN MISSOURI.

The production of pig iron is no longer such an industry in Missouri as it was when the famous Iron Mountain was affording a plentiful supply of ore and the great Cherry Valley Mine, near Steelville, was in its prime, but a little iron is still being made in the State and the high range of prices for two or three years back has favored the makers of it. The furnace at Midland was long since dismantled, during the period when pig iron was low; the Cherry Valley Mine was permitted to fill with water and the railroad to the furnace was taken up. The plant at Sligo, a few miles further south, continues in operation, although the available ore is inferior in quality to what it formerly was, and charcoal is more expensive. There is a single furnace, 57 feet in height above the ground, 52 feet above the tuyeres, 5 feet in diameter at the tuyeres and 11 feet at the bosh. It is blown at 3-to-4-pound air pressure, and the air is preheated to about 900° F. in a pipe stove. The latter is heated by gas from the furnace, which is also utilized for the generation of steam in the boilers.

The charcoal is partly carted in from outlying camps and is partly prepared at the works. Whether the cord wood is shipped and carbonized in bee-hive ovens. This part of Missouri is rather well timbered with white and black oak, which makes very good charcoal. An acre of the average timberland yields about 15 cords of wood, and a cord of wood produces about 40 bushels of charcoal. At present about 112 bushels of charcoal are used in making a ton of pig iron; consequently even a small furnace, like that at Sligo, producing only 40 tons of pig iron per day, rapidly denudes the adjacent country of its timber



GEORGIA EXHIBIT AT CHARLESTON.

material by one of the reduction works near New York city was not completed until toward the close of the year; consequently, the receipts from this source were small, but the material is now being regularly treated, and the receipts promise to be quite important during the current year. The copper contents do not average quite as high in regular mining as was indicated by the sample first sent to market, and as the price of copper has been 5 to 6

and by compelling the charcoal burners to go further and further away increases the cost of the fuel. In this part of Missouri charcoal commonly costs about 3 cents per bushel, of which 1 cent is for the wood and 2 cents for the labor of charring it. Delivered at Sligo it costs about 4.5 cents per bushel.

The ore now smelted at Sligo is sandy and clayey and low in iron, making the cost of production per ton of pig iron comparatively high. In 1893 at Mid-

land, when the Cherry Valley Mine was still producing, two tons of ore would yield a ton of iron; sometimes a little more. At Sligo it is now necessary to smelt 2.75 tons of ore to produce a ton of iron. Common labor costs 90 cents per day; furnacemen are paid \$1.35 per day. The lime flux is quarried near the works. The present cost of production, general expenses, etc., is approximately as follows:

2.75 tons of ore at \$2.00.....	\$5.50
112 bushels of charcoal at 4.5c.....	5.04
Lime flux.....	0.12½
Labor.....	1.25
Total.....	\$11.91½

In 1893, the year when Midland Furnace went finally out of blast, the cost per ton of pig iron at that place was \$9.40, although charcoal cost as much as 5 cents per bushel, the timber having been entirely cut from the surrounding country within a radius of 15 miles. However, the consumption of charcoal was only about 85 bushels per ton of iron, and the ore cost only \$2.25 per ton for the first grade and \$1.75 for the second. The increasing scarcity of ore and of charcoal, combined with the low price for iron prevailing at that time, led to the discontinuance of operations, which had been conducted very successfully for 20 years previous.

The deposits of iron ore which were exposed at the surface in Crawford County appear now to have been mostly exhausted, but it also appears that no consistent exploration has ever been done in the region for any deposits except those which had some surface showing. The country is obviously iron bearing and it would be remarkable if the exposed deposits were the only ones. The geology of this part of Missouri and its possibilities for iron were ably discussed by Frank L. Nason in one of the excellent reports of the Missouri Geological Survey.

MICHIGAN COAL.

The Michigan State Geological Survey has just issued a report on the coal of that State, its mode of occurrence and quality, by the State Geologist, A. C. Lane, which will form Part II of Volume VIII of the *Reports*, but of which a small edition is bound separately, for those especially interested in the subject. It contains a map showing the extreme area of the coal series, about 11,000 square miles, confined to the central part of the Lower Peninsula. This map also shows roughly the elevation of the bed rock surface, from which the depth of drift under which the Coal Measures are buried may be inferred. In the northern part this is very considerable, amounting to hundreds of feet, and proves an almost insuperable bar to exploitation. Sections are also given which show the way in which the coal seams occur.

An interesting plate shows how the different methods of expressing or determining heating power correspond to each other. A large part of the report is occupied with a discussion of analyses and boiler tests. It will be noticed that the author thinks there are at least 7 distinct coal horizons of which 3 are mined, each having its own characteristic quality, but all being bituminous, and generally gas coals. These three he calls the Saginaw and Lower and Upper Verne. We select as characteristic analyses the following:

	Saginaw.	Lower Verne.	Upper Verne.
Moisture.....	10.67	8.71	9.57
Volatile combustible.....	33.59	38.45	40.93
Ash.....	1.94	11.68	4.35
Fixed carbon.....	53.80	41.16	46.13
Total.....	100.00	100.00	100.00
Sulphur.....	1.01	2.72	.98

The general horizon is identified as that of the Pottsville, the Sewanee of Tennessee, and the Massillon of Ohio.

There is an interesting discussion of the prospects of over production, which the author considers possible if the rate of increase in production is kept up, and also some figures on the value of coal lands and royalties. The customary royalty appears to be about 8 cents per ton. A large number of records

of drillings in different parts of the State are given.

EXPENSE OF MINING AND MILLING GOLD ORE IN SAN JUAN DISTRICT, COLORADO.

BY OUR SPECIAL CORRESPONDENT.

Some valuable information is presented in the report for 1901 of one of the largest mining companies of the San Juan District, Colorado, which answers, in tabulated form, questions that are often asked by those about to enter into like enterprises. The vein is a true fissure, having an average width of three and one-half feet. The development is by shaft on the vein with drifts, upraises and stopes, following the usual methods. The outside equipment includes stamp mills, concentrators and cyanide tanks.

The total of tons mined and milled in 1901 was 53,370. Of this the tailings cyanided were 37,195 tons. The cost of stoping was \$65,272.58, or 1.22 cents a ton. General cost of timbering was \$25,327.74, or 47.45 cents per ton. To these two fixed charges may be added such items as foremen, shift bosses, \$6,486.25. Assaying, \$63. Ventilating, \$172.15, etc.

Under table of operating expenses, it cost for dead work in driving the main levels, spurs and cross-cuts, an average of \$7 a foot, and the upraises cost \$3.33 a foot.

Under mill operations on 53,231 tons, are the following items:

	Amount.	Per Ton.
Crushing.....	\$4,795.77	8.98 cts.
Stamping and amalgamating 54,197 tons.....	14,782.40	27.27 cts.
Cyanide treatment of 37,195 tons of sands and tailings.....	26,129.72	70.25 cts.

The above items are chosen from a long list as applying in a general way to all mines of that region, and in that character of ore, and may serve as a basis for general estimate.

With an increase in the width of the vein or pay streak will naturally come a relative reduction of expense per ton, while with a decrease in width the opposite would obtain.

Among the leading items of supplies needed at the mine for mining 53,370 tons, may be mentioned the following:

	Total Amount.	Value. Dollars.	Cost per ton. Cents.
Powder.....	44,346 lbs.	\$6,294	11.79
Fuse.....	321,758 ft.	1,000	1.87
Caps.....	590 bxs.	430	.81
Candles.....	475 bxs.	2,362	4.43
Steel.....	1,835 lbs.	158	.30

Though information such as the above must be regarded only in the light of local geological and economic conditions, yet as reasonable suggestions on which to base calculations these items may be safely relied upon as a gauge by which to measure other estimates of the same general character.

FURTHER NOTES ON THE OCCURRENCE OF RARE METALS IN THE RAMBLER MINE, WYOMING.

BY WILBUR C. KNIGHT.

Since my note on the occurrence of platinum in the ores of the New Rambler Mine was published in the *ENGINEERING AND MINING JOURNAL*,* there has been a great deal of analytical work done on the various classes of ores found in this property. At the time of the discovery the ore was being hauled by wagon to the Grand Encampment smelter, which is located some 30 miles to the west of the mine. Shortly after it was known that the ores contained rare metals, shipments ceased, and since that time all of the ore that has left the camp has been hauled to Laramie, which is about 50 miles to the northeast, as it was before the Grand Encampment smelter was built. Immediately following my article, Prof. Wells† of Yale announced that the platinum in the ore occurred as sperrylite, an arsenide of platinum (PtAs₂). A great many chemists have been at work on the covellite ore, and as there are many

results available we can at this time give a better idea of the absolute contents of the ore. The ores containing the platinum or precious metals are anything but uniform in composition. Usually platinum is reported; but there are several returns where palladium has been the only rare metal found.

Prof. Slosson of the University of Wyoming has made an analysis of one sample in which he found palladium and no trace of platinum. Mr. A. H. Lowe of Denver has had a similar experience.

The reports, taken as a whole, are, however, favorable to this property, and prove that the rare metals taken as a whole average at least 3 ounces to the ton. Some of the best results have shown as high as 12 ounces. Usually when the metallic value is high the bulk of the metals is palladium. From the work of several chemists it is absolutely certain that the ore contains platinum, iridium, osmium and palladium. Usually the platinum and palladium are found in nearly equal proportions, with a very small amount of the two other metals. There has not been any complete analysis made, so that it is impossible to give the absolute composition of the ore.

A considerable work on this ore has been done in the School of Mines of the University of Wyoming, and an attempt has been made to determine how the palladium occurs; but the results have not been satisfactory. It was thought possible that it might be found in the metallic state, and various quantities were crushed to 60 mesh and concentrated in a gold pan. At one time 10 pounds were treated in this way. Upon testing the concentrates there was not a trace of any metallic element found, and further, upon analyzing the concentrates it was proved that none of the precious metals were present. The sperrylite and the palladium ore had floated off with the lighter material.

Owing to this and other tests that have been made, I am led to believe that the palladium occurs as an arsenide in the Rambler ore, and corresponds to sperrylite answering to the formulae PdAs₂. It is quite probable that this new mineral will resemble sperrylite in its physical characters and crystalline form, and for this reason will be difficult to detect and to separate from the platinum arsenide.

PARTINIUM.—The *Journal de l'Electrolyse* says that this material is an alloy of aluminum and tungsten, manufactured by Henry Partin, of Puteaux, near Paris. It is now largely used in automobile construction. Most vehicles at the last Paris show had partinium bodies. The alloy is very light and strong. It is manufactured in profiled sections and sheets as well as castings.

WHITE-LEAD COMPANY IN MEXICO.—United States Consul-General P. C. Hanna reports from Monterey, April 16, 1902, that a company, known as the Mexican White Lead Company, was formed a short time since at Gomez Palacio, Coahuila, with a capital of \$100,000. The lead found at that place is said to be pure and of an excellent quality. The duty on white lead is high, says Mr. Hanna, and the company expects to be able to supply the product much more cheaply than it can be imported from the United States.

DEMAND FOR COAL-HANDLING APPLIANCES IN LOURENCO MARQUEZ.—U. S. Consul W. S. Hollis reports from Lourenco Marquez, Portuguese East Africa, March 19, 1902, that, in a recent conversation with Senhor Albers, head of the harbor commission, he was informed that it is intended to make that port a great coaling station. Senhor Albers particularly requested to be put in communication with people in the United States who could supply him with the most economical and up-to-date coal-handling appliances, such as trestles, cranes, and machinery for delivering coal from freight cars (3 feet 6 inches gauge) into the holds and bunkers of vessels. Any written or printed matter addressed to the consul will be submitted to Senhor Albers.

* *ENGINEERING AND MINING JOURNAL*, Dec. 28, 1901.
† *American Journal of Science*, Feb., 1902.

NOTES ON TONOPAH, NEVADA.

By S. A. EASTON.

The ledges at Tonopah, Nye County, Nevada, were located by J. N. Butler, in October, 1900. As co-owners with Butler in the locations were two men, who made assays from the first samples taken from the Tonopah ores, by Butler, with the understanding that they were to share in the locations for so doing. They all sold their holdings to the present owners, the Tonopah Mining and Milling Company, of Philadelphia.

The word Tonopah is taken from the local Indian dialect and signifies "no wood, no water," and hence is particularly applicable to this barren and arid section which is now attracting so many prospectors and miners, and which promises to be another one of Nevada's rich desert mining towns.

The Tonopah Mines are in a low range of hills on the edge of the San Antone desert 6 miles across the Esmeralda County line into Nye County, and 60 miles east from Candelaria, or Sodaville, its shipping points on the Carson & Colorado Railroad. The elevation above the sea level at Tonopah is 6,000 feet and within a radius of 75 miles from it are the old well known camps of Nevada, which have produced millions, namely: Candelaria, Silver Peak, Belmont, Berlin, Sodaville and Downieville.

The rocks at Tonopah are all eruptives, rhyolite, andesite and basalt, with breccias formed from the detritus from the erosion of the rocks, formed at a time when much more active erosive agencies than now exist in that country gave it its present gentle contours.

There have been apparently several successive flows of the eruptives, the oldest being the ore containing rock, and the most recent the basalt, which with its characteristic and well defined columnar structure forms the summits of the adjacent peaks. Erosion has cut down through this and through the other flows to the ore-bearing rhyolite. In extent the exposed area of this rhyolite is about 2,000 feet in either direction and rudely circular in form. Towards the west and south, the directions in which this surface slopes, the rhyolite is bounded by a mass of breccia and uncemented detritus of unknown depth, the dumping ground for the broken fragments of the over-lying rocks, which have been ground and eroded away to the present forms. These fragments are all of rocks which are at present found in place about Tonopah.

The vein system is one of parallelism in strike and dip, in dip quite steep and towards the west, although there is some tendency towards inter-lacing among the smaller veins.

The most western vein of this group, the Mizpah, has proved at present to be the most important, being larger and the ore occurrence more continuous than the others of the group. The production of the property has been mostly from this vein and by far the largest amount of work has been done on it. The deepest opening in the district is on the Mizpah and is less than 250 feet. To the east of the Mizpah are the Valley View, Burro and other veins, all of which have produced more or less ore, and on which a considerable number of shallow workings have been opened.

The ore of the group is a siliceous silver ore, carrying varying amounts of gold; a minimum ratio is 0.2 ounce of gold to 100 ounces of silver. The ore, particularly near the surface, is heavily impregnated with oxides of manganese, carrying some oxides of antimony and horn silver (cerargyrite). At greater depths the horn silver gives way in part to silver sulphides and antimonial combinations, often appearing in the opalescent quartz as a dark cloud. The lack of iron in any of its forms in this ore is a notable feature. Ores from local shoots, and on the Valley View and Burro, often carry much higher gold values than the general average, some shipments going as high as 60 and 70 ounces per ton in gold.

The ore in all these veins is clearly a metasomatic replacement of the rhyolite along fracture planes. In many places the gradual transition from

rhyolite to clean, solid ore is readily traceable, and pieces of "undigested" porphyry surrounded by ore are quite common in the ore bodies. Some little faulting has taken place, but the veins as a rule are continuous and the alignment little disturbed.

On the Mizpah vein stoping for a width of from 2 to 7 feet has been carried on, with more or less continuity, for a distance of 1,000 feet. Ribs of barren ground 15 and 20 feet long separate larger areas of pay ore, and at places shafts were started in barren places, which led downward into ore bodies, and vice versa. This whole distance of 1,000 feet may best be considered as a succession of ore shoots, irregular in form, but having a general northerly pitch, from 50 feet to 75 feet long and generally separated by waste bodies 15 and 20 feet wide, while the ore bodies often run into each other.

The ore bodies on the other veins of the system have been much narrower in width and irregular in occurrence, area and value.

The method of operation, which has been adopted and which up to January 1, 1902, was in general practice at these mines is quite novel in view of the fact that they were practically virgin properties. Sections of 100 feet were measured off along the apices of the various ledges, and leases were made on each of these portions of the vein. Somewhat over 100 of these leases were made. The owners of the mines, or their agents, marketed the ore for the various leasers, reserving, as royalty, 25 per cent of its value after smelting and transportation charges were deducted. The leaser providing himself with all tools, hoisting machinery and other supplies.

The amount of ore shipped under this arrangement returned a gross sum of nearly \$700,000 and of an average value per ton of about \$200, and there remains on the dumps, as the property of the leasers, about the same amount, but in the form of a lower grade ore.

The work done by the leasers has all been done on the vein following the ore and with a view to produce the largest and quickest ore returns. The owners are now sinking two shafts in the hanging walls of the Mizpah and Valley View veins. Gasoline hoisting engines are used for this work. During the leasing period whips, whips, and windlasses were mostly in use, although one small steam hoist was in place and in constant use.

Discoveries of various degrees of importance are stantly reported in the adjacent country, and this large section of the State is now receiving a more thorough prospecting than ever before.

A town of 800 to 1,000 inhabitants has come into existence about the mines, water is hauled in barrels and retails at \$1.50 per barrel about the town. Wood is collected with burros from the mesquite which is sparingly scattered about these hills and cañons. The questions of water and power are to be solved by the pumping of water and the transmission of electricity from sources said to exist to the northward at no prohibitive distance.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

RIGHT TO ENJOIN ACTION OF MINERS' UNION IN FIXING WAGES.—At the instance of coal miners in Indiana and Illinois who were members of the organization known as the United Mine Workers, such organization undertook to secure the adoption of a certain scale of wages, which it had fixed, in the mines of Kentucky. Certain operators there, who employed union miners, agreed to adopt such scale, provided it was adopted in a majority of the mines in another mining district of the State, in which the miners were non-union men. The relations between the latter and their employers were harmonious, and the wages paid satisfactory; and for the most part they did not desire to join the union. Under such circumstances parties representing the miners' organization invaded the district in large force, and estab-

lished camps of armed men near the mines, for the purpose of threatening and compelling the miners therein to join the union by a display of force, and of compelling a strike unless the union scale of wages was adopted. These camps were maintained for many months, the occupants threatening and even assaulting miners who refused to join the union. Both the employers and miners resented such action, and took measures of defense and retaliation. It was held that the actions of the members or persons representing such organization, and their associates in establishing and maintaining such camps, constituted an unlawful invasion of the rights of both mine owners and miners, which resulted in and threatened irreparable injury, and that it was the duty of a court to enjoin the same on application by a mine owner who was affected.

An order of a State court refusing a preliminary injunction in a suit brought by a number of corporations jointly, in which no final judgment has been rendered, is not a bar to a subsequent suit in a United States court for an injunction by a successor to one of such corporations, which was not a party to the former suit, and against persons for the most part different, and where the acts alleged as grounds of relief were committed after the former order was entered, though they are of the same general character as those relied on in the State court.—*Reinecke Coal Mining Company v. Wood* (112 *Federal Reporter*, 477); United States Circuit Court, District of Kentucky.

DUTY ON ZINC-DUST.—The Treasury Department is informed that the appeal in the case of the United States v. A. Klipstein & Co., was recently decided in the United States circuit court of appeals for the second district adversely to the Government, the court affirming the decision of the United States circuit court below. The merchandise in suit consisted of so-called zinc-dust, commonly known as indigo auxiliary, some of which was imported under the tariff act of August 28, 1894, and some under the act of July 24, 1897. That imported under the act of 1894 was assessed for duty under paragraph 174 and section 4 of that act at 1 cent per pound by similitude to zinc in blocks or pigs, and that imported under the act of 1897 was assessed for duty under the corresponding provision of paragraph 192 and section 7 of that act at 1½ cents per pound, and in some instances at 45 per cent ad valorem under paragraph 193, as a manufacture of metal, not specially provided for.

The importers protested, claiming the merchandise to be free of duty under paragraph 386 of the act of 1894, and paragraph 482 of the act of 1897, as an article in a crude state used in dyeing, not specially provided for, which claim has been sustained by both the United States circuit court and the United States circuit court of appeals in this case. The Attorney-General advises the Treasury Department that the application of the Government to the Supreme Court for a writ of certiorari in this case has been denied, and that no legal reasons now remain why this issue should not be considered as disposed of.—Circular of Treasury Department.

DUTY ON SULPHIDE OF ANTIMONY.—1. The product of antimony ore produced by removing the gangue or slag by heat is the crudest form of sulphide of antimony known to commerce, and is entitled to free entry under the provisions of paragraph 476, act of July 24, 1897.

2. The merchandise in question consists of sulphide of antimony. It was returned by the local appraiser as "Needle antimony, as manufactured article, not enumerated," and duty was assessed thereon at the rate of 20 per cent ad valorem under the provisions of section 6 of the act of July 24, 1897. The importers claim, among other things, that the merchandise is entitled to free entry under the provisions of paragraph 476 of said act as crude sulphide of antimony ore. The precise question raised by these protests was passed upon by this Board ad-

versely to the importers, and on appeal to the circuit court of the United States for the southern district of New York the same was, on March 12, 1902, reversed (McKesson & Robbins v. United States, unpublished). The Treasury Department has acquiesced in that decision and the same has become final.

3. Following this ruling the Board sustains the protests and reverses the decisions of the collector.—Appeal of Schoellkopf, Hartford & McLagan from Collector of Customs at New York; Board of General Appraisers.

ABSTRACTS OF OFFICIAL REPORTS.

Ontario Silver Mining Company, Utah.

The report of this company covers the year ending December 31, 1901. The statement of earnings and expenses for the year is given in the following table:

	Amount.	Tons.	Per ton.
Ore sold	\$362,295	22,539	\$16.07
Ore treated in mill	137,076	7,787	17.60
Miscellaneous	14,886	30,326	0.49
Total receipts	\$514,257	30,326	\$16.96
Mine account	\$172,302	29,317	\$5.88
Prospecting	65,766	29,317	2.24
Ontario mill	2,316	29,317	0.08
Tunnel No. 2	894	29,317	0.03
General expense	28,209	29,317	0.96
Cost of production	\$269,487	29,317	\$9.19
Ore bought	1,205	190	6.34
Decrease in ore stock	10,068	819	12.29
Cost of ore used	\$280,760	30,326	\$9.26
Ore expense (sold)	24,711	22,539	1.10
Marsac mill	51,481	7,787	6.61
Total expenses	\$356,952	30,326	\$11.77
Profit	\$157,305	30,326	\$5.19

The profit and loss account shows receipts as follows: Balance from previous year, \$395,005; operating profits as per table above, \$157,305; miscellaneous, \$1,754; total, \$554,064. The disbursements against this were for settlement of Crown Point suit and purchase of stock, \$60,000; purchase of mining claims, \$1,233; dividends, Nos. 222-223 inclusive, \$90,000; total, \$151,235, leaving a balance forward to current account of \$402,829.

The ore statement shows that on January 1 there were 914 net tons on hand. During the year 29,317 net tons were mined and 190 tons were bought, making a total of 30,421 tons. The ore sold was 22,539 tons and the ore milled 7,787 tons, making a total of 30,326 tons and leaving 95 tons on hand. The mill ran on ore 138 days, treating an average of 60.09 tons daily. There were used in treating this ore 885 tons salt, the percentage of salt being 11.36. The average saving was 82.67 per cent, the average assay value of the ore showing 36.89 ounces silver to the ton. The mill also ran 112 days on tailings, working 7,170 net tons; the average proceeds were 5.90 per ton, and the cost of reduction \$5.14, leaving a profit of 76 cents per ton.

The total amount paid by this company in dividends since its incorporation in 1877 has been \$13,752,500.

The report of Superintendent C. L. Rood gives a number of interesting details as to the working of the mine during the year. Work is now in progress on the East drift on the 1,700-foot level which will make it possible during the present year to clear the water from the 1,500-foot level and to resume stoping on that level where a good body of ore is known to exist. Shaft No. 3 was sunk 85 feet, and a station was cut at 1,760 feet to instal a large steam pump. From the surface down to the 900-foot level stoping was carried on during the year, and the vein has now been practically exhausted to that level. From the 900 down to the 1,500-foot level, stoping and exploration have been carried on, and there are still considerable bodies of ore to be taken out. On the 1,700-foot level about 1,400 feet of drifting and cross-cutting have been done generally with favorable results.

Nothing has been done with the Ontario Mill during the year except to keep the building in repair and sell or transfer to the mine the available supplies. The Marsac Mill was run partly on ore and partly on

tailings as noted above during the greater part of the year. This mill is operated under lease from the Daly Mining Company. Beginning with May 1 all the ore produced at the mine was sold direct to the American Smelting and Refining Company; this includes the silicious ores which were formerly worked in the Ontario and Marsac mills as well as the base ores which had been previously sold to the smelters. The bullion statements shows that there was obtained from the ore worked in the mill 237,481 ounces of silver and 150 ounces of gold; and from the tailings worked in the mill 71,171 ounces of silver and 159 ounces of gold. From the ore sold the product was 952,005 ounces of silver and 1,048 ounces of gold. This makes a total production for the year of 1,260,657 ounces of silver and 1,357 ounces of gold. The average price received for the silver contents of the ore was 58.17 cents per ounce, which is 3.5 cents less than the average return for 1900.

In September the company began the use of drain tunnel No. 1 for the transportation of ore and coal. The ore is loaded direct into railroad cars at the mouth of the tunnel and the coal is hauled back in the mine cars, hoisted to the surface and dumped in front of the boilers. The tunnel is used also by the Daly-West Mining Company, rents for such use being paid to the Ontario Company. Drain tunnel No. 2 has been kept in good condition and some prospecting work done in connection with it. The power-house at the mouth of this tunnel has been kept in good condition, and the ditch has been extended so as to increase the power generated, which is now sold to outside parties by the Park City Light, Heat and Power Company.

The developments made on the 1,700-foot level have justified exploration of the lode at greater depth; for the purpose it is proposed to sink shaft No. 3 to a depth of 2,000 feet and to run cross-cuts to intersect the vein.

The coal mines of the Weber Coal Company, which is owned by the Ontario Company, have never been in better shape for the economical extraction of coal. The main slope has been sunk 300 feet following the vein, which is of nearly uniform thickness for the whole distance. A very large body of coal is now exposed, and the quality has improved with the development in depth.

The report closes with a fitting tribute to the late R. C. Chambers who had been connected with the management of the company for 30 years.

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.

National Iron and Steel, Coal and Coke Blue Book. Edited by B. H. Morwood. Pittsburg, Pa.; R. L. Polk & Company. Pages, 670. Price, \$7.50.

United States Fish Commission. Report on Fishes Collected in Mexico and Central America. By B. W. Everman and E. L. Goldsborough. Washington; Government Printing Office. Pages, 24; illustrated.

Hydraulic Motors and Turbines. Third Edition, Revised and Enlarged. By G. R. Bodmer. New York; the D. Van Nostrand Company. London; Whittaker & Company. Pages, 580; illustrated. Price, \$5.

On the Study and Difficulties of Mathematics. Second Edition. By Augustus De Morgan. Chicago; the Open Court Publishing Company. London, Kegan, Paul, Trench, Trubner & Company, Limited. Pages, 288. Price, \$1.25.

Die Geschichte des Eisens in Technischer und Kulturgeschichtliche Beziehung. Part 5. By Dr. Ludwig Beck. Braunschweig, Germany; Friedrich Vieweg & Sohn. Pages, 176; illustrated. Price (in New York), \$1.75.

The Science of Mechanics. By Dr. Ernst Mach. Translated from the German by Thomas J. McCormack. Second Edition. Chicago; the Open Court Publishing Company. London; Kegan Paul, Trench, Trubner & Company, Limited. Pages, 624; illustrated. Price, \$2.

United States Geological Survey. Twenty-first Annual Report. Part II. General Geology, Economic Geology, Alaska. Pages, 522. *Part III. General Geology, Ore and Phosphate Deposits, Philippines.* Pages, 644. *Part IV. Hydrography.* Pages, 768. All illustrated. Washington; Government Printing Office.

BOOKS REVIEWED.

Geological Survey of Canada. Summary Report for the Calendar Year 1901. Dr. Robert Bell, Acting Director. Ottawa, Canada; Public Printers. Pages, 272; illustrated.

This volume contains the report showing the work done by the Geological Survey during the past year. It covers varied and extensive explorations in different provinces of the Dominion, from Nova Scotia to the Yukon. Besides the general report, there are a number of special reports on various sections of the work. The Geological Survey of Canada has an enormous territory to cover, and this report gives some idea of the extent of the valuable work which it has done and is doing with a working force so small that it would seem almost impossible to attempt to cover the ground. Great credit is certainly due to the Survey for what it has accomplished.

Armature Windings of Direct Current Dynamos. By E. Arnold. Translated from the German by Francis B. De Gress, New York; the D. Van Nostrand Company. Pages, 124; illustrated. Price, \$2.

This book is the outcome of a series of lectures delivered to students by Prof. Arnold. Having experienced the difficulty of presenting the various methods of winding armatures in a brief and simple way, he endeavored to establish rules for the various windings. In doing so he found that all so-called closed coil windings, with either a series or parallel arrangement of the inductors, could be embraced under a general rule which applied equally well to ring, drum and disk armatures. The common as well as the peculiar properties of the various windings can be accurately observed with the aid of this rule. The relationship between ring, drum and disk armature windings is brought into prominence, and the transition from one winding to another can be accomplished without difficulty. The rule not only embraces all known windings, but furnishes, according to the author, a general solution of the winding problem. In this book the rule is clearly explained, and a number of new designs for connections are also shown.

The Evolution of Mine Surveying Instruments. By Dunbar B. Scott and others. New York; The American Institute of Mining Engineers. Pages 324; illustrated. Price, in cloth, \$3.50; in half morocco, \$4.50.

In this volume the secretary of the Institute has gathered the several papers and discussions on the subject of mine surveying instruments which have been contributed to the recent volumes of the *Transactions*, except those that were received too late for this special publication. The original paper by Mr. Scott on the evolution of mine surveying instruments, which was published in volume XXVIII of the *Transactions*, forms the opening chapter. This is followed by interesting discussions by Bennett H. Brough, D. D. Scott, W. F. Stanley, Prof. Dr. Mox Schmidt, D. W. Brunton, H. D. Hoskold, W. S. Hungerford, Dr. R. W. Raymond and others. In addition to the discussion of Mr. Scott's paper, Messrs. H. D. Hoskold and Benjamin Smith Lyman contribute extended papers on mine surveying

instruments in general, and Mr. John H. Horden adds some notes on tripod heads. In this volume, and in the special volume on ore deposits which was reviewed in the JOURNAL several weeks ago, the Institute has accomplished a valuable piece of work. Both volumes deserve a place in every technical library.

The Asphalt and Bituminous Rock Deposits of the United States. Extract from the *Twenty-second Annual Report of the United States Geological Survey.* By George H. Eldridge. Washington; Government Printing Office. Pages, 256; illustrated.

In preparing the monograph, the author states, the intention has been to give a general conception of the nature of the materials discussed, their mode of occurrence, the stratigraphy and structure of the attendant geology. Much of the material is the result of the author's personal investigation of the deposits, but he has used the work of others also, and makes due acknowledgment. The report is a general and comparative review of the deposits of asphalt and bituminous rock in the United States. It does not discuss the varieties of these materials from a chemical standpoint, nor their relative merits for paving and other uses; though some incidental references to these points have been necessary. The classification of hydrocarbons and allied substances adopted is in the main that of Prof. W. P. Blake, with some modifications which seemed to be desirable.

After an introduction on the general subject of asphalts and bituminous rocks and their distribution in the United States, the author takes up the deposits of the different States, describing their location and other characteristics in detail, giving much valuable information regarding them. These descriptions are illustrated by maps, views, geological sections, etc. The monograph is a very full and valuable one.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so required.

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

The Avino Mines of Mexico.

Sir: We beg to call your attention to one or two errors which have appeared in your JOURNAL regarding our plant. There appeared on page 428 of your issue of March 22, the assertion that our payroll amounted to literally over \$20,000. This is quite incorrect. Your correspondent has no inside information on this point. Nor is the statement correct that we are installing a new concentrating plant. We are neither building a concentrating plant nor operating one.

AVINO MINES OF MEXICO, LIMITED.

Avino, Durango, Mexico, April 24, 1902.

(Our correspondent's attention is invited to the correction which appeared in the JOURNAL of March 29, which stated that the new lixiviation plant purchased in the United States for the mines at Avino was expected to arrive at an early date. The error in this regard was in the use of the word "concentrating" instead of "lixiviation."—EDITOR, E. & M. J.)

The Hargreaves-Bird Electrolytic Process for Producing Soda and Bleach.

SIR:—In my article on the process that appeared in your issue of April 5, I stated that the life of the cell averaged 100 days, during which time no attention is required, as the process is entirely automatic. It should be stated that the diaphragm is the only part of the cell which wears out during this time

and renders it necessary for the cell to be disconnected and reset. The iron frame-work and the copper cathode are unaffected by the chemicals, and are only subject to the usual wear and tear of ordinary machinery and plant. The carbon anodes require occasional renewal, but not so often as the diaphragms. The actual life of the cell itself is therefore much greater than the 100 days that the cell works without renewing the diaphragm, so that the cost of the plant is much less than if the whole cell had to be renewed every 100 days. An interesting point in connection with the process is that the only raw materials required are brine, coal, and lime, and that no by-products or waste are made. No sulphuric acid is used as in the Leblanc process, so that one of the chief uses of this acid in the alkali trade will be checked—a fact which is already causing some disquietude in England among producers of pyrites. It is hardly necessary to add that the process does not use mercury or other liquid metals as cathodes. Though many processes using such cathodes have been tried in England, France, Germany, and America, none of them have been found to stand the test of practice as commercial propositions.

EDWARD WALKER.

London, April 22, 1902.

The Cyanide Patents.

SIR: The inquiry of F. U. H., page 590, your issue of April 26, as to the cyanide process patent situation is certainly interesting.

The late Dr. F. M. Endlich, for many years a well-known mining engineer and expert, claimed priority in that line in conjunction with Mr. N. H. Muhlenberg, basing the claim upon certain experimental and practical work carried out by them in New Mexico. As the matter is dead now, I feel free to say that some interest was taken by Dr. Endlich and Mr. Muhlenberg in the litigation arising upon the MacArthur-Forrest patents in South Africa, in which a good deal of testimony was taken in this country.

There are, however, many ancient publications and patents referring both directly and incidentally to the use of cyanide solutions, and the MacArthur patents themselves are based only upon the selective action of cyanide in certain prescribed proportions. Of course no patent question could be answered off-hand, and action should only be based upon careful investigation and report upon the precise process, the use of which is contemplated. The above memorandum may be of interest to your correspondent and to others concerned in the subject.

As a mere matter of engineering, your correspondent would probably be very foolish not to avail himself of the extended experience of persons installing cyanide plants. He would go over a great deal of the same ground that they have covered at his own expense, and any plant that he would erect for himself would no doubt be so defective in comparison with the ones they could put up for him that the difference in results would more than make up for the saving in outlay.

T. J. JOHNSTON.

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.)

Gas Fuel for Lime-Kilns.—Would it be any cheaper to produce and use gas from bituminous coal for burning lime than to burn with the coal direct? If so, what would approximate saving be with kilns using 25 tons coal per day costing \$2 ton?

Answer.—With regard to the use of gas in lime-kilns, Mr. H. A. Frasch, in *The Mineral Industry*,

Volume VII, says: "Kilns with gas fuel are used in the sugar industry, where it is required to obtain clean carbonic acid gas and pure lime. They are expensive to construct, but have the advantage that coal of an inferior quality can be used. On the other hand, if the gas is introduced horizontally, the flame does not penetrate far enough toward the center of the kiln, and they have therefore to be constructed of smaller diameter and capacity. To avoid this difficulty, attempts have been made to construct gas kilns with a perpendicular gas conduit extending from the bottom of the kiln into the interior, but it was found that the cone distributing the gas was soon destroyed. Altogether, the vertical gas kiln has yet to establish itself, and even the advantages to be gained from it are doubtful."

As to the substitution of fuel gas for coal, if it should be desirable for other reasons, it would be impossible to say what the saving might be. It would depend upon the quality of the coal and other circumstances; all of which must be known before any definite estimate could be given.

British Columbia Mining Claims.—In a recent issue your special contributor, in an able article setting forth the disadvantages of our present apex law, refers to claims in British Columbia, and states that mineral claims there may be 1,500 feet square, bounded by vertical side planes. I assume that the statement is correct.

In the *Colliery Manager's Handbook*, by Caleb Pamey, published in 1893, the statement is made on page 58 that "In British Columbia * * * * the largest claim measures 1,500 feet by 600. Within his claim-limits all veins and lodes belong to the owner holding the license."

Will you kindly print a brief synopsis of the text of the laws actually in force at the present time, and inform me whether Pamey was correctly posted at the time of his writing; and if so, when was the law changed?—W. B. K.

Answer.—The statement in the *Colliery Manager's Handbook* was correct at the time it was written. The law was changed, however, very shortly afterwards by acts passed in 1893 and 1894. A claim in British Columbia now is limited to 1,500 by 1,500 feet, bounded by vertical side planes. There are no extra-lateral rights.

Iceland Spar or Calcareous Spar.—I have received your information with regard to calcium carbonate, but would like to ask you a few more questions in relation to it. The carbonate of calcium on which I want the information is what is ordinarily called calcareous spar or Iceland spar. It is transparent, colorless or of white milky consistency. The crystals are of the obtuse rhombohedron form and always break or split into the same form. Besides the pure and transparent crystals exhibited in very high degree, the double refraction of light is the principal characteristic of this mineral.

Can you tell me what is the price of this (CaCO₃) carbonate crude and in powder? Whether or not this crystalline form of carbonate is found in large quantities in the United States? What is the home consumption? Do they import any and how much? Is the demand greater than the home supply? Who are the buyers in New York, Boston and Philadelphia? Is it used in the preparation of hydraulic cement? In what other industries is it used?

Answer.—Your questions can be answered without taking them up in detail. The only special use for Iceland spar is that suggested in your description. On account of the double refraction of light by the pure, transparent crystals, they are used in the polariscope. This, of course, is not sufficient to cause any considerable demand for this mineral. If found in large quantities, however, it could be used for cement, or for any purpose for which an especially pure limestone is desirable. Under these circumstances, you will see that the statistics you ask for cannot be given, nor can any price be quoted.

ELECTROLYTIC PRECIPITATION OF GOLD.

Attention is called by the *Electrical World and Engineer* to a process for the recovery of gold from cyanide solutions which is the subject of a recent patent to Edward D. Kendall, of Brooklyn. The dilute cyanide solution derived from the leaching of gold ores is permitted to filter slowly through a mass of hard fragmental carbon, packed around the porous cup of an electrolytic cell and connected as the cathode of a circuit of as relatively high electromotive force as 15 volts. A carbon plate, situated within the porous cup and immersed in a solution of caustic soda therein contained, constitutes the anode of this circuit. Upon passage of the current, the double cyanides are electrolyzed, the cyanogen being collected in the anode solution, and the precious metal deposited in pulverulent form in and through the mass of the cathode. After collection in this manner of a considerable quantity of the metal, the two compartments are emptied of their solutions, a carbon plate, silvered and rubbed with plumbago, substituted for the carbon plate anode, and the current connections are reversed. There is now permitted to flow through the cell a strong solution of cyanide of potassium, the flow occurring successively through the anode and cathode compartments, in the order named. Under these conditions the second step of the process—the recovery of the metal—is effected. The gold, which in the first step was distributed in divided form over the great area of the fragmental cathode, in the second step is redissolved from this cathode, which has now become the anode, and redeposited, this time in reguline form, on the metal cathode in the porous cell.

The method is a very suggestive one and loses nothing of interest from the fact that it is not, in its broad outlines at least, novel with the present patentee. Dr. Pflieger in 1895 first suggested that the coat of gold precipitated over an enormous cathode area from the dilute solutions of practice be stripped and redeposited in a strong solution and thereby obtained in a smaller compass and more available form. The full and clear development of the idea is due, however, to Prof. S. B. Christy, of the University of California, who pointed out its advantages in the following figures:

A plant producing 600 troy ounces of gold in 30 days would under normal conditions distribute this metal over 1,200 square feet of cathode surface in a film approximately 0.00033 an inch in thickness; by the stripping process this gold may be collected upon an area not exceeding 10 square feet in a deposit 0.04 inch thick.

THE MANUFACTURE OF MINERS' CANDLES.

In our issue of April 5 there was published a description of the modern miners' candle and the process of its manufacture. This was preceded by a comparison with the earlier types of candles and their modes of manufacture. As some of the statements regarding the present process were unfortunately inaccurate, we give space to the following corrected account of the methods employed at the works of E. Schneider & Co., of Chicago, the manufacturers of the original stearic wax candle, which we think will be of interest to our readers:

In the first place, it is well to repeat that the essential points of a good miners' candle are that it should not smoke, and thus foul the atmosphere of the mine; it should show a hard, dry surface, and should be capable of withstanding more than 140° of heat without bending or dripping. It should be self-consuming, be able to resist the drafts encountered in mines and the wick should be instantly extinguished when the candle is blown out.

After years of chemical research it was found that a material to produce the required candle was in one of the component parts of tallow itself, which are principally stearic acid, oleic acid, and glycerine. It is necessary to make a complete separation of the stearic acid from the oleic acid and the glycerine, in order to obtain the former in a pure state free of the oily elements existing in both oleic acid and glycer-

ine. This result is accomplished by the decomposition of tallow, the stearic acid being secured in the shape of a hard, dry wax. It is the product from which all of the finer grades of candles are made today, and if compared with other candle-making material, such as ordinary tallow, beeswax or paraffin, the advance in this line of manufacture is readily apparent.

In the process of manufacture the tallow is first taken into the melting room in barrels, rolled upon a track which runs over a large vat. After the required number of barrels is in position, the nozzle of a steam hose is inserted in the bung-hole of each, steam is turned on and the tallow melts and drips into the vat beneath. From the vat the melted tallow is pumped into a number of tanks, where it receives a thorough cleansing, preparatory to its decomposition. It is then run into immense copper boilers or digesters, in which a mixture, composed largely of water and alkali, has previously been placed. Steam is applied under high pressure, and after a given time, decomposition sets in. During this portion of the process the glycerine is set free from the tallow, mixes with the water and sinks to the bottom of the digester. The glycerine water is piped to a concentrator, where it is boiled down to a proper consistency for marketing.

The oleic and stearic acids remain in the digester, combined with the alkali in the form of an emulsion. This is drawn off to large wooden tubs and treated with oil of vitriol, which precipitates the alkali. All traces of the vitriol are eradicated by several washings with water and steam.

The pure fatty acids which now remain are piped to what is termed a granulating room. Here they are run into pans, and after a certain time, a partial separation of the oleic from the stearic acid takes place. The mass now assumes about the color and consistency of maple sugar. The contents of the pans are next placed in bags or mats for pressing. The bags are arranged in layers between press plates in a hydraulic cold press. Great pressure is exerted and a large portion of the oleic acid is squeezed out. What is left in the bags is taken to a hot press. Here additional pressure is applied, while steam is let in between the press plates and every drop of oleic acid is removed. The residue is the stearic acid in the form of a hard, snow-white wax, the material from which the miners' stearic wax candles are moulded.

PATENTS RELATING TO MINING AND METAL LURGY**UNITED STATES.**

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

Week Ending April 29, 1902.

698,431. TUYERE.—Samuel K. Behrend, Washington, D. C., assignor to Howard Evans, Philadelphia, Pa. The combination with the circular frame of a converter, having a plurality of holes therein, of a corresponding number of tuyeres, one for each hole, said tuyeres vertically adjustable from their inner ends as centers, whereby an all-around blast of air may be directed at varying angles at a level approximately coincident with the horizontal plane in which the holes are located.

698,434. CASTING-MACHINE.—Henry L. Bock, Hartford, Conn., assignor to the Veeder Manufacturing Company, Hartford, Conn., a corporation of Connecticut. In a casting-machine, the combination with a melting-tank, of a valve-chamber having an inlet-opening from the tank and terminating in a vertically-disposed outlet-opening at its extreme lowest point, whereby the head of molten metal rendered effective to augment the velocity with which the metal issues downward from said chamber is equated to the total height of the chamber; a well located at one side of the valve chamber and communicating therewith below the plane of the inlet-opening from the tank; a plunger in the well; and mechanism for controlling the inlet and outlet openings of the valve-chamber.

698,441. GRINDING-MILL.—Joseph Brown, Lorain, Ohio. A grinding-mill, comprising a casing, grinding-heads arranged in said casing, a shaft on which one of the grinding-heads is rigidly mounted, a shaft having a ball at one end engaging a socket in the other head, a clutch-section secured to the said head and having a portion of the socket

for the ball formed therein, a clutch-section secured to the shaft, the said clutch-sections having short intermeshing teeth arranged to permit of one section having a slight rocking motion with reference to the other clutch-section, and a coiled spring surrounding the clutch-sections and bearing at its ends upon said clutch-sections.

698,462, 692,463 and 692,464. PROCESS OF MAKING ALKALINE CYANIDES.—James D. Darling, Philadelphia, Pa., assignor to Harrison Bros. & Co., Incorporated, Philadelphia, Pa., a corporation of Pennsylvania. A process of producing pure alkaline cyanide, which consists in subjecting alkaline oxide to the action of carbon and nitrogen under the influence of heat, whereby cyanized charcoal is produced; and subjecting this cyanized charcoal to the action of ammonia-gas and alkali metal under the influence of heat, whereby the carbon remaining in the cyanized charcoal is converted into cyanide.

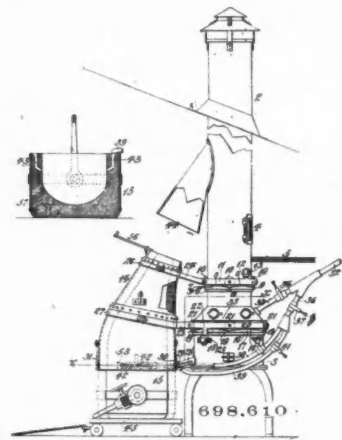
698,485. TUYERE FOR FURNACES.—William B. Foster, Utica, N. Y. The combination in a furnace of a tuyere opening having a vertical extent equal at least to the thickness of the furnace-wall at the tuyere-opening, a plate for said opening removable without necessitating the removal of other coating parts and having a blast-opening and means for conducting the air to said blast-opening.

698,495. FURNACE FOR HEATING OR SMELTING METALS.—Herbert H. Hewitt, Buffalo, N. Y. A furnace having a combustion-chamber the wall whereof is perforated to admit the fuel-supply and a vertically-adjustable cover or diaphragm extending over and serving to define the effective volume of said combustion-chamber.

698,565. BOTTOM-POURING LADLE.—Clifton W. Sherman, Bellevue, Pa., assignor to Pennsylvania Car Wheel Company, Pittsburg, Pa., a corporation of Pennsylvania. A bottom-pouring ladle, having a plug, a yoke from which it is rigidly suspended, an operating-slide to which the yoke is rigidly applied, a guideway for said slide having an inwardly-inclined projection arranged above the ladle and next the slide, and means to reciprocate the slide.

698,590 and 698,591. CASTING-MACHINE.—Curtis H. Veeder, Hartford, Conn. In a casting-machine, the combination with means for subjecting a mass of molten metal to a pressure greater than atmospheric, of an outlet-nozzle through which molten metal is discharged; a shiftable mold; means for advancing the mold to a position when a casting is to be made in which it contacts with the nozzle and for withdrawing it therefrom; a valve independent of the mold for controlling the entrance of molten metal thereto; means for exhausting the space extending from the valve to the bottom of the mold-space proper and through and into which the molten metal passes during its flow; a power-driven device in the machine; and means operatively connected with such device for actuating said valve to first admit molten metal under pressure to the exhausted mold, and then to shut off all communication of the metal therewith.

698,610. APPARATUS FOR MAKING STEEL, ETC.—Edwin C. Wills, Peru, Ind., assignor of one-half to Howard Evans, Philadelphia. The combination of a dome-section, a ladle-section independent thereof and adapted to coast therewith, and tuyere in the ladle-section which tuyeres pass



downwardly from a point in the upper surface of the ladle-section through the walls of the said section and then turn and pass in a downward direction through the inner walls of the section whereby the blasts of air issuing from said tuyeres are directed upon the surface to be occupied by the metal and toward the center thereof.

698,593. ART OF FORMING CASTINGS.—Curtis H. Veeder, Hartford, Conn. Improvement in the art of making a casting which consists in projecting the molten metal into and against the walls of the mold by a ram-like action produced by first setting in motion a body of molten metal in a direction other than into the mold, and afterward, subsequent to the establishment of such flow, instantly diverting the direction of flow of the entire body of moving metal into the mold, whereby the kinetic energy of the entire mass of moving metal becomes effective to increase the impact of the entering metal.

698,596. CASTING-MACHINE.—Curtis H. Veeder, Hartford, Conn. In a casting-machine, the combination with

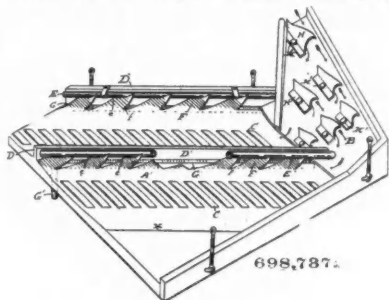
means for subjecting a mass of molten metal to a pressure greater than atmospheric, and a mold, of a plurality of air-pumps for producing a vacuum in the mold; a valve for controlling the entrance to the exhausted mold of molten metal; a powder-driven device in the machine; and mechanism operatively connected with such device which first renders one of the air-pumps effective to exhaust the mold, then renders such pump ineffective and a second pump effective to further exhaust the partially-exhausted mold, and finally during the second exhaustion actuates the said valve and thereby admits molten metal under pressure to the mold.

698,599. MACHINE FOR FORMING BRICKS, TILE, ETC.—William R. Wakefield, Mount Union, Pa. The combination with a suitable gearing, of a hopper arranged adjacent thereto, a plunger reciprocating in said hopper, a conveyor beneath the hopper and molds carried thereby, said plunger being adapted to be actuated by the gearing, a second plunger arranged near the first plunger, and a smoothing-trowel adapted to be reciprocated over the top of the mold.

698,696. PROCESS OF MAKING PARIS-GREEN.—Richard Franchot, Niagara Falls, N. Y.—A process of making paris-green, which consists in electrolyzing with a copper anode a solution of an acetate and arsenious oxide.

698,704. METHOD OF MAKING HYDROCHLORIC ACID.—Edward Hart, Easton, Pa., assignor to General Chemical Company, New York, N. Y. A process of manufacturing hydrochloric acid, which consists in heating sodium pyrosulphate and sodium chloride in the presence of water.

698,737. CONCENTRATOR.—Mark D. Rochford, Kingman, Ariz. In a concentrator, the combination of a concentrating-table having along one side a concentrate-trough and superposed water-supply pipe, and having along another portion a line of riffles, extending transversely and tapering in the direction of their length to form central portions of

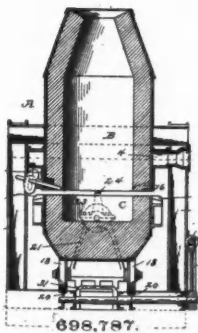


greater thickness than the ends whereby the material at the ends of the riffles is agitated with greater effect than the material at the thickened center, and a deflecting-surface extending in line with the trough and below the water-supply pipe, and rising from the table in a series of independent and gradual curves.

698,739. METHOD OF EXTRACTING METALS FROM THEIR OXIDE ORES.—John Rudolfs and John Landin, Stockholm, Sweden, assignor to Alwin Jacobi, Stockholm, Sweden. A process for producing briquettes or other bodies which are hard, do not fall into pieces at a high temperature and are suitable for reduction, consisting in mixing pulverized oxid ores, carbon, hydrocarbon and an organic nitrogen compound or compounds, pressing the mixture to bodies of suitable shape and finally heating said bodies to 300 to 500° C.

698,768. FURNACE-CHARGING APPARATUS.—Samuel S. Wales, Munhall, Pa. In charging apparatus, a grip-bar having a cavity with a closed bottom and arranged to contain a pool of cooling fluid.

698,769. PROCESS OF PREVENTING OXIDATION OF MOLTEN METALS.—James H. Walker, Milwaukee, Wis., assignor of one-half to Elias H. Bottum, Milwaukee, Wis. A process consisting in directing the non-oxidizing gases which are produced by the complete combustion of the fuel employed to melt the metal and from which heat has been



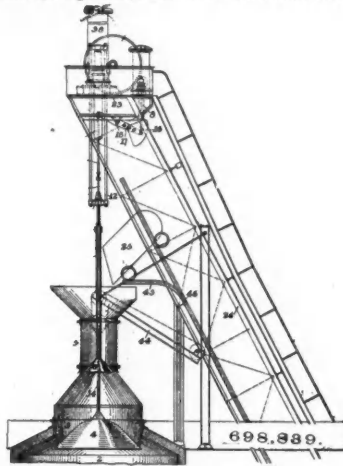
absorbed, over the surface of the molten metal so as to exclude the air therefrom, without interfering with the removal of the molten metal when the crucibles or pots are open.

698,787. STEEL-CONVERTER.—Samuel K. Behrend, Washington, D. C., assignor to Howard Evans, Philadelphia, Pa.

A converter comprising a stationary stack, and a movable ladle, the ladle adapted to contain the molten metal, and the stack having a series of tuyeres extending around it, their lower ends extending no lower than the upper end of the ladle whereby the blast of air issuing from the tuyeres is directed upon the surface of the metal and toward the center thereof.

698,822. CONVEYOR.—George W. Cross, Carbondale, Pa. In a conveyor, the combination with a chute, of a U-shaped flight coating therewith, the side members of said flight lying substantially parallel with said chute.

698,839. BLAST-FURNACE-FILLING APPARATUS.—Julian Kennedy, Pittsburg, Pa. A blast-furnace having an in-



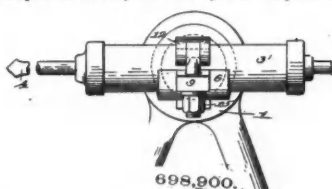
clined track leading to its top, with an overhung cantilever portion, a bell, and bell-operating mechanism supported on said cantilever.

698,840. METHOD OF OPERATING BLAST-FURNACES.—Julian Kennedy, Pittsburg, Pa. A method of preventing the discharge of coke after a slip, in a blast furnace, consisting in reducing the area of the gas off-take when the charge in the furnace is hanging.

698,850. ARTIFICIAL FUEL. William R. Peakes, Vineyard Haven, Mass. A compound to be used in connection with fire-wood and consisting of sawdust, salt, blue vitrol, charcoal, sulphur and copperas.

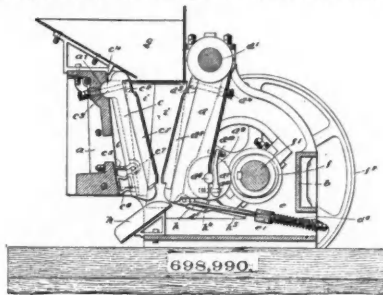
698,889. PROCESS OF PREPARING SAND MOLDS FOR STEEL CASTINGS.—Herbert B. Atha, East Orange, N. J. The process consists in first pressing the sand about a pattern, then withdrawing the pattern and applying to the surface of the mold, a wash or paint of carbonate of magnesium, and a highly volatile or inflammable liquid, and finally igniting the liquid.

698,900. CLAMP FOR ROCK DRILLS.—Frank R. Brown, Unga, Alaska. The combination with a stand or support having a frusto-conical pivot, of a clamp comprising two oppositely-disposed semicylindrical jaws adapted to embrace



the barrel of the drill-rod, one of said jaws being provided with a substantial U-shaped base and the other jaw being provided with a base arranged to slide between the sides of said U-shaped base, each of said bases on their inner edges being provided with arc-shaped dove-tailed grooves, the said bases embracing the pivot on the stand, and means carried by the ends of the jaws for adjustably drawing the latter and said bases together.

698,990. CRUSHER.—Alexander G. Morris, Tyrone, Pa. A crusher having a frame, a stationary jaw, a removable wear-plate fitted thereon, a clamp holding the wear-plate in posi-



tion, and a bolt engaging the clamp and passing into connection with the frame of the machine to hold the clamp and the jaw both rigidly in place.

699,009. PROCESS OF PRECIPITATING COPPER FROM WATER.—Andrew J. Polmeter, Whitehall, Mont., assignor of two-thirds to Joseph Mitch and Alberta G. Dygert, Butte, Mont. The process consists in adding to coppery

water before it enters the pipes of the pumping system a precipitant solution containing an excess of alkali.

699,011. APPARATUS FOR THE MANUFACTURE OF CONCENTRATED SULPHURIC ACID.—William R. Quinan, Pinole, Cal. In an apparatus for obtaining sulphuric acid, the combination of a kiln for burning sulphur, a reaction device and a flue extending from said kiln to said reaction device, said flue having a series of steps over which the acid flows from the reaction device in continuous contact with the gases passing from the furnace to said device.

699,012. PROCESS OF OBTAINING TIN BY ELECTROLYSIS.—Ernest Quintaine, Argenteuil, France. The process of separating tin electrolytically from tin-scraps, which consists in suspending the scraps, as the anode, in a bath composed of an aqueous solution of nitrate of tin to which have been added chloride of ammonia and chloride of tin, suspending a suitable cathode in the bath, and finally passing the electric current through the anode, bath and cathode.

699,022 and 699,023. DOWNHAUL FOR MINES.—Carl L. E. Schenk, Walkers Mills, Pa., assignor of one-half to Tate, Jones & Company, Incorporated, Pittsburg, Pa., a corporation of Pennsylvania. A downhaul having in combination of a chain, pairs of oppositely-swinging dogs pivotally mounted on the chain and provided with weights for holding the adjacent or inner ends of each pair in operative position, a depressing-plate arranged parallel with the line of movement of the chain, and a lateral extension from the front dog of each pair adapted to engage and be shifted by said plate.

699,024. BRAKE FOR UPHAULS FOR MINES.—Carl L. E. Schenk, Walkers Mills, Pa., assignor of one-half to Tate, Jones & Company, Incorporated, Pittsburg, Pa., a corporation of Pennsylvania. An uphaul for cars having in combination a chain, a rail parallel with the line of movement of the chain, an arm having one end connected to the chain and means on the opposite end of the arm operative on a rearward movement of the chain to grip the rail.

699,052. FILTER-PRESS.—John Wilson, Glasgow, Scotland. The combination with the stationary and the movable platens or followers of the press; of cake-forming frames interposed between said press-platens or followers, inclined portions forming the bottoms of said frame, links supporting said frames, and means connected to said links adapted to give an angular or slanting position to said frames, when the platens are separated.

GREAT BRITAIN.

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

Week ending April 10, 1902.

5,846 of 1901. INGOT CASTING LADLE.—G. Hatton, Brierley Hill. An interceptor of V-shape between the ladle and moulds, for equaling the flow of metal in casting iron and steel ingots.

6,257 of 1901. CONCENTRATOR.—W. A. Green, Aberystwith. A rocking vanner with longitudinal riffles, with means of adjusting the inclination of the surface.

7,845 of 1901. GAS RETORT CHARGER.—W. Fowles, Glasgow. A machine for charging gas retorts, requiring only one or two forward motions.

9,541 of 1901. COAL WASHER.—N. McLellan, Spenny-moor. A coal washer consisting of troughs having dams at certain distances apart to catch the dirt which is removed by scrapers and elevators.

10,865 of 1901. ZINC SULPHIDE PIGMENT.—J. & J. Lones and E. Holden, Birmingham. Method of making an artificial zinc sulphide for use as white paint by roasting blende, then forming acetate of zinc and then precipitating the zinc as sulphide by sulphuretted hydrogen obtained from the roaster.

15,471 of 1901. TREATING GOLD-BEARING CLAY.—J. Brendon, Sydney, N. S. W. A plant for altering gold bearing clay so as to make it gritty and so suitable for amalgamation, etc.

21,176 of 1901. MELTING FURNACE.—The Hawley Down Draft Furnace Company, Chicago, U. S. A. An improved metal melting furnace with jets of gas blown against the walls of the crucibles.

25,475 of 1901. ROCK DRILL CHUCK.—T. Kay, Stockport. An improved chuck for rock drills.

118 of 1902. ELECTROLYTIC ANODE.—M. D'Andrimont, Liege, Belgium. Improved anodes for electro-deposition of metals, so as to make it possible to regulate the distribution of the current.

698 of 1902. NITRIC ACID MAKING.—W. Ostwald, Leipzig, Germany. A method of obtaining nitric acid from ammonia and air by the catalytic action of platinum.

2,231 of 1902. CRUCIBLE STEEL MAKING.—E. B. Clarke, Pittsburg, U. S. A. Process for producing crucible steel by mixing the ingredients in a separate furnace and then charging into a hot crucible.

3,560 of 1902. MINERS' LAMP.—J. Prestwich, Manchester. Improvement in miners' safety lamps to prevent the oil escaping when the lamp is accidentally overturned.

PERSONALS.

Mr. Karl Eilers of Denver, Colo., is in New York City.

Mr. John Hays Hammond leaves London, Eng., for New York City, on May 22.

Mr. T. A. Rickard, who has been in New York City, has returned to Denver, Colo.

Mr. Arthur Pearce, of Colorado, has just returned from an interesting trip to Peru.

Mr. A. E. Riter has been placed in charge of the Little Joe Mine, Kootenai County, Idaho.

Mr. Geo. T. Bancroft is now at Santa Rosa, Mex., in the employ of Phelps, Dodge & Company.

Mr. Victor Clement has left New York City for the mines at Mazapil, in the State of Zacatecas, Mex.

Mr. H. E. T. Haultim has resigned as consulting engineering to the Hastings Exploration Company at Nelson, B. C.

Mr. Samuel Newhouse, prominent in the mining industry of Utah, arrived in New York City from London this week.

Mr. M. McLean, superintendent of mines of the Detroit Copper Company has returned to Morenci, Ariz., from California.

Mr. T. Mennie, late mill superintendent of the Rock Lake Mining Company, at Bruce Mines, Ont., has returned to Butte, Mont.

Mr. R. Williams has resigned as superintendent of the Anchor Mine, Park City, Utah, and will shortly go to England for a visit.

Dr. Frank R. Van Horn has been appointed professor of geology and mineralogy at the Case School of Applied Science, Cleveland, O.

Mr. A. C. Beatty, of Denver, Colo., who recently completed the sampling of the Camp Bird Mine, at Ouray, is now in New York City.

Judge W. A. Garrett, of Holdrege, Neb., was a visitor to Black Hawk, Colo., this week to look after mining interests in Gilpin County.

President T. F. Cole, of the Oliver Iron Company, recently inspected the company's mines on the Marquette and Menominee ranges in Michigan.

Mr. E. Z. Burns, mining engineer, associated with Messrs. Simonds & Wainwright, of New York city, is going to New Mexico on professional business.

Mr. Richard Eames, Jr., has returned to Salisbury, N. C., from an examination of the San Miguel Mining Company's mines near Ahualulco, Jalisco, Mex.

Mr. H. M. Barry, connected with the Mine and Smelter Supply Company of Denver, Colo., has been in Butte, Mont., introducing the Durkee electric drill.

Mr. H. C. Gerber, manager of the Two Republics Mine at Parral, has gone to Hermosilla, Sonora, Mex., where he with some Cleveland, O., men is heavily interested.

Mr. George Williams, of Central City, Colo., has gone to Cardinal, Boulder County, to take charge of the new mill for the owners of the Boulder County Mine.

Mr. Pope Leatman has returned from Mexico and is now on his way to Johannesburg, South Africa. Mr. Leatman is general manager of the Randfontein Mines.

Mr. J. E. Bowers of La Colorada, Sonora, Mex., has been appointed foreman for the American-Mexican Anthracite Mining Company at San Marcial, Sonora, Mex.

Mr. N. L. Frothingham has moved his offices in New York City, from 116 Nassau street to 271 Broadway, and in Boston from 40 Water street to 53 State street.

Mr. H. J. Burtwell, mining engineer of San Francisco, Cal., has been in New York City, having just returned from Porto Rico, where he has been on professional business.

Mr. C. W. Baldwin, of Chicago, Ill., has returned from a visit to Gilpin County, Colo., where he is interested in the New National Tunnel, Mining and Milling Company.

Mr. Llew Humphrey, of Central City, Colo., has returned from a month's visit to Old Mexico, where he has been with a party examining mines in the interests of an English syndicate.

Mr. Edward H. Cox, of Springfield, Ill., is spending the month of May at Coalfield, Ia., looking after some development work for the Miller Creek Coal Company, of which he is mining engineer.

Mr. W. L. Hounold, lately of San Francisco, has arrived in Johannesburg, South Africa, where he now fills the important appointment of consulting engineer to the Consolidated Mines Selection Company of London.

Dr. John A. Mathews, the Carnegie fellow at Columbia University, was awarded the Carnegie gold medal on May 8, by the Iron and Steel Institute of

London, for his research work on low carbon steel alloys.

Mr. Harry A. Moss, who has recently been promoted to a partnership in the Dwight Furness Company of Guanajuato, Mex., passed through New York City this week en route to Europe for a three-months' vacation.

Mr. C. J. Garvin, who has spent 4 1/2 years in Mexico has returned to Denver, Colo. Mr. Garvin was connected in a professional capacity with several large companies and spent some time examining properties for an English syndicate.

Mr. Wm. MacCameron for many years superintendent for Mr. Mudd at the Small Hopes and other properties of the Leadville District has accepted a position with John Hayes Hammond's companies in South Africa and will leave in July for his new home.

Mr. S. E. Bretherton has spent a few days in Denver on business in connection with the Rocky Mountain Smelting and Refining Company, but returned immediately to Prescott Ariz. He has taken a position as manager for the Val Verde Copper Company, Limited.

Mr. Franklin Leonard, of New York City, president of the Comstock Tunnel Company, was in San Francisco last week, and from there returned to Nevada, where he expected to complete negotiations with mine owners for the construction of the lateral branch of the Sutro Tunnel to Silver City.

Mr. Chas. T. Arkins has resigned his position as metallurgist for the Cold Spring Gold Mining Company, Rowena, Colo., and resumed general mining and metallurgical practice. He has established an office with Mr. Geo. Wm. Brown, the firm name being Arkins & Brown, 512 McPhee Building, Denver, Colo.

Mr. H. Tromp, the Dutch mining engineer, who has been in the United States for the past 5 months visiting several of the mining districts, has sailed. Shortly after reaching The Hague, he will sail for the Dutch East Indies for the purpose of assuming charge of extensive mines in which the Dutch Government is interested.

Mr. Edward C. DeWolfe, late in charge of the draughting room of the Dodge Manufacturing Company of Mishawaka, Ind., and a frequent contributor to the columns of various mechanical journals, has accepted a position as associate editor of *Steam Engineering*, which has lately removed from New York City to Chicago. He takes up his new duties at once.

Mr. J. C. Kortz, president; Mr. H. G. Reddington, vice-president; Mr. J. A. Heimbrenner, secretary; Mr. J. M. Thomas, treasurer, of the Ohio & Colorado Smelting Company, and Messrs. U. L. Weirick and August Goff, of New York City, spent a portion of last week looking over the company's new plant at Salida and the New Monarch Mine at Leadville, Colo.

OBITUARY.

James Huston Watt died at Philadelphia, Pa., on May 2. Mr. Watt was president of the Watt Mining Car Wheel Company, of Barnesville, O.

Major William Jolliffe, a civil and mining engineer, died at Roanoke, Va., May 12. He laid out most of the city of Duluth, Minn. He was city engineer of Pittsburg, Pa., and had been connected with the largest railroads in the West and South as an engineer. He wrote several books on engineering and mining subjects. His health failed while he was engaged in engineering work in New Mexico.

James Dick, who died recently in Glasgow, Scotland, was well known both at home and in Australia. He was a member of the firm of R. & J. Dick, Greenhead, Glasgow. Mr. Dick was a great speculator in Australian mines and was very successful. Mr. Dick was on a visit to Australia in connection with his firm's leather business at the time the Broken Hill mines were being developed, and hearing most promising accounts of them he visited the Barrier Range with a mining expert, and secured large interests in the Broken Hill Proprietary Block 14, British Broken Hill and other mines. These interests brought him wealth, and having learned of the great value of mining investments he determined to embark in them on a large scale. It was his custom to visit Australia frequently, engage a mining engineer in Sydney or Melbourne, and visit with him the chief mining fields. In this manner he secured large interests in the Mount Lyell and other mines in Tasmania, the Sunlight and Mitchell's Creek Gold Mines in New South Wales, and the Scottish Gympie Gold Mine in Queensland. His shares in all these mines are very valuable. Mr. Dick's demise will be much regretted in Australia.

A. P. Minear, one of the pioneers of gold mining in the West, died in Washington, D. C., on April 28. Mr. Minear was a man of strong physique until in recent years when the hardships and exposure that he endured began to tell upon him. He was taken sick last August, while visiting a mining property in the Blue Mountains, in Oregon, and gradually became weaker until his death.

Mr. Minear was born in what is now West Virginia, on March 10, 1828. Going to the Coast early in 1849 he soon became one of the prominent placer miners. On the discovery of the Comstock lode, he hurried there and became heavily interested in the Bowers, the Yellow Jacket, the Woodville, the Silver Hill, and other mines, and became a power in the San Francisco stock market.

He was one of the first of the prominent Californians to go to Idaho, and he built the first quartz mill in that State—in Owyhee County. The failure of the Bank of California, in 1876, had bankrupted him, and when he went to Wood River, in 1882, he was unlucky in his investments.

Three years ago he went to Alaska, and took hold of some 20 copper and gold properties near Ketchikan, in partnership with his son, John I., manager of what was formerly known as the McFadden group of mines, in Custer County, Idaho.

Mr. Minear leaves a widow, a daughter and two sons.

Col. Francis F. Orbiston, who died in Coolgardie, West Australia, on April 20, had been a resident of Idaho Springs, Colo., for over 20 years, and had many acquaintances and friends among mining men in the West. Mr. Orbiston was born in England, January 23, 1843, the 17th in a family of 22 children. In 1864 he came to the United States as the secretary of an English mining company, settling at Reno, Nev. Very soon after his arrival he was made superintendent of the mining company for which he had been secretary. Within the next few years he became secretary and assistant superintendent of the Yellow Jacket on the Comstock lode, near Gold Hill, Nev. A little later he was the confidential agent and mine expert of the Bank of California, under Ralston & Sharon, who at that time were operating a large number of mines. At the end of 3 years the firm of Mackey, Flood, Fair & O'Brien appointed him superintendent of the Savage Mine, on the Comstock lode. Subsequently he held a similar position with the Belcher Mine. In 1879, in company with Messrs. Mackay, Rosener and Roberts, he purchased the Freeland Mine at Idaho Springs, and the old Hukhill claims belonging to the Freeland Mining Company. These properties have since been sold to the Consolidated Stanley Company. He was the most prominent citizen in lower Clear Creek County at that time, and socially he was very popular. He left Idaho Springs for Australia in November, 1898.

Col. Orbiston took an active interest in politics and served several terms in the state legislature. He left a wife and a daughter.

Henry Morton, president of the Stevens Institute of Technology at Hoboken, N. J., and a scientist of wide reputation, died May 9, in New York City, from the effects of a surgical operation.

Prof. Morton was born in New York city December 11, 1836, and graduated from the University of Pennsylvania in 1857, taking a post graduate course in chemistry. He then determined to study law, and entered the offices of George M. Wharton in Philadelphia, but shortly after was offered the post of Instructor in Chemistry and Physics at the Protestant Episcopal Academy in Philadelphia. He accepted it, and thereafter devoted his life to scientific attainment. In 1863 he became one of the founders of the Philadelphia Dental College, and was its first Professor of Chemistry. At about the same time he delivered some lectures on light before the Franklin Institute, which attracted wide attention.

In 1868 he was the chief of an expedition organized to observe and make photographic records of a total eclipse of the sun in Iowa. He was at that time resident secretary of the Franklin Institute and editor of its journal, but he assumed the presidency of the Stevens Institute when it was founded, in accordance with the will of Edwin A. Stevens, in 1870, selecting the original Faculty and holding the office without interruption until his death.

He formulated the Stevens curriculum, which has had an important part in the success of the school. Ten years later he gave the institute a mechanical laboratory fitted with steam engines and tools at a cost of \$10,000. He purchased with his private fortune the apparatus for the study of applied electricity and guaranteed the salary of a professor. In 1888 the chair of Engineering Practice was established, and Dr. Morton donated \$10,000 toward its endowment. Four years later he gave \$20,000 in 5 per cent bonds for the same purpose. His total gifts to the school are said to exceed \$45,000. It was his influence that led Andrew Carnegie to build and endow the Carnegie Laboratory. In 1897 Prof. Morton received the degree of Doctor of Laws from Princeton University.

SOCIETIES AND TECHNICAL SCHOOLS.

THOMAS S. CLARKSON MEMORIAL SCHOOL OF TECHNOLOGY.—This school, at Potsdam, N. Y., in its catalogue for the current year, describes the equipment of its workshop and various laboratories, the organization of its 4-year courses for civil, electrical and

mechanical engineering and the various courses in detail. The catalogue also states the requirements for admission and the necessary expenses of students, cost of living, etc. The total number of students enrolled is 80. The first graduating class was that of 1900.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on May 3, there were 69 members and visitors present.

Mr. William Hewitt presented a paper upon "Aerial Cable Transportation," and illustrated his descriptions with a large collection of photographs. The paper consisted of a historical review of the different methods and devices for transporting material through the air by means of wire-rope tramways and cable hoist-conveyors. The subject was discussed by Messrs. C. H. Ott, J. Kay Little, H. K. Meyers and others.

INSTITUTION OF MINING AND METALLURGY.—The annual dinner was held in the Hotel Cecil, London, on April 30. Among the guests present were Sir William Roberts-Austen, Sir Charles Crauford, Dr. Le Neve Foster, Mr. S. Neumann and Mr. Lionel Phillips and Mr. Julius Werner. Mr. John Hays Hammond replied to the toast to the members of the Institute abroad. Mr. A. G. Charlton, the newly elected president, in his address on "The Evolution and Influence of Technical Training and Business Principles in the Conduct of the Mining and Metallurgical Industries; and of their bearing upon some of the professional requirements of Mining Engineers and Metallurgists, which altered conditions have brought about in modern times." He remarked that if one could picture the condition of mining and metallurgy in the days of the earliest miners and metallurgists, in all probability it would be found that the changes through which these ancient crafts passed, in all the many centuries prior to the time of Agricola (1556), were as nothing compared with the progress the arts of mining and metallurgy made between 1657 and the middle of the 19th century; but as compared with this second period, in the past 50 years, mining and metallurgy might almost be said to have advanced by leaps and bounds.

Mr. Charlton mentioned the improvements made in late years in metallurgical methods, referring to the use of bromo-cyanide as applied to the treatment of raw sulpho-telluride ores, and to the "oil process," which he remarked, "may yet exercise a far greater effect upon the treatment of various copper and other base metal ores, and possibly on those of the precious metals." He also dealt at length with the changes which have taken place in mining practice, concluding with the statement that "changes in practice such as these require the mining engineer and metallurgist to keep his eyes and ears constantly open, and to follow them up from the cradle to his or their grave.

AMERICAN CHEMICAL SOCIETY—NEW YORK SECTION.—There was a large audience at the regular meeting of the section on May 9. The announcement was made that Mr. W. H. Nichols had established the Nichols Medal by presenting \$1,000 in General Chemical Company's 6 per cent bonds to the research fund of the section.

The program was made up of the following papers:

W. H. Birchmore, "Notes and Studies on Moulds and Their Allies."

F. H. Thorp, Boston, Mass., "The Teaching of Industrial Chemistry."

L. M. Dennis, Ithaca, N. Y., "The Rare Earths," illustrated.

C. W. Stoddart, "On the Determination of Sulphur in Coal."

G. A. Soper, "The Sterilizing of Water by Peroxide of Chlorine."

Prof. Thorpe pointed out those matters which he considered of special value in a course of industrial chemistry, and said while it is true that the man who goes into an oil works thinks he has no use for a knowledge of soap manufacture, it is not desirable to specialize too much in the industrial course, but rather to get a broad view of the important technical applications of qualitative and quantitative principles. "Technical schools," to quote Dr. Dudley, "should turn out men who know what to do when there is something to be done."

The properties of the materials of construction of the apparatus which is used, the quantitative handling of tons instead of grammes; of thousands of gallons instead of cubic centimeters; the importance of leakage, waste, dust and all those matters which make chemical work on a large scale so different from that of the laboratory, should receive particular attention. He did not consider that a finished industrial chemist can be made in any industrial school.

In the active discussion which followed Prof. Thorp's paper, Mr. W. H. Nichols said that he was in a position to receive the young men after teachers are through with him, and, as a rule, was disappointed. In a chemical work he would prefer a good engineer with no knowledge of chemistry, to a good chemist with no knowledge of engineering. Drs. McMurtrie, McKenna, Doremus and others took part in the discussion.

Professor Dennis explained recent advances in methods for studying the rare earths, and showed a separation of didymium from cerium in a few minutes, which formerly required three months of tedious fractional crystallization. He said that his study of these rare elements had led him to the conclusion that such relationships as existed between the atomic weights of chlorine, iodine and bromine indicated the addition of another element with atomic weight corresponding to the uniform increment.

Dr. Soper stated that owing to the more feeble character of the typhoid bacillus than the average innocuous bacteria of water supply, one-tenth the amount of germicide necessary to completely sterilize would effectually destroy the typhoid germ and others with about the same power of resistance. He had made experiments to show that typhoid infected water was freed from these weaker but more dangerous germs by the application of an amount of peroxide of chlorine which would cost only \$3.86 per 1,000,000 gal. of water treated, and which could be easily and safely prepared without expert chemical assistance.

He did not claim any "elective affinity," but simply a destruction of the less vigorous bacterial life among which is the typhoid germ, at the same time leaving in the water those which are not only innocuous, but undoubtedly advantageous.

INDUSTRIAL NOTES.

The F. D. Cummer & Son Company, of Cleveland, O., manufacturer of the Cummer dryers, has established a Chicago office in the Masonic Temple Building. Mr. W. F. Putnam in charge.

The American Spiral Pipe Works, of Chicago, Ill., states that its trade, already very large, is rapidly increasing. The company is shipping 40,000 ft. of spiral riveted pipe to one of the largest mines in Arizona.

The Lidgerwood Manufacturing Company, of New York City, recently secured a contract for hoisting gear, through Fraser & Chalmers, Limited, of London, for shipment to the Bokitsi gold fields, West Africa.

The Watt Mining Car Wheel Company, of Barnesville, O., states that the recent death of the president of the company, J. H. Watt, will not affect in any way the policy of the company nor the management of its business.

The Pittsburg Gage and Supply Company, Pittsburg, Pa., has been appointed direct representative of the Weller Manufacturing Company, Chicago, Ill., for the latter's line of elevating, conveying and power-transmitting machinery.

Stockholders of the Tidewater Steel Company have voted to increase the capital stock by an issue of \$600,000 worth of preferred stock. At present the stock consists of 150,000 shares of \$10 par value. The old board of directors has been re-elected.

The Mexican White Lead Company was formed a short time since at Gomez Palacio, Coahuila, Mex., with a capital of \$100,000. The company expects to be able to supply the product more cheaply than it can be imported from the United States.

The Sullivan Machinery Company, of Chicago, Ill., recently secured a contract for a complete air compressor and drill plant for installation in the mines of the Prieta Gold and Silver Mining Company, at Parral, Mex. The Santa Eulalie Mines, located 12 miles southwest of Chihuahua, operated by the Santa Eulalie Mining Company, of which John M. Wilson is the manager, is also to be equipped with a complete plant, comprising air compressors, drills,

The Fairbanks Company announces that in order to provide the facilities necessary to meet the requirements of its greatly increased business, it has secured the premises at the northwest corner of Elm and Broome streets, New York City, embracing numbers 186 and 188 Elm Street, and 416, 418, 420 and 422 Broome Street, and has there concentrated all the various departments of its business. The company invites its friends to inspect the new establishment.

The Marinette Iron Works Manufacturing Company of Marinette, Wis., is to remove its plant to Warren, Pa., where 6 acres of land have been purchased. The main buildings to be erected are: machine shop, 80 by 350 ft.; foundry, 80 by 250 ft. and blacksmith shop, pattern shop, etc. The buildings are to be of brick and steel construction, equipped electrically, power to be supplied by the company's gas engines, direct connected to generators. The plant will be equipped with modern appliances and have three times the capacity of the company's present shops.

It is reported that the Western Wheeled Scraper Company, of Aurora, Ill., has purchased the business and good will of the F. C. Austin Manufacturing Company, Harvey, Ill., the Fleming Manufacturing Company, Fort Wayne, Ind., and the Indiana Road Machine Company, also of Fort Wayne. The price paid for the Austin Manufacturing Company's plant is given as \$500,000. It is stated also that negotia-

tions have been opened with the American Road Machine Company, Kennett Square, Pa., with the object of uniting that concern with the consolidation.

The Wheeler Condenser and Engineering Company, through its New York City offices, has received a contract to supply 3 sets of cooling towers for the Stuart Street Station, Manchester, Eng., the plant to be capable of dealing with 300,000 gals. per hour. The company has also in hand a cooling tower and condensing plant for the Lister Drive Station, at Liverpool, to have a capacity for handling 42,000 lbs. of steam per hour. Another order is for extensions at the London United Tramways' power-house, Chiswick. This comprises a cooling tower with condensing plant to deal with 30,000 lbs. of steam. The Electrolytic Alkali Company, of Middlewich has also ordered a plant. A cooling tower and condensing plant is also to be forwarded to Helsingfors, Finland.

At the annual meeting of the stockholders of the Tennessee Coal, Iron and Railroad Company at Tracey City, several changes were made in the board of directors, Oliver H. Payne, Nathaniel Baxter, Jr., and H. S. Manning not being re-elected. Gross earnings for the year amounted to \$1,724,138. Improvements were made during the year amounting to \$759,000. A committee of directors composed of E. R. Chapman, F. S. Wetherbee, S. L. Schoomacher and James B. Dickson visited almost every one of the plants of the company. The directors will hold a meeting in New York City on May 20, when officers will be chosen. Chairman Don H. Bacon, of the board of directors, has been acting president since the resignation of Mr. Nathaniel Baxter, Jr.

The water softening and purifying business of the We Fu Go Company, Cincinnati, O., together with all its patents, capital stock and good will has been purchased by the Wm. B. Scaife & Sons Company, of Pittsburg, Pa. The purchasers state that steam users now fully realize the vast saving in fuel and labor, the increased durability of boilers, and prevention of disastrous explosions when scale-forming and corroding ingredients are properly removed before entering the boilers. Wm. B. Scaife & Sons Company's softening and purifying plants in the United States alone are now daily treating over 14,000,000 gals. of water. The plants are found in steel factories, ice plants, bleacheries, malt houses, textile works, hotels, office buildings and include almost every conceivable industrial and domestic purpose.

It is stated that an exact duplicate of the monster works to be built at Economy, Pa., by the American Bridge Company will be erected at Chicago, Ill., at a cost of between \$2,500,000 and \$3,000,000. The plant will be used to concentrate the works of the western district. The Toledo plant alone will remain in operation. It will be operated in connection with the Pittsburg and Chicago works. The land for the Chicago plant has already been procured. Grading is now being done for the Economy plant, and the expectation is that the ground will be ready in August. The building of the plant will take the remainder of the year. The Chicago plant will be about one mile long. It is the intention to concentrate the Lassic and American plants of Chicago, the Milwaukee and Lafayette works in the new plant to be built near the Lake Michigan front.

The Pittsburg Reduction Company is to build a large plant 3 miles from East St. Louis, Ill. The company has purchased a plot of 20 acres for buildings and 10 acres of marsh land to be used as a dumping ground. The buildings will cover 6 acres and will be similar to those now located at New Kensington, Pa. M. H. Young, of Parnassus, has charge of their construction. Work has started. As soon as the buildings have been completed, it is said the 8 calcining furnaces now at New Kensington will be removed to the new works. During the last few years the bauxite from which the aluminum is extracted, had been shipped from Alabama or Illinois to New Kensington, when the white aluminum oxide was separated and shipped to Niagara Falls to be reduced to metal. It was then sent back to New Kensington and rolled into sheets or drawn into wire.

The Allis-Chalmers Company, of Chicago, Ill., is filling some important orders for large engines, and reports a heavy demand for them. Among the most important orders recently received for their Allis Works at Milwaukee are those from the Dow Chemical Company, Midland, Mich., and the Illinois Steel Company, for their Joliet Works, for 2,000 and 4,500 h. p., respectively. Each of these engines is of the compound vertical and horizontal type, with the high-pressure cylinder horizontal and the low-pressure cylinder vertical. Jones & Laughlins, Limited, of Pittsburg, Pa., have placed an order for a 1,500-h. p. vertical cross compound direct coupled engine, a duplicate of one now under construction. In the crusher and cement machinery departments orders are increasing, those for cement machinery during April having exceeded anything heretofore experienced. The demand for mining machinery is strong.

The Mine and Smelter Supply Company, owing to the great increase in its export trade from New York City, has opened a branch store and office in that city for the sale of a general line of mining machinery and supplies, together with specialties which it manufactures and controls. These specialties are used now by many modern mining plants. They include the Wilfley concentrating table, Durkee electric rock drill, Dimmick classifier, Scobey tailings sampler, De Remer tangential impact water wheel, Weber gasoline engine and hoist, and many other improvements in mining machinery. The company states that having branches in most of the large mining centers in the West, as well as in Mexico, it is able to fill orders promptly from those points for mining companies in the neighborhood. The company at all times guarantees good prices for all supplies needed and prompt delivery. It is paying particular attention to export trade.

TRADE CATALOGUES.

Cast and wrought iron work of great variety is described in a catalogue issued by the Western Iron Works of San Francisco, Cal. The list embraces ornamental iron fencing and architectural iron work, doors and screens, also structural steel work, steel tanks and wheel barrows.

The Camp Engineering Company, 47 West Lake street, Chicago, Ill., rebuilders of second-hand engines, is issuing monthly stock sheets of its material. These lists give short descriptions of rebuilt machinery ready for immediate service and will be mailed upon request to purchasing agents, managers and all buyers interested in this class of machinery.

Engines and boilers made by the Frost Manufacturing Company of Galesburg, Ill., are described in a pamphlet of 63 pages, sent out from the company's office in Chicago. The automatic engines built by the Frost Company are stated to be of simple design and to contain the highest grade workmanship throughout. Some of the noteworthy features of the engines are the Rites' governor, consisting of but one heavy moving part, swinging on a single pivot, while the eccentric is a part of the governor. The balanced valve used is double ported and stated to be so perfectly balanced that it can be moved by hand when under steam pressure. Attention is called to other details, such as the main shaft and pin, the main bearing, connecting rod, cross head and the crank-pin oiler. The engines are built either side crank or center crank. The company also manufactures throttling engines, makes a specialty of engines for well-drilling outfits, and builds vertical or horizontal tubular boilers.

The A. Leschen & Sons Rope Company of St. Louis, Mo., issues an 80-page pamphlet on wire ropes. A patent flattened-strand rope is claimed to be an ideal rope for inclines and underground haulage in that it has a large wearing surface and combines strength and pliability. The rope is said not to twist or curl and to be spliced as readily as any rope. The company makes ropes of crucible steel, plow steel, and Swedish iron, and also manufactures galvanized steel wire-strand, running rope and hawsers. The pamphlet gives prices of the different kinds of rope and the necessary fastenings, also of blocks and sheaves. The pamphlet contains some good condensed information on wire-rope haulage and power transmission, and attention is called to the Company's patent automatic aerial tramway. This is claimed to excel in safety, cost of operation, maintenance and capacity. The Leschen & Sons Company also carries in stock Manila ropes, and makes a specialty of drill ropes for gas and oil wells.

Catalogue No. 30, an illustrated pamphlet of 28 pages, issued by the Link Belt Machinery Company of Chicago, Ill., discusses the application of modern methods to gold dredging and placer mining, calling attention to certain details of construction in dredging machinery controlled by the Link Belt Company. One of these is the grit-proof bucket chain provided with the Holmes patent joints. These chains are described as having a durable and absolutely grit-proof articulation, the steel bushings being interchangeable and the bearing surfaces so constructed as to permit of replacing bushings without disconnecting the chain. The links are made of cast steel and the bucket shells cast in one piece of special grade malleable iron having a rib in the rear of the cutting lip to stiffen the shell and act as an abutment for the lip. The buckets are made in 5 sizes, from 2 to 10 cu. ft. capacity, though larger sizes are made to order. The buckets are stated to be of short pitch, wide and shallow to insure easy filling and free dumping. Patent equalizing gears are used to transmit power to the excavating chain. These are stated to save power and counteract the destructive strains that arise in driving by circular gears. Another improvement is a self-contained back-gear head stall, which gives a rigid connection for the driving machinery, and is said to be easy to erect and align and to be adjustable in all directions.

GENERAL MINING NEWS.

Mineral Oil Exports.—In April the United States exported 8,166,769 gals. crude oil; 1,856,038 gals. naphthas; 65,669,123 gals. illuminating oil; 7,440,352 gals. lubricating and paraffin, and 4,700,919 gals. residuum; total, 87,833,201 gals., against 87,140,597 gals. in the same month last year. In the 4 months ending April 30, the total exports were 335,018,613 gals., as compared with 311,767,925 gals. in the corresponding period last year; showing an increase of 23,250,688 gals., or 7 per cent, chiefly in illuminating oil.

ARIZONA.

GRAHAM COUNTY.

Arizona Copper Company.—The production of copper for the month of April was equivalent to 1,170 tons of 2,000 lbs. each.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Horn Silver.—Dr. Whitesides and his Mexican associates in this mine north of Chloride, have resumed work and are shipping by jacktrains down the mountain.

Juno.—The Philadelphia & Arizona Mining Company has lately resumed work at this old mine on some fairly high grade ore for the new smelter.

Midnight.—This mine, belonging to John St. Charles and Wilford Babcock, of Chloride, and Klau St. Charles, of Kingman, is being worked again, and will ship to the new smelter.

Minnesota.—This Chloride mine continues in rich ore on the 350-ft. level, furnishing almost enough to keep the 225-ton concentrator running. E. T. Loy, the superintendent, has had a pipe line laid to the Paynall Mine, 2 miles away, for an additional supply of water for the mill, and work now proceeds without stop.

Samoan.—This mine, at Chloride, adjoining the Lucky Boy on the southeast, has been idle several years. It is to be worked again by its owner, Frank P. Arbuckle, of Denver, Colo. The ore blocked out is to be treated at the new Vulcan smelter at an \$8 rate of treatment.

Schuylkill.—At this Chloride mine 4 ft. of fine galena have been opened on the 500-ft. level. W. D. O'Neil, the superintendent, has shipped the first carload.

Vulcan Smelter.—The machinery for this new plant is being unloaded and the plant will be in operation within 60 days.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Belmont.—This mine near Defender, John McKelvey, of Oakland, owner, is to resume work. It is also stated that the original Amador Mine at Amador City, which has been idle many years will be reopened by Eastern men. The mine has been explored to a depth of 1,400 ft.

Bunker Hill Mining Company.—On the 800 level of this mine at Amador City, C. R. Downs, superintendent, the drift has broken into a body of ore estimated to be worth \$10 per ton.

Central Eureka Mining Company.—On this property at Sutter Creek, W. R. Thomas, superintendent, the 20 additional stamps in the mill have started. The mill has now 40 stamps.

Del Monte Mining Company.—On this mine at Jackson, Geo. I. Wright, secretary, the compressor plant has been installed. Three Ingersoll-Sergeant drills are to be used. Twelve men are at work.

Kennedy.—This mine at Jackson, J. F. Parks superintendent, is working a large ore body on the 2,300 ft. level, from which a good profit is made. It is expected that a new 60-stamp mill will be erected at the new East shaft.

Plymouth Consolidated.—This property at Plymouth, owned by Alvinza Hayward and Chas. D. Lane, 532 Market street, San Francisco, has been shut down many years. The legal difficulties have now all been settled and it is understood that the owners have made arrangements to repair the old works, put in improved machinery and develop the mine.

Sargeant.—W. R. Thomas, of Jackson, has bonded this mine at Middle Bar, 10 miles from Valley Spring, and considerable money is to be spent on development.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Etna.—This mine, 3 miles from Angels, after lying idle for 5 years, is to be unwatered by its owners, Jos. Pierano and Ralph Lemue. The shaft is 230 ft. deep with 195 ft. of water in it.

Guifra.—On this mine, near Mokelumne Hill, considerable work is being done and necessary buildings are going up.

Gwin Mine Development Company.—From this mine at Gwinmine, F. F. Thomas, general manager, there were extracted 107,380 tons of ore in 1901, which yielded an average net value of \$4.14 per ton. The free gold recovered averaged \$2.99 per ton, with sulphurets \$1.14 per ton. The tailings averaged \$0.37. Mining and transporting ore to mill cost \$2.28 per ton, and milling and concentrating \$0.38, or a total of \$2.67 for mining and milling. The 80 stamps crushed an average of 3.67 tons per day each. The ore reserves are estimated at 670,000 tons. The dividends for the year were \$125,000, or 12½ per cent. Diamond drills are shortly to be used for exploration.

Iowa Consolidated.—In this mine, near Rich Gulch, some very rich ore has been found.

Mauna Brothers.—This quartz mine, near Mokelumne Hill, owned by D. M. Mauna, is under bond to Wm. Hamilton, of San Francisco, who is to unwater the shaft and start sinking with 2 shifts.

Mokelumne Mining Company.—The big steam shovel sent from Toledo, O., a year since to this company's ground near Wallace, has been sold and shipped away. The gravel was not rich enough to pay.

Sparrowhawk.—This mine, near Mokelumne Hill, owned by B. K. Mauna, has been sold to R. C. Hayward and H. H. McIntyre. It is an extension of the Mountain View. The same men bought the Never Thought Mine at the same place. The new owners start work at once.

CONTRA COSTA COUNTY.

(From Our Special Correspondent.)

Oil Refinery.—The largest oil refinery on the Pacific Coast is being built at Point Richmond by the Standard Oil Company. Fifteen 50,000-bbl. storage tanks are being constructed, and a pier for deep water ships is being built. A pipe line to the Kern County and other valley oil fields is under construction. Machine shops, boiler houses, etc., have equipped. W. S. Rheem is general superintendent of construction at Point Richmond.

ELDORADO COUNTY.

(From Our Special Correspondent.)

Atlantic.—The Mines Exploration and Development Company of Los Angeles has an option on this old mine near Placerville, and the property will be reopened under management of John Kern.

FRESNO COUNTY.

(From Our Special Correspondent.)

Bushy Ridge.—This mine, owned by Clay Bros., at Dunlap, is turning out good ore which the owners work in an arastra.

Sycamore District.—Several quartz mines are being opened in this district, about 45 miles east of the town of Fresno. John Harkins and C. M. Shannon, of Madera, are opening a claim, which is showing up well.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Columbus.—From this mine at Coulterville, Thomas J. Brown superintendent, ore is to be hauled to the Tyro Mill, which is now being repaired.

Garibaldi.—This mine at Coulterville has closed down on account of too much water.

Whitlock.—The electric plant projected by Capt. A. H. Ward on the Merced River will be of great benefit to the old mining camp of Whitlock, where there are large bodies of low-grade ore in mines now idle. With cheap power they may be operated profitably.

MONO COUNTY.

(From Our Special Correspondent.)

Bodie Mill.—A custom mill is being put up at Bodie.

Golden Gate.—In this mine at Coleville, I. W. Geary, superintendent, a strike of rich ore is reported in the new workings.

Syndicate.—This mill has started up on a run of ore taken out by leasers last winter.

White Mountain.—This company has purchased more property at Benton, and is soon to start development and put up reduction works.

PLACER COUNTY.

(From Our Special Correspondent.)

Bonnie Bee.—From this mine, 11 miles from Dutch Flat, J. L. Waggoner, superintendent, some good ore is being taken from the 14-ft. ledge.

Pioneer.—It is stated that on this mine at Towle, E. P. Chittenden, superintendent, 20 stamps are to be added to the present 20-stamp mill.

Red Point.—On this mine at Damascus, J. A. Ferguson superintendent, owned by the Societe des Mines de Golden River, Paris, France, the tunnel is now in on the channel over 3½ miles. There is a water flow of 70 cu. ft. per minute from the tunnel.

PLUMAS COUNTY.

(From Our Special Correspondent.)

Copper Deposits.—A party of Minneapolis, Minn., men has been at Susanville examining the copper properties on the belt in Plumas and Lassen counties. Between Taylorsville, Plumas County and Susanville, Lassen county, several prospects are being opened. The belt is, as far as known, about 15 miles long, and lies mainly in this county. Some ore has been shipped to smelters, but a local smelter will be necessary before the mines can work at a profit. The Plumas Copper Mining and Smelting Company has been organized at Quincy by Judge Spencer, E. N. Cornell, J. M. Engle, and others, who own copper claims. The deposits of copper ore are said to be large, but as yet little development work has been done.

SAN BENITO COUNTY.

(From Our Special Correspondent.)

Antimony.—Palmer & Clark at Tres Pinos have uncovered another deposit of antimony ore.

Golden Star.—H. W. Scheld, of Yreka, has bonded this mine and is to open it at once.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Bagdad Mining Company.—Surveys are being made for a narrow gauge railroad, to run 7 miles from the mines to Ludlow on the line of the Santa Fe Railroad. From there the ore will be shipped to the smelter at Barstow. Thirty-seven men are employed. These mines are owned mainly by parties connected with the New York Central Railroad Company.

Holcomb Valley Gold Mining Company.—About \$25,000 worth of machinery belonging to this company at Holcomb Valley is to be sold at public auction by the sheriff to satisfy judgment.

SHASTA COUNTY.

(From Our Special Correspondent.)

American.—Work is being pushed at this mine at French Gulch, under superintendence of Thos. Irvin.

Brushy Canyon.—Development work on this mine near Winthrop, owned by Wm. Ellis, John Cannon, Wm. Connell and Richard Collins, is being done by W. H. Mitchell, who has bonded it for Salt Lake men. Eight men are at work. High-grade ore has recently been encountered.

Early Brothers.—John and Henry Early have made a new find of quartz at Shasta, and very rich ore is being taken out. It is the extension of the Sunlight Mine recently discovered, where the county hospital was situated.

Gladstone.—Superintendent Salisbury, of the Hazel Gold Mining Company, has 70 men at work on this mine at French Gulch. The new electric power line will be 8 miles long.

Great Western Coal Company.—A 4,000-ft. aerial tramway is being built from the mines to the smelter site at Copley, and 25 men are working in the tunnels. A 100-ton smelter is to be put up shortly. E. F. Adams is president.

Mountain Copper Company.—General Manager Lewis T. Wright has appointed Chas. F. Nourse mine superintendent, vice W. S. Haskins resigned. Blowers have been put in at the tunnel entrances and the hot drifts cooled.

Niagara-Summit Mining Company.—This is the name of the new company operating the old Niagara Mine at French Gulch, under Wm. T. St. Auburn as manager. The old mine is being reopened and new machinery is being installed. The property includes 24 patented quartz claims comprising about 320 acres.

Sonoma Gold Mining and Milling Company.—This company has been organized to operate the Oro Fino Mine near Shasta. Wm. Woran is to be superintendent and will prospect the property.

Texas.—The Mountain Copper Company having refused to accept any more low-grade ore, this mine at Hart has been compelled to close down until a plant for ore reduction can be built. Considerable machinery was recently bought and the mine reopened after long idleness.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Consolidated Mining and Development Company.—This company at Callahans, E. H. Scott, superintendent, has been working the dredger over a month with satisfactory results. The gold saving device is stated to be the best yet tried in that section.

Siskiyou Mining and Development Company.—This company of Etna has bonded for 2 years from Andrew Wise, of Ager, the coal vein at the latter place. Very little work has been done thus far.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Cosmopolite.—The owners of this mine at Groveland, Messrs. Wm. Pool, Wm. Schmidt, D. R. Gilliam and J. T. Pool, have bonded it to Josiah M. Merrill,

of San Francisco, who is to prosecute work steadily, and pay the owners 25 per cent of the gross proceeds to apply on the purchase price.

Dutch.—A large shoot of ore has been found on the 1,200 ft. level of this mine, at Quartz.

Green Gold Mining Company.—Operations on this mine near Confidence, have been resumed, and A. P. Sherer is superintendent.

Gross.—This mine at Tutletown, is being opened for examination.

Harvard Gold Mining Company.—B. M. Newcomb, of Oat Hill, is manager. The machinery is in place, and the chutes are finished at shaft No. 1. Hoisting will shortly begin.

Mack.—W. J. Wait, secretary of this mine at Big Oak Flat, has arranged to pay off all indebtedness, and the company is to be reorganized.

New Era.—This mine, formerly known as the Gold Hunter, C. A. Holland, superintendent, is to be developed under bond.

Republican.—This mine at Chinese Camp, B. Delcray, superintendent, is sinking again. The shaft is now 400 ft. deep. The 10-stamp mill is busy.

Wheal Perrin.—This mine, an extension of the Soulsby, at Soulsbyville, has been unwatered, and work is to be carried on.

TRINITY COUNTY.

(From Our Special Correspondent.)

Lappin.—J. K. Fleming is superintendent of this mine at Deadwood, recently bonded to the Pittsburg & Deadwood Mining Company. The mine is being developed.

YUBA COUNTY.

(From Our Special Correspondent.)

Victor Gold Mines.—This property at Browns Valley, Lindsay Scrutton manager, consists of 5 patented claims. Five new concentrators have been put in by the new management. Electrical power is used, but there is a supplementary steam plant. Sixty-five men are employed, and the property is being put in good shape. A cave in the workings caused the shut down under former ownership.

COLORADO.

CLEAR CREEK COUNTY.

Little Mattie Company.—The finds in the ground being opened by this company seem to keep up. In level No. 4, drifting east from the shaft in the Republican ground, good ore has been encountered. The width of the entire vein is over 4 ft., of which 2½ ft. is a mixed ore carrying several streaks of this high grade mineral running from 4 to 6 in. wide, the rest of the streak being milling ore which is being treated at the company's mill on Chicago Creek.

Sun & Moon Mining and Milling Company.—At the annual meeting in Colorado Springs, the by-laws were changed so that the branch office of the company which has been at Cleveland, O., will be in New York city, as a majority of the directors reside there. The election of officers resulted as follows: President, W. J. White; vice-president, C. A. Wimpfheimer; secretary-treasurer, Nathan Westheimer, all of New York city. The other directors are F. C. Goldsmith, of New York city; J. U. May, Charles S. Britton and G. G. Snowden, of Cleveland, O. The officers instructed Manager Sims to sink the shaft an additional 200 ft. Work will start at once.

GILPIN COUNTY.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—James Tyson, trustee to the Druid Gold Mining Company, the Haseltine, West and East Haseltine, Quandry, Howard, Col. Fry and Recompense lodes and the Church placer.

Abundant Mining Company.—In drifting at the 250-ft. level high grade ore has been opened, carrying values as high as 250 ozs. gold per ton as well as 3,000 ozs. silver. The company is figuring on taking the Arizona Mine, and will install a larger plant of machinery. C. Morgan, Idaho Springs, is manager, and Boston parties are interested.

Americus.—A contract has been let to sink the main shaft, now down 1,035 ft., a lift of 75 ft. The property has been worked on the leasing system for some time, and good ores have been taken out, under the management of S. V. Newell, Central City.

Druid Gold Mining Company.—This company has taken hold of the Haseltine property in Russell District, now owned by the Coates Brothers, the thread manufactures of Scotland. Prospecting will be carried on, as there are a number of the claims which have not been thoroughly tested on surface. E. McGinnis, Central City, is in charge, with William Weston, of Colorado Springs, consulting engineer.

Four-Mile Gulch Mining Company.—This company has taken hold of the Klondike, Democrat and Wheeler properties in Enterprise District, and will open them by tunnels and through the shaft. Rich sil-

ver ores have been taken out by former operators. John Brohl, Central City, is superintendent.

Miner's Ore Sampling Company.—The capital stock of this independent concern is \$50,000 all taken up by local mining and mill men, and the officers are: President, E. F. Olden; vice-president, S. V. Newell; secretary and manager, D. H. Allen; treasurer, Bruce M. Myers, with the following directors: R. Wilkinson, S. V. Newell, D. H. Allen, H. M. Myers and E. F. Olden. The sampler is to be running by June 15.

Stewart Mining Company.—Returns this week from a 10¼ cord lot gave a clean-up on the plates of 42.25 ozs. gold, and the dirt made 11½ tons of tailings, which sold for \$21.16 per ton, making the average of the ore something like 7 ozs. gold per cord, a splendid average. The New England owners will probably erect a 25-stamp mill this summer near the property to save the 6-mile haul to the Black Hawk mills. J. A. Gilmour, Central City, is manager.

Stubtail.—Local parties are leasing this property after an idleness of several years, and returns from the last mill dirt show 4 ozs. gold per cord, while the iron went \$97 per ton.

Tucker.—This mine is operated by the Lyons-Kyle Mining Company with W. Wood, of Central City, as manager. The shaft is now down 450 ft., and a pump has been put in to handle the water. Returns from an 8-car shipment to the Idaho Springs Mill gave values of \$48.72 per ton for the concentrates, and carried values of 45 per cent lead.

GUNNISON COUNTY.

(From Our Special Correspondent.)

Whig.—The 5 claims of this group, on Gold Ridge, have been purchased by J. T. Quigley for Galveston men. The claims are developed by shafts and tunnels, and new machinery has been ordered.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Output.—The daily production averages 2,300 tons. Increased shipments from the Small Hopes properties and the IbeX will increase this tonnage still more, while the Greenback Company, having finished sinking, will soon be shipping 200 tons a day of clean iron sulphides.

Low Grade Ores.—There are thousands of tons of low grade gold bearing ores along the gold belt and in localities like St. Nevin and Lake Park which cannot be handled by the smelters. Much of this stuff averages \$5 to \$8 a ton. The Hap Hazard, Penn, Big Six, Ballard, Resurrection, President and other properties have great deposits of such material, which can only be handled by some milling process. Cyanide has not been entirely satisfactory owing to the talcy character of the ores.

A. M. W. Combination.—An enormous amount of new development work is under way. Shipments are 300 tons a day, of which 100 tons goes to the concentrating mill and 200 tons of sulphides to the smelters.

Banker Mining Company.—This New York company has been doing development for several years on the Banker Mine. Indications are encouraging. The shaft is over 1,100 ft. deep with 6 working levels. A large quantity of low grade ore has been located but no body of shipping value. The mine has been idle a few months. It is near the crest of Breece Hill.

Cloud City Mining Company.—Manganese shipments have ceased. A diamond drill is exploring from one of the drifts for richer ore.

Greenback Mining Company.—A pump and working stations are being cut at 1,340 ft. In sinking an entirely new and strong vein was cut showing good copper sulphides. Heavier machinery is being put in.

Helen Gould.—The workings show a 3-in. copper streak that averages 53 per cent copper and runs well in gold and silver. It is in virgin territory north of the city.

Keystone Mining Company.—All the machinery is in place and pumping is resumed at the Rex shaft. About 500 gals. a minute are handled.

Lillian Gold Mining Company.—Different blocks of ground are successfully operated under lease, and some good gold ore is being shipped. A large amount of re-timbering is being done by the company.

Little Louise Group.—It is understood that this combination in Little English Gulch has been sold to eastern parties who will shortly begin work.

Minneapolis.—Denver people are interested. Ore has been found in the shaft and incline. It will be developed this summer.

Nayr Mining Company.—This company is developing the sulphide contacts below the 700-ft. level and has a large mass of low grade sulphide material. In the upper levels lessees at the 400 and 500-ft. levels are getting out 600 tons a month.

New Leadville Home Mining Company.—The output is now 250 tons a day. No monthly dividend was declared but the surplus is put in a reserve fund. Manager Dyatt was requested by the entire board to remain with the company for the present at least.

Penn Mining Company.—Shipments average 60 tons a day of a fair grade siliceous ore. Considerable new work in virgin territory is under way.

Printer Boy Mining Company.—The attachment against this New York Company has been dissolved and the indebtedness has about all been settled. It is announced that work will be resumed.

Progressive Mining and Investment Company.—W. L. Cooper is in charge. Sinking to contact has commenced. Another new shaft on which is known as the Olathe placer is promised.

Reno Mining Company.—Sinking has been temporarily suspended on account of fire destroying the shaft house. New machinery was ordered at once.

St. Louis Tunnel.—Several sets of lessees are operating and 200 tons a month come from one lease above the tunnel level. In a 200-ft. winze other lessees are just opening up good carbonate ore.

Silent Friend.—Shipments average 30 tons daily from the new strike. The lead ore is coming in stronger. Some important new work is also being done in virgin territory.

Twin Lakes Gold Mining Company.—The reports read at the annual meeting show a flourishing condition of affairs. New York people back the enterprise and J. D. Barrett, of Leadville, represents the company.

Walter Scott.—This property has been in the courts on account of the death of one of the owners. Arrangements are on foot to sell or lease. A good gold bearing vein is developed and a mill is on the property.

MINERAL COUNTY.

(From Our Special Correspondent.)

Creede Home Mining Company.—This company, of Creede, is operating on the once famous Bachelor Mine.

OURAY COUNTY.

(From Our Special Correspondent.)

Camp Bird Mining Company.—Articles of incorporation filed state that the company is incorporated under the laws of Colorado, to work mines in Ouray, Arapahoe and San Miguel counties. The incorporation is thought to be for simplifying the transfer of title to some foreign corporation should the occasion arise. Negotiations between the Venture Company, of London, and Mr. Walsh are believed well under way, though there is no positive evidence of the transfer, and no indication of the price to be paid. The directors are: John S. McBeth, Henry F. May and John T. Adams, of Denver, and the managers, Leonard E. Curtis, Colorado Springs, and A. Chester Beatty and Henry F. May, of Denver.

SAN MIGUEL COUNTY.

Liberty Bell.—The mine and mill at Telluride, have resumed active operations. The tram system carrying ore from the mine to the mill has been repaired. The mine and mill have been idle since February 28, the date of the snowslides. Operations will be on a more extensive scale than ever.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Free America.—Frank Lindsley is preparing this mine, near Kokomo, for active development.

Kimberley.—This mine on Elk Mountain, near Kokomo, is reported as having cut a vein of sulphides running well in gold.

IDAHO.

CUSTER COUNTY.

(From Our Special Correspondent.)

Clayton.—All the mines of this company are looking well, and preparations are being made to start the smelter about June 1 for the usual season's run.

Lucky Boy.—This mine at Custer has been running its 25-stamp mill and cyanide plant all winter with excellent results. The full complement of about 80 men has been busy and the physical condition of the property is excellent. A change in the hoisting gear necessitated a shut down for a few days recently.

River-View.—This mine at Bayhorse, in which a 40-ft. body of lead-silver ore was struck 6 weeks ago, continues to hold out and is showing some handsome development. An incline has been sunk on the ore shoot 110 ft. which shows rich values all the way.

White Knob Copper Company.—Affairs have been seriously interrupted during the past few weeks. The fine new 600-ton copper smelter at Mackay is within 2 weeks of completion. After laying 10 miles of track on the electric railway to connect the smelter with the mines the rails were found to be too light, and the whole line will have to be relaid with much heavier steel before an electric motor can be safely run over its heavy grades and curves.

The employees at the mine went out on a strike for the privilege of forming a union. This was denied them by the management, and development at the mine was suspended for a month. A representative of the company from New York arrived at

Mackay recently and took temporary charge. General Manager Wayne Darlington and his staff have resigned.

LEMHI COUNTY.

(From Our Special Correspondent.)

The business men of Salmon City were the first to get a loaded pack train through to Thunder Mountain and are now delivering goods within 10 miles of the Dewey Mine. They have built 2 bridges and their road is now safe from the dangers of high water. Travel out has already started over this road, also via Mackay and Challis. These two routes connect at Singiser.

INDIANA.

(From Our Special Correspondent.)

Oil Wells.—Much drilling is under way and much more is planned. Two large sales were made during April. The Standard Oil Company, through its branch, the Ohio Oil Company, bought a 1/2 interest in the property of the Huntington Light and Fuel Company in Huntington and Grant Counties. The leases cover over 6,000 acres and a number of good wells. The consideration was \$175,000 for half interest. Claud A. Ulsch, an Ohio operator, bought 40 wells and leases on 800 acres of the Ft. Orange Oil Company for \$55,000.

The development figures for April are as follows: Completed wells, 232; new production, 3,543 bbls.; wells drilling, 212; new rigs, 93. Increase over March: Wells completed, 7; wells drilling, 14; rigs, 10. Net increase in new work 14.

DELAWARE COUNTY.

(From Our Special Correspondent.)

Muncie Mining and Investment Company.—This company has incorporated with a capital stock of \$25,000. It will buy oil and coal lands and mine the products. Headquarters will be in Muncie. William A. Spurgeon heads the board of directors.

MICHIGAN.

IRON—MENOMINEE RANGE.

Florence.—Felix A. Vogel is now general manager of this mine at Florence. Sterling Miller, of New York City, is chief clerk, and Charles Johnson succeeds Capt. Thomas as mine captain.

Great Western.—This mine, at Crystal Falls, is to be bailed out. In the new shaft a station is being cut at the tenth level, where a Prescott triple-expansion pump, with a capacity of 1,000 gal. per minute against a 1,000-ft. lift, will be installed on a concrete foundation. Wickes vertical boilers have been installed in the new power house, and the old power house is being dismantled.

Groveland.—Corrigan, McKinney & Company, it is said, have decided to close this mine east of Randville, and the pumps will be pulled. The reason given for closing is that the ore is unsaleable.

Traders.—This mine, back of Iron Mountain, belonging to the Antoine Ore Company, has about 80 men busy, and the output is 700 tons of siliceous ore daily.

MINNESOTA.

(From Our Special Correspondent.)

Ore shipments for April from this State were as follows: Duluth & Iron Range road, 443,926 gross tons; Duluth, Missabe & Northern, 314,407; Eastern Minnesota, 215,000; total, 973,333. During much of the month the roads were handicapped by delayed dock construction, by frozen ore, etc.; later they were troubled by bad weather. Never were such shipments made in April, and April shipments in prior years have usually been too little to mention. Ore is coming down now very fast.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Columbia Mining Company.—At this new Sellwood property, at Hibbing, the main shaft is down 100 ft., having been in ore since 60 ft. from surface.

Deering Harvester Company.—Contracts for a railroad to the new mine in section 32, T. 57, R. 22, have been let to A. Guthrie, who is to have the work done in August. The mine is to be named the Hawkins, after one of the discoverers, who is manager in this district for Drake & Stratton Company. It will be opened for the milling process, but no ore will be taken from the open pit this year. Shaft sinking starts at once, and some ore will be mined this season. A steam shovel will be set at work, a milling pit excavated, and next year's output will be large. Some exaggerated reports of this mine have been circulated. There are about 9,000,000 tons of merchantable ore in the property, averaging 58 per cent iron and .045 per cent phosphorus. There are also some 12,000,000 tons of stuff, averaging 45 per cent and better in iron, but this is not ore, as that word is used here.

The Deering Harvester Company also has the northeast 1/4 of the northeast 1/4 of section 11, and the north 1/2 of the northwest 1/4 of section 12, all in T. 57, R. 21, 120 acres in all, that it bought for \$150,000 from

Messrs. Alworth, Agnew, Washburn and W. H. Cole. The lease carries a 25c. royalty to Alworth, Hull & Boeing, and the minimum is 100,000 tons a year. This will be opened as an underground mine, also under the supervision of Jos. Sellwood, of Duluth. It contains, so far as known, about 3,500,000 tons of good ore, running above 60 per cent, and largely low in phosphorus. It lies just south of the Hull, of the Minnesota Iron Company, and west of the new Elizabeth, of Kimberley et al. There is probably a far larger ore body in this property than has been yet found. It is a very much better property, and was secured at a far lower price, comparatively, than the Deering Company's other investment. It will be called the Agnew, after the general manager of the Mahoning properties. Both this and the Hawkins will ship over the Eastern Minnesota, under a traffic agreement that covers the life of the lease, and the annual minimum on the two is 200,000 tons. Combined, they are known to contain about 13,000,000 tons of ore. If the Deering Harvester proposes to utilize these ores for its chief mixture in its new works at Chicago it can make bessemer steel.

Minnesota Iron Company.—This company's steam shovel, in use at the Genoa Mine, has been transferred to the Spruce, which is worked heavily and will make a larger production this year than ever before. The company's Mountain Iron Mine is working shovels in the ore and is stripping, and will ship about 1,000,000 tons this year. The Ohio, Oliver and Lone Jack mines, at Virginia, are idle, and will do comparatively little this season. The Stevens Mine is making ready for shipping, but will not get out to its minimum this season. The Hibbing mines are shipping very heavily. The new Glen Mine, northeast of Hibbing, is now shipping from developments. The Chisholm and Clark mines are both shipping heavily, and will produce 500,000 tons this year it is expected. The Adams is sending down a flood of ore, and should produce nearly 1,000,000 tons this year. The Auburn will make a large shipment, and is stripping new ground. The Saunty is shipping, with one shovel in ore and two in the stripping.

Pickands, Mather & Company.—This concern has closed a deal for the purchase of 60 acres, adjoining the Agnew property on the west and the Mahoning No. 2 on the south, containing about 4,000,000 tons of ore, some of it under a very shallow surface of earth and boulders. This part will be stripped, and mining is expected to start within a year. The firm is extending its Mesaba operations materially, in view of the arrangements it has with the Buffalo Steel Company for ore.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

Minnesota Iron Company.—This company will make a new grade this year at its Soudan Mine, "Soudan Siliceous." The mine will ship this year 100,000 tons more than last year, and has the appearance of better promise than in a number of years.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—The zinc ore shipment last week was the largest recorded in the history of the district, the total being 6,850 tons. The largest weekly total last year was 6,457 tons. It took 20 trains to move the shipment to the smelters, estimating 25 tons to the car and 16 cars to the train. The total value of the shipment was \$224,194, including both zinc and lead. This amount is larger by \$478,928 than for the corresponding period of last year. Only one sale was reported at \$34 per ton, the highest price for the week, that of the Excell Mine at Joplin. A large part of the shipment sold at \$32 and \$33 per ton. Lead ore advanced \$1, and now sells at \$44.50 per ton. This is entirely due to a reduction of the freight rate on lead ore from the Joplin District to Mississippi River points.

Following are the sales from the various camps of the district for the week ending May 10, 1902:

	Zinc. Lbs.	Lead. Lbs.	Value.
Joplin	4,924,380	393,980	\$85,240
Galena	1,332,620	101,920	20,283
Cartersville	2,016,420	344,810	35,902
Webb City	1,019,780	92,520	15,820
Aurora	830,190	11,290	11,120
Oronogo	555,270	8,900	8,372
Spurgeon	118,900	74,490	2,920
Zincite	174,920	3,290	2,697
Duenweg	680,180	53,430	10,142
Carthage	382,450	2,330	5,789
Central City	111,250	1,740	1,417
Cave Springs	167,670	2,540	2,325
Neck City	533,420	.....	8,601
Alba	128,100	.....	1,922
Springfield	132,000	.....	1,880
Sarcozie	41,400	.....	850
Peoria	.....	92,540	1,943
Granby	266,000	38,600	3,325
Carl Junction	286,820	.....	4,446
Total	13,701,770	1,227,380	\$224,194
Total, 19 weeks	195,161,760	24,000,720	\$3,237,889

Zinc value for week, \$196,884; lead, \$27,310; zinc value, 19 week, \$2,717,980; lead, \$518,908.

MONTANA.

FLATHEAD COUNTY.

(From Our Special Correspondent.)

Butte Oil Company.—A flow of petroleum amounting to a few barrels per day was struck recently in the well situated about 80 miles from Belton.

Libby Mining Company.—This company under the management of John Cowell has received the machinery for the new stamp mill to be erected on the West Fisher.

Snowshoe.—The shaft has reached the 400 ft. station. The bottom of the shaft is said to be in ore of better grade than heretofore encountered. It is the intention to continue sinking 100 ft. The concentrator which was badly wrecked by snowslides during the winter is under repair. S. S. Anderson, who has the contract for hauling the concentrates from the mill to Libby, has arrived with 45 heavy draft horses and 9 big wagons. The distance from the mill to Libby is 18 miles. The contract price for hauling the concentrates is said to be \$4.50 per ton. Manager Bowen is getting the property in producing shape.

LEWIS & CLARKE COUNTY.

(From Our Special Correspondent.)

Capital Consolidated Mining Company.—The Hope, Faith and Nancy Hanks claims, about 5 miles south of Helena, near Holmes Gulch, have been incorporated in this company with a capital stock of \$50,000 by Mose Manuel, Chas. A. Clark and A. B. Totten, all of Helena. The company is to put machinery on the property and open it under the management of Mose Manuel.

Montana Mining Company.—The annual statement filed with the county clerk gives assets of £667,000. The liabilities are placed at £3,544, consisting of salaries due in Montana and current expenses.

MADISON COUNTY.

(From Our Special Correspondent.)

Watska.—The shaft on this property at Rochester is now 450 ft. It is understood that the management will continue sinking as soon as the station at the 450 ft. is finished.

MISSOULA COUNTY.

(From Our Special Correspondent.)

Vermillion Placer Mining Company.—John Gerrick and C. A. Daley, of Butte, and R. G. Collins, of Anaconda are the incorporators of this company. The capital stock is \$250,000 in \$1 shares. The property consists of some 5 miles of placer gravel along the Vermillion River. The ground is under development. A pipe line $\frac{3}{4}$ of a mile long takes the water from a side gulch to be used as a pipe head for two No. 2 giants. A 6-ft. flume has been put in on bedrock. The 2 pipe heads in connection with the ground sluice will enable the company to handle through the flume fully 3,000 yards of gravel per 24 hours. The gold is coarse, easily saved and is said to average 30c. to the yard. John Gerrick is general manager at Vermillion.

SILVER BOW COUNTY.

(From Our Special Correspondent.)

Amazon.—The Butte Copper Company which intends to develop a number of properties in the foot hills of the main range southeast of Butte has this property under bond from the owners. The company is composed of Connecticut people, with Thomas M. Waller, ex-Governor of Connecticut, president.

West Altoona.—The Butte Copper Company has this claim under a developing bond from the owners, James H. Lynch and Patrick Mullins.

Yankee Boy.—This property situated near the old Parrot Smelter is being opened by a new shaft by Pat. Mullins and others. The property is an old placer patent that has never been explored for a vein.

NEVADA.

ELKO COUNTY.

Dexter.—The mill at Tuscarora has had 35 of its 40 stamps dropping, and the cyanide plant is running full capacity. The water supply, it is said, promises to be ample this summer.

NYE COUNTY.

Tonapah District.—A recent strike in the Fraction Mine is reported to carry streaks of almost solid ruby silver. There is considerable work under way, but lack of water is a great hindrance to prospecting. All the high grade ore bodies exposed are reported to be in a small area.

STOREY COUNTY—COMSTOCK LODGE.

Justice Mining Company.—At the annual meeting of this company in San Francisco, May 5, there were 91,045 shares voted and the following directors were elected: William Bannan, J. B. Shaw, A. F. Coffin, B. F. Shaw, and George C. Sneider. William Bannan was elected president; B. F. Shaw, vice-president; R. E. Kelly, secretary, and W. G. Douglass, superintendent.

NEW MEXICO.

COLEFAK COUNTY.

New Mexico Gold Ore Treating Company.—This company, capitalized at \$3,000,000, in \$1 shares, has been formed to work a group of claims near Ute Creek and erect a mill to treat the ores by the Hicks process. H. P. Scherer, of Fort Wayne, Ind., is president, and O. P. Eversole, of Fort Wayne, secretary. A prospectus issued by the company makes some strong claims for the Hicks process, but says nothing regarding the results obtained at Dahlonega, Ga., where, according to reports, the process was a complete failure.

TAOS COUNTY.

(From Our Special Correspondent.)

A new mining camp has been established south of Cieneguela, which has attracted the attention of prospectors in the Taos range. A new company, composed of Charles A. Whitney, Ramon Sanchez and Joseph Peyer, of Penasco, has been organized to operate near the Muller & Berry lode.

OHIO.

PERRY COUNTY.

(From Our Special Correspondent.)

Continental Coal Company.—Several companies, operating about 14 coal mines in this county, including Col. W. P. Rend's mines, have consolidated under this name, with Tracey W. Guthrie of Columbus, former general manager of the Congo Coal Mining Company, as general manager.

OREGON.

JACKSON COUNTY.

Last Chance Gold Mining and Milling Company.—This company has been incorporated at Ashland. The following directors were elected: O. C. Tiffany, R. P. Neil, H. L. Whited, D. A. Applegate, and L. L. Mulit. R. P. Neil was elected president; J. L. Mulit, vice-president; D. A. Applegate, secretary and treasurer, and O. C. Tiffany, superintendent. The corporation owns the Last Chance Mine and the first Westerly Extension, in Gall Creek District, 2 miles south of Gold Hill, near the Bill Nye, Roaring Gilet and Braden. The Last Chance was discovered first in February, 1893. Several pockets have been found in the past, varying from \$1,400 to several thousands. The vein is free milling.

Orme.—At this quartz mine on Footh Creek, near Ashland, owned by Alex. Orme, 2 shifts of men are running a new tunnel on the ledge. A 5-stamp mill is crushing ore.

Treasure.—A strike of high grade ore is reported in this mine near Eugene, now worked by Charles Harding Park. Five tunnels have been run on the property, and a number of men are busy.

PENNSYLVANIA.

ANTHRACITE COAL.

Anthracite Miners' Strike.—In accordance with an order issued by President Mitchell of the United Mine Workers practically all the miners and laborers throughout the anthracite region did not go to work on May 12, and remained away from the collieries during the following days pending the decision of a convention of delegates of the mine workers at Hazleton. This convention assembled on May 14, and is to decide whether the temporary cessation of work is to last indefinitely until the mine operators make certain concessions. Fully 144,000 men and 357 collieries are idle, only firemen, engineers and pumpmen remaining at work to keep the collieries from being flooded. The operators have refused to grant the radical requests reported to have been made by the miners, and are apparently quite ready that a strike should come, since a strike at this season would cause less inconvenience than at any other time. As a result of the miners stopping work, coal train crews, switchmen, machinists and others not identified with the United Mine Workers are idle. Except for the output of steam sizes from a few washeries the production of coal has stopped.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Chicago Mica Company.—The third car-load of mica has been shipped from the Crown Mine within 4 weeks. It went to the company's works at Valparaiso, Ind. A new ledge of mica has lately been uncovered.

Saginaw Mining Company.—The company has been exploring with a diamond drill for several months, and has recently started its fourth drill hole. The holes have been put down 50 ft. apart. The last hole struck the ledge in 300 ft., and the fourth is expected to get to the ledge in 500 ft. The Saginaw joins the North Star on the north.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Alder Creek Company.—The new cyanide plant on Yellow Creek has started. It is intended to treat

quartzite ores of the Little Blue group. Supt. Frasier has established headquarters at Flatiron.

Bullion.—A full force of miners is at work getting out ore for the National Smelter at Rapid City. The Bullion belongs to the National Smelting Company, and is situated at Galena.

Dakota Mining and Milling Company.—The cyanide mill at Deadwood is working 100 tons of ore a day. The capacity has recently been increased by putting in 10 more stamps, making 30 altogether.

Galena Mining and Smelting Company.—The Eureka property at Galena, has been leased to James Ryan, who has recently encountered a 4-ft. vein of gold ore. Shipments will start as soon as the roads improve.

Horseshoe Mining Company.—It is decided to employ wet crushing in the new cyanide plant at Pluma instead of rolls. The plant is to be larger than originally intended, and will be able to treat 1,250 tons of ore a day. This will require 360 stamps. The new building will be erected on the hillside next to the old chlorination mill, which will contain most of the machinery, the new structure being largely for the cyanide tanks. The company has a 100-ton experimental plant at work.

Imperial Mining Company.—The new cyanide plant in Deadwood is treating 150 tons of ore daily. The supply comes from the company's Blacktail Gulch mines, with some ore from the Horseshoe Company. The crushing capacity is 300 tons a day, and the company is going to build more tanks. Only oxidized ores are treated, but a roaster is being put in, and will be ready during the summer.

Merritt.—W. E. Sutton and Charles F. Graham who have a lease on this property at Galena, have cut a body of silver-lead ore. The mine has been idle for 15 years.

Monarch Lease.—George Bachman has resumed shipments to the Golden Reward Smelter in Deadwood. The ore is hauled by team, 2 miles.

Pluma Mining Company.—The new hoist is in position at the shaft in Lead, and the water has been removed. The shaft will be sunk from the 200 to the 500 ft. level, and cross-cuts will be run on the vein.

Spearfish Mining and Reduction Company.—It is said the clean-up for the last 15 days' run resulted in 700 fine oz. of bullion, worth \$12,600 at the United States Assay Office in Deadwood. This was from 2,000 tons of ore. The mill has not been running continuously. A. C. Burrage, of Boston, had a bond on the property expiring May 1.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Eagle Chief Mining Company.—This company with \$1,000,000 capitalization has recently been organized to work the Wealthy group of claims at Keystone. P. S. Farrar, of Lead is president; John B. Henry, of Rapid City, vice-president; Victor T. Jepson, of Lead, secretary and treasurer, and J. J. Farrar, of Rapid City, manager. There is a 20-stamp mill on the property. A shaft is to be sunk 500 ft.

Gertie.—The water in the shaft of this tin mine has been removed. The hoisting machinery was destroyed by fire a few years ago, and has just been replaced.

Gregory Mining Company.—P. F. Hibbard, the superintendent at Rochford, has been purchasing hoisting machinery, preparatory to continuing the Montana shaft from the 100 to 500 ft. level. There are several hundred feet of lateral workings in ore. Ex-Governor Smith, of Vermont, is principal owner.

National Smelting Company.—The new 500-ton smelter has blown in, and is running smoothly. It comes from the properties of the company near Deadwood, and from a number of other mines in the Black Hills. Olaf Seim, of Deadwood, furnishes the flux.

Rapid River Mining Company.—This company has purchased the holdings of Roessler & Johnson at Silver City, and will carry on placer work during the summer. Roessler & Johnson formed the Big Bend Placer Company 2 years ago.

TEXAS.

HARDIN COUNTY.

(From Our Special Correspondent.)

Atlantic & Pacific.—Gusher No. 2 at Sour Lakes came in on May 7, throwing the oil 50 ft. above the pipe; bailing was then resumed to thoroughly clean it out. The new well has 8-in. casing and lies about 200 ft. east of Atlantic and Pacific No. 1.

Sour Lake Springs Company.—This well is nearing the depth of other gushers and should be brought in shortly. The construction of the Guffy Petroleum Company pipe line will be hastened. The Guffy Company has started drilling another well 100 ft. from its first well.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

The number of gushers brought in on Spindletop now reaches 248. How many will not flow is a problem. There are a number, but as some have not produced a barrel of oil for months, it is impossible to say whether they will flow or not. The safety committee will not permit some wells being flowed on the ground and they are not connected with a pipe line. To controvert the newspaper reports that the gushers had suddenly ceased to flow the committee relaxed their rule and permitted several gushers to be opened up in different parts of the field. Two wells threw oil about 100 ft. without any preliminary air agitation and one other flowed a good stream after agitation, showing that the wells still gushed. The pressure, however, and the volume of oil are much reduced from 6 weeks ago and it seems to be a fact that only a few of the wells have sufficient pressure to force oil into tanks off the hill. The Spindletop Power Company plant is to be used solely to furnish air to force oil into tanks and agitation contracts similar to those now in force will not be accepted. Gas well owners are making contracts for the same purpose and the supply of air and gas is not nearly equal to the demand.

Prices for crude oil are stiffening. It was sold on May 8 at 20c. f. o. b. Gladys and long contracts are not wanted. The prevailing rate 2 weeks ago was 8 to 10c. Shipments for May so far show little change from the April record.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—During the week ending May 10, the banks report settlements on ore, bullion and gold bars as follows: Bullion, \$37,700; gold bars, \$8,000; silver, lead and copper ores, \$138,100.

BEAVER COUNTY.

(From Our Special Correspondent.)

New Smelter.—Col. Wm. A. Farish, of Denver, Colo., has been making a study of ore resources about Frisco. He said that the mineralized belt covers miles of ground, and ore treatment on the ground is demanded, as the great mass is low grade. A smelter in that district would, he thinks, be a paying investment. Col. Farish has gone to Salt Lake to compile his report.

Annie Laurie.—The last clean-up of the mill shows an April production of \$60,000. Two new cyanide vats are being added.

Comet.—A. B. Lewis has purchased this property, adjacent to the Cactus, just out of Frisco, and reports development progressing rapidly.

Golden Star.—Manager Pat. Ryan expects to install a new hoist to sink on a body of milling ore in this Frisco property.

Horn Silver.—This mine, at Frisco, for the week of May 10 shipped 6 cars of ore giving the usual average values.

BOX ELDER COUNTY.

(From Our Special Correspondent.)

Century.—The Century reports a \$3,000 gold bar, brought down by Manager P. W. Madsen, representing the run of the mill for the last half of April. This brings up the production for the month to \$5,000. Mr. O'Rourke is now superintendent.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—During the week ending May 10 the production was 36 cars of ore and concentrates, divided as follows: Mammoth, 7 cars ore; Yankee Consolidated, 6 cars ore; Bullion-Beck, 5 cars ore; Star Consolidated, 3 cars ore; Ajax, 3 cars ore; Lower Mammoth, 2 cars ore; Carisa, 6 cars ore; Grand Central, 3 cars ore; May Day, 1 car concentrates; Gemini, 10 cars ore; Dragon Iron Mine, 15 cars ore.

Mammoth vs. Grand Central.—The Mammoth Mining Company had its suit against the Grand Central transferred from the District Court at Nephi to the Federal Court of Salt Lake, and later dismissed. This action temporarily ended the dispute. A few hours later the Grand Central filed a bill in equity against the Mammoth to quiet titles to certain ore bodies claimed in the Silveropolis and Consort claims. The bill claims the plaintiff has been in possession of the said claims for the last five years, and has been and now is the owner. Counsel for the Mammoth at Nephi has conferred with Judge Marioneaux relative to a bond proposed as a preliminary step to re-opening the case. The bill, it is said, asks damages of \$200,000 for ore extracted from the Silveropolis and Consort claims by the Grand Central prior to February 19, 1900; for the appointment of a receiver for the defendant; for the appraising of the ore extracted since February 19, 1902, and restitution therefor; also for writ of injunction on the disputed ore bodies.

May Day.—The committee appointed to report on the books state the net earnings during the past 13

months were \$32,000, and on April 1 there was a balance in the treasury of \$6,904. It does not find any intent on the part of the board of directors to defraud. The directors have relinquished their claim to share in past dividends.

Uncle Sam.—The superintendent reports a strike of galena and carbonates in the intermediate level, 80 ft. vertically below the upper tunnel.

United States Company.—Suit has been brought by the United States Company against L. M. Lawson, E. Balbrach, Jr., H. F. Lamson, W. H. Shearman, R. C. Hoffman and Sarah Stevenson for the sum of \$54,000 in the Federal Court. It has a bearing on the suits pending over the Neptune tunnel rights and title. The bill pleads the extraction of ore by means of secret tunnels, that were run under ground into the claim belonging to the United States Company, and known as the Jordan Extension lode, and that the amount of ore taken was approximately more than 1,800 tons, valued at \$50 per ton.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—Shipments during the week ending May 10 are as follows: Columbia 4 cars ore, New England 1 car ore, Highland Boy Consolidated 5 cars ore, Storey 3 cars ore.

Bingham Consolidated.—The officers, J. A. Coram, W. F. Hammett, E. L. White, and D. McVichie, with Superintendent Nutting, saw the first converter go in commission. The first consignment of pig copper went to Perth Amboy, N. J., May 10. With a single converter the company will produce 20 tons of bullion daily. In producing 20 tons of bullion the company uses but 50 tons of matte and has now over 3,000 tons ready.

Highland Boy.—The usual 4 cars of copper bullion went east in the week ending May 10, approximating 240,000 lbs.

United States.—Work on the new tramway has begun. It will be completed within 60 days. Dederichs & Burke have the contract. At least 350,000 ft. of lumber will be used in the work and the tram will have a capacity of 500 tons of ore daily.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—The output for the week ending May 10 was 6,053,725 lbs. of ore, as follows: Daly-West, 2,828,060 lbs.; Ontario, 1,375,850 lbs.; Anchor, 454,350 lbs.; Silver King, 1,395,465 lbs.

Daly-West.—At the meeting in Denver, the shareholders ratified the action of the board of directors in buying the Quincy properties at Park City. The secretary, Mr. Mountney, will be instructed to issue the Quincy block of shares if no further action is taken by any of the parties interested. M. Harrington, of the Quincy, thinks that he is entitled to more shares than have been allotted to him in the sale to the Daly-West Company. This is simply a personal matter, and probably will not affect the transfer.

Kearns-Keith Mining Company.—The capitalization is \$150,000, in \$1 shares. Incorporators are: Senator Thomas Kearns and David Keith, of Salt Lake; John A. Creighton, of Omaha, Neb.; F. J. Wescott and J. T. Richards. Senator Kearns is named as president; David Keith, vice president, and F. J. Wescott as secretary and treasurer. These, with J. A. Creighton and J. T. Richards, form the directorate. The company owns 1,200 acres of ground, just west of the Silver King Mine, comprising over 60 claims. Work will begin on the property at once. It is probable that no shares will be offered for sale, as the money required is at hand.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—The shipments for the week ending May 10 were: Ophir Hill, 33 cars of its concentrates; Hidden Treasure, 2 cars of ore.

Chloride Point Consolidated Mining and Milling Company.—Gustavus A. Duncan, of Salt Lake, receiver, announces that the mining claims and the cyanide mill, with its equipment, are to be sold at Sheriff's sale in Tooele on May 31.

Cygnets.—This property has been sold to C. H. Scheu for, it is said, \$100,000. It was formerly owned by T. H. & I. A. Benton, A. Gibson, and H. Zerbe, who have taken out considerable ore. Who are associated with Mr. Scheu in the proposition is not disclosed. H. Zerbe will remain as superintendent.

FOREIGN MINING NEWS.

AUSTRALIA.

NEW SOUTH WALES.

Broken Hill Proprietary Company.—The refinery statement for the four weeks ending April 23, shows an output of 436,729 oz. silver, 5,265 tons lead and 25 tons hard or antimonial lead.

SOUTH AUSTRALIA.

The Mines Department reports the value of mineral exports from this State in 1901 as follows: Copper, £468,606; lead, £722; copper ore, £23,011; manganese, £330; gold, £16,613; tin, £86; silver lead, £199; unenumerated, £1,753. Total, £511,320. The total for the year 1900 was £431,289; showing an increase last year of £80,031, or 18.5 per cent.

WESTERN AUSTRALIA.

The gold production for April is reported as 183,531 oz. crude, an increase of 33,513 oz. over April, 1901. For the four months ending April 30, the total was 681,887 oz. crude, against 552,058 oz. in the corresponding period last year; an increase of 129,829 oz., or 23.5 per cent. The total this year was equal to 587,954 oz. fine gold, or \$12,153,016.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

British Columbia Copper Company.—The big rock crusher installed at this company's Mother Lode Mine, near Greenwood, is in use. The ore is hauled through a tunnel under the big ore quarry in cars, each with a capacity of about 3 tons, drawn by a mule. At the crusher a pneumatic hoist lifts the full car and tips its contents into the crusher hopper. A grizzly allows all the ore below 5 in. to drop through into the pit, the larger pieces falling into the same pit after being crushed. The ore is elevated thence by a bucket elevator to the ore bins alongside the railway track and loaded thence into the railway cars for hauling to the company's smelter. The crusher, which is a Farrel 14B, has a capacity of 650 tons of rock crushed to a size not exceeding 5 in. every 10 hours.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Production.—The Giant Mine is now a shipper. The output of the different mines for the week ending May 3 and for the year to date was as follows according to the Rossland Miner:

	Week.	Year.
Le Roi	5,172	94,137
Le Roi, No. 2	1,500	21,950
Cascade		300
Bonanza		30
Velvet		250
Center Star	100	3,110
Rossland Great Western	100	2,250
Giant	100	100
War Eagle		90
Spitzee	20	20

Le Roi.—A large number of miners has been laid off, but over 400 men are still at work.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Company.—This company's coal shipments in April were 174,008 tons. For the two months of the fiscal year from March 1 to April 30, the total shipments were 349,354 tons, against 245,200 tons for the corresponding period in 1901.

DUTCH EAST INDIES.

BORNEO.

Myndouw Maatschappij Kahajan.—This company's Kahajan Mine is, we are informed, in Dutch Borneo, and not in British Borneo, as was stated by a recent letter. The mine is now in charge of Mr. Brian Hooker, who succeeded Mr. F. M. Perkins, the former manager, in December last.

Several other mines in Dutch Borneo now have mills and machinery in course of erection.

MEXICO.

CHIHUAHUA.

(From Our Special Correspondent.)

Adela.—The machinery for the mill, the property of William V. Pettit, is arriving at Parral, and the work of construction is being pushed with all possible speed.

Refugio.—An option has been given the American Smelting and Refining Company, on the mine and the mill of this famous property, near Parral, for 45 days. The price of the property is said to be \$3,000,000 gold, and will include all of the property now worked and under control by Angel Garcia. The Refugio is one of the old mines of the camp, as well as having been among the heavy producers for several years. The mill is an amalgamation plant of 150-ton capacity.

SONORA.

Anita.—A hoisting plant has been put in at these mines, owned by Theodor Douglas, which have been undergoing development during the past year. Over 16 ft. of copper-gold-silver ore is reported cross-cut on the 150-ft. level from shafts No. 1 and No. 2. The mines are east of Coccol, and were taken hold of after the pacification of the Yaqui Indians. A survey for a railroad to connect the mines with the new port of Torari, on the Gulf of California, is being made. It is rumored that the property will be turned over to an Eastern syndicate.

MINING STOCKS.

(Complete quotations will be found on pages 714 and 715 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 15.

Insiders and their brokers are supporting the copper shares, while the public awaits further developments in the situation. Consequently stock transactions and prices attract but little attention. Amalgamated sold at \$69@86 1/2, when trading was the largest; later smaller sales fixed the price at \$68 1/2@87 1/2. Anaconda was moderately dealt in at 112@111 1/4 per cent, or \$28@27 1/2. United shares when issued sold at \$30@35 1/4. It is said they are shortly to be listed in Boston. Greene Consolidated, of Mexico, changed hands at \$26 1/4@25 1/2, lower prices than last week. Tennessee was firm at \$11 1/2@12 1/2. White Knob, of Idaho, weakened to \$21 1/4, as the company is having trouble with its miners. British Columbia showed more strength, selling up to \$9 3/4, though at the close holders have eased their price fractionally. Montreal & Boston, also of British Columbia, after touching \$3 1/4, fell to \$2 3/4 on freer offerings. Union, of North Carolina, brought \$4 3/4@4, and Gold Hill, its neighbor, \$2@1 3/4.

The weak silver market is felt by Ontario, of Utah, which sold down to \$7.75, a drop of 25c. since last week, and the lowest price since March.

A little better feeling prevails in the Cripple Creek, Colo. section, though prices are still low. Portland brought \$1.75, Elkton 72c., and Isabella 27c.

Sales of Quicksilver, preferred, of California, are noted at \$10@10 1/4.

The Comstocks are again heavy. Consolidated California & Virginia dropped from \$1.60 to \$1.30, Ophir to \$1.40, and Mexican to 55c.

Auction sales were 2,999 shares Franco-American Chemical Works, of Woodbridge, N. J., at 10c. per share; 250 preferred shares Joseph Ladue Gold Mining and Development Company, of Yukon, at \$1.55 per share, and \$4,000 first mortgage 5 per cent gold bonds Blue Ridge Mining Company at 11c. At Philadelphia, auction sales were 6 shares Keystone Coal Company at \$10 1/4.

The New York Stock Exchange has listed \$7,410,300 common stock, and \$9,416,000 6 per cent cumulative preferred stock of the General Chemical Company. The authorized capital of \$25,000,000 is equally divided into common and preferred shares of \$100 par value. The company owns in fee 20 chemical manufacturing plants in New York, New Jersey, Pennsylvania, Connecticut, Missouri and Illinois. The corporations whose capital stocks are owned represent an investment by the General Chemical Company of \$2,560,760. In addition to the plants named above the company owns stock in other concerns. Last year there were net profits of \$1,358,347, while dividends amounted to \$813,788, being at the rate of 6 per cent on the preferred stock and 4 per cent on common.

Boston, May 14.

(From Our Special Correspondent.)

There has been an utter lack of animation in copper shares the past week, notwithstanding the admitted better conditions prevailing in the metal trade. This can be accounted for, in part, by the unwillingness of the leaders to enter into speculation and of the tightness in money. Prices, as a result, have suffered some decline, but there is a noticeable absence of offerings of copper shares, and any buying orders easily precipitate an advance in a stock. There is an air of expectancy that prices are liable to move up at any time and the followers are watching things closely.

Mass and Adventure mining were benefited in price by talk of a consolidation. There is the best of reason for saying that negotiations are now going on to this end, and that final announcement may be expected late this month. It is hoped to put them in alike, although there is a few dollars difference in the selling prices. Mass advanced \$2.50 to \$21.50, but suffered a reaction to \$19.50 on a half-hearted denial that a deal was on. The close to-night was \$20.37 1/2. Adventure rose \$1.25 to \$24.75, but fell back to \$22.50, recovering to \$23.25. There are 100,000 shares of each company for \$25 each. There has been paid in on Adventure \$11.50, against \$9.50 on Mass, but the claim is made that the latter company has spent fully \$1 per share in development, which was taken from earnings. The Mass Company has been running its mill successfully some time, whereas the Adventure's is in process of construction.

It has been suggested that a consolidation of these two mines with the Michigan and Victoria would be considered favorably by large holders.

Bingham has lost \$2.50 to \$36.50. Director Hammett has just returned from the property, and states that high grade ore is being shipped. Atlantic touched \$36, but receded to 34 again. The activity

in Dominion Iron and Steel has subsided. After dropping \$11.37 1/2 to \$50 a recovery to \$56.50 followed. It is said that considerable realizing by insiders has occurred from \$72.50 down, and that the same sellers were the recent buyers. Sellers at the high prices had a cover in the new \$5,000,000 stock at \$60, which was the subscription price. The rights sold down to 1c. each. Four or 5 of the largest banks in Montreal and Canada underwrote this stock at \$57. Old Dominion holds firm around \$21. The recent buying has been for New York account principally. Daly-West fell \$4 to \$40.50, but recovered to \$43.25. The filing of a suit against the company for distribution of the new capital effected the stock. It is understood that Heinze's new United Copper Mining stock will shortly be listed on this market. Whereas it was talked that the Tamarack Mining Company would have to pass its dividend it is now said that semi-annual dividend of \$2 will be declared next month. Mohawk is selling at \$39.50, with a \$3 assessment paid. Trinity has been firm around \$13, and Winona spurted to \$3.25. American Zinc Lead and Smelting stockholders have been asked to pool their stock so as to effect a sale to a combination in the Joplin (Mo.) district.

Colorado Springs, May 8.

(From Our Special Correspondent.)

The market experienced a sharp reaction during the past two days and scored one of the strongest advances that has occurred during the past year. The improvement occurred in such substantial leaders as Elkton, El Paso, Isabella and Portland, and while the latter may experience some falling off on account of the threatened litigation by the United States Reduction and Refining Company, the other three seem to be making gains upon solid foundation. Many of the lower priced prospect stocks have had new life infused into them and a strong undercurrent of buying of all classes of securities has set in.

A week ago Elkton was selling at 63 and 62 1/2, from which point it broke steadily to 57 on May 5. A master hand then appeared behind the stock and the price has been advancing steadily until 67 was reached on the morning call to-day. The announcement that the mine is again shipping rich ore from the 800-ft. level is not sufficient to explain the advance in these shares. So far it is a game for the insiders alone as nothing of a reliable nature has been given out to the public.

El Paso shares made a strong advance during the week. On May 2 the stock sold at 43 and advanced to 47 1/2 on the 5th on rumors of a rich strike in the 600-ft. level. A heavy flow of water was encountered the day following and the stock dropped to 44 1/2 but recovered on the 7th to 50 1/2 upon the official announcement that the strike in the sixth level was one of the richest that Cripple Creek has ever produced. A determined effort was made to-day to keep the price down and the closing quotation was established at 50 bid and 50 1/2 asked. As the sixth level was inundated by the flow of water encountered and is still submerged, it will be two or three weeks yet before authentic information can be obtained as to the dimensions of this strike.

Isabella, after hanging around 23 for several weeks, made a sudden advance to-day as high as 28 1/2.

A week ago a selling turn appeared in Doctor Jack Pot, the shares losing from 32 to 28; beginning May 6 a buying turn appeared and the stock was carried back to 30 on the announcement that the company intended paying off its debt of \$75,000 by July 1. There has been alternate buying and selling during the week, the stock selling off to-day to 29.

Portland has not attracted much attention during the week and has been generally soft. May 5 the shares fell to \$1.75 when it became known that the United States Reduction and Refining Company intended to proceed legally against the Portland Company over the use of the Sloan patent in the new mill at this place. The stock has, however, been gradually strengthening during the week and sold to-day at \$1.84, the closing quotation being \$1.83 bid and \$1.86 asked.

Salt Lake City, May 10.

(From Our Special Correspondent.)

The week ending to-day has been a singularly quiet one on the Exchange, and only two or three stocks have featured to any extent. With the mines doing business as they are there seems to be no reason why the securities should be laid away in the back-ground.

Ajax has been selling at about the same figures as last week but with only half as many shares coming into the field this week, showing 15,300 as against 31,700 last week. Carisa has been pushed down the ladder several steps and at the close to-day shows its sales of the week to have been between 38 and 36.5c., with only a third as many shares out this week compared with those of last week, the total being 24,500. Consolidated Mercur has remained within the same limits as

of the former week, selling about four times as many shares, or 9,700. Daly-West still sticks around \$45, and its fluctuations are between \$45.50 and \$44, selling this week 1,134 shares. Grand Central is heard from with 750 shares which brought from \$3 to \$3.32 a share. Lower Mammoth places 2,500 at \$1.45@ \$1.49. Mammoth has made no advances or retreats and sold but 700 shares. May Day has placed about half as many shares this week as last and has lowered the price. Sales were this week 89,000 shares, at 29@ 25 1/2c. against 32 1/2c. last week. Star Consolidated has made some smart advance going to 25@20 1/4c. with sales of 16,100 shares. Tetro featured during the last part of the week, placing 17,000 shares between 21 1/2 and 27 1/2c. Uncle Sam has occupied attention all week and has placed 111,300 shares at a few cents raise over last week's prices; high 39 1/2c., low 32c. Yankee Consolidated had a slip from \$2.35 high of last week to \$2.15 high of this week, low \$1.89.

San Francisco, May 10.

(From Our Special Correspondent.)

The mining stock market showed much activity in the week, but quieted down towards the close, with a corresponding drop in prices. Just at the end, however, there was some improvement.

Some quotations noted are: Ophir, \$1.65, a drop of 10c. from the highest point; Consolidated California & Virginia, \$1.50@1.55; Mexican, 60c.; Caledonia, 45c.; Sierra Nevada, 27@28c.; Potosi, 24@26c.; Overman, 22c.; Hale & Norcross, 20c.

On the Producers' Oil Exchange business was much more active and a good deal of trading was done. Buyers were in evidence all the week. Some quotations noted are: Hanford, \$85; Kern River, \$7; Sterling, \$1.80@1.85; Sovereign, 35c.; Occidental, 21c.; Junction, 19c.; Petroleum Center, 12@14c.; B'ar, 4c. The feature of the week was the heavy buying of Sterling. Occidental and Petroleum Center were also in demand.

London, May 2.

(From Our Special Correspondent.)

The fall in Le Rois that I mentioned last week has continued, and the directors have been obliged to satisfy the shareholders as to the cause by publishing the actual messages from the mine. It appears that the ore mined during March, amounting to 24,500 tons, will yield no profit at present prices of silver and copper, although the published estimate was \$9,950 profit. The manager therefore finds it necessary to sort the ore more carefully to bring it to a higher grade. He also mentioned that the recovery of metals is poor, being considerably less than assay value. Investigations are to be made as to these losses, and if they cannot be remedied, it is proposed to shut down the smelter and confine operations to the development of the mine and sorting of the ore until the prices of metals go up again and the price of fuel goes down. Shareholders and directors are very much disappointed and you can buy any number of the £5 shares at £2 1/2.

DIVIDENDS.

Name of Company.	Latest Dividend		Total to Date.
	Date.	Per Share.	
Amalgamated Copper.....	May 26	.50	769,439 18,117,809
Am. L. & St., com.....	May 28	\$0.15	5,100 265,100
Calumet & Hecla.....	May 22	5.00	500,000 78,850,000
*Daly-West, Utah.....	May 15	.40	72,000 204,000
*Esperanza, Mex.....	May 10	4.10	12,300 985,170
*Gold Coin, Colo.....	May 26	.03	30,000 1,210,000
*Guadalupe Mill, Mex.....	May 20	1.64	16,400 3,442,250
*Helena, Oregon.....	May 26	.00 1/2	6,500 150,500
*Homestake, S. Dak.....	May 26	.25	52,500 11,178,750
Homestake, extra.....	May 26	.25	52,500
Imperial Oil, Cal.....	May 6	.20	20,000 100,000
Lehigh C. & Nav.....	May 27	1.50	430,399 19,808,187
*Natividad, Mex.....	May 14	1.64	3,936 131,340
†Ontario, Utah.....	Jun. 20	.30	45,000 14,827,000
*Sta. Gertrudis, Mex.....	May 26	.20	5,760 2,577,164
†Standard Con., Cal.....	May 22	.10	17,839 4,071,136
†Standard Oil.....	June 16	10.00	9,700,000 49,485,000
Thirty-Three Oil, Cal.....	May 6	.10	10,000 50,000

*Monthly. †Quarterly.

ASSESSMENTS.

Name of Company.	Taxation No.	Delinq.	Sale.	Amt.
Alta.....	Nov.	May 26	June 20	.05
April Fool.....	Nov.	June 7	June 28	.05
Ben Franklin.....	Cal.	May 19	.....	.01
Coe.....	Cal.	May 19	.....	.25
Comstock.....	Utah.	May 3	May 23	.10
Con. Imperial.....	Nov.	Apr. 27	May 27	.01
Golden Star.....	Cal.	May 31	.....	.04
Gould & Curry.....	Nov.	May 1	May 20	.10
Hale & Norcross.....	Nov.	May 27	June 20	.10
Joe Bowers.....	Utah.	May 12	.....	.01
Jumbo.....	Utah.	May 16	June 4	.00 1-6
Kern River Oil.....	Cal.	May 29	.....	.50
Menlo.....	Cal.	May 31	.....	.03
Occidental.....	Nov.	May 15	June 5	.05
R. G. W.....	Utah.	May 6	May 26	.00 1/2
Silver King.....	Ariz.	May 27	June 24	1.00
Va. Con.....	Cal.	May 5	May 20	.02
West Morning Glory.....	Utah.	May 15	May 20	.01
Yellow Jacket.....	Nov.	May 10	June 19	.10

Some uneasiness was caused among shareholders in the Ymir Gold Mines, Limited, by the publication of a report that the tunnel now being driven to tap the vein at depth had not proved very successful so far, as the vein struck was of low value and not workable. Mr. Fowler's opinion, however, is that with further development a payable vein will be met with, and he considers it advisable to provide new plant to treat the increased supplies of ore on a larger scale. For this purpose £20,000 additional capital is to be raised by issuing new shares. The profit of the company in 1901 amounted to £45,000, but most of this was spent in developments and machinery. The average value of the ore raised in 1901 was just less than \$8 per ton, as against \$8.88 the year before, the fall being partly due to lower contents and partly to the drop in silver. The directors probably know where they will find this new capital.

The shares of an American company called the Standard Copper Mines of Clifton, Arizona, are being offered for sale in England. The properties belonging to the company are the Standard, American, New England, Hazel, Kate D., Mabel and Nellie, and it is said that developments have been sufficient to enable the owners to ship ore. The amount of shares issued is 74,250 of nominal value of \$1 each, but the price of issue is not given. It would be interesting to hear if any of your correspondents in Arizona can give an account of the actual value of the property, as shares introduced this way in England are always open to suspicion.

COAL TRADE REVIEW.

New York, May 16.
ANTHRACITE.

The anthracite miners began to quit work last Saturday and Monday not a colliery was in operation. A number of washeries kept at work but their total tonnage of steam sizes is too small to cut any figure. Anthracite production has stopped, practically no coal is going forward and consumers will have to wait. There is no reason for the public or for dealers to get unduly excited, however. Let them remember the unwarranted scare at the start of the 1900 strike. That strike began when winter was approaching and coal was a necessity for domestic use. Prices were rushed up and certain men made money, but not those who temporarily lost their wits and paid all sorts of prices for coal. If a strike should last a couple of months the regular price would then be 20c. per ton higher than now and dealers would be that much out but for the chances that retail prices would advance considerably more than 20c. It is quite possible that a shut down for two months would advance retail prices considerably, but the advance would be less felt by the opening of winter and by late winter prices might be at last year's figures.

As to stocks on hand, these are probably larger, particularly at eastern points, than is generally supposed. The total shipments from the mines for April were approximately 4,924,830 tons, by far the largest output for that month on record, comparing with 3,685,013 tons in April, 1901. The consumption of prepared sizes is bound to be light until next September, while the supplies of steam sizes available for consumers at points along the seaboard, though not large, are reported sufficient to last longer than some people think. A lot of wild talk about a coal famine may be expected from irresponsible newspapers with a strike on, but the ignorance of the average newspaper man about anthracite mining and the anthracite trade is something with which all men in the trade are familiar.

There is a good demand for coal, aside from any excitement over the impending strike, in most consuming territories. It is strongest in the east and diminishes westward. At the head of the Lakes business has been pretty quiet. In Chicago territory there has been more activity but sales have not been as heavy as might have been expected from last year's experience. In the all-rail trade and along the Atlantic seaboard dealers have been taking all the coal they could get. Sales agents at New York City since the miners stopped work, and shipments from the mines ceased, have declined to take orders for new business, and are doling out coal to regular customers. This does not mean that they have no coal to sell, but is to stop speculators from gobbling available supplies. Prices at the present writing are nominally unchanged at \$3.85 for broken and \$4.10 for egg, stove and nut, f. o. b. New York Harbor shipping ports.

BITUMINOUS.

There is still a heavy and widespread demand for bituminous coal along the Atlantic seaboard and deliveries have been large on account of the good car supply last week. Vessels for coastwise traffic have been available in increased numbers. Craft that were at the loading ports to take anthracite were unable to get their cargoes owing to the possibility of a total suspension of anthracite production and

the action of anthracite shippers in refusing to load vessels that did not have some coal on board on the morning of May 12. Car supply this week, however, has fallen off. On May 12 when railroads handling anthracite were reported as laying off engines and train crews and sidetracking empties, car supply to many bituminous producers was immediately reduced 50 per cent from the previous week's figures and more than that to some. Producers allege that this action is a sufficient commentary on the claims of lack of motive power and sufficient cars that the railroads have been making.

It is not thought that the strike in the anthracite field will interrupt work at bituminous mines as in the well-organized bituminous fields the miners are working under contracts which do not expire before April, 1903.

The demand for coal at points beyond Cape Cod is heavy, but the good car supply last week allowed producers to wipe out part of the available orders. Along Long Island Sound there is still a shortage of the better grades of coal and the lower grades are none too plentiful. At New York Harbor points demand is good, but trade is in an easy condition with \$2.65 the ruling quotation for Clearfield f. o. b. New York Harbor shipping ports. Stocks in the all-rail trade are none too heavy though producers are a little better off than they have been.

Transportation from the mines to tidewater is fairly good. Car supply at the mines is 50 per cent of the demand and under. In the coastwise vessel market vessels are still scarce though the supply has been increased by those unable to load anthracite. We give current quotations from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 75c.; Boston, Salem and Portland, 95c.; Wareham and Portsmouth, \$1; Lynn and Bangor, \$1.05@ \$1.10; Newburyport, \$1.10@ \$1.15; Gardiner, \$1.05 and towages; Saco \$1.10 and towage. Rates from the further lower ports are 5@10c. above these figures.

Birmingham, May 12.

(From Our Special Correspondent.)

The production of coal in Alabama to-day is as heavy as it has been for some time. During the past week some big purchases of coal lands in Walker County were made by Eastern capital, and they will be developed on a big scale.

There is a little labor trouble at the Abernant Mine, on the Birmingham Railroad, 55 miners being out. It is claimed by the miners that the Abernant Coal Company refuses to recognize the union. This mine was opened but a few weeks since.

The official call for the Alabama District organization of the miners has been issued. The convention will be held on June 16 in Bessemer. The joint conference with the coal operators will be held on June 23 in Birmingham. Efforts will be made to separate the wage scales in the mining of domestic coal and those for mining used in manufacturing pig iron.

Chicago, May 13.

(From Our Special Correspondent.)

Chicago coal dealers are urging a reduction in railroad rates on anthracite coal to the Missouri River. At present the rate from Chicago to Missouri River points is \$2.50 per ton. If this can be reduced to \$2, the trade of Chicago dealers will be greatly extended, and the Kansas City supply cheapened and bettered. Several prominent traffic officials of railroads interested are known to be in favor of the reduction, and it will probably be made.

There is practically no change in the local coal market. Anthracite is selling well at \$5.60, though the supply by boat is hampered by the condition of the Chicago River. Bituminous coals are as quoted last week: Smokeless lump and egg, \$3.25; smokeless nut, \$3; smokeless run of mine, \$2.85; Hocking, \$3; West Virginia, \$3.40@ \$3.50; Youghiogheny, \$3.55; Indiana block, \$2.45; Indiana semi-block, \$2.10; Clinton lump, \$1.90; Indiana lump, \$1.80; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2; blacksmith's coal, \$3.40. The last named grade, which has been somewhat scarce, is now plentiful.

Cleveland, May 14.

(From Our Special Correspondent.)

The coal rates to Lake Superior have broken during the last week to 30c. This is due to the lack of sufficient receipts of coal at Ohio ports to keep the tonnage engaged. The shippers last week held a conference, and decided to pay no more than 30c. after Saturday. The demand for a reduction brought an immediate reply from the vessel interests who are not standing on the rate as long as the cargoes are to be had. The supply of coal at the lower lake ports is still anything but satisfactory. The railroads have promised a better supply of equipment ever since the season of navigation opened, but so far have been unable to afford enough cars to keep the boats which are under contract busy. As a result boats have been begging for cargoes, and many contract vessels have gone to the head of the lakes light. This condition has been increased by the strike of the anthracite coal miners, which has stopped the supply of

coal into Buffalo, and has sent all of the boats doing business out of that port to the soft coal shipping ports, so that the market has been glutted with tonnage. The demand for coal at the upper lake ports has not ceased, and some of the statements received from the Northwest indicate that the need of coal there is imperative. The lake-carrying rates now are 45c. to Milwaukee and 30c. to Duluth.

Pittsburg, May 13.

(From Our Special Correspondent.)

Coal.—Movement of coal to lake ports continues slow and unsatisfactory. The shortage of railroad cars seems more pronounced this week, but additional promises of better service from the railroad companies are being received. The mines are all in operation, but are not turning out the usual tonnage, owing to the scarcity of railroad cars. It is reliably reported that F. M. Osborne, former president of the Pittsburg Coal Company, who recently formed the Youghiogheny & Ohio Coal Company, with headquarters in this city, has purchased a half interest in the Pittsburg Terminal Railroad and Coal Company, and that the work of completing the railroad and opening 10 mines in the heart of the Pittsburg District will be actively pushed. The prices of coal in this district remain unchanged.

Connellsville Coke.—There is a marked improvement in the shipment of coke, but the production is practically the same as it has been for several weeks. The demand is heavy but the transportation facilities are not satisfactory. Prices are unchanged. *Courier* in its last issue gives the production for the previous week at 220,874 tons. The shipments for the week aggregated 11,975 cars distributed as follows: To Pittsburg and river tipples, 4,164 cars; to points west of Pittsburg, 5,632 cars; to points east of Connellsville, 2,179 cars. This was an increase of 229 cars compared with the shipments of the previous week.

San Francisco, May 10.

(Special Report of J. W. Harrison.)

During the week there have been two coal arrivals from Oregon, 980 tons; three from British Columbia, 9,450 tons; three from Washington, 7,400 tons; one from Australia, 3,103 tons; one from Swansea, 2,161 tons, total, 23,094 tons. The amount at hand this week is below the average amount received, at the same time it is fully up to the amount called for. The present outlook for the consumption of coal is not at all flattering, as consumers appear to be falling off monthly. Prices are being reduced to offset the use of oil, yet they do not appear to reach same successfully. Several steam colliers that have been in service for a considerable time, are for the moment retired, and it is questionable when they will be again called into requisition. Australian coals have been marked down to prices heretofore unknown, and are not finding ready sale. The list of loading vessels at Swansea is increasing, but that character of coal is used almost exclusively for gas purposes, and is landed here at nearly \$1 per ton less than last year. Coal will continue to hold the market for household purposes until some method may be devised by which oil may be substituted. It is difficult to say how successful this may eventually be. The writer thinks it very dubious if it will ever supplant coal for domestic purposes. It is dangerous to handle, and it will be very difficult to overcome the smell and smoke that emanate from its use.

Foreign Coal Trade, May 15.

Export business continues quiet, though some inquiry is reported for coal for foreign shipment.

Charters are comparatively few from United States ports, though rates are easy. Mediterranean ports are quoted at 7s. 6d.@7s. 9d. (\$1.80@ \$1.86), sailings next month. Compared with last year, these rates show a fall of about 5s. (\$1.20). In fact, charters this year are being booked at some of the lowest rates in years.

United States Consul F. W. Hossfeld writes from Trieste, Austria, April 8, 1902: "I have to report that Mr. Nikolas Revay, of I Jasomirgottstrasse 5, Vienna, desires to contract for about 123,000 tons of bituminous coal, to be delivered at his option at Trieste or Fiume, within one year. The coal, which is desired for the manufacture of briquettes and coke, should possess coking qualities, should be practically free from sulphur, and should not contain more than from 5 to 6 per cent of ashes. Fine coal up to 0.6 in. in diameter is preferred. There should be, if possible, 24 semi-monthly shipments of about 5,000 tons each. Offers, with analyses, may be addressed directly to Mr. Revay.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of May 3, that the general tone of the Welsh coal market remains steady and prices for best coals are well maintained. Other sorts are a shade easier, owing to a lack of tonnage in dock: Quotations are: Best Welsh steam coal, \$3.96@ \$4.08; seconds, \$3.78; thirds, \$3.48; dry coals, \$3.30; best Monmouthshire, \$3.42@ \$3.48; seconds, \$3.18; best small steam coal, \$2.28; seconds, \$2.04; other sorts, \$1.92.

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 about unchanged, and a fair amount of business has been done at recent rates. Mediterranean perhaps slightly firmer. Some rates noted from Cardiff are: Algiers, \$1.30; Marseilles, \$1.40; Genoa, \$1.44; Naples, \$1.36; Sabang, \$2.76; Singapore, \$2.76; Las Palmas, \$1.56; St. Vincent, \$1.74; Rio Janeiro, \$3; Santos, \$3.36; Buenos Aires, \$3.24.

IRON TRADE REVIEW.

New York May 15.

The condition of the iron market remains very much the same as a week ago. Work continues on a very large scale, but the current transactions are limited to orders on which early delivery is needed, and on which premiums of varying amounts are paid.

A curious feature of the situation is—and has been for some time past—that steel rails are quoted at from \$4 to \$6 per ton below billets; which is reversing the usual order.

Negotiations for German pig iron and steel billets continue, but few transactions appear to have been closed.

The May reports of the furnaces show that the weekly capacity of the stacks in blast is now 352,250 tons; that is, we are making pig iron at the rate of over 18,500,000 tons a year. The actual output in April exceeded 1,500,000 tons. At the same time unsold stocks on May 1 are given at only 84,000 tons, or a little over 2 days' production.

Birmingham May 12.

(From Our Special Correspondent.)

There is absolutely no iron in the storage yards, while what little iron is to be seen on the furnace yards is waiting only for the hands to load it on cars. The iron is being shipped from the district as rapidly as it is being manufactured. Outsiders and small lot purchasers say that the price is from \$2 to \$3 above the quoted figure, and that orders cannot be filled as promptly as desired.

The following quotations are given: No. 1 foundry, \$12.50; No. 2 foundry, \$12; No. 3 foundry, \$11.50; No. 4 foundry, \$11; gray forge, \$10.50; No. 1 soft, \$12.50; No. 2 soft, \$12. Immediate delivery iron is bringing a premium, but this business is not being sought.

In foundry and machine shop circles much activity is noted. Many of the plants have orders on hand which assure them of steady work for some months to come. The Hardie-Tynes Machine and Foundry Company, has a number of orders on hand for Corliss engines. The East Birmingham Machine and Foundry Company is working on some heavy contracts. The Hood Machine and Foundry Company, the Williamson Iron Company and several other plants doing similar work, have their books well filled with business for the future.

At the steel plant a good quantity of steel is being manufactured. There is abundant business being done at the cast iron pipe industries in this State.

Chicago May 13.

(From Our Special Correspondent.)

Pig Iron.—Prices of pig iron have again advanced, the present quotations being: Northern No. 1, \$22; Northern No. 2, \$21.50; Southern No. 1, \$20@21; Southern No. 2, \$19.50@20.50. This increase, however, does not stop the eager buying of foundrymen. Apparently they agree with furnace proprietors in believing that the prices for pig iron are going steadily toward the \$25 mark, and though grumbling they are paying the price. A notable feature of the situation is the fact that there is no disposition on the part of furnacemen to enforce contracts coming due; the demand is so great, and the bonus offered for spot iron so large that a defaulting foundryman makes money for the creditors who are supplying him with raw material. It is also said that there are foundry proprietors, who are making more money by curtailing as much as possible their trade in castings and disposing of iron that they are now getting at \$14@16, under contracts made months ago. This condition, however, is not general, most of the foundrymen being crowded with orders.

Finished Material.—Contractors for buildings in Chicago and vicinity are complaining of inability to get structural material. The market for local use appears to be sold out to the first of next year, and many projects for buildings in the downtown district, consequent upon the recent removal by the City Council of the ban upon height, will have to wait until 1903 for consummation. Nominally the price is \$34 a ton for structural shapes, and it is claimed that there is no disposition on the part of dealers to increase this figure. Plates are somewhat more obtainable, odd lots bringing \$36@40 a ton for prompt delivery.

Cleveland May 14.

(From Our Special Correspondent.)

Iron Ore.—The shippers of iron ore are finding that the boats which they charter at the head of the lakes are regularly being held up at the unloading ports, and that delays are frequent and often of considerable duration. The exact cause remains an unsettled question with, however, very strong indications that more boats have been chartered up above than the docks here can accommodate. The shippers are extremely anxious to ship 4,000,000 tons down the lakes during May, and to accomplish this end they are taking no chances on leaving the lower lake docks idle. The boats being offered freely and without restrictions as to the length of time required in unloading, charters are made with considerable freedom. There is no disposition manifest upon the part of the shippers to break down the rate. The supply of tonnage makes it almost impossible that there shall be any advance in rates for the time being. The rates are 75c. from Duluth; 65c. from Marquette, and 55c. from Escanaba.

Pig Iron.—Some small lots of Southern foundry No. 2 have been sold here this week at \$20.20 Cleveland, or \$16.50 Birmingham. The foundry grades have about been sold up at least to the end of August, and what small sales are made for deliveries past that date are on the basis of \$22.50 for No. 1 Cleveland. Some small sales of gray forge have been made of late, the dealers about commanding their own prices. Bessemer and basic producers are entirely off of the market, and some jobbers going through the Cleveland market offering \$20 for Bessemer failed to obtain a ton of it.

Finished Material.—Some sales of structural steel have been made in this territory of late entailing deliveries into next year. On these sales a line is being drawn strictly between those who desire to use and those who care to hoard the product, the latter class being refused material. The price holds steady at 1.70c. All of the jobbers who had plate contracts announce now that they have sold up all of the material which they have at their disposition, and have advanced the quotation to 1.80c., which is being willingly paid when any plates are to be obtained. Bars have about been sold up, and the sales are not numerous, nor are the available lots large.

Old Material.—The trade during the week has been active, but the increase in the supply of material has caused a certain weakening of prices, but no break is recorded.

Philadelphia May 15.

(From Our Special Correspondent.)

Pig Iron.—Conditions in pig iron are quieter than a week ago. Apart from some quiet effort to obtain supplies from the South which have not succeeded, nothing of material importance has transpired. Considerable concern is felt, however, over the possibilities of a general strike in the anthracite region and the outcome to the blast furnaces in the eastern and middle sections of the State which depend on anthracite fuel. Quotations may be given at \$21.50 for No. 1 X foundry, \$20@20.50 for No. 2 X, \$19.50@20 for No. 2 plain, \$18@18.50 for standard gray forge, and \$18 for ordinary, \$19.50 for basic.

Billets.—Negotiations continue in regard to foreign billets, but information is scant. Billets are \$34@35 nominally, foreign \$32.50.

Bar Iron.—A restricted production in bar iron has started a few halting buyers to obtain supplies, and quite a business has been done at store and at mills. The prices are very firm at 1.95c. for iron and 1.85c. for steel.

Sheet Iron.—The sheet iron manufacturers, although all loaded up with business, report trade rather quiet. Quotations are 2.20c. for No. 10 and 3.20c. for No. 28.

Plates.—The agitation over advancing prices has had the effect of hurrying a number of urgent buyers to the market. The purpose seems to be to openly advance prices to the actual selling prices which have prevailed for emergency delivery. Information has just been received as to 2 or 3 very large requirements, part of which will be covered East, but the rest will go into Western Pennsylvania. No. 1 charcoal plate is 2½c., No. 1 flange 3c., universals 2c., sheared 2c., flange 2.10c., fire-box 2.15c.

Structural Material.—Owing to the feverish condition in regard to structural material no business of any consequence has been placed.

Old Rails.—Iron rails are \$27 and steel rails \$22; very few to be had.

Scrap.—There is an urgent demand at present for heavy melting steel which commands \$22@22.50. A lot of iron axles brought \$27.50. Cast borings sell at about \$10. No. 2 light forge scrap will bring \$18. Choice railroad scrap is quoted at \$24@25, but there is none changing hands.

Pittsburg May 14.

(From Our Special Correspondent.)

The feature of the iron and steel market this week is a stiff advance in prices of raw material without a corresponding increase in finished products. As a result independent manufacturing concerns that buy steel are being gradually forced to suspend operations and wait for higher prices on finished products or lower rates for raw material. The consumers must also wait until their orders can be filled, and the large interests that are not dependent on the market for material are assured of business extending through the coming year. The steel plate pool has not held a meeting for two months, but is scheduled to meet this week. Some of the interests represented will urge an advance, but it is understood the United States Steel Corporation and Jones & Laughlins, Limited, will continue to oppose an increase. Prices have been stationary for several months, while a number of advances in steel have occurred. Bessemer steel billets have gone up \$2 and \$3 a ton during the week, while open-hearth billets are held at fully \$2 a ton above the highest price asked for bessemer. The scarcity of steel, together with the price, has seriously affected the independent sheet mills. That the plants of the American Sheet Steel Company are benefited is indicated by the announcement this week that some of the works are soon to be operated seven days a week. The combine plants are not short of steel, and most of them carry unusually heavy stocks of sheet bars. The Allegheny Steel and Iron Company, a new independent concern with works at Tarentum, near Pittsburg, will start its second open-hearth furnace in about two weeks. The furnace now operated supplies all the requirements of the sheet plant, and the additional product will be sold.

The price of bessemer pig iron has advanced fully \$1 a ton for quick and future delivery. Gray forge has also advanced, and foundry iron prices are firm. Valley furnace owners have at last received the official notice from the National Association of Blast Furnace Workers and Smelters demanding a three-turn system on June 1 without any reduction in pay. No attention will be paid to the demand, as it is not believed the men will strike to enforce it. The wages now paid are the same that were fixed when bessemer pig iron was sold in the Valleys at \$25 a ton. No reduction was made when prices fell to \$12.50, and manufacturers contend that an increase in wages is not warranted, for while there is no question that the market is in excellent shape, it is no better than at the time the present wage rate was arranged.

The bi-monthly examination of the sales sheets of the Republic Iron and Steel Company made at Youngstown yesterday caused surprise. Under the sliding scale of the Amalgamated Association of Iron, Steel and Tin Workers wages are based on the average selling price of shipments for the previous two months of bar iron. The highest price quoted in November and December was 1.50c., and when the examination was made in January it was shown that the sales averaged that price, and wages were fixed accordingly. The Republic Company advanced the price to 1.60c. in February, but the March settlement showed no change in the average selling price of 1.50c. In March bar iron was advanced to 1.70c., and early last month to 1.80c., but the examination of the actual sales or deliveries during March and April showed an average of 1.50c. This indicates that some large contracts were made last year for extended delivery, as it is impossible to get iron bars for quick delivery at less than 1.80c., Pittsburg, while steel bars continue to be sold at 1.60c. The bi-monthly examination of sheet and tin-plate sales was also made this week, but there will be no change in wages for May and June. The base of the tin-plate scale is \$4.20 a box, but the American Tin-Plate Company continues to sell at \$4 a box. The base of the sheet scale is 3c. for Nos. 26, 27 and 28 gauges, and the average selling price has not exceeded that point.

While no official announcement has been made it is reliably reported that there will be no advance in the price of steel rails for delivery next year. It is likely that orders will soon be placed for 1903 delivery at \$28.

The strike of structural iron workers which began on May 1 was ended yesterday. A demand had been made for 50c. an hour and an eight-hour workday, the scale to be enforced within a radius of 75 miles of Pittsburg. Last year's rate was 40c. an hour. The American Bridge Company offered 47½c. an hour, and increased the radius to 150 miles. The compromise was accepted. All the independent concerns in this district have signed the scale.

Pig Iron.—About 8,000 tons of bessemer pig iron were sold during the week at \$20@21.25, Valley furnaces. One sale of 1,500 tons for third quarter delivery was made at \$21, and one of 1,000 tons at \$21.25, Valley furnaces. The price for earlier delivery would likely be \$22 or higher. Gray forge has advanced to \$19.75, Pittsburg, and about 500 tons were sold. Foundry No. 2 is quoted at \$20.50@22, Pittsburg.

Steel.—There is still a great scarcity and about 600 tons of bessemer steel billets sold at \$34. For quick delivery \$3 is asked. Open-hearth billets are offered at \$38 for early delivery. Tank plate and steel bars remain unchanged at 1.60c. There is no change in prices of structural material, and large orders for next year's delivery continue to be placed.

Sheets.—The demand continues and prices are very firm. The combine plants are operating in full, but the independent mills are only on part time, owing to high prices and scarcity of steel. No. 28 gauge black sheets are still quoted at 3.10@3.15c., and galvanized sheets at 4.47c. in car load lots.

Ferro-manganese.—The market is unchanged, 80 per cent domestic remaining at \$52.50.

New York. May 16.

Pig Iron.—The market is very firm indeed in spite of heavy production. The suspension of anthracite shipments will affect some furnaces. We quote for tidewater delivery No. 1X foundry \$20@22.50; No. 2X, \$19@19.50; No. 2 plain, \$18.50@19.50; gray forge, \$17.75@18.50. For Southern iron on dock, New York, No. 1 foundry, \$19.75@21; No. 2, \$18.50@19.50; No. 3, \$17@18.50.

Bar Iron and Steel.—Demand is strong. We quote 1.70c. for common bars in large lots on dock; refined bars, 1.85@1.95c.; soft steel bars, 1.83c.

Plates.—Prices have advanced. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 2.08@2.10c.; marine, 2.20c.; firebox, 2.30c.; universal, 2.08@2.10c.

Steel Rails.—Sales for 1903 delivery have been closed. Imports of small lots continue. Standard sections are still nominally quoted at \$28 at Eastern mills; light rails at \$30@33, according to weight.

Structural Material.—Demand remains active. We quote for forward delivery on large lots at tidewater as follows: Beams, 1.95@2.15c.; tees, 1.85@2.05c.; angles, 1.80@2.10c.

Cartagena, Spain. April 26.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Prices are unchanged since last report. During the week only one cargo of manganiferous ore, 4,100 tons, has been shipped from this port, and there is not much to report in our local market. Inquiries are brisk both for iron and manganiferous ores, and prices are decidedly firm. Several new contracts have been made for parcels of 10,000 to 20,000 tons for delivery May-September.

Iron Pyrites.—Are in good demand for Italy, and sales have been made at an increase of 50 centimes on the f. o. b. price. Rates of freight continue favorable to shippers. Exports have been 1,200 tons pyrites to Genoa.

CHEMICALS AND MINERALS.

New York. May 16.

Heavy Chemicals.—More doing in forward contracts for domestic alkali up to end of 1903, and for domestic caustic soda well into 1904. Prices little changed. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 80@80 1/2c. for prompt shipment, and 75@77 1/2c. for forward; caustic soda, high-test, \$1.90@1.92 1/2 for early delivery, and \$1.85@1.87 1/2 for futures; bicarb. soda, ordinary, \$1, and extra, \$3; sal soda, 55c.; chlorate of potash, \$8@8 1/4 for prompt, and \$7.75 for shipping contracts. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 90@92 1/2c.; caustic soda, high-test, \$2.25; sal soda, 65@67 1/2c.; chlorate of potash, \$10 1/4@10 3/4; bleaching powder, \$1.55@1.87 1/2, according to test and seller.

Acids.—There is a little better demand, and prices are firm. Blue vitriol sold at \$4.75 per 100 lbs., but purchases can now be made at quotations below. In fact, sales for export have been made at somewhat less.

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

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.....13.50@15.50
Muriatic, 20 deg.....	1.62 1/2	Sulphuric, 60 deg.....	1.00
Muriatic, 22 deg.....	1.75	Sulphuric, 60 deg.,	bulk.....18.00@20.00
Nitric, 36 deg.....	4.00	Sulphuric, 66 deg.....	1.20
Nitric, 38 deg.....	4.25	Sulphuric, 66 deg.,	bulk.....21.00@23.00
Nitric, 40 deg.....	4.25		
Nitric, 42 deg.....	4.87 1/2		

Brimstone.—Sales of best unmixed seconds from store have been made at \$23.25@23.50 per ton. Shipments are quoted at \$22.50. Best thirds are worth \$2.50 per ton less than seconds.

Pyrites.—Business is regular at stationary prices. 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.—Gas liquor is in moderate request, and sales of 24@25 per cent quality are noted at \$3.07 1/2 per 100 lbs. for immediate delivery, and \$3.02 1/2@3.05 for future shipment. At the close, however, prices are easier, and purchases can doubtless be made on spot at \$3.05, and for shipment at \$3.00@3.02 1/2.

Nitrate of Soda.—Market is very quiet, owing to unfavorable advices from Europe. Ex-store goods are held at \$2.20 per 100 lbs., while the Whitgrift cargo of 52,000 bags is offered ex-dock at Philadelphia at \$2.07 1/2. Futures are still quoted at \$1.97 1/2 at all ports for delivery to the end of this year. Cargoes due this month are the *Coya* with 15,000 bags, and the *Britannia*, 25,000 bags. In June expected arrivals are the *Elleric*, with 37,000 bags, and *Cuzco*, 22,000 bags, while in July 7 cargoes are looked for, aggregating 202,000 bags.

In Europe the situation is not encouraging, as the failure of C. Wehrhahn & Co., of Valparaiso and Hamburg, a prominent concern in the trade, has caused further depression in the market. It is claimed that they carried over 100,000 tons of nitrate, which is now being disposed of by a syndicate.

Present spot prices in Hamburg, Germany, are equivalent to \$41.17 per ton, or about \$9.75 less than the high point touched only a short time ago.

With regard to the operations of the industry it is interesting to note that good dividends are being paid by British companies from last year's earnings. The New Paccha & Jazpampa Nitrate Company pays 10 per cent on its issued ordinary shares, and 8 per cent on the preferred; the Salar del Carmen, 10 per cent; Lagunas Syndicate, 10 per cent; Lagunas Nitrate Company, 5 per cent; Liverpool, 7 1/2 per cent; Alianza, 6 per cent; Colorado, 2 1/2 per cent; San Donato, 2 1/2 per cent, and the Nitrate Railways Company, 3 per cent on the ordinary and preferred converted shares.

Phosphates.—Statistics for April show larger exports than any month this year. The exports of Florida high-grade rock from Savannah in April were 20,025 tons, making a total for the four months of 47,064 tons, against 54,979 tons last year; a decrease of 7,915 tons. The movement from Fernandina in April aggregated 22,165 tons, the largest month since last September. In the 4 months ending April 30 the exports totaled 61,025 tons, against 51,879 tons in the same time last year; showing an increase of 9,146 tons.

Shipments of phosphate rock from Mt. Pleasant, Tenn., in the quarter ending March 31, are reported as below, comparison being made with the corresponding period of last year, in tons:

	1901.	1902.	Changes.
Domestic	69,349	67,613	D. 1,736
Exports	37,651	26,273	D. 11,378
Total	107,000	93,886	D. 13,114

The decrease this year is equal to fully 12 per cent, and is attributed chiefly to the shortage in the car supply at mines during the months of January and February.

In April the exports of Tennessee rock from Pensacola amounted to 15,769 tons, against 16,158 tons last year; showing a decrease of 389 tons. It is noteworthy, however, that the April exports were the largest of any month this year.

We quote phosphate prices below:

Phosphates.	Per ton F. o. b.	C. I. f. Un. Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (17@80%)..	\$6.50@7.00	6 1/4@6 1/2 d.	\$9.75@10.53
*Fla. land pb. (68@73%)..	3.00@3.25	4 1/2@5 d.	6.65@ 7.00
*Fla. Peace Riv. (58@63%)..	2.25@2.50	4 1/2@5 d.	5.70@ 6.00
†Tenn., (78@80%) export...	3.75	5 1/2@6 d.	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	4 1/2@5 d.	5.67@ 6.30
†So. Car. river rock.....	2.75@3.00	.....	.....
Algerian (63@68%) .....	.....	5 1/4@6 1/2 d.	7.48@ 8.45
Algerian (58@63%).....	.....	5 1/4@6 d.	6.30@ 7.20
Algerian (53@58%) .....	.....	5 @5 1/2 d.	5.50@ 5.78

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

Liverpool. April 30.

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

The export demand for the ordinary lines of heavy chemicals is still very quiet and there is nothing of interest to report. Soda ash, we quote spot range for tierces about as follows: Leblanc ash, 48 per cent., £5 15s.@£6; 58 per cent., £6 2s. 6d.@£6 7s. 6d. per ton, net cash; Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash, bags, 5s. per ton under price for tierces. Soda crystals are steady at generally £3 7s. 6d. per ton, less 5 per cent for barrels; or 7s. less for bags, with special terms for certain export quarters. Caustic soda prices are well maintained, as follows: 60 per

cent, £8 15s; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Bleaching powder is dull at £6 15s.@£6 17s. 6d. per ton net cash for hardwood; with special terms for Continental and a few other export quarters.

Sulphate of ammonia is strong and dearer at £12 11s. 3d.@£12 13s. 9d. per ton, less 2 1/2 per cent for good gray 24@25 per cent in double bags f. o. b. here, and there is little offering.

Nitrate of soda for immediate delivery is quoted at £10 5s.@£10 10s. per ton, less 2 1/2 per cent for double bags f. o. b. here, but tendency is downwards and for May delivery 5s.@7s. 6d. under figures named would be accepted.

The report of the Castner-Kellner Alkali Company for the 12 months ending March 31 last has just been issued, showing a net profit of £68,319. The directors recommend that £15,000 be placed to depreciation reserve, in addition to writing off £11,000 standing to suspense account, and propose paying a dividend for the last 6 months on the ordinary stock at the rate of 8 per cent per annum, making with the interim dividend paid in November last 6 per cent for the whole year and carrying forward a balance of about £6,600. This is considered by the trade to be very satisfactory.

METAL MARKET.

New York. May 15.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in April and Year.

Metal	April.		Year.	
	1901.	1902.	1901.	1902.
Gold.				
Exports....	\$4,916,965	\$2,844,204	\$14,045,205	\$18,167,347
Imports....	2,249,038	1,864,767	15,894,393	7,563,567
Excess. E.	\$2,667,927	E. \$979,437	E. \$8,150,812	E. \$10,603,840
Silver.				
Exports....	\$4,959,047	\$3,739,900	\$19,478,721	\$15,502,253
Imports....	2,370,114	2,051,251	10,455,207	8,490,730
Excess. E.	\$2,588,933	E. \$1,688,649	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 15 and for years from January 1, 1902, 1901 and 1900:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$11,900	\$5,547	\$477,670	\$3,475 E.	\$480,548
1902.....	16,455,001	1,044,869	11,619,277	474,448 E.	20,554,961
1901.....	18,122,994	1,064,138	13,494,915	1,552,561 E.	29,971,210
1900.....	12,915,072	1,351,669	14,978,454	1,720,341 E.	24,821,516

Exports of gold this week were to the West Indies; of silver, to London. Imports were from Central America and the West Indies.

Financial Notes of the Week.

General business continues active and with little change in conditions. Reports of crop conditions are fairly favorable so far, in spite of rumors to the contrary. Money is somewhat easier; it is reported that this is due to large loans placed in New York by bankers in London and Paris.

Exports of merchandise from the United States in April were valued by the Bureau of Statistics of the Treasury Department at \$109,170,974; showing an increase of \$2,421,387 over March, but a decrease of \$11,583,216 from April, 1901. For the 10 months of the fiscal year, from July 1 to April 30, the statement is as follows:

	1901.	1902.
Exports	\$1,260,422,817	\$1,190,158,674
Imports	676,124,805	754,517,725
Excess, exports	584,298,012	\$435,640,949
Excess of exports, silver.....		18,213,252
Total		\$453,854,201
Deduct excess of imports, gold.....		228,726
Apparent balance		\$453,625,475

The gold and silver movement in detail will be found at the head of this column.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending May 10 gives the following totals,

comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts	\$787,452,100	\$897,716,900	\$901,938,000
Deposits	567,246,300	977,490,900	960,235,600
Circulation	21,308,100	31,081,100	31,229,600
Specie	168,790,700	179,760,700	170,490,400
Legal tenders	68,333,600	72,739,500	73,029,500
Total reserve	\$232,144,300	\$252,500,200	\$243,519,900
Legal requirements	216,811,575	244,372,725	240,058,900
Balance surplus	\$15,332,725	\$8,127,475	\$3,461,000

Changes for the week, this year, were an increase of \$180,300 in circulation; decreases of \$2,224,500 in loans and discounts, \$7,954,000 in deposits, \$3,390,000 in specie, \$2,651,500 in legal tenders, and \$4,023,000 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1901		1902	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.	\$179,760,700	.....	\$170,490,400	.....
England	177,370,790	.....	178,841,950	.....
France	482,095,220	\$220,940,345	514,086,595	\$222,194,070
Germany	157,450,000	72,400,000	186,670,000	69,050,000
Spain	70,010,000	83,065,000	70,520,000	92,515,000
Neth'lds	25,287,500	28,872,000	23,910,000	32,890,500
Belgium	15,255,000	7,630,000	16,090,000	8,045,000
Italy	76,080,000	9,623,500	80,740,000	10,777,500
Russia	355,960,000	36,500,000	368,930,000	42,160,000

The returns of the Associated Banks of New York are of date May 10, and the others May 8, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports only gold.

The low price of silver has brought out orders, which, though limited, have had the effect of staying the panicky feeling that prevailed about April 21. While no great advance is in sight the feeling for the present is rather better.

The United States Assay Office in New York reports receipts of 29,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to May 1 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£2,812,210	£2,741,585	D. £70,625
China	314,125	16,500	D. 297,625
The Straits	79,976	250	D. 79,726
Totals	£3,206,311	£2,758,335	D. £447,976

Arrivals for the week, this year, were £118,000 in bar silver from New York, and £8,000 from Australia; total, £126,000. Shipments were £91,000 in bar silver to Bombay, and £85,000 to Calcutta; total, £176,000.

Indian exchange has been weaker and the amount of Council bills sold in London was only 21 lakhs of rupees. More were applied for, but all applications at less than 15.94d. per rupee were rejected. There was only a moderate demand for silver on Indian account.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$0.41	\$0.44
Peruvian soles and Chilean pesos	.37	.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				
	Sterling Exchange	N. Y. Cts.	Lake Pence.	Electrolytic per lb.	London per ton.	Lead per lb.	N. Y. Cts.	St. L. Cts.	
9 4.87¾	51	28½	12	11½	59¾	30	4.05	4.32½	4.12½
10 4.87¾	50¾	23½	12	11½	59¾	30	4.05	4.32½	4.12½
12 4.87¾	51¾	23½	12	11½	59¾	30	4.05	4.32½	4.12½
13 4.86¾	51¾	23¾	12	11¾	54¾	30	4.05	4.35	4.15
14 4.86¾	51¾	23¾	12	11¾	54¾	30	4.05	4.35	4.15
15 4.86¾	51¾	23¾	12	11¾	54¾	30	4.05	4.35	4.15

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 is very firm. Manufacturers in this country are very busy, and abroad business is improving. It is reported that a number of the large producers have sold their product for the near future, and it is believed that buyers have

not yet filled their entire requirements. Prices have improved somewhat, and we quote Lake copper at 12½@12¼c.; electrolytic in cakes, wire-bars and ingots at 11¾@11½c.; in cathodes at 11½@11¼c.; casting copper at 11½@11¼c.

The London market for speculative sorts has advanced steadily during the week under review, in all about £1. It closed on the 9th instant at £53 10s. for spot and futures, and on the 15th at £54 10s. for both deliveries.

Refined and manufactured sorts we quote: English tough, £56@£56 10s.; best selected, £56@£56 10s.; strong sheets, £69; India sheets, £66; yellow metal, 6¼d.

Exports of copper from New York and Baltimore in the week ending May 14, are reported by our special correspondents as follows: To Great Britain, 1,054 tons; Germany, 675; Holland, 600; France, 300; Austria, 515; Italy, 209; Russia, 260; Belgium, 3; Australia, 44; total, 3,660 tons. Also, 210 tons matte to Great Britain. Imports were 1,002 tons copper from London, and 328 tons from Mexico.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the producing companies, was as follows for April and the four months ending April 30, stated in long tons (2,240 lbs.), of fine copper:

	April.		4 months.	
	1901.	1902.	1901.	1902.
U. S., reporting mines	15,038	20,824	75,001	73,245
U. S., outside sources	3,400	3,800	13,600	14,700
Total, U. S.	21,438	24,624	88,601	87,945
Foreign, reporting mines	8,810	10,169	29,869	34,990
Totals	30,248	34,793	118,470	122,935
Exports, U. S.	4,849	16,424	28,123	67,656

The United States production shows an increase of 589 tons over March, and of 3,186 tons over April, 1901. For the four months there was a small decrease this year, 656 tons. The foreign reporting mines show the large gains of 1,359 tons for April and of 5,121 tons for the four months. The United States exports for the month were less than in March by 3,673 tons, but were still very large.

Tin.—A fair business has been done at the higher prices. The scarcity of spot metal continues, and the arrivals for the balance of the month are not heavy. It is believed that in consequence of the higher prices, buyers have been deferring purchases which will have to be made later in the month. Opinions differ as to the position of the article. On the one hand it is thought that present prices are due to manipulative influences in London, and, on the other, that the production at the Straits has decreased. It appears to us that both factors are involved. At the close we quote spot tin at 30¾c., May at 30c., June at 29½c.

The foreign market, which closed last Friday at £135 for spot, £131 15s. for three months, opened on Monday at £136 for spot, £133 for three months. On Tuesday it was 15s. higher; on Wednesday it was quoted £136 5s. for spot, £132 10s. for three months, and it closed on Thursday at £136 7s. 6d. for spot, £132 5s. for three months.

Lead.—A good business has been done at last prices. We quote 3.97½@4.05c. St. Louis, 4.05@4.10c. New York.

The foreign market is slightly higher, Spanish lead being quoted at £11 12s. 6d@£11 15s., English lead at £11 16s. 3d@£11 18s. 9d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is firm at 3.97½c. for Missouri metal and 4.05c. for desilvered.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of April 26: The price of silver during the week has been 13 reales per ounce. The exchange has gone down by 2c. making it 34.33 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 11s. 6d. per ton of 2,240 lbs. f. o. b. Cartagena. Exports of pig lead have been 347,836 kgs. to Marseilles. Other exports have been 1,157 kgs. silver bars to Marseilles.

Spelter.—The market remains dull. Consumers are not buying at the moment. We quote St. Louis 4.15c, New York 4.35c.

The foreign market is a little higher, good ordinaries being quoted at £18 10s., specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is strong at 4.17½c, with more buyers than sellers.

Silesian Spelter Market.—Herr Paul Speier reports from Breslau under date of April 29, that the tendency of prices is firmer. There is a better feeling among producers, and consumption is beginning to draw upon the accumulated stocks. Quotations are 17.60 to 17.80 marks per 50 kgs., f. o. b. cars Breslau, which is equivalent to an average of 3.82c. per pound. For the first quarter of the year the average price realized at works was 16.35 marks per 50 kgs.—3.53c. per pound. Zinc sheets have been in good de-

mand. There is also a better sale for zinc dust, and prices are improving. The exports and imports in Germany for the three months ending March 31 are reported as follows, in metric tons:

	Exports		Imports	
	1901.	1902.	1901.	1902.
Spelter	17,405	20,083	7,388	9,843
Zinc sheets	6,051	8,024	39	64
Scrap zinc	766	899	364	421
Zinc white, etc.	5,441	7,785	1,755	1,404
Lithopone	2,698	3,736	1	25
Zinc ore	19,145	30,982	31,474	30,033

Zinc dust and zinc dross are included under the head of zinc white in the reports.

Antimony.—We quote Cookson's, at 9¼@10c., Hall's 8¼c., Hungarian, Italian, Japanese and U. S. Star at 8c.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

A cargo of 1,641 tons nickel ore from New Caledonia was received at Baltimore last week.

Platinum.—Consumption continues good. Ingot platinum in large lots brings \$19.50 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Quicksilver.—The New York price is \$48 per flask for large lots, with a slightly higher figure asked for small orders. In San Francisco quotations are easier, \$46@46.50 being named for domestic orders, with \$43 quoted for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb.	Per lb.
No. 1, 99% ingots	33@37c.	Ferro-Tungsten (37%)
No. 2, 90% ingots	31@34c.	Magnesium
Rolled sheets	4c. up	Manganese (over 90%)
Alum-bronze	20@22c.	Mangan' Cop. (20% Mn)
Nickel-alum	33@36c.	Mangan' Cop. (30% Mn)
Bismuth	1.50	Molybdenum (Best)
Chromium (over 90%)	1.00	Phosphorus
Copper, red oxide	50c.	American
Ferro-Molyb'dum (50%)	1.25	Sodium metal
Ferro-Titanium (10%)	90c.	Tungsten (Best)
Ferro-Titanium (20%)	1.10	

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

Our London correspondent reports that the current price of tungsten powder (best), 96 to 98 per cent, delivered Sheffield or f. o. b. Liverpool, is 1s. 5½d. (35c.) per pound.

Average Prices of Metals per lb., New York.

	Tin.		Lead.		Spelter.	
	1902.	1901.	1902.	1901.	1902.	1901.
January	23.54	26.51	4.000	4.350	4.27	4.13
February	24.07	26.68	4.075	4.350	4.15	4.01
March	26.32	26.03	4.075	4.350	4.28	3.91
April	27.77	25.93	4.075	4.350	4.37	3.98
May	27.12	27.12	4.350	4.350	4.04	4.04
June	28.60	28.60	4.350	4.350	3.90	3.90
July	27.85	27.85	4.350	4.350	3.90	3.90
August	26.73	26.73	4.350	4.350	4.08	4.08
September	26.62	26.62	4.350	4.350	4.23	4.23
October	26.67	26.67	4.350	4.350	4.29	4.29
November	24.36	24.36	4.153	4.153	4.31	4.31
December	24.36	24.36	4.153	4.153	4.31	4.31
Year	26.54	26.54	4.334	4.334	4.08	4.08

Average Prices of Copper.

Month.	New York		London	
	Electrolytic.	Lake.	Standard.	1901.
January	11.053	16.25	11.322	16.77
February	12.173	16.38	12.378	16.90
March	11.882	16.42	12.188	16.94
April	11.618	16.43	11.986	16.94
May	16.41	16.41	16.94	16.94
June	16.38	16.38	16.90	16.90
July	16.31	16.31	16.61	16.61
August	16.25	16.25	16.50	16.50
September	16.25	16.25	16.54	16.54
October	16.25	16.25	16.60	16.60
November	16.224	16.224	16.33	16.33
December	13.845	13.845	14.36	14.36
Year	16.117	16.117	16.53	16.53

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1902.		1901.		1900.
	London.	N. Y.	London.	N. Y.	
January	25.62	55.56	28.97	62.82	59.36
February	25.41	55.09	28.13	61.06	59.76
March	25.00	54.23	27.04	60.63	59.81
April	24.34	52.72	27.30	59.29	59.59
May	27.43	59.64	27.56	59.90	59.90
June	27.42	59.57	27.51	60.42	60.42
July	26.96	58.40	28.23	61.25	61.25
August	26.94	58.37	28.13	61.14	61.14
September	26.95	58.26	28.85	62.63	62.63
October	26.62	57.59	29.58	63.83	63.83
November	26.12	56.64	29.66	64.04	64.04
December	25.46	55.10	29.68	64.14	64.14
Year	27.11	58.95	28.27	61.33	61.33

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

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices from May 8 to May 14.

*Per cent.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations for New York, listing companies and their prices from May 8 to May 14.

Total sales, 461,532 shares. * Ex-dividend.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, PA, listing companies and their prices from May 8 to May 14.

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 7,274 shares. †Ex-privileges.

MEXICO.

May 3.

Table of stock quotations for Mexico, listing companies and their prices from May 3.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies and their prices from May 8 to May 14.

Official Quotations Boston Stock Exchange. Total sales, 154,667 shares. †Ex-dividend

ST. LOUIS, MO.*

May 12.

Table of stock quotations for St. Louis, MO, listing companies and their prices from May 12.

*From our Special Correspondent.

SPOKANE, WASH.*

May 9.

Table of stock quotations for Spokane, Wash., listing companies and their prices from May 9.

Total sales 70,500 shares. * Reported by Hunner & Harris.

SALT LAKE CITY.*

May 10.

Table of stock quotations for Salt Lake City, listing companies and their prices from May 10.

*By our Special Correspondent. Total number of shares sold, 306,259.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices for various dates (May 5-10), and sales volume.

Total sales 510,691 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph), listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices for various dates (May 8-14), and sales volume.

MONTREAL, CANADA.

May 12.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, Can. Gold Fields, etc., with columns for par value, high/low prices, and sales volume.

LONDON.

May 3.

Table of stock quotations for London, listing companies like Anaconda, c. s., Montana, Copiapo, c. Chile, etc., with columns for authorized capital, par value, last dividend, and quotations (buyers/sellers).

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-dividend.

PARIS.

Apr. 24.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Huta-Bank, Anzin, etc., with columns for country, product, capital stock, par value, latest dividends, and prices (opening/closing).

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, Olive, British Columbia, Cariboo MCK, etc., with columns for par value, high/low prices, and sales volume.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasives—		Cust. Meas.	Price.	Barium—		Cust. Meas.	Price	Graphite—Am. f.o.b. Provi-		Cust. Meas.	Price	Paints and Colors—		Cust. Meas.	Price
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.02 $\frac{1}{2}$	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	Barytes—				German, som. pulv.	lb.		.01 $\frac{1}{4}$ @.01 $\frac{1}{2}$	Ocher, Am. common	"		9.25@10.00
Chester, Mass.			.04 $\frac{1}{2}$ @.05	Am. Crude, No. 1	sh. ton		9.00	Best pulverized	"		.01 $\frac{1}{4}$ @.02	Best	"		21.25@25.00
Barry's Bay, Ont.			.07 $\frac{1}{2}$ @.09 $\frac{1}{2}$	Crude, No. 2	"		8.00	Ceylon, common pulv.	"		.02 $\frac{1}{4}$ @.03 $\frac{1}{2}$	Dutch, washed	lb.		.04 $\frac{1}{2}$
Crushed Steel, f.o.b. Pittsburg	"		.05 $\frac{1}{2}$	Crude, No. 3	"		7.75	Best pulverized	"		.04@.08	French, washed	"		.01 $\frac{1}{4}$ @.01 $\frac{1}{2}$
Emery, Turkish flour, in kegs	"		.03 $\frac{1}{2}$	German, gray	"		14.50	Italian, pulv.	"		.01 $\frac{1}{4}$	Orange mineral, Am	"		.07 $\frac{1}{2}$ @.08 $\frac{1}{2}$
Grains, in kegs	"		.05@.05 $\frac{1}{2}$	Snow white	"		17.00	Gypsum—Ground	sh. ton		8.00@8.50	Foreign, as to make	"		.08 $\frac{1}{2}$ @.11 $\frac{1}{4}$
Naxos flour, in kegs	"		.03 $\frac{1}{2}$	Bauxite—Ga. or Ala. mines:				Fertilizer	"		7.00	Paris green, pure, bulk	"		.12@.12 $\frac{1}{2}$
Grains, in kegs	"		.05@.05 $\frac{1}{2}$	First grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.05 $\frac{1}{2}$ @.05 $\frac{3}{4}$
Chester flour, in kegs	"		.03 $\frac{1}{2}$	Second grade	"		4.75	English and French	"		14.00@16.00	Foreign	"		.06 $\frac{1}{2}$ @.08
Grains, in kegs	"		.05@.05 $\frac{1}{2}$	Bismuth—Subnitrate	lb.		1.40	Infusorial Earth—Ground				Turpentine, spirits	gal.		.40 $\frac{1}{2}$
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01 $\frac{1}{2}$	Subcarbonate	"		1.65	American, best	"		20.00	White lead, Am., dry	lb.		.04 $\frac{1}{2}$ @.04 $\frac{1}{4}$
Grains, in kegs	"		.02 $\frac{1}{2}$	Bitumen—"B"	"		.03 $\frac{1}{2}$	French	"		37.50	American, in oil	"		.05 $\frac{1}{2}$ @.05 $\frac{3}{4}$
Crude, ex-ship N. Y.; Ab bott (Turkey)	lg. ton		26.50@30.00	"A"	"		.05	German	"		40.00	Foreign, in oil	"		.07 $\frac{1}{2}$ @.09 $\frac{1}{4}$
Kuluk (Turkey)	"		22.00@24.00	Bone Ash	"		.02 $\frac{1}{4}$ @.02 $\frac{1}{2}$	Iodine—Crude	100 lbs		2.45	Zinc, white, Am., ex dry	"		.04 $\frac{1}{2}$ @.04 $\frac{1}{4}$
Naxos (Greek) h. gr	"		.26.00	Borax	"		.07 $\frac{1}{4}$ @.07 $\frac{1}{2}$	True	"		.04	American, red seal	"		.06 $\frac{1}{2}$
Garnet, as per quality	sh. ton		25.00@35.00	Bromine	"		.40	Oxide, pure copperas col.	"		.05@.10	Green seal	"		.07
Pumice Stone, Am. powd.	lb.		.01 $\frac{1}{2}$ @.02	Cadmium—Metallic	"		1.40	Purple-brown	"		.02	Foreign, red seal, dry	"		.05 $\frac{1}{2}$ @.06 $\frac{1}{2}$
Italian, powdered	"		.01 $\frac{1}{2}$	Sulphate	100 lbs.		2.00@2.50	Venetian red	"		.01@.01 $\frac{1}{2}$	Green seal, dry	"		.06 $\frac{1}{2}$ @.08 $\frac{1}{2}$
Lump, per quality	"		.04@.40	Calcium—Acetate, gray	"		1.30	Scale	"		.01@.03	Potash—			
Rottenstone, ground	"		.02 $\frac{1}{2}$ @.04 $\frac{1}{2}$	"brown"	"		.90	Kaolin—(See Clay, China.)				Caustic, ordinary	"		.04 $\frac{1}{2}$ @.06
Lump, per quality	"		.06@.20	Carbide, ton lots f.o.b. Niagara Falls, N. Y., or Jersey City, N. J.	sh. ton		75.00	Kryolith—(See Cryolite.)				Elect. (90%)	"		.06 $\frac{1}{2}$
Rouge, per quality	"		.10@.30	Carbonate, ppt.	lb.		.05	Lead—Acetate, white	"		.07 $\frac{1}{4}$ @.08	Potassium—			
Steel Emery, f.o.b. Pittsburg	"		.07	Chloride	sh. ton		9.00@10.00	Brown	"		.06	Bicarbonate, cryst.	"		.03 $\frac{1}{4}$
Acids—				Cement—				Nitrate, com'l.	"		.06 $\frac{1}{2}$	Powdered or gran.	"		.14
Boracic, crystals	"		.10 $\frac{1}{4}$ @.11	Portland, Am., 400 lbs.	bb. l.		1.70@1.90	"gran.	"		.08 $\frac{1}{4}$	Bichromate, Am.	"		.08 $\frac{1}{2}$ @.08 $\frac{3}{4}$
Powdered	"		.11 $\frac{1}{4}$ @.11 $\frac{1}{2}$	Foreign	"		1.65@2.25	Lime—Com., abt. 250 lbs.	bb. l.		.80	Scotch	"		.08 $\frac{1}{2}$ @.09
Carbonic, liquid gas	"		.12 $\frac{1}{2}$	"Rosendale," 300 lbs.	"		.75	Finishing	"		.90	Carbonate, hydrated	"		.04@.04 $\frac{1}{4}$
Chromic, crude	"		.20	Slag cement, imported	"		1.65	Magnesite—Greece.				Calcined	"		.03 $\frac{1}{2}$ @.03 $\frac{3}{4}$
Hydrofluoric, 36%	"		.05	Ceresine—				Crude (95%)	lg. ton		6.50@7.00	Chromate	"		.35
48%	"		.05	Orange and Yellow	lb.		.12	Calcined	sh. ton		14.00@15.00	Cyanide (98@99%)	lg. ton		9.05
60%	"		.11	White	"		.13 $\frac{1}{2}$	Bricks	M		170.00	Kainit	"		.66
Sulphurous, liquid anhy.	"		.05	Chalk—Lump, bulk	sh. ton		2.50	Am. Bricks, f.o.b. Pittsburg	"		175.00	Manure salt, 20%	100 lbs.		1.12
Alcohol—Grain	gal.		2.45	Ppt. per quality	lb.		.03 $\frac{1}{2}$ @.06	Magnesium—				Double Manure salt, 48@53%	"		1.83
Refined wood, 95@97%	"		.60@.65	Chlorine—Liquid	"		.30	Carbonate, light, fine pd.	lb.		.05	Muriate, 80@85%	"		1.86
Purified	"		1.20@1.50	Water	"		.10	Blocks	"		.07@.09	95%	"		1.86
Alum—Lump	100 lbs.		1.75	Chrome Ore—				Chloride, com'l.	"		.01 $\frac{1}{4}$	Permanganate	lb.		.09 $\frac{1}{4}$ @.10 $\frac{1}{4}$
Ground	"		1.80	(50% ch.) ex-ship N. Y.	lg. ton		24.75	Fused	"		.20	Prussiate, yellow	lg. ton		.13 $\frac{1}{2}$ @.14
Powdered	"		3.00	Sand, f.o.b. Baltimore	"		33.00	Nitrate	"		.60	Red	"		.36
Chrome, com'l.	"		2.75@3.00	Bricks, f.o.b. Pittsburg	M		175.00	Sulphate	100 lbs.		.75@.95	Sulphate, 90%	100 lbs.		2.11
Aluminum—				Clay, China—Am. com., ex-dock, N. Y.	lg. ton		8.00	Manganese—Powdered,				96%	"		2.14
Nitrate	lb.		1.50	Am. best, ex-dock, N. Y.	"		9.00	70@75% binoxide	lb.		.01 $\frac{1}{4}$ @.01 $\frac{1}{2}$	Sylvinit—(See Silica).	unit		.39 $\frac{1}{4}$
Oxide, com'l. common	"		.06 $\frac{1}{2}$	English, common	"		12.00	Crude, pow'd.	"			Quartz—			
Best	"		.20	Best grade	"		17.00	75@85% binoxide	"		.01 $\frac{1}{4}$ @.02 $\frac{1}{4}$	N. Y. com. fine	sh. ton		2.00
Pure	"		.80	Fire Clay, ordinary	sh. ton		4.25	85@90% binoxide	"		.02 $\frac{1}{4}$ @.03 $\frac{1}{4}$	N. Y. agricultural	"		1.50
Hydrated	100 lbs.		2.60	Slip Clay	"		5.00	90@95% binoxide	"		.03 $\frac{1}{4}$ @.05 $\frac{1}{4}$	Saltpetre—Crude	100 lbs.		3.20@3.37 $\frac{1}{2}$
Sulphate, pure	"		1.50@2.00	Coal Tar Pitch	gal.		.08	Carbonate	"		.16@.20	Refined	"		4.25@4.62 $\frac{1}{2}$
Com'l.	"		1.15@1.25	Cobalt—Carbonate	lb.		1.75	Chloride	"		.04	Silica—Best foreign	lg. ton		10.00@11.00
Ammonia—				Nitrate	"		1.50	Domestic	"		.30	Ground quartz, ord.	sh. ton		6.00@8.00
Aqua, 16°	lb.		.08	Oxide—Black	"		2.26@2.30	Ore, 50%, Foreign	unit		.20@.21	Best	"		12.00@13.00
18°	"		.03 $\frac{1}{4}$	Gray	"		2.28@2.40	Best	"		.20	Lump quartz	"		2.50@4.00
20°	"		.03 $\frac{1}{4}$	Small, blue ordinary	"		.20	Marble—Flour	sh. ton		6.00@7.00	Glass sand	"		2.75
26°	"		.05 $\frac{1}{2}$	Best	"		.20	Mercury—Bichloride	lb.		.77	Silver—Chloride	oz.		65
Ammonium—				Copperas	100 lbs.		.30@.35	Mica—N. Y. gr'nd, coarse				Nitrate	"		35
Carbonate, lump	"		.08 $\frac{1}{4}$ @.08 $\frac{1}{2}$	Chloride	lb.		.18@.19	Fine	"		.04@.05	Oxide	"		85@1.10
Powdered	"		.09@.09 $\frac{1}{2}$	Nitrate, crystals	"		.35	Sheets, N. C. 2x4 in.	"		.30	Sodium—			
Muriate, grain	"		.05 $\frac{1}{2}$	Oxide, com'l.	"		.19	3x3 in.	"		.80	Bichromate	lb.		.08 $\frac{1}{4}$
Lump	"		.08 $\frac{1}{4}$	Cryolite	"		.06 $\frac{1}{4}$	3x4 in.	"		1.50	Chlorate, com'l.	"		.07 $\frac{1}{2}$ @.08 $\frac{1}{2}$
Nitrate, white, pure (99%)	"		.12	Explosives—				4x4 in.	"		2.00	Hyposulphite, Am.	100 lbs.		1.00@1.65
Phosphate, com'l.	"		.09	Blasting powder, A	25 lb. keg		2.65	6x6 in.	"		3.00	German	"		1.70@1.90
Pure	"		.12	Blasting powder, B	"		1.40	Mineral Wool—				Peroxide	lb.		.45
Antimony—Glass	"		.30@.40	"Rackarock," A	lb.		.25	Slag, ordinary	sh. ton		19.00	Phosphate	"		.02 $\frac{1}{4}$ @.03
Needle, lump	"		.05 $\frac{1}{2}$ @.06	"Rackarock," B	"		.18	Selected	"		25.00	Prussiate	"		.10 $\frac{1}{2}$ @.11
Powdered, ordinary	"		.05 $\frac{1}{4}$ @.07 $\frac{1}{4}$	Judson E. R. powder	"		.10	Rock, ordinary	"		32.00	Silicate, conc.	"		.05
Oxide, com'l white, 95%	"		.09 $\frac{1}{2}$	Dynamite (20% nitro-glycerine)	"		.13	Selected	"		40.00	Com'l.	"		.01
Com'l white, 99%	"		.12	(30% nitro-glycerine)	"		.14	Nickel—Oxide, No. 1	lb.		1.00	Sulphate, com'l.	100 lb.		.77 $\frac{1}{2}$
Com'l gray	"		.07	(40% nitro-glycerine)	"		.15	No. 2	"		.60	Sulphide	lb.		.01 $\frac{1}{2}$
Sulphuret com'l.	"		.16	(50% nitro-glycerine)	"		.16 $\frac{1}{2}$	Sulphate	"		.20@.21	Sulphite crystals	"		.02 $\frac{1}{2}$
Arsenic—White	"		.08 $\frac{1}{4}$ @.08 $\frac{3}{4}$	(60% nitro-glycerine)	"		.18	Oils—Black, reduced 29 gr:				Sulphur—Roll	100 lbs.		1.85
Red	"		.06 $\frac{1}{4}$ @.07	(75% nitro-glycerine)	"		.21	25@30, cold test	gal.		.09 $\frac{1}{4}$ @.10 $\frac{1}{4}$	Flour	"		1.90
Asphaltum—				Glycerine for nitro (32 2-10° Be.)	"		.12 $\frac{1}{2}$ @.13	15, cold test	"		.10 $\frac{1}{4}$ @.11 $\frac{1}{4}$	Flowers, sublimed	"		2.15
Ventura, Cal.	sh. ton		32.00	Feldspar—Ground	sh. ton		8.00@9.00	Zero	"		.11 $\frac{1}{4}$ @.12 $\frac{1}{4}$	Talc—N. C., 1st grade	sh. ton		13.75
Cuban	lb.		.01 $\frac{1}{4}$ @.03 $\frac{1}{4}$	Flint Pebbles—Danish, Best.	lg. ton		14.75	Summer	"		.00 $\frac{1}{4}$ @.00 $\frac{1}{2}$	N. Y., Fibrous, best	"		10.20
Egyptian, crude	"		.05 $\frac{1}{4}$ @.06	French, Best	"		11.75	Cylinder, dark steam ref.	"		.08 $\frac{1}{4}$ @.10 $\frac{1}{4}$	French, best	100 lbs.		1.25
Trinidad, refined	sh. ton		35.00	Fluorspar—				Dark, filtered	"		.11 $\frac{1}{4}$ @.15 $\frac{1}{4}$	Italian, best	"		1.62 $\frac{1}{2}$
San Valentino (Italian)	lg. ton		16.00	Am. lump, 1st grade	sh. ton		\$14.40	Light filtered	"		.14 $\frac{1}{4}$ @.17 $\frac{1}{4}$	<			