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THE APPEARANCE in New York this week of drafts for about \$800,000 against shipments of gold from the Klondike indicates that the opening of that region is much earlier than last year, or probably that a considerable amount of work has been done through the winter. In either case, it gives promise of an increased output from the Yukon for the current year. Little has been heard lately of the quartz locations made last season, but it will probably take some time to carry out the development work necessary to determine their value.



THE CONDENSED description of the property of the Dominion Steel Company, given on another page, shows its importance more plainly, perhaps, than a more extended account would do. The Dominion plant is the most important new industrial enterprise in Canada; not only on account of its extent, but because it is so situated that it can at any time put its surplus on the markets of the United States or on those of Great Britain. It will have every opportunity to make iron and steel at low cost and to ship the products cheaply, and it will be in the future a competitor to be considered on both sides of the water.



WE HAVE heretofore referred to the depression which characterized the British iron trade in 1901, and the figures given on another page show the extent to which production was affected. The total output of pig iron in Great Britain last year was 7,761,830 tons, the smallest reported for several years; it showed a decrease of 13.4 per cent as compared with 1900, and one of 16.6 per cent as compared with 1899, which was the year of maximum output. On the other hand, steel production has remained nearly the same, the total of 4,904,044 tons reported last year exceeding that of 1900 by 0.6 per cent and that of 1899 by 1 per cent. The decrease has been entirely in the make of wrought or puddled iron, showing the changes made in the iron trade and the extent to which steel has replaced wrought iron.



MARKET CONDITIONS.

Iron and Steel.—The markets are practically unchanged, except that a number of large mills are known to be out of the market for the rest of the year. The example of a few large buyers seems to have overcome to some extent the reluctance to make contracts extending into next year. This is especially the case with rails, and it is stated that the quantity already placed for 1903 delivery is over 700,000 tons. Production in all lines continues very active; so far the only plants affected by the anthracite strike have been a few furnaces in Eastern Pennsylvania.

There are still reports of orders placed abroad, especially in Germany. Some notes on imports and exports will be found on another page.

Copper.—The copper market is still very quiet, and without noticeable change. While consumption is very large, the manufacturers seem to be generally well supplied; on the other hand, producers are sold up, as a rule, and are not pressing metal on the market. There are no speculative stocks of any account. Abroad business has been very dull. The London

Exchange was to be closed for the last half of the week on account of the coronation festivities, and the King's dangerous illness has temporarily prostrated business.

Other Metals.—Tin is again lower, in sympathy with the foreign market. A good business continues to be done with consumers, whose needs are considerable.

Lead remains quiet and unchanged, with a fair business reported, but no special changes.

Spelter remains strong and active, and a good consumption by manufacturers is evident.

Silver is quiet and quotations a little lower, with offerings only moderate. The London market has been somewhat affected by the current excitement.

Coal.—The Western coal markets show a little improvement, so far as transportation is concerned. There is some disposition to stock coal, in anticipation of a possible strike of bituminous miners, though there does not seem to be any general anticipation of such a movement. The Lake coal trade is in rather a demoralized condition, so far as rates of freight are concerned. The stoppage of anthracite shipments from the Lake Erie ports has, however, left more tonnage available for bituminous coal, if the railroads could get it there as fast as wanted. The West Virginia strike seems to be practically a failure, and the shipments from the district are increasing daily.

The seaboard bituminous trade is still unsettled by the extra demand for soft coal due to the anthracite strike. There is no change from the condition noted a week ago. Supplies of coal at the ports are generally good, but there is some delay in railroad transportation from the mines.

The anthracite market is still paralyzed by the strike, with no indication of a change.



MR. MITCHELL'S APPEAL TO THE PUBLIC.

Since my last article was written, Mr. Mitchell has issued an address to the public, to which I am obliged to give a passing notice, though I am thereby hindered from continuing my analysis of elements in the situation, more important than the temporary tactics of the combatants. But when an argument is interrupted by remarks from a partisan in the audience, it is sometimes best to notice the interruption before proceeding further.

Mr. Mitchell is out of his depth in a discussion of this kind. It would be safer for him to issue orders and not arguments—to address mass-meetings of those who agree with him (or tumultuously out-vote him, as the case may be) rather than the public.

1. His excuse for not having stated his case before is ludicrous. He was so anxious not to irritate the other party, and hinder a compromise, that he kept silence! But the statement of the other party, which he now undertakes to refute, was made, not to the public, but in writing to him. He would have us believe that, in order not to irritate the operators, he refrained from showing them in temperate language, their errors of fact and judgment, and took the milder course of ordering their employees to stop work, abandon property to destruction, inflict loss and discomfort upon innocent communities, paralyze industries not in the least connected with the dispute, and threaten a general ruin, fortunately beyond their power to produce. Does Mr. Mitchell really think,

or does he expect some people to think, that the way to dispose an opponent to amicable settlement is not to argue with him, but to smite him, take money from him, call him names, and maltreat his friends?

2. Nothing shows the tyro more quickly than his handling of statistics. They are dangerous tools in untrained hands. Mr. Mitchell's statistics give him away at once. Apparently he does not even know that, when an opponent makes an assertion concerning his own business, and offers his books for inspection in proof thereof, he cannot be answered by an ingenious indirect calculation, based upon other and unconnected evidence, to show that his assertion is incorrect. The primary evidence, having been offered, must be directly controverted, or else admitted true.

3. But to any one acquainted with the history and conditions of the anthracite industry, Mr. Mitchell's indirect proofs are themselves pitiable. For instance, he offers, as part of his proof of the average profits of the anthracite industry, the reported testimony of an individual manager concerning the profits realized several years ago, at certain mines under private ownership. This may be a mere newspaper report, and therefore undoubtedly in some particulars incorrect; the testimony, having been given for one side in a law-suit, was probably cross-examined, controverted and more or less explained away by the other side; and, finally, if entirely and admittedly true, it would prove only that for a certain period certain mines were worked with a certain amount of profit—though whether this profit was net or gross; that is, whether it did or did not remain after proper deduction for royalty on the coal mines, interest on capital, and depreciation of plant, is still undetermined. Making, however, the assumptions most favorable to Mr. Mitchell's case, we must still say that the argument based upon this evidence begs the fundamental question at issue. For he assumes that the results at one place represent the results at all, ignoring the declaration of the operators that the anthracite collieries cannot be thus lumped and averaged. This declaration is not only true, but obvious to all who know the anthracite business. Mr. Mitchell's avowed purpose of enforcing uniform terms of employment throughout the anthracite region requires him to ignore it; and, perhaps, reasoning from the more uniform conditions in the bituminous coal-fields, he really believes his absurd assumption. True, differences are permitted, under his management, among the "scales" of different bituminous regions. But, so far as I know, these are wholly geographical. Perhaps Mr. Mitchell does not conceive that in the districts into which he has made ignorant intrusion, one colliery may be profitable, while another in the same county and coal-basin may be losing money, and that his dictation of identical terms to both may ruin one enterprise, while not "intolerable" (except as a matter of principle) to the other. It is a pity that he did not personally, or through a competent expert, inspect the books of the operators when they offered him the opportunity to do so. If he had done so, he would be wiser now, and less addicted to "averages."

4. Mr. Mitchell's statements about wages are similarly crude and inexperienced. His "average" of wages has been determined, apparently, by dividing the total sum paid to all classes of labor (including old men and boys, common laborers on odd jobs, etc.) by the number of persons employed. His number of days' work in a year (which is, I suppose, simply the number of days on which each colliery is operated) is then multiplied by his average "wages," to show the pitiful sum on which the anthracite-miner has to support himself and family.

Here are logical lapses almost too numerous to mention. Do all the laborers counted in calculating the "average" wages stop work every time the colliery

stops? If the sum named by Mr. Mitchell is an "average" year's earnings, many persons must earn far less. How do these live at all? Above all, how do so many of the miners prosper, own their own houses, have large sums in the savings-banks—or, more frequently, on deposit with their tyrants, who pay them high interest to encourage them in their submission to "intolerable conditions"?

The answer to the last question is simple. A miner who gets his day's pay for four or five hours' work, on less than 200 days a year, does not (as Mr. Mitchell seems to wish us to think) sit down for the rest of each "day" of work, and all day for the rest of the year, and starve. There are other things to do, even in Pennsylvania; and the proposition is absurd for any part of the United States, where labor is in such demand. It is, and always will be, true that certain industries are more active at certain seasons. All employers know that it would be advantageous to arrange so as to give steady employment at good wages, the year round, to loyal workmen. Perhaps this could not be completely done in anthracite mining; but I think an approximation could be made to it, if labor could be trusted to keep its contracts. The present irregularity of employment in that business is due, partly to the irregular nature of the demand for anthracite, but chiefly to the attitude of "organized labor," which will not permit the equalization of the conditions of product and shipment, and which has hampered and limited the sale of anthracite by successive measures, ignorantly (but none the less effectively) extending the market for bituminous coal.

Nevertheless, even now, it is not necessary for an anthracite miner to be idle when he is not mining. Nor is he so idle. Let Mr. Mitchell, in corroboration of his remarkable deductions, adduce instances in which sober, decent and industrious men, working as miners only a couple of hundred days in a year, have done nothing all the rest of the year—and he will have furnished some support to an argument which is now self-evidently lame.

Finally, Mr. Mitchell does not say how great a part of the "idle time" of last year was caused by more than 100 "local strikes," for which "union labor," and nothing else, was responsible.

5. Under the head of the efficiency of "union" labor, Mr. Mitchell's reasoning is equally superficial. He includes in the total product of coal for recent years all the product of the washeries, which is simply a recovery of former waste. Why does he not tell us how many feet of galleries or air-ways were run last year, or how many feet of shaft were sunk per man and day, as compared with the former rates of progress in similar ground? Even bituminous experts must know that this is the simplest measure of a miner's efficiency. Whatever he may deduce by circuitous argument from general data, the fact is notorious, and familiar by daily experience to every mine-manager in the anthracite regions, that since the settlement of 1900, both the discipline and the efficiency of mining labor have greatly declined. In the latter, the loss is stated by the large companies at some 12 per cent. I have the testimony of an individual operator that, at his colliery, it has been twice as much.

6. The date which Mr. Mitchell fixes for the beginning of his period of "intolerable conditions"—namely, 25 years ago—is highly unfortunate for him. However uninformed as to the business of mining, transporting and selling anthracite, he ought to have known enough of American history to be aware that the date he gives as the beginning of the present tyranny of capital coincides with the exposure and overthrow of the most audacious and cruel reign of terror ever maintained in this country in the name of organized labor. Did he ever know, or has he forgot-

ten, or does he think everybody else has forgotten, the regime of the "Mollie Maguires"? Does he really believe, or expect men of my years to believe, that the hanging of Jack Kehoe, after a score, more or less, of his agents and associates in crime had been similarly hung, marked the beginning, and not the end, of "intolerable" tyranny.

The story of the "Mollie Maguires" deserves to be told again, to a generation which seems to need its lesson; and some day I may find opportunity, as a witness acquainted with its leading characters, to tell it. Meanwhile, I would advise Mr. Mitchell, and all other pleaders for the present claims and demands of organized labor in the anthracite region, to avoid alluding to the situation of 25 years ago.

7. The foregoing remarks have been based mainly upon the statements of Mr. Mitchell, without controversy as to the accuracy of his data. But I do not wish to be understood as accepting his figures. On the contrary. I have direct evidence of their incorrectness. For this occasion, however, I have preferred to show that, apart from such refutation, they neither prove nor improve his case.

R. W. RAYMOND.



ANTHRACITE MINE CONDITIONS.

A statement has been issued by John Mitchell, president of the United Mine Workers, which purports to be a plea for the Pennsylvania anthracite miners. The value of this plea is badly damaged by its being issued after the miners have been on strike for six weeks, but like all Mr. Mitchell's published utterances, the present statement is written in good English, and shows considerable cleverness in evading dangerous admissions. It is doubtless intended to influence people who know nothing of anthracite mining nor of conditions at the mines, yet we shall review it at some length, believing that the truth will not suffer by repetition.

"For more than twenty-five years the anthracite coal-mining workers have chafed and goaned under the most intolerable and inhuman conditions of employment imaginable. Their average annual earnings have been less than those of any other class of workmen in the United States, notwithstanding the fact that their work is more hazardous and the cost of living greater than in any other important American industry," says Mr. Mitchell. This is mere rhetoric and misrepresentation. It is inconceivable that men who came to the mines freely and were free to go at any time should work under inhuman conditions, and it is well known that there has been for many years an excess of labor at the mines. The men have stayed because, when the mines were working, they could make better wages than they could hope to get in any other field open to them. No one can visit the mines in the anthracite region without being impressed by the fact that the miners look well fed and decently clad; their wives and children are rosy and healthy. The great majority of families at the beginning of the strike were living in simple comfort. When the strike began, a considerable percentage of the foreign-born went to Europe with the avowed purpose of returning when the strike was over. Such men can scarcely have worked under intolerable conditions.

The total number of men employed about the anthracite mines in 1901 was 147,651, but to say that they are employed never to exceed 200 days in any one year, and receive as compensation for their service an average of \$1.42 for a 10-hour workday, thus earning annually less than \$300, is to talk nonsense. In the first place, one of the reasons why the breakers averaged but 197 days last year, was because officials of organized labor were actively sowing the seeds of discontent among the men, urging them to strike for

all manner of trivial causes. The Delaware & Hudson Company alone reports 123 such strikes during 1901. Mr. Mitchell knows very well that the breakers could have averaged over 197 days just as well as not; the operators certainly were willing. Again, it is not true that the men employed never work over 200 days a year. The records of the Pennsylvania Bureau of Mines show the average number of days that the mines are in operation, but there are many employees who work practically the year round, including firemen, ashmen, pumpmen, fan bosses, stable bosses and fire bosses; there are also other men, such as carpenters, timbermen, brattice men, track layers and certain miners, who may work on days when the breaker is idle.

Mr. Mitchell takes the sum of money he thinks is paid out daily by the coal mining companies, divides it by 147,000, gets \$1.48 as a result, and says this is the average pay of a mine employee. In doing this he includes breaker boys who get from 45c. to \$1 per day, surface laborers, including superannuated old men at light work, who get \$1 to \$1.50 per day, and boys employed underground.

Mr. Mitchell's statement that the average earnings of anthracite miners have been less than those of any other class of workmen in the United States is not in accordance with fact. Company miners about Wilkes-Barre, where Mr. Mitchell has his headquarters, make from \$2 to \$2.50 per day, and miners working on contract frequently make as high as \$100 a month and work less than four hours a day; mine laborers, often men newly arrived from Austria, Hungary, Italy or Russia, get \$1.50 to \$1.75. Surface laborers are paid as much about the mines as on railroads. The records of the Pennsylvania Bureau of Industry show many trades paying far less than anthracite miners receive, to say nothing of farm labor.

Mr. Mitchell complains of the hazardous nature of anthracite mining. The percentage of accidents is certainly greater than it should be, and greater than in European mines. This is partly because of the inherent carelessness of the average miner, partly because the mines in this country are not under such rigid control by the State as those in France, Germany and England, and partly because labor organizations such as Mr. Mitchell's do not try to promote higher standards of work among their members. If a workman is discharged for carelessness or insubordination, the Union insists on his reinstatement, and if the mine superintendent puts a higher value upon life and property than on the behest of the Union, the result is a strike. Men connected with the United Mine Workers in the summer of 1890 took an active part in a strike that tied up a large mine near Wilkes-Barre for several weeks. The mine is one of the most fiery in the United States. The miners struck simply because the company insisted that they should use, to protect their lives and the company's property, an improved type of safety lamp.

It is true that in the settlement of the 1900 strike a reduction in the price of powder was included in the 10 per cent advance in wages. This was distinctly understood at the time, and was accepted as satisfactory by the representatives of the United Mine Workers. Mr. Mitchell, however, perhaps does not know that the largest coal mining company in the Schuylkill Region virtually granted its men an increase in wages of 16 per cent, in which the price of powder was not figured. Mr. Mitchell says that the cost of living, "according to reliable commercial agencies," has increased from 30 per cent to 40 per cent, and that the purchasing power of the miners' wages is less now than before the strike of 1900. This is nonsense. According to Dun, the increase in the necessities of life, particularly foodstuffs, since 1900, has been less than 5 per cent. For our

own part, we have no hesitation in saying that, taking everything into consideration, the average miner could get more by a month's work at the time this strike was declared than at any time during the past 30 years.

Mr. Mitchell attempts to defend the easily verified facts regarding the restrictions that his union has put upon labor at the mines, and the resulting decrease in efficiency of mine employees, by saying that from 1890 to 1900, the average output per man employed was 2.16 tons per day, while during 1901 it was 2.36. This statement is as misleading as some of Mr. Mitchell's other so-called facts, for it entirely ignores all the economies in mining and preparing anthracite with a resulting increase in tonnage per employee that have developed in the last ten years.

Small breakers producing 400 to 500 tons of prepared coal daily are out of date; they are being replaced by breakers with an output of 2,500 tons or more, taking coal from several mine openings; pumping plants below ground are larger; power plants use improved boilers with fuel economizers; conveyor lines are used for handling material; mechanical slate pickers for separating coal and slate are being introduced; in fact, the tendency of the past ten years has been to increase in every way the output of coal per man. Yet what do the returns of the Bureau of Mines show?

Year.	Production.	Miners employed.	Days worked by breaker.	Average tonnage per man per day.
1891	43,575,180	30,552	213	6.69
1897	46,947,354	36,932	151	8.42
1898	47,145,174	36,377	151	8.58
1899	54,034,224	36,421	179	8.14
1900	51,217,318	36,832	176	7.90
1901	59,905,951	37,804	197	8.04

The increased output per miner up to 1898 shows how successful the companies were in developing economies underground, and also the effect of the increased output by washeries. The steady decline since the United Mine Workers started to organize the anthracite miners in 1898 is also shown; 1899 and 1901 were years of record-breaking production, but Mr. Mitchell's organization did not help. The miners got a 10 per cent increase in wages in 1900; their average efficiency in 1901 was 6.3 per cent less than in 1898.

The published statement of Mr. E. B. Thomas gives the falling off in work per man of the Delaware & Hudson Company's employees as 12 per cent. This statement based on exact returns is undoubtedly nearer the truth than the results given in the above table, since the statistics of the Pennsylvania Bureau of Mines, while admirable in many ways, are not compiled with the care shown in keeping the accounts of a private corporation.

Mr. Mitchell's statement that the operators have advanced the market price of coal more than \$1 per ton since the strike began also shows his ignorance of the facts. Coal is selling at retail at New York harbor points to-day for \$4 a ton above its price in May, but this advance has not gone to the companies that produced the coal. It has gone to retailers, jobbers and speculators. The regular price of egg, stove and nut sizes at New York harbor shipping ports to-day is \$4.20 per ton. It was \$4.10 in May. It is true that no coal can now be had at the figures named, but that is simply because the union that Mr. Mitchell represents has for over a month been successful by threats, violence and every manner of persecution, in keeping all miners idle who might care to get out coal. The producing companies have practically no coal for sale, and have not had for several weeks, but it is safe to say that if they were to start shipping coal to tidewater to-morrow, they would dispose of it to their regular customers at the regular price.

In regard to Mr. Mitchell's talk about the enormous profits extorted from the public by the coal trust, as shown by the selling price of coal last year, it may be said that, in the first place, there is no anthracite trust, in the sense in which that word is ordinarily used, and in the second place, the higher average prices have been partly due to the desire of the operators to distribute production throughout the year. Prices were fixed at a figure which, while slightly higher than that prevailing during the years of depression from 1893 to 1899, can hardly be considered extortionate (the basis being \$4.50 for free-burning white ash coal f. o. b. New York harbor shipping ports), with discounts to spring and summer buyers. The average prices were higher, because the companies adhered to these discounts. In the past, buyers have usually neglected the market during spring and summer, the result being that shipments from the mines were necessarily light, and mine employees frequently for four or five months in the year, worked but five or six days a month. Whatever uninformed writers in the daily press may say, there is no doubt but that the new plan of selling coal at certain prices for the current month's delivery will provide the men at the mines with steadier work than they ever had before.

Mr. Mitchell undertakes to show that the mining companies are making enormous profits by citing the testimony of a large individual operator in the Lehigh region. Such testimony is altogether irrelevant. It is a well known fact that some of the individual operators have made money and have made a great deal of it. These companies have been the worst offenders with company stores and other abuses, but in general have been wisely managed, and enjoy the great advantage of owning in fee their coal lands. No one familiar with the history of the trade will claim that equal judgment has been shown in the management of the large companies. They have been the victims of attempts to control coal lands for certain railroads, and have suffered from other causes. These companies, instead of having a necessarily less cost of production, as Mr. Mitchell infers, may produce coal at a higher cost than the independent operators. In the scramble to secure coal lands, the large companies were burdened with long-time leases requiring large minimum outputs and high royalties. An independent operator producing coal from land which cost \$10 per acre or less is not on the same footing as a company mining under royalties running up to 75 and even 80 cents per ton.

Mr. Mitchell may believe his contention that the miners, when paid for their labor, are required to produce and load from 2,740 to 3,190 lbs. of coal for a ton, but most miners in the anthracite country know better. A very small proportion of the total anthracite output, perhaps 10 per cent, is mined by the ton. In the Lackawanna and Wyoming regions, a miner who does not work on company account is paid by the car, in the Lehigh and Schuylkill regions by the car and by the cubic yard. A car holds from 73 to 90 cubic feet, different companies having different standards. The miner knows the size of the car that he has to load and knows about how much coal he can hope to break down in a day in the chamber where he goes to work. That the miner should be paid by weight sounds well, but really means little. Every mine superintendent knows that the average miner does not consider it a sin to get the better of the company in small ways, that a varying amount of all anthracite mined goes to the culm pile, and the companies must take it into consideration in determining wages.

If all coal produced were paid for by weight at the breaker, without restriction, the miner and his laborer would simply send to the surface slate and rock, heavier than coal, and claim payment for it. To check this, the companies would, as now, have

to keep a sharp eye on the output of each miner, and the miner who sent up what he thought might pass for a ton, might find himself paid for but half a ton or even less. Paying by weight therefore would cause just about as much friction as paying by the carload. Mr. Mitchell may be aware that at many bituminous mines where miners once paid by ton of screened coal are now paid by run-of-mine, there has been a great increase in the amount of slack coal produced, with resulting loss to the mines. The organization Mr. Mitchell represents, has promised to see that miners would take as much care in mining and loading coal at these mines as formerly, but has failed to keep its promise.

Doubtless those parts of the statement that appeal most to the uninformed, are the protestations of eagerness to have all questions in dispute referred to arbitration. Mr. Mitchell says that the leaders of the Union officials "resorted to every delay and precaution, every conceivable effort, that honorable and conservative men could take to prevent a rupture, and every means that thought could suggest to bring the matter in dispute to arbitration was resorted to by the union, without avail, the operators replying to all overtures that there was nothing to arbitrate." In its disingenuousness, this sentence is a fair sample of Mr. Mitchell's whole plea. Neither Mr. Mitchell nor any other officer of the United Mine Workers offered this year that the matters in dispute should be referred to a board of arbitration composed of representatives of the miners, representatives of the operators and persons chosen jointly. Mr. Mitchell was quite ready to have the matter referred to a body of which he was a member composed of representatives of labor organizations, two soft coal operators and a sprinkling of manufacturers and politicians, none of whom ever had any practical experience in anthracite mining, and some of whom have already shown which side they favored. He was also ready to have the matter referred to two distinguished prelates, who, however well meaning, can scarcely be regarded as competent judges of complicated questions of mine management. The operators in 1900 and again this spring expressed a willingness to discuss all points at issue with their employees. They apparently are just as willing now, but Mr. Mitchell's organization has demanded that it shall be recognized, that is, shall have sole power to determine all the conditions of employment about the mines. Such an issue is not to be settled by arbitration. It must be fought out, and if both sides are obstinate the fight may be long.

Mr. Mitchell complains that his organization has been misrepresented, asserts that its members are law-abiding, and appeals to the chiefs of police of four large mining communities for support. In reply, it is enough to say, that Mr. Mitchell, by calling out pumpmen, firemen and engineers, showed that the infliction of losses that might amount to millions of dollars, was to him a matter of little concern; his organization is now, by the boycott, by threats and violence, keeping men in idleness, and he now threatens in order to gain even a slight advantage from the anthracite operators to call out an army of bituminous miners, and thus strike a paralyzing blow at the industries of this country. An appeal to the evidence of police courts is trivial in the face of such facts.

There is, however, one feature of the present strike of which the public has heard little and knows less, and on which, Mr. Mitchell can certainly give much information. Anyone who will take a trip through the anthracite country, will have little difficulty in finding that a majority of the mine employees, particularly those of foreign birth, were opposed to striking in May. The investigator will also find that although the action taken at the various local lodges of the United Mine Workers did

not always represent the full strength of the anti-strike element, yet a majority of the men chosen by these lodges as delegates to the Hazelton convention were not in favor of an immediate strike. The convention, however, voted for a suspension of work. What influenced the delegates? Mr. Mitchell knows; the public which is paying part of the expense of this strike does not. Rumors have been heard of a network of intrigue and trickery, of influences discreditable to Mr. Mitchell and his associates, of happenings that reflect on Mr. Mitchell's honesty and the integrity of his professed motives. What swayed the Hazelton convention?



BRITISH IRON AND STEEL PRODUCTION.

The report of the British Iron Trade Association for the year 1901, which has just been made public, shows that there was last year a considerable falling off in production. Thus the pig iron made in 1901 shows a total of 7,761,830 long tons, against 8,959,691 tons in 1900, the decrease being 1,197,861 tons, or 13.4 per cent. The production of steel, however, showed but little change, though that of puddled iron fell off heavily. The output of steel ingots is reported below:

	—1900.—		—1901.—		Changes.
	Tons.	Per ct.	Tons.	Per ct.	Tons.
Bessemer	1,745,004	35.6	1,606,253	32.8	D. 138,751
Open hearth	3,156,950	64.4	3,297,791	67.2	I. 141,741
Totals	4,901,954	100.0	4,904,044	100.0	I. 2,990

The fact that the steel production remained practically the same, with a large falling off in pig iron, shows that the substitution of steel for wrought iron is making more rapid advance in Great Britain than heretofore.

Of the total steel made last year, in round figures, 4,063,000 tons, or 82.8 per cent, was made by the acid process, and 841,000 tons, or 17.2 per cent, by the basic process.

The following table shows the output of pig iron and steel in Great Britain for five years past, in round figures:

	Pig Iron.	Steel Ingots.
1897	8,817,000	4,485,000
1898	8,681,000	4,569,000
1899	9,305,000	4,855,000
1900	8,908,000	4,901,000
1901	7,761,000	4,904,000

It will be noted that while the maximum pig iron production was reached in 1899, and was 1,544,000 tons greater than that of 1901, the steel production of last year showed a slight increase—49,000 tons—over that of 1899.

The production of wrought or puddled bars in 1901 was 974,000 tons, showing a decrease of 189,000 tons, or 16.3 per cent, as compared with 1900. If the comparison is extended five years, to 1897, the decrease was 314,000 tons, or 24.4 per cent. The output of steel rails in 1901 was 732,000 tons, a decrease of 28,000 tons, or 3.4 per cent, from 1900. Comparing last year with the year of maximum production, 1897, we find a decrease of 189,000 tons, or 20.5 per cent.

The following extracts from the report will be found of interest:

"Imports and Exports.—There was a very notable decrease in the British exports of iron and steel in 1901, the total having been 2,900,100 tons, against 3,545,357 tons in 1900, 3,717,616 tons in 1899 and 3,247,368 tons in the year 1898. In our exports of pig iron, there was a decrease in 1901 of not less than 589,326 tons, compared with 1900, but the exports of the last-named year were about the largest in our history. The decrease was mainly due to the extraordinarily low prices at which the Belgians and the Germans offered iron and steel products in all the principal markets of the world owing to the decline in their own home demands. Our exports were less affected by the competition of the United States than they had been in the previous year.

"The imports of iron and steel into the United Kingdom in 1901 have been the largest in our industrial history. The total amounted to 868,739 tons, against 761,402 tons in 1901, 645,019 tons in 1899, and 591,425 tons in 1898. The great increase in 1901 was due to the flooding of our markets with German iron

and steel. This movement has been accentuated in the current year, during which our imports have been at the rate of nearly 200,000 tons a year in excess of those of 1901. The increase of imports has been under almost every head, but chiefly under the head of pig and puddled iron, unwrought steel, beams and girders, and unenumerated descriptions.

"The American Industrial Commission.—In February of last year the board of management of the British Iron Trade Association, on the suggestion of the secretary, considered the question of the expediency of appointing a special commission to inquire into the conditions of the American iron and steel industries, with special reference to the competition of that country in our own and other foreign markets. The members ultimately appointed to serve on that commission were the president, Mr. Ebenezer Parkes, M.P.; Mr. Axel Sahlin, manager of the works of the Millom & Askam Iron Company, in Cumberland; Mr. Enoch James, formerly of the Dowlais and Patent Shaft and Axletree companies, and Mr. J. Stephen Jeans, the secretary. These gentlemen proceeded to the United States in the autumn of last year, and returned to England in November last, since which time they have been engaged on their reports.

"The following extract from the prefatory note to the volume of reports will sufficiently indicate the conditions under which the commission pursued its inquiries: Of their reception, the members of the commission feel that they cannot speak without such a sense of gratitude and appreciation as it would, perhaps, be difficult for those who have not enjoyed similar experiences at the hands of our American cousins to understand. Hon. Abram S. Hewitt told the members of the Iron and Steel Institute, when they were the guests of the American Iron industry in 1890, that they would find the latch-string on every door. We, who were not invited guests, and who were there with the avowed purpose of appropriating all the best ideas and systems we might come across in the course of our wanderings, had exactly the same experience—with one or two exceptions of so trifling a character as hardly to be deserving of notice. Speaking generally, our American friends appeared to be just as ready to impart information as we were glad to receive it, and this is true, not of managers of iron and steel works alone, but of those engaged in allied and collateral industries as well. The perfect candor and absence of reserve, the unqualified readiness with which all questions were answered, the unhesitating consent given to applications for plans and illustrations, and the unmistakable friendliness and cordiality of our reception, made it hard to believe that we had not absolutely identical interests, instead of being keen rivals and competitors.

"Directly after their arrival in New York, the commissioners were afforded the opportunity of explaining the object of their mission, and their programme so far as it has been formulated, to a number of the leading men connected with the American iron industry. All of these gentlemen at once notified their intention to do everything possible to forward the purposes of our mission. Mr. Schwab gave us letters to the heads of the various departments of the United States Steel Corporation, and also to the superintendents of the leading works belonging to that great organization, directing that all information should be afforded to us that had ever been given to any one, outside the corporation's own officials.

"In some respects, indeed, we found a highly intelligent and far-seeing recognition of the fact that our interests are identical—in the methods of dealing with labor and with transportation by land and water; in the general relations of employers and employed; in the attainment and maintenance of the highest efficiency in mines and works, and in the organization of means for the successful cultivation of foreign trade. On these and kindred matters we always found our friends ready to exchange experiences and views."

ASPHALTUM BRICK.—According to the *Clay Record*, the Mutual Union Oil and Asphalt Company, of St. Jo, Montague County, Texas, has decided to build a plant for the manufacture of asphaltum brick.

BOHEMIA MINING DISTRICT OF WESTERN OREGON.

By JAMES P. KIMBALL.

Railway connection with the Southern Pacific system will serve to bring the Bohemia Mining District of Lane and Douglas counties, Oregon, into new and increasing importance. Covered by not less than 2,000 mining claims of record, some of which, as may be assumed, are fractional and some re-locations, this district has been wrought since 1891 for free-milling products from the oxidized zone of several well-known lodes. Mineral discoveries date from the year 1858. The district numbers about 60 head of stamps.

Development of its normal products in the form of heavy sulphides of the base metals has thus far been retarded for want of an outlet for shipping products—practicable only to the west. As all opera-

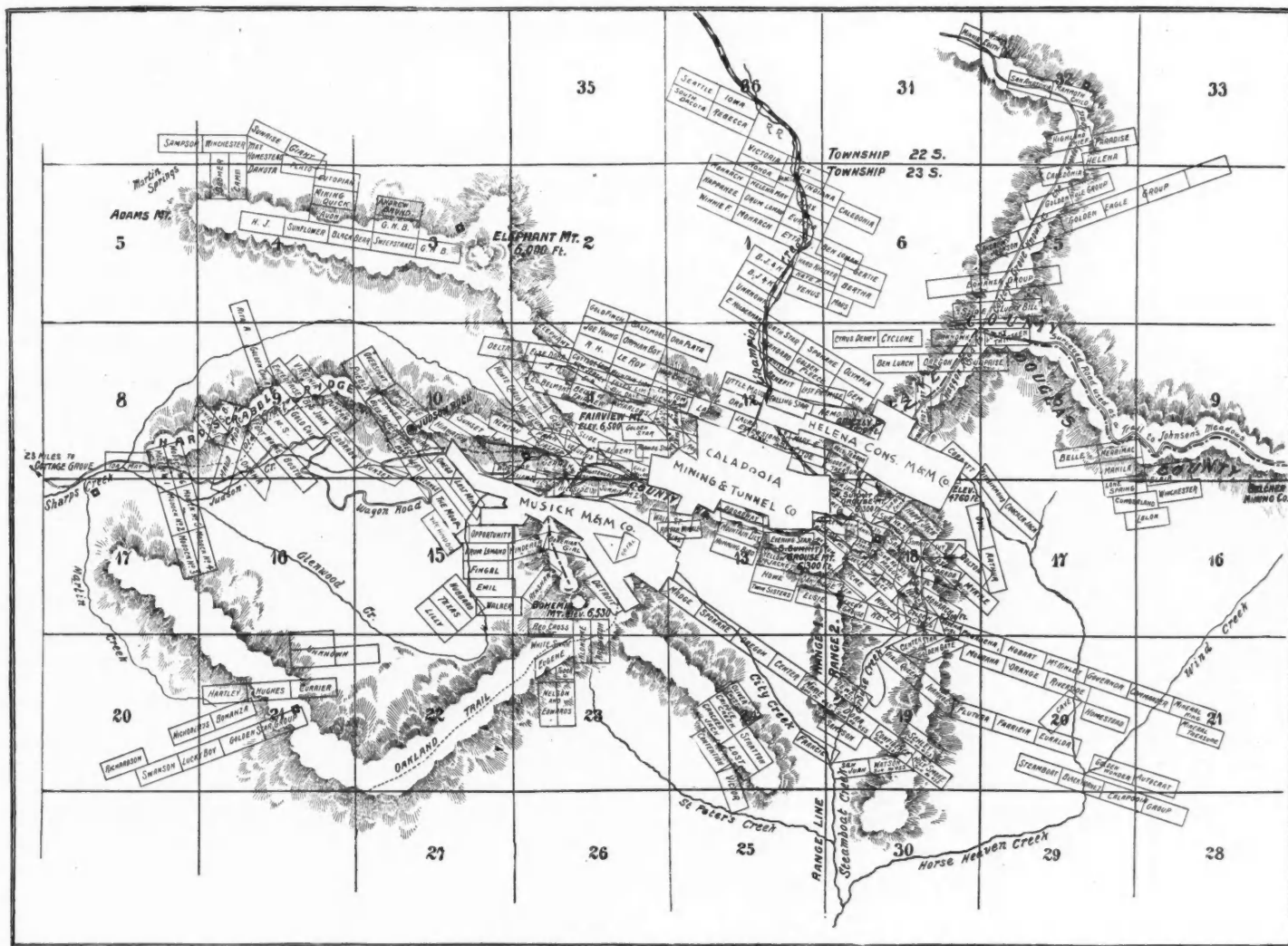
depend largely upon facilities afforded by this railway.

Several important timber belts outside the Cascade Forest Reserve will be reached by the railway, and will contribute to its traffic. The timber of the mining district itself is mainly protected from logging by mineral locations, and by adverse topography, if not by forest reservation.

The Bohemia Mountains may briefly be described as culminating crags of Calapooia Mountain, the survival of a great volcanic massif as left by erosion in the form of a narrow and tortuous ridge with numerous radial spurs or ramifications. From the summits at elevations of from 5,000 to 6,500 feet erosion has advanced in all directions toward the base. Deep V-shaped basins have thus been sculptured on the west slope descending into the Willamette and Umpqua waters.

have been opened by drifts and stopes in the Musick within a development of 1,100 feet longitudinally and 300 feet vertically. One of these has a length of at least 350 feet, faces of drifts still being within its limit. Another is about 100 feet in length, and the third about 300 feet. As far as wrought these are in divisions—also three in number. Outcropping extensions of the lode are highly mineralized for 3,000 feet to the southeast and at least 1,000 feet toward the summit of Bohemia Mountain, beyond which the top of the lode is concealed. Sericitic clay is a common occurrence from decomposition of andesite, marginal to divisional planes and walls.

The Helena lode is distinctly traced for over a mile, and opened at this interval at several elevations. In October, 1891, a remarkable ore-body was opened from the east slope of Grouse Summit near the present mill at a depth of 75 feet. Its limits in



CENTRAL PORTION OF THE BOHEMIA MINING DISTRICT, OREGON.

tions are still on the opposite side of Calapooia Mountain at elevated points, two wagon roads from the west, the one a 9 per cent grade to the Musick, and the other a ridge road to the Helena, have hitherto sufficed for free-milling operations. Of such rude facilities the best has been made—not without serious difficulties from excessive precipitation, especially in the winter months. Snow, however, rarely reaches the bottoms.

Transportation of concentrates proving impracticable except in the short dry season, their steady production from oxidized or free-milling material has been suspended. Neither surface space nor capital has been found for their accumulation—in anticipation of railway facilities. Such facilities will soon be near at hand on the completion of the Oregon & Southeastern Railroad now building from Cottage Grove to the western base of Calapooia Mountain, and thence up one of its deeply sculptured basins. Extraction of a large tonnage of shipping ores practically "in sight" awaits its service. Concentrating operations yet to be located at the base of the mountains will

The whole massif, essentially andesitic in character, is traversed from base to base by numerous powerful mineral lodes in nearly vertical attitude, with a N.W.-S.E. course. These occupy in part great clear-cut fissures parallel to the divisional partings, and in part bordering shearing belts defined by planes of least resistance—all more or less separated—thus constituting divisional planes, and walls, slickensided in places, and more or less warped. Unequal separation along with slight displacements on divisional planes give unequal sections, expanding up to 10 feet as in the Helena and 12 feet as in the Musick. Between divisional planes the filling is more or less brecciated in ratio of sectional expanse. Mineralization of brecciated parts also appears in ratio of the expanse of breccia. Segregated quartz occupies the less brecciated parts, and is more or less interstitial throughout all brecciations. Both quartz and breccia are unequally mineralized with the metallic sulphides, carrying different ratios of gold and silver but generally as far as proved uncommonly high. Mineralized expanses or parallelism of lenses and plates constitute ore-bodies, of which three

any direction have not, so far as I am informed, yet been reached, though opened for a length of over 200 feet in the level by which it was first penetrated. An upraise on the outer edge follows the ore body to grass roots. When examined by me in November, 1891, this lens, 72 feet beyond the same edge, presented a face of 8 feet 10 inches—including 7½ feet of shipping ore as run-of-mine. The average assay value of gold in this product at that time was \$125 per ton. Divisional planes in the Helena so far as exhibited do not compound the lode by intervention of andesite as in parts of the Musick. A single plane, however, divided the lode into two parts, one a heavy galeniferous product, the other a dry ore, but nearly equally rich in gold.

The metalliferous ores of the region are of several types—according to the relative distribution of the several sulphides and their relative enrichment with gold. The oxidized zone is characterized as usual by hydro-chemical elimination of sulphides of copper and lead. Vannings from such material consist mostly of auriferous pyrite. Varying doubtless in ratio

of the original sulphides, oxidized ores widely differ in gold contents from locally and inordinately high tenor down to moderate richness. Low grades rarely fall below a value of \$10, while \$16 may be taken as a fair average. The depth of the superficial zone also varies as determined, first, by local erosion, and, second, by circulation of underground acidulated waters. Intermediate products are apt to occur next below the oxidized zone. This zone is thin in the Musick lode and generally wanting. In the California it is developed to an unknown, but to no great extent. In the Champion it has a deep development; in the Helena, an unequal development following a sharply undulating line, at which sound or unaltered sulphides make their appearance, sometimes at the surface, as generally in the Musick.

group of 16 locations, lie in a body at the head of Champion Basin, and occupy the west side and summit of the culminating ridge.

The workings of the Champion and Broadway, together with discovery and representation developments, reveal the occurrence of several powerful lodes parallel to the general system of lodes well exhibited in the Helena and Musick groups, and all of the same type.

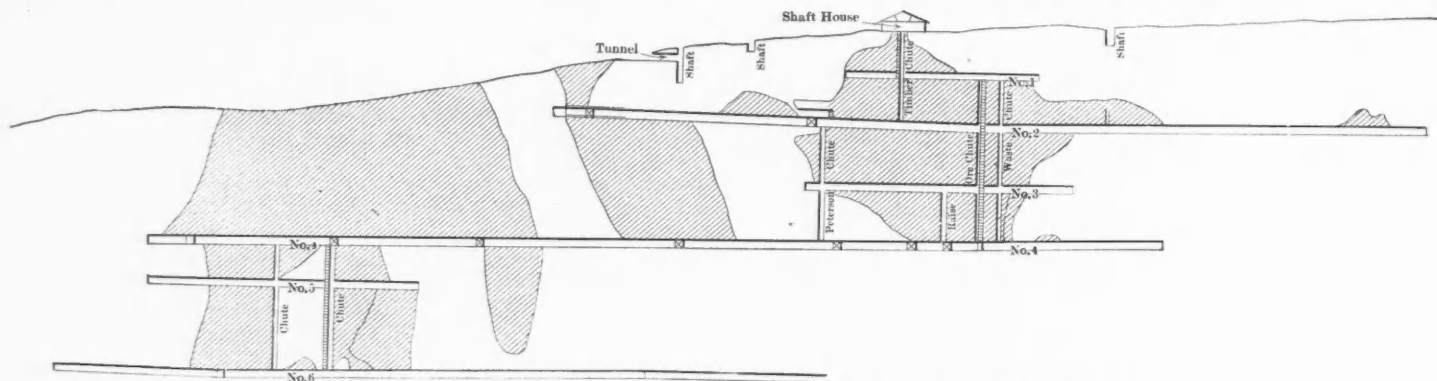
This group assumes definite importance, however, in advance of extensive development below the oxidized zone, as the key to deep development of the Musick and California lodes by means of two tunnels, or of an adit from the head of Champion Basin at the terminus of the railway.

The Calapooia is designed as immediately a de-

mixture with the base sulphides in places up to commercial values. Quantitative determinations of copper have been too few for practical purposes. Two hundred and ninety tons of Musick concentrates smelted at Tacoma in 1898 averaged 9.53 per cent of copper, along with 12.3 per cent of lead, \$24 of gold and \$2.82 of silver. These were produced from partially oxidized ores. Much of the galeniferous product of both mines as far as yet extracted has proved up to shipping grade without spalling.

In the Musick lode and in the Helena as far as wrought, the bulk of the lode is mineralized to separating grade even between ore-shoots, except in constricted parts, which thus far have proved few and short.

The local industry will therefore develop into



SECTION SHOWING STOPES IN MUSICK MINE, BOHEMIA DISTRICT, OREGON.

Heavy sulphides, mostly galena, are often of shipping grade, and richly impregnated with gold. The lower grades constitute concentrating material. Pan concentrates reduced to the specific gravity of dense or shipping material are also rich in gold, but even from material at equal depths prove of somewhat less value, probably from loss in siliceous tailings. The shipping product of the Musick from the lower levels averages about \$70 in value of gold; and of the Helena about \$125. Net values of Musick vannings in gold after elimination of amalgamating values of gold in oxidized material under the stamps may be taken at about \$45; of Helena vannings of the same type about \$40; the latter from ores giving \$26 of gold by pulp assay. No shipment of Musick high-grade ore has yet been made. Typical samples, however, assay nearly as high in gold as the best product of the Helena in car lots.

This brief general statement of values refers, of course, to present developments.

The oxidized zone of the Helena lode on the east slope of Grouse Summit is still good for a reasonably long supply of milling material. That of a parallel lode remains untouched. The deepest development of the oxidized zone is observed in the Champion lode.

All stopes in the Musick have only been partially wrought for oxidized or amalgamating products. Unaltered ores have been left standing as reserves.

Space forbids anything like a detailed description of the Bohemia mines, the development of none of which has so far advanced as to furnish all the factors of several important problems, like relative zones of enrichment with the precious metals, relative distribution of copper sulphides along with galena and sphalerite, or distribution, entire shape and full size of ore-bodies. Zinc has not yet been found in deleterious proportion.

In printed reports on the Helena and Musick mines such practical details have briefly been given as could be ascertained as late as November last.

Some twenty locations have since been collected as a third group under the name of Calapooia Mining & Tunnel Company—intermediate between the Musick and Helena groups. Each group is the property of separate corporations of which Mr. P. J. Jennings, of Portland, is president. To his sagacity and energy the recent development of the Bohemia District is chiefly due.

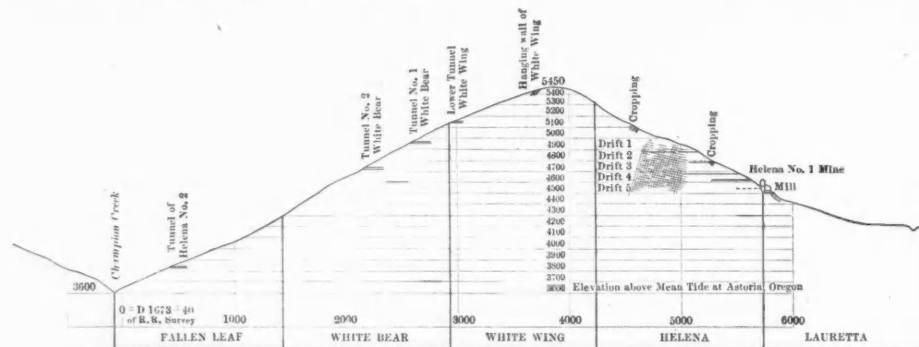
The Calapooia group, including the Champion

developing proposition for the driving of at least one deep tunnel through to City Creek Basin, giving access to the Musick-California system of lodes, and egress for their products—thus obviating surface transportation over the summit. It is designed to drive on the Champion lode, and after establishment of suitable lines to cross-cut the whole system of lodes between the Helena and Musick-California systems. Milling material will incidentally be found for the present Calapooia 10-stamp mill. By the addition of vanners valuable concentrates can be immediately produced.

For 20 miles on the upper waters of the Willamette, which is followed by the railway, are distributed falls and rapids adaptable to water power

shipping of high-grade ores, and of reduction products in the form of concentrates direct from the ore without amalgamation. The volume of the industry will of course depend on mining development and milling plant. These in turn will be in measure of the application of capital.

Resolute and extensive development of the Bohemia mines, as now practicable with railway transportation at hand, will go far toward the establishment of a smelter in the Willamette valley—perhaps, as long contemplated near Portland, where may readily be assembled the various smelting products of eastern and southern Oregon, along with Washington or Vancouver coke, fire clay and fluxes. No other available ores thus far excel the auriferous



PROFILE ON HELENA LODGE THROUGH GROUSE MOUNTAIN, BOHEMIA, OREGON.

sufficient for air compression and for electric energy for all mining and milling purposes, and even for locomotion.

Advanced operations for the production of smelting ores and other shipping products in the form of concentrates, will be mainly by drifts and cross-cuts from which the sum of rise or back will be up to 2,000 feet.

The Helena is now driving a low drift from Champion Basin, eventually to connect with the several openings on the opposite side of Grouse Summit, at higher elevations.

Railway, tunneling and milling improvements will thus serve to change the Bohemia Mining District from a free-gold camp to essentially a producer of auriferous smelting ores both wet and dry. Galena has now come to be the most conspicuous base product within the present development of the Musick and Helena lodes. Chalcopryrite is developed in ad-

sulphides of the Bohemia District, or the dry ores of one part of the Helena lode, now exposed.

By the installation of water power for electric energy and for air-compression, all mining and milling expenses will be reduced to a minimum. In the item of fuel alone the saving will be great by dispensing with a wood-cutting force, and with the difficult maintenance of stables at high elevations. The preservation of timber is also a consideration of great importance.

The three groups of mining locations, numbering 43 locations in all, should as I have urged from the first, eventually be consolidated into a single commanding operation, even including the railroad. With such consummation, if not too long delayed, much duplication of plants will thus be avoided, while the magnitude of potentialities in such an industrial unit should insure an able and comprehensive administration with the unremitted aid of adequate capital.

Even if not immediately practicable, such a consummation should be kept steadily in view, pending solution of what problems remain by continued development.

THE SHALES OF WESTERN KANSAS.

References have been made from time to time in the columns of THE ENGINEERING AND MINING JOURNAL to the alleged existence of gold in the shales of Western Kansas and the attempts to find a boom on the supposed values. These shales are found in Trego and Ellis counties, and the first report of the finding of gold dates back to 1894. In the eight years since then we do not know of any gold which has actually been recovered in the district. Prof. Erasmus Haworth, of the Kansas State University, has, however, made careful examinations and stated after his first one that over 200 samples of shale failed to show any appreciable quantities of gold. Another examination was made in 1899, when the University secured samples of shale from various parts of the district, and these were analyzed, with the same negative results. The conclusions drawn from the first examination were published in a report on the mineral resources of Kansas, made by Prof. Haworth in 1898.

The latest developments in this region are the erection of two small mills near the little town of Smoky Hill City. The first of these, which has been in operation about a month, has been put up by A. G. Gage, who is described by a local paper as "a practical miner, having spent many years in the Galena zinc mines." The process which he is using is a "secret" of his own, and among the backers he has secured are J. R. Mulvane, president of the Bank of Topeka, and J. H. Richards, attorney for the Missouri Pacific Railway Company. Our readers know what our opinion of "secret" processes usually is. From local accounts Gage seems to be using some modification of the cyanide process. It is, perhaps, needless to say that no gold has been shipped from the Gage mill; the manager is reported locally as saying that results obtained have been satisfactory, but the machinery is not right.

The other mill is expected to be ready for work in July. It is being erected under the charge of Dr. Ernest Fahrig, of Philadelphia, who claims to have made a number of tests showing a maximum of \$6.75 and an average of \$2.80 gold per ton. He further claims that the stuff can be worked at a cost of \$1 per ton. In this case a company has been organized with a capital of \$50,000, at the head of which is H. P. Dillon, of Topeka, Kansas. What process is to be adopted in this case is not stated.

A short time should be sufficient for these two companies to present some tangible results—if any can be obtained. Until they can do so, the statement of Prof. Haworth, who is a geologist of experience and standing, should be accepted. We have given some attention to this matter—perhaps more than it deserves—because of the evident attempt to boom the district. We are pleased to see that reputable Kansas papers are not disposed to aid the boom.

PIG IRON IMPORTS OF GREAT BRITAIN.

—The imports of pig iron into Great Britain for the five months ending May 31 were 99,224 tons, of which 5,907 tons were from the United States. For the corresponding period last year the imports were 54,805 tons, of which 26,921 tons were from the United States.

RUSSIAN PETROLEUM IN GREECE.—Mr. C. S. Wilson, chargé d'affaires at Athens, reports that the Greek Minister of Finance has invited the Russian and Roumanian companies to make proposals for furnishing the petroleum used by the Greek Government. Mr. Wilson adds that there is a strong probability that the Russian bid will be accepted, on account of the low price, although, from previous trials, the Russian petroleum has been found to be inferior in quality to the American product.

THE NEW PLANT OF THE AMERICAN SMELTING AND REFINING COMPANY AT MURRAY, UTAH.

The new plant of the American Smelting and Refining Company, at Murray, Utah, is now rapidly approaching completion and will doubtless be well in operation before the end of the current year. Murray is a few miles south of Salt Lake City, with which it is connected by a trolley line. The new works are situated within a few hundred yards of the terminus of the latter and in close juxtaposition to the old Germania plant, which is the only one of the Salt Lake lead smelting works operated at present. The new plant is of special interest inasmuch as it is the latest construction for silver-lead smelting in the United States and may be considered as embodying the best experience in that industry, the designers having had access to the results attained at almost all of the previous installations. It will be perceived, however, that there has been no radical departure in methods and the novelties are rather in details than in the general scheme.

The new works are built on level ground; there has been no attempt to seek or utilize a sloping or a terraced surface, save immediately in front of the blast furnaces, where there is a drop of several feet from the furnace-house floor to the slag yard level, affording room for the large matte settling-boxes to stand under the slag spouts. A lower terrace, beyond the slag yard, furnishes convenient dumping ground. Otherwise the elevations required in the works are secured by mechanical lifts, the ore, fluxes and coal being brought in almost entirely by means of inclines and trestles.

The plant consists essentially of two parts, the roasting department and the smelting department. The former comprises a crushing mill and two furnace houses, one equipped with Brueckner furnaces and the other with hand-raked reverberatories. The reverberatories are of the standard design, but are noteworthy for the excellence of their construction. Similar praise may be, indeed, extended to almost all the other parts of the works, in which obviously no expense has been spared on false grounds of economy. The roasting furnaces stand in a long steel house; they are set at right angles to the longer axis of the building in the usual manner. At their feed end they communicate with a large, dust-settling flue, which leads to the main chimney of the works. The ore is brought in on a tramway over the furnaces and is charged into the furnaces through hoppers. The furnaces have roasting hearths only. The fire-boxes are arranged with step-grates and closed ash-pits, being fed through hoppers at the end of the furnace. The coal is dumped close at hand from the railway cars, which are switched in on a trestle parallel with the side of the building, which side is not closed in. This, together with a large opening in the roof for the whole length of the building, affords good light and ventilation. The floor of the house is concrete. The roasted ore is dropped into cars, which run on a sunken tramway passing under the furnaces. At the end of this tramway there is an incline up which the cars are drawn and afterward dumped into brick bins. From the latter it is spouted into standard gauge railway cars, by which it is taken to the smelting department. The roasted ore from the Brueckner furnaces is handled in a similar manner. The delivery of coal and ore to the Brueckners and the general installation of the latter are analogous to the methods employed in connection with the reverberatories.

The central feature of the smelting department is the blast furnace house, which comprises eight furnaces, each 48 by 160 inches at the tuyeres. In their general design they are similar to those at the Arkansas Valley works at Leadville. There are 10 tuyeres per side, a tuyere passing through the middle of each jacket, the latter being of cast iron and 16 inches in width; their length is 6 feet, which is rather extraordinary. The furnaces are very high and are arranged for mechanical charging, a rectangular brick down-take leading to the dust chamber, which extends behind the furnace house. The

furnace house is erected entirely of steel, the upper floor being iron plates laid on steel I beams, while the upper terrace of the lower floor is also laid with iron plates. As previously remarked, the lower floor drops down a step in front of the furnaces, but there is an extension on each side of every furnace, which affords the necessary access to the tap-hole. The height of the latter above the lower terrace leaves room for the large matte settling boxes, and the matte tapped from the latter runs into pots on the ground level, dispensing with the inconvenient pits that are to be seen at some of the older works. The construction of the blast furnaces, which were built by the Denver Engineering Works Company, is admirable in all respects. The eight furnaces stand in a row, about 30 feet apart, center to center. The main air and water pipes are strung along behind the furnaces. The slag from the matte-settling boxes overflows into single-bowl, Nesmith pots, which are to be handled by means of small locomotives. The foul slag is returned by means of a continuous pan-conveyor to a brick-lined, cylindrical steel tank behind the furnace house, whence it is drawn off through chutes as required for recharging.

The charges are made up on the ground level, immediately behind the furnace house. The ore and fluxes are brought in on trestles, whence the ore is unloaded into the beds and the fluxes into elevated bins. These are all in the open, there being only two small sheds where the charges are made up and dumped into the cars which go to the furnaces. There are two inclines to the latter. At the top of the inclines the cars are landed on a transferring carriage by which they can be moved to any furnace of the series.

The dust flue extending behind the furnace house is arranged to discharge into cars on a tramway in a cut below the ground level. This flue, which is of brick, connects with the main flues leading to the chimney. The main flues are built of concrete, laid on a steel frame in the usual manner and are very large. For a certain distance they are installed in triplicate; then they make a turn approximately at right angles and two flues continue to the chimney. At the proper points there are huge dampers of steel plate, pivoted vertically, for the purpose of cutting out such section of flue as it may be desired to clean. Each flue has openings, ordinarily closed by steel doors, which give access to the interior. The flues are simple tunnels, without drift-walls or any other interruption than the arched passages which extend transversely through them at certain places. The chimney is of brick, circular in section, 20 feet in diameter and 225 feet high. This is the only chimney of the works save those of the boiler house.

The boiler house is equipped with eight internally fired corrugated fire-box boilers. They are arranged in two rows, face to face. Between the rows there is an overhead coal bin, from which the coal is drawn directly to the hoppers of the American stokers, with which the boilers are provided. Adjoining the boiler house is the engine house, the latter a brick building, very commodious, light and airy. It contains two cross-compound, horizontal Allis-Chalmers (Dickson) blowing engines for the blast furnaces, and two direct-connected electrical generating sets for the development of the power required in various parts of the works. A travelling crane, built by the Whiting Foundry Equipment Co., spans the engine house. In close proximity to the engine house there is a well equipped machine shop. Other important buildings are the sampling mill and the flue dust briquetting mill.

A noteworthy feature of the new plant is the concrete paving, laid on a bed of broken slag, which is used liberally about the ore yard and in other places where tramming is to be done. The roasting furnace houses are floored with the same material, which not only gives an admirably smooth surface, but also is durable. The whole plant is well laid out with service tramways and standard gauge spur tracks and the design has been obviously to save manual labor as much as possible.

PRODUCTION OF PETROLEUM.

In his report on petroleum¹, Mr. F. H. Oliphant invites attention to the following conspicuous features in the production and sale of petroleum in the United States during the year 1901. He notes that the production of crude petroleum was greater than that of any previous year; and that there was a very remarkable increase in the production in the States of Texas and California, a decrease in the production of the Appalachian or Eastern petroleum fields, and a slight gain in the output of the Lima-Indiana region. Of the total production in the United States 80 per cent came from the older Appalachian and Lima-Indiana fields, leaving 20 per cent to be made up from all the other fields; this amount is 11½ per cent greater than the proportion furnished in 1900 by the other fields. There was a slight decrease in the number of wells completed in most of the important fields, and stocks held in the Appalachian and the Lima-Indiana fields were also slightly decreased. There was an average decline of about 24 cents per barrel for crude petroleum at the wells in 1901 as compared with 1900. The exports of petroleum and its products increased and were larger than ever before recorded, although there was a slight decrease in their total value. The year was conspicuous for the new pools found and for the new production in the Southern and Western States, which was followed by the organization of an immense number of petroleum stock companies representing many millions of capital.

The total production of crude petroleum in the United States in 1901 was 69,389,194 barrels, being larger than that of any previous year. It was larger by 5,768,665 barrels, or 9 per cent, than the production of the year 1900. The increase in the production of 1900 over 1899 was 6,291,854 barrels, or 11 per cent, and the increase in 1899 over 1898 was 3 per cent, or an average gain of 7.7 per cent for the last three years.

As compared with the value of the total production of 1900, 63,620,529 barrels, valued at \$75,989,313, the total production of 1901, 69,389,194 barrels, valued at \$66,417,335, shows a decline of \$9,571,987. In the order of production Ohio comes first, with over 21,000,000 of barrels; West Virginia second, with over 14,000,000 of barrels; Pennsylvania third with over 12,000,000 of barrels; California fourth, with over 8,000,000 of barrels; Indiana fifth, with over 5,000,000 of barrels; Texas sixth, with over 4,000,000 of barrels, a loss in production, as compared with 1900, for Ohio, West Virginia and Pennsylvania, and a gain of nearly four and a half millions of barrels for California; of a little over three and a half millions of barrels for Texas, and of nearly nine hundred thousand barrels for Indiana. This production for 1901, by fields, was in round numbers for the Appalachian field 33,600,000 barrels; the Lima-Indiana field 21,900,000 barrels; the Southern California field 8,800,000 barrels, and for the Texas field 4,400,000 barrels.

The quality of the petroleum produced from these new sections is generally much inferior to that produced in the old fields, but the greater part of it is valuable as a fuel in its natural state, or after some of the more volatile products have been removed, and is particularly acceptable as fuel in the absence of available coal deposits in the Southwest and West. In 1901, the Appalachian field produced 48.45 per cent of the total output, the Lima-Indiana field 31.61 per cent, and all other fields 19.94 per cent, as compared respectively with 57.5 per cent, 34.34 per cent, and 8.61 per cent in 1900. The new fields of California, Colorado, Kansas, Wyoming and Texas, it is observed, produced practically 20 per cent of the total production of 1901, a gain of 11.4 in percentage over 1900, with the probability that the Southwest and West will produce 35 per cent of the total output in 1902.

The average price paid for all the petroleum marketed in the United States during 1901 was 95.7 cents per barrel, as compared with \$1.194 in 1900,

showing a decrease of 23.7 cents per barrel or 20 per cent, the lowest price since 1898. The gross decrease in value for 1901, as compared with 1900, was nearly 13 per cent, notwithstanding that the quantity increased for the same period a little over 9 per cent. The average price paid for Pennsylvania petroleum, which represents 48.5 per cent of the total production, was \$1.21 per barrel in 1901, as compared with 57 per cent produced in 1900 and marketed at an average price of \$1.356 per barrel, a decline of 14.6 cents per barrel, or 12 per cent. There was a decline of 37.7 cents per barrel in the average price paid for California petroleum, and a decline of 76 cents per barrel for the Texas product in 1901, as compared with 1900—a decline accounted for by the increased production of the new fields developed in both these States.

The total number of wells completed in 1901 in the United States in the search for petroleum approximates 14,250, of which 3,220 are estimated to be dry. The cost of these 14,250 wells is estimated at \$21,375,000, approximately one-third of the receipts for the entire crude product.

In 1901, for the first time in the history of the trade, the total number of gallons of petroleum and its derivatives exported exceeded 1,000,000,000, the number of gallons being 1,062,750,306, a gain of 9 per cent over the exports of 1900. The value of these exports in 1901 was \$71,479,124, as compared with a value of \$73,276,282 in 1900. The total exports of manufactured petroleum from Russia in 1901 was 390,920,095 gallons, about 36.8 per cent of the exports from the United States.

The average price received for all the various grades of petroleum exported from the United States in 1901 was 6.73 cents per gallon, as compared with 7.52 cents per gallon received in 1900 and with 6.83 cents per gallon in 1899. The developments of the oil pools at and near Beaumont, Texas, and in the section surrounding Bakersfield, California, and the developments at Boulder, Colorado, have been the chief causes of the organization of 1,578 oil stock companies with a capitalization, acknowledged and estimated, of \$669,083,000 in 1901.

New York continued to be the leading port for the export of petroleum and its products during 1901. Of the total amount shipped abroad, about 56.66 per cent was sent from that city, 30.75 per cent from Philadelphia, 8.75 per cent from Delaware ports, 3.75 from Baltimore, and less than one-tenth of one per cent from Boston. It is estimated that 45 per cent of the entire product of the crude petroleum produced in the United States finds a market abroad, notwithstanding the high duties that are imposed by almost all countries, except Great Britain, upon all imports of our petroleum. This fact seems to indicate that no other artificial source of light can replace petroleum in the markets of the world.

COAL IN BAVARIA.—The London *Colliery Guardian* says that in December, 1901, coal was discovered at Sammersdorf, near Ansbach, in Bavaria. The extent of the deposit has not yet been ascertained.

COAL IN TURKEY.—The British Consul at Erzeroum (Turkey), in a recent report states that in addition to the lignite deposits of Kara Khan, described in a previous report, two fresh coal seams were working during the past year under the direction of a Greek foreman sent from the Eregli mines at the request of the late Vali, Raouf Pasha. These seams are situated, one near the village of Lezghaif in the Tortoum Kaza, and the other in the Kaza of Nariman near the Russian frontier. The coal extracted from the latter appears to be of considerably greater value than that of Kara Khan, being of a somewhat bituminous character. Like the other, it has so far been mainly supplied for the use of the barracks and military kitchens, but a small quantity has also been placed on the market at 48 piastres per kantar, or a trifle less than \$10 per ton.

THE DOMINION STEEL PLANT AT SYDNEY, CAPE BRETON.

The report of the Dominion Iron & Steel Company, just issued, gives a description of its new plant at Sydney, on the island of Cape Breton, Nova Scotia, which is so clear and concise that we reproduce it below in full, as giving a complete and official description of these important works.

The principal supply of ore is from the company's mine at Bell Island, Newfoundland, about 400 miles from Sydney, where there is an immense deposit of red hematite. This mine has been equipped with modern machinery and shipping piers, capable of handling about 5,000 tons of ore per day. In addition to this mine the company has acquired, for the purpose of obtaining the necessary furnace mixtures, several mining leases in the Province of Nova Scotia, and, for the purpose of making sulphuric acid, a pyrites mine on the coast of Labrador. Some of these properties are now being developed. The company owns a property of remarkably pure marble, from which a very large supply of limestone can be produced. This quarry is situated on the Bras d'Or Lakes, about 60 miles by water from Sydney. There is also a dolomite quarry at George's River, 14 miles by rail from Sydney, from which open hearth furnace lining is obtained, and which was used in the blast furnaces while the Marble Mountain quarry was being developed.

The Marble Mountain quarry is equipped with crushing machinery, and with storage bins and shipping facilities, capable of handling 600 tons per hour. The George's River quarry is also equipped with crushers and shipping appliances of a capacity of 1,200 tons per day.

For receiving the ore and limestone and shipping the product, two piers have been constructed in a most substantial manner; the one, a large pier equipped with five heavy steam unloading machines, rope haulage, and all appliances necessary for the most economical handling of the material; the other, a low level pier, also equipped with four machines, arranged both for unloading ore and loading finished material. From the docks the material is transported in special railroad cars about a quarter of a mile to the stock yards, where it is distributed by standard electrically operated ore-bridges. The coke for the blast furnace is also brought on railroad cars to the bridges from the coke ovens, which are situated about a mile distant.

The coke ovens consist of eight batteries of Otto-Hoffman by-product ovens, there being 50 ovens in each battery, or 400 in all. The plant, which has been running for some time, has a capacity of 1,200 tons per day, but with the compressing machinery now being installed, it is expected that this will be increased about 10 per cent, and that the quality of the product will be improved, allowing a larger yield from the blast furnaces. The present production of coke averages about 1,000 tons per day. The coke ovens are well equipped with machinery for handling material economically, and so arranged that the gases, usually wasted are collected for heating the open hearth furnaces and the tar and ammonia saved for sale as by-products. Before being sent to the ovens, the coal is thoroughly washed, to reduce the ash and sulphur. The washing plant was at first planned to wash only a portion of the coal, but the results were found unsatisfactory, as referred to above, and it has recently been increased to provide for washing all the coal and is now giving very satisfactory results.

The blast furnaces are four in number, of a capacity of 1,000 tons per day. Since the completion of the washing plant, Nos. 2 and 4 are giving perfect satisfaction. No. 3 will be blown in again on July 10, after being re-lined, and No. 1 will be blown in shortly after. There is no doubt as to their working satisfactorily. The waste gases from the blast furnaces are used for firing the boilers, supplying steam for the blowing engines, electric plant and pier unloading machinery.

There are ten 50-ton open hearth steel furnaces of the tilting type. The first heat of steel was made December 30, 1901, and the furnaces have been put

¹Mineral Resources of the United States, now in press, U. S. Geological Survey, David T. Day, Chief of Division.

in operation as fast as they could be lined up. The fifth furnace was started on May 26; the sixth will probably be ready about June 23, and the remaining furnaces at intervals of three and four weeks. The output of steel for the week ending May 31 was 1,800 tons, when four furnaces were in operation, giving a daily average of 75 tons per furnace, but considerable increase of the output per furnace is expected as the organization is perfected.

The open-hearth furnaces are contained in a building 102 feet wide by 832 feet long, of steel construction, with the wall spaces filled in with brick. It is equipped with two 75-ton ladle cranes, two Wellman-Seaver charging machines, and has adjacent to it a calcining plant, a ladle repair shop, and gas producers for heating those furnaces not supplied from the coke ovens.

The blooming mill building is 82 by 480 feet in size, of steel and brick construction, similar to the open-hearth building. It contains 16 soaking pits, a 35-inch roll train, with latest type of tables; hydraulic and steam shears, steel cranes, billet conveyors, etc. The rolling mill was started in February, and has rolled up to June 1 about 14,000 tons, principally in the shape of billets and slabs.

When the company was first organized it was intended to produce nothing but blooms and billets, but the directors subsequently decided that it would be an advantage to get more capital and provide a modern plant, capable, if necessary, of rolling all the product of the open-hearth furnaces into finished rail sections. The steel frame work for the rail mill, hot-bed building, and finishing mill building, is now all erected, and some of the foundations for the machinery are in place. The engines are contracted for, to be delivered August 9, and much of the machinery is well under way in the company's own shops. Were it necessary, the rail mill could probably be completed in October or November, but in the present condition of the markets, it is considered advisable to perfect the organization of the other departments before pushing the rail mill to completion.

The rail mill building is 530 by 65 feet, with engine houses alongside; the hot-bed building, 90 by 135 feet, and the finishing mill building, 90 by 525 feet. They are all of heavy steel construction, to be covered on the sides with expanded metal and cement, and to have corrugated iron roofs. All of the equipment will be of the latest type to handle the product in the most economical manner.

In addition to the steel making plant proper, the company has a foundry, 92 by 192 feet, equipped with two electric traveling cranes, and cupolas for making iron and brass castings. A machine shop, 92 by 256 feet, which has a full equipment of machine tools capable of handling all the repair work, and in which a large part of the new rail mill is now being constructed. There are also a large wood working shop, tin shop and pipe shop, all well organized and equipped to make repairs or construct anything required about the plant.

There is an electric power station, equipped with three 300-kilowatt generators, to supply current for lighting, electric cranes and other electrically driven machinery about the plant. It is built in a most substantial manner with a steel frame, brick walls, and tiled roof. All machinery in it is the best procurable.

The docks and various departments are connected by a complete system of broad-gauge tracks, about 15½ miles in all, and the steel departments have in addition a system of narrow-gauge tracks covering 2½ miles. The rolling stock comprises 81 flat cars, 59 gondolas, 90 hoppers, 8 locomotives, all of standard gauge, and a full equipment of narrow-gauge locomotives and cars, consisting of 5 locomotives, 54 ingot cars, 38 billet cars, and 40 charging boxes.

The company controls an unlimited fresh water supply from Sydney River, about 5 miles distant, to which connection has been made by a 24-inch main, and where a pumping station has been erected, with pumps of about 6,000,000 gallons daily capacity.

The company owns about 500 acres of land, deeded to it by the Corporation of Sydney, for the purposes of its works and possible additions to the

plant, and has also acquired other real estate, affording ample space for workmen's houses; a number of these have been erected, suitable for the company's employees.

MINING NOTES FROM CHINA.

SPECIAL CORRESPONDENCE.

There is not much new in mining matters in China. The new mining regulations issued by the Chinese government show the same desire to prevent foreigners making any money out of Chinese mines that has been so painfully apparent in the past. The foreign ministers at Peking have declined to accept these regulations and have asked that they be modified; possibly some improvement may be made in the future. The only sensible thing that has been done in the negotiations with the Chinese was Dr. Timothy Richard's stipulation with the Shansi authorities that 50,000 taels (\$25,000) should be paid annually for 10 years for a foreign college in Tai Yuan Pi; the money and college to be entirely under foreign control.

There are a number of syndicates represented in China who have engineers exploring in various parts of the country. I have not heard that any concession has been sanctioned by the Peking authorities since 1900. The Lu Han Railroad from Peking to Hankow is being built and being extended both from Hankow north and from Peking south. The Peking Syndicate has just sent a party of about 20 engineers and assistants to build the railroad from their mines at Huai Ching in Northern Houan to a point on the Wei River. This railroad will be about 80 miles long and will be finished in two years. This same syndicate is trying to get a concession for some 600 miles of road from Huai Ching Fu to Nanking on the Yang-Tze River, but they are opposed by Sheng Taotai, who says the railway will interfere with the Lu Han line.

The quicksilver mines in Kuei Chou province are now being worked by an English company, and have produced about 500 flasks of quicksilver so far, which is sold in Hong Kong. Engineers have recently gone to the mines and a large amount of machinery is going forward, so it is probable that work will be carried on extensively in the near future.

It is reported that concessions have lately been obtained for the petroleum in Szechuan. Petroleum is found over a large area there, with brine, but though many thousands of wells have been bored by the Chinese no flowing well has ever been found. The most productive well I have heard of is said to give about 10,000 gallons per day when worked, but as there is no special demand for the oil only a small quantity is produced.

The Kai Ping coal mines near Tientsin are the most important mines operated by foreigners in China and are turning out nearly 3,000 tons of coal per day. Judging from the fact that nearly all the British employees are being replaced by Belgians, it seems as if the control of these important mines had passed into Belgian hands, though this is denied by the management.

It is reported that steel rails are now being made at Hankow (Hanjang Iron Works) for 22 taels (about \$12) a ton, but that the "squeezes" are so many that the works are still losing money. There is some talk of the Japanese taking over these iron works.

The Siberian Railway is now completed to Port Arthur and the journey can be made all the way by rail to Irkutsk—with the exception of the crossing of Lake Baikal—and in fact to Calais by this line. Shanghai is now only 24 days from London. The Germans are steadily working on their railroads in Shantung and say they are going to build all the way to Si Ngan Fu, the capital of Shensi, and I have no doubt they will do so. The fact that they have no concession will be got over somehow, mailed fist or otherwise.

Some "old China hands" think that there will be another Boxer outbreak this fall.

THE JOHN FRITZ MEDAL.

An organization of members of the four great national engineering societies has been effected to found a gold medal fund in honor of the eightieth birthday anniversary of John Fritz, the celebrated American metallurgist, which occurs in September next. The bodies represented are the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Institute of Mining Engineers, and the committee formed comprises the following: S. T. Wellman, chairman; C. Kirchhoff, secretary; John Thomson, treasurer, and fourteen other gentlemen. The subscription to the fund is \$10, and it is expected to raise \$5,000 or \$6,000. The founding of the medal will be celebrated in the fall by a dinner, about November. Rules and regulations governing the award of the medal by a board of sixteen, drawn from the membership of the four societies, have been prepared. The medal is to be awarded annually by a board of sixteen persons, equally representing the four societies named, and it shall be awarded "for notable scientific or industrial achievement." Every indication points to the great success of this plan of doing honor to one whose work has done so much for the advancement of American iron and steel industries.

COMMERCIAL SOUTH AFRICA.

The establishment of peace between the Boers and British has initiated great activity not alone in South African industries, but also in export circles throughout Great Britain, Continental Europe and America. Each country that did a large business with the Transvaal before the war is now rapidly increasing its shipping facilities and running steamers at closer intervals than before hostilities began. As an illustration of the confidence felt in America, the Prince Line announces that it will in future operate its East and South African steamers jointly with the Houston Line for South and East African ports. These steamers will make fortnightly trips, and there is every reason to believe the movement will be a success. It will give American manufacturers of mining machinery unusual opportunities for reaching South African markets. It is also noticeable that in England, Germany and Austria prominent merchants and manufacturers have organized committees for the purpose of more effectively propagating their trade in competition with the Americans. One of these syndicates was recently organized in England by 9 or 10 well-known engineering concerns, who will send experts to the Witwatersrand to solicit orders for all classes of mining machinery, etc. This is certainly a good idea from an economical standpoint, and may result in benefiting the manufacturer, but as long as American mining engineers are employed and American machinery manufacturers continue to follow specifications minutely and sell cheaply, there is no cause for our exporters to worry.

WATER POWER IN SWEDEN.—The London *Colliery Guardian* says: "The Sandviken Iron Company at Sandviken, near Gefle, in Sweden, is making a new departure. The directors of the company are said to have entered into a 50-years' agreement with the owners of a large waterfall at Näs on the Dal River, about 35 miles southwest of Sandviken, for the hire of about 2,500 horsepower to be used in lieu of coal for the driving of the machinery at the works.

GERMAN TRADE IN MACHINE TOOLS.—Germany imported only 1,872 tons of machine tools in 1901, against 7,072 tons in 1900. The first three months of 1902 show a further decrease, there being imported only 251 tons, while in 1901 it was 615 tons, and in 1900 2,235 tons. Germany imports machine tools chiefly from the United States, but these imports have greatly declined. In 1900 they amounted to 5,233 tons, and in 1901 they were only 1,282 tons. The decrease of imports of machine tools from the United States is attributed to the flourishing condition of business here, which causes manufacturers to neglect the export trade to Germany.

A BLOWING ENGINE DRIVEN BY BLAST FURNACE GASES.*

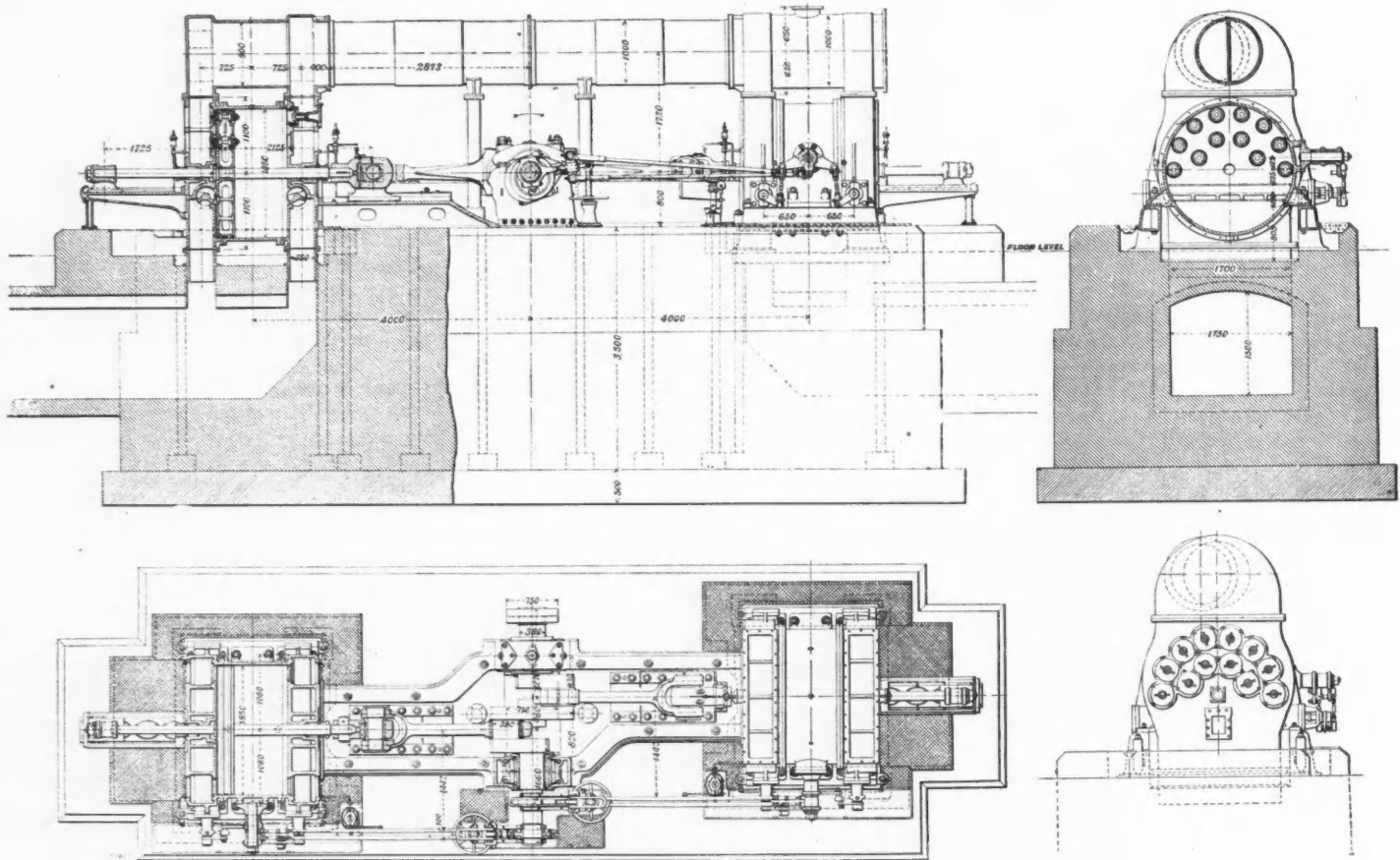
One of the latest improvements in the metallurgical industry is the direct application of blast-furnace gas as a motive agent. Some of the most progressive blast-furnace owners had for several years past put down the necessary plant for collecting this gas and delivering it to special steam boilers, in which it was made to burn by supplying one equivalent of air in the firebox, together with the gas. It was long thought that a better and cheaper method of utilizing this by-product could not be found, when the advent of the blast-furnace gas engine diverted the attention to a new departure in engine construction. Some works owners still maintain, however, that the use of steam engines driven by steam which is generated in blast-furnace gas-fired boilers can hardly be beaten for economy, even by the direct driving of gas engines with the blast-furnace gas. These manufacturers have evidently a

obvious reasons, it is driven by producer gas supplied from gas generators which have been put down in an annex to the pavilion, and have a capacity of from 800 to 1,000 horse-power.

It is proposed in the present article to deal only with the blowing engine shown in the illustration. The comparatively high speed of 135 revolutions per minute at which it runs has been rendered possible by the use in the blowing cylinders of Stumpf's patent delivery valves. Three engines of this type have been built by the Gutehoffnungshutte Works at Sterkrade; two of these are of 500 horse-power, and the third is the 1,000 horse-power engine in question, which has been sent to Dusseldorf previous to being put in service. The drawing shows a section, a plan and two end views. As will be seen from these, the engine is so designed that the two blast-cylinders are worked by a common two-throw shaft, direct-coupled by a flange coupling to the gas motor shaft. The following were the conditions to

their removal. Similar valves were fitted to a blast-engine, supplied in September, 1900, to a steel plant in Lorraine, on which they have been in constant operation since.

In order to increase the air pressure from 0.5 to 0.75 atmosphere with the attendant decrease in volume to 700 cubic meters, the suction slide governing mechanism has been provided with a regulating device. In arranging for this it had to be borne in mind that the point at which the suction valves should open is little affected by the change in pressure of delivery, the expansion line of the cushion air crossing the atmosphere at practically the same point in two cases. On the other hand, a smaller quantity being delivered at the higher pressure, it is necessary to keep the suction valve open till the piston has finished one-fourth its return stroke, during which part of the air drawn in on the suction stroke is returned to the atmosphere. Both these conditions have been met by the provision of



BLOWING ENGINE OF 1,000 HORSE-POWER, DRIVEN BY BLAST-FURNACE GAS.

very perfect and complete system of gas-fired boilers, or have not been satisfied hitherto with any of the numerous arrangements that have been designed for absorbing the dust from the blast-furnace gas, previous to its delivery to the gas engines. It is true that these apparatus have, perhaps, been too intricate, and it will, no doubt, be found that the best device which will ultimately evolve from the numerous trials and experiments in this most important accessory side of the problem, will be constructed on simpler lines than those which have so far been brought forward. This comparatively new departure in the construction of powerful engines is well illustrated at the Dusseldorf Exhibition. The Deutz Gas Engine Works, of Deutz, near Cologne, is among the older and larger firms which have made a specialty of the construction of combustion motors. They have exhibited, in conjunction with the Gutehoffnungshutte, one of the largest metallurgical and industrial companies of Germany, a 1,000 horsepower gas-driven blowing engine which runs at 135 revolutions per minute. This engine has been designed for working with blast-furnace gas. At the Gutehoffnungshutte pavilion, however, and for

be met by the constructors: To design and build a blowing engine, coupled direct to the shaft of a 1,000 horse-power Deutz blast-furnace gas-engine, the blowing engine when running at a normal speed of 135 revolutions per minute to deliver 1,000 cubic meters (35,316 cu. ft.), at a pressure of 0.5 atmosphere (7.112 pounds per square inch), the pressure to be evenly raised to 0.75 atmosphere under approximately identical working conditions for the gas motor. The latter pressure involved a reduction in the quantity of air drawn in to 700 cubic meters, which was agreed to. Both air cylinders are 1.850 meters in diameter, with 10.750 meter stroke.

For the suction, governed Corliss valves are used, and, as stated above, Stumpf's patent valves are used on the delivery side. These open to the inside of the cylinder, under the action of the air-pressure, and are closed by the india-rubber buffers fitted to the piston. The greatest valve-lift does not exceed 26 millimeters (1.02 inches); the valve itself weighs 2.3 kilograms, and measures 0.265 meters outside diameter; they are of forged steel, and there are 12 in each cylinder cover. The valve boxes and valve seats are held by springs, and all the component parts are light in weight, thus greatly facilitating

means for altering at will the lap and lead of the suction valves.

Each suction valve is governed by a separate oscillating bell-crank driven by a special eccentric rod, there being for each pair of valves one eccentric only, but two rods, as shown. These valve-rods end in collars which slide on guide-rods swivelling about the main shaft, one on either side of the eccentric. The guide rods are connected at their other ends with a screw adjusting gear and hand-wheel, as shown, by which their inclination to the horizontal can be changed, and in this way the resultant motion transmitted to the valve bell-crank is varied, thus altering the lap and lead of the valves as required.

IMPORTS OF IRON ORE IN GREAT BRITAIN.—The imports of iron ore into Great Britain for the five months ending May 31 were, in long tons:

	1901.	1902.	Changes.
Spain	1,821,421	2,158,190	I. 336,769
Other countries.....	312,894	421,714	I. 108,820
Totals	2,134,315	2,579,904	I. 445,589

The gain this year has been a very considerable one, 20.9 per cent. This indicates better conditions in the iron trade.

*Abstract of article in London Engineering.

THE LITHOGRAPHIC STONE DEPOSITS OF EASTERN KENTUCKY.*

By E. O. ULRICH.

Limestone possessing more or less of the requisites of lithographic stone are of not uncommon occurrence in many parts of the world, and the discovery in this country of deposits of stone "equal to the German" is so often reported in newspapers and trade journals that the layman must find it surprising to learn that nearly all of the stone used by lithographers is still derived from the Bavarian quarries. On investigation something proves wrong in nearly every case with these reported discoveries. Generally the stone is wholly unfit for the lithographer's purpose; and, if it does at first seem to

fracture. Thus, while the less compact strata over and beneath it often adapt themselves to the strain without fracturing, the lithographic stone, especially the higher grades, nearly always breaks. These fractures are generally cemented by crystalline calcareous deposits, and when they are fine and not too numerous may not prove seriously detrimental—indeed, very few high-grade stones are entirely free of them.

Considering the hitherto almost invariably unfavorable result of close investigations of lithographic stone deposits in this country, it was with something akin to prejudice that the writer entered upon the journey to the part of Eastern Kentucky from which fine-looking samples of lithographic stone had been

pected, their project failed, not because they could not get the stone, for they seem not to have tried, but because they could not get people to buy stock. Nothing further was done toward the development of the deposits until last spring, when they were secured by a company of enterprising young men of Mount Sterling and Louisville. Since then prospecting operations have been carried on in a quiet and conservative manner. Practical tests of the stone have been made in the lithographic department of the *Courier-Journal* Job Printing Company of Louisville, and in the lithographic department of the United States Geological Survey at Washington, with satisfactory results in both cases.

Geology.—Topographically the country about Yale is hilly—almost mountainous—the hills being mostly narrow and ridge-like, with abrupt slopes and narrow valleys between them. The hills rise from 250 to 350 feet above the bed of Licking River, and are well wooded with forests of oak, hickory, chestnut, ash and pine. The farms are almost entirely confined to the valleys.

Nearly 250 feet of the slopes of the hills are made up of the shales and thin sandstones of the Waverly series. Above these come from 10 to 20 feet of yellow and earthy sandstones, sometimes shaly and showing occasionally a conglomeratic phase. The thickness of the next bed varies in short distances from 0 to 16 feet. Usually it is a gray white, containing a greater or less percentage of quartz grains, the relative amount of the latter giving the bed at one point the character of an arenaceous oolitic limestone, while at another it would be more appropriately described as a calcareous sandstone. The next higher bed contains the gray and blue lithographic stone, and occupies an interval of about 15 feet. Not infrequently it rests directly upon the yellow shaly sandstone. Succeeding the main lithographic bed there are from 15 to 20 feet of yellow, and usually compact, limestones, in layers varying from 10 to 20 inches thick separated apparently by shales. These limestones are generally composed of minute crystals of calcite imbedded in a calcareous and earthy matrix. One of the layers, however, is very coarsely crystalline. Five or six take a high polish, and one looks as if it would afford a fair article of yellow lithographic stone. The cap of most of the hills is formed by a bed of dirty-white oolitic limestone having a maximum thickness of 18 to 20 feet. Finally, only the highest points preserve the next and youngest bed seen in this vicinity. This is a heavy bedded sandstone containing layers of conglomerate made up of sand and quartz pebbles usually varying from 0.5 to 2 inches in diameter. This last formation represents the usual basal member of the Lower Coal Measures as developed in Eastern Kentucky. The oolitic and lithographic limestone beneath them represent only the lower part of the St. Louis group of the Mississippi Valley, while the intervening Chester group is wanting here entirely.

The limestones of the St. Louis group, especially in Kentucky, often present the compact and homogeneous character that distinguishes a lithographic stone from more ordinary varieties of limestone; and it is a noteworthy fact that the only lithographic stone quarry now being operated in this country is situated within this State at Brandenburg, in practically the same geologic formation.

We have said that Yale lies in the center of the field under consideration, and topographically that is true, but when we consider only the valuable parts of the deposit the statement requires modification. In fact, the only portion of the circle of hills worth development is the one-half mile wide segment lying to the east of the town, across the river in Rowan County. The western side of this half-mile of favorable territory is just north of the mouth of Beaver Creek. Apparently throughout the remainder of the circle the stone is, for one reason or another, either unfit for the lithographer's use or its extraction is impracticable.

Even in the area in which there is good stone, its distribution is by no means uniform. Furthermore, at the most favorable points, the good is not un-



LITHOGRAPHIC STONE DEPOSITS IN KENTUCKY.

fill the long-felt want, then it is found to be disappointing for reasons that cannot be determined from hand specimens. As a rule the texture of the rock is neither fine nor homogeneous enough, or it is filled with "needle points"—small glassy spots—or it is of uneven or undesirable tints. All of these are fatal defects. Should the sample pass on these points its chances for acceptance may again be wrecked by some defect that is first brought to light when the stone goes through the hands of the transferer and pressman. Finally, another difficulty is usually encountered that will render the marketing of the stone unprofitable, namely, the impossibility of securing the stone in sizes large enough to command the high prices of from 20 to 40 cents per pound, or even 40 cents to \$1 per pound, that the lithographic stone prospector always holds before himself. It is probably impossible to find good lithographic stones of large sizes in any region that has been subjected to crustal disturbances which has caused folding or profound faulting of the strata. The more even and fine the texture of the rock the more brittle it is, so that relatively unimportant jars will cause it to

received by the United States Geological Survey. The region in question lies on the Licking River in each of, and near the angle of junction between, the counties of Rowan, Bath and Menifee. The town of Yale, a new settlement grown around and supported by a chair factory, lies in the center of the area and is connected by a narrow gauge railroad with the Louisville branch of the Chesapeake & Ohio Railroad at Salt Lick, Kentucky. The latter point is about 20 miles east of Mount Sterling, one of the most progressive towns of the State.

The fact that lithographic stone of excellent quality occurs in this region is not by any means a recent discovery. Indeed, no less than 30 years ago it was recognized by an antiquarian named James Hood, who secured several pieces at that time and sent them to different cities to be tested. Good reports coming in, a considerable tract of land was bought and an attempt made to sell the prospect, without offers, however, until a large sample sent to the Centennial Exposition at Philadelphia proved its superiority by taking a gold medal over the German stone. New York capitalists are said to have offered \$150,000 for the property, but the unwise Kentuckians thought it better to organize a million-dollar stock company for themselves. As might have been ex-

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mixed with evil. Despite it all, however, the writer is of the opinion that lithographic stone, equal in quality to the best known, may be quarried here at a profit. The principal element of uncertainty as to the degree of profit lies in the flint which renders the greater part of otherwise excellent lithographic stone wholly useless. This flint is in the shape of flattened nodules varying from an inch to several feet in length. Possibly, when the quarry reaches well into the hill, the flint may become less troublesome. It is almost certain that it will not become more so. On account of these flint nodules, which occur chiefly in the layers having the most favorable lithographic qualities, much of the stone after dressing will be too thin to stand the strain of the printing press. But these thin stones, as has been demonstrated by experiment, may be made quite serviceable and strong by backing them with a slab of Tennessee marble or other tough rock.

Perhaps the finest stone in the field, so far as texture and tint are concerned, occurs in the hill from the southern part of which the first specimens were obtained nearly 30 years ago. Indeed, no better grade of lithographic stone can be found anywhere, and it would doubtless be a very valuable deposit except for one fatal defect. Being struck by the excellent quality of the stone, the writer made an unusually careful examination. The result proved most disappointing, for he was forced to the conviction that, on account of uncemented fractures, that are so close together that anything like good-sized stones is out of the question, the deposit here is practically worthless. It is doubtful if a stone 2 feet square could be obtained here, and it would certainly not pay to remove the 10 to 15 feet of cover to secure stones of that size. However, it would probably be worth while to work the outcropping edges of the more favorable layers. In following the layers northward it was noticed that the fractures became less frequent, but at the same time it was observed that the quality of the stone deteriorated rapidly in that direction.

Taking all features into consideration, there is but one point at which extensive quarrying is now justified. This lies about 1/4 mile northeast of the original discovery on the property leased by the Mount Sterling and Louisville parties before mentioned. Here the gray-blue stone is above the average in quality and size, while the yellow stones and marble layer are heavier, less earthy, and of more desirable tints than at any other point visited. The stripping required to uncover the valuable stone also is here much less, varying from nothing to a maximum of about 15 feet. Finally, this is perhaps the only point affording a natural and reasonable grade for a wagon road from the Licking Valley to the top of the hill.

The five or six layers of yellow stone appear to the writer as eminently fitted for interior decoration, while at least one of the layers may be used for exterior work. Good stones of pleasing yellow tints are not common, so it is scarcely to be doubted that a market may be found for these. Viewing them for the present as a by-product, leaving time to show if their relations to the gray stone may not be reversed, the proposed quarrying of lithographic stone in Eastern Kentucky may reasonably be expected to prove a successful and paying venture.

the previous year. The liquid ammonia is largely consumed in the sherry district for preparing casks by the Ivison process, while sulphate of ammonia is sold to the beet sugar growers. There are numerous gas works in Spain, but comparatively few recover the ammonical liquors which go to waste, owing chiefly to the difficulty of transportation and scarcity of sulphuric acid. Consequently, of the 30,000 tons of ammonia consumed annually in Spain, only about one-tenth is produced locally, the balance being imported from Great Britain and Germany. Copper sulphate exports in 1901 were nearly 2,000

imported ore. The quantities paid for in 1901 were 351,259 tons pig iron, 5,568 tons puddled bars and 33,352 tons steel ingots.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—The imports of fuel into Spain for the three months ending March 31 were 744,522 metric tons of coal and 53,530 tons of coke. Imports of metals included 1,370 tons pig iron, 1,492 tons of wrought iron and 3,894 tons of steel. Exports of minerals are reported as below by the *Revista Minera*, in metric tons:

	1901.	1902.	Changes.
Iron ore.....	2,194,386	2,392,117	I. 197,731
Copper ore.....	350,951	317,440	D. 33,511
Zinc ore.....	24,707	19,778	D. 4,929
Lead ore.....	123	21	D. 102
Pyrites.....	145,811	160,840	I. 15,029
Salt.....	98,521	84,716	D. 13,805

Exports of metals included 22,103 tons pig iron, against 2,937 tons for the corresponding period in 1901; 6,618 tons copper, against 7,265 tons; 899 tons zinc, against 885 tons; 53,581 tons lead, against 42,766 tons last year.

ABSTRACTS OF OFFICIAL REPORTS

Dominion Iron and Steel Company, Limited.

This company is building and has nearly completed extensive iron and steel works on the island of Cape Breton in Nova Scotia. Its report covers the year ending April 30, 1902. The only financial statement given is the balance sheet, which is as follows:

LIABILITIES.	
Common stock.....	\$15,000,000
Preferred stock.....	5,000,000
Bonds.....	8,000,000
Notes and accounts payable.....	3,544,947
Reserve.....	52,441
Total liabilities.....	\$31,597,388
ASSETS.	
Property account.....	\$29,419,535
Raw material, products, etc., on hand.....	1,488,672
Accounts receivable.....	591,198
Cash.....	97,983
	\$31,597,388

N. B.—Since the close of this report 50,000 shares common stock have been underwritten at \$60 per share. This will bring the sum of \$3,000,000 (less commission) into the treasury by July 11, and will be used for reducing debt and further improving the property.

The report says: "During the past year construction work has been steadily pressed forward and the entire plant is now almost completed, with the exception of the rail mill. As might be expected, the output during the time when the plant was still under construction did not realize working expenses; but the costs will now show a reduction each month, and as soon as some changes are completed, the company will be able to show satisfactory commercial results.

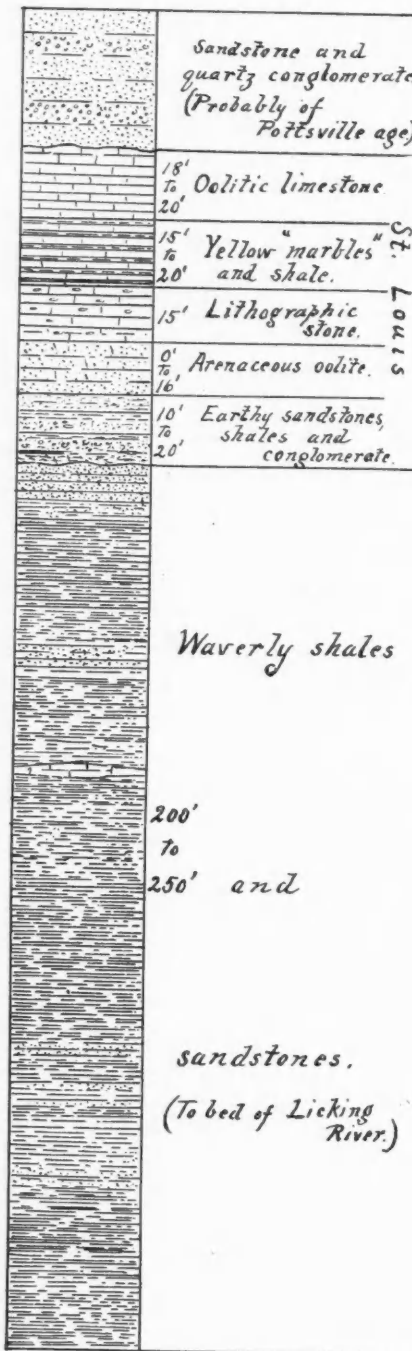
"The principal difficulty to be overcome in the commencement of such an enterprise is to so contrive from the first that the different parts of the enterprise will work together harmoniously with the least possible waste of energy and expense; and the larger the property is the more difficult it will be to achieve this. . . . The mistake which has proved most detrimental was that of not keeping the washing plant ahead of the blast furnaces. It was originally calculated that it would be necessary to wash only one-third of the coal required for use in these furnaces, but experience has proved that in order to ensure first-class results the entire supply must be washed. Since the washing plant has now been enlarged, this handicap on the production of the blast furnaces is removed.

"The steel manufactured by the company is of the first quality, and has given satisfaction everywhere."

The report contains a description of the property of the company, which we give elsewhere separately.

Dominion Coal Company, Limited.

This company owns a large coal property in the island of Cape Breton, Nova Scotia. The report is for the year ending February 28, 1902. The capital account includes \$15,000,000 common stock; \$3,000,-



SECTION OF ROCKS NEAR YALE, KY.

CHEMICAL TRADE OF SPAIN.—In 1901 the production of salt amounted to 508,494,520 pounds, showing an increase of nearly 35 per cent as compared with the previous year. Most of this was exported to foreign countries, particularly to the River Plate and Newfoundland. The total exports were 434,102,580 pounds, which exceeds those of 1900 by 50 per cent. Stocks on hand on January 1, 1902, were 1,278,854,920 pounds, which is 74,394,040 pounds more than was held on the same day in 1901. Freight rates to foreign countries were somewhat less than 1900. Prices for salt suffered severely from competition. The ammonia industry is progressing, and in 1901 there were produced from gas works at Cadiz 50 tons of liquid ammonia and 80 tons sulphate of ammonia, both showing an increase over

tons, all of which went to France and Algiers, while 4,000 tons were produced for consumption in the Peninsula.

CANADIAN IRON AND STEEL BOUNTIES.

—The bounties paid by the Dominion Government on iron and steel made in Canada have been as follows for two years past:

	1900.	1901.	Changes.
Pig iron.....	\$238,296	\$351,259	I. \$112,963
Steel ingots.....	64,360	100,058	I. 35,698
Puddled bars.....	10,124	16,703	I. 6,579
Totals.....	\$312,780	\$468,020	I. \$155,240

The bounty on puddled bars is \$3 per ton; on steel ingots, \$3 per ton; on pig iron, \$3 per ton, if made from Canadian ore, and \$2 per ton if made from

000 preferred stock; \$2,704,500 first mortgage bonds; and \$600,784 sectional bonds and debentures. The income account for the year is as follows:

Net proceeds of sales of coal, and net income from railroads, steamers, etc....	\$1,551,881
Interest on bonds.....	\$162,240
Sinking fund payments.....	120,232
Miscellaneous interest, premiums, etc....	91,728
Dividends on preferred stock.....	240,000
	\$614,200
Balance to general surplus.....	\$937,681

The net earnings showed an increase of \$864,586 over those of the preceding year. The coal production of the company's mines for eight years past has been as follows, in tons:

1895.....	884,000	1899.....	1,295,543
1896.....	1,169,785	1900.....	1,739,374
1897.....	1,221,471	1901.....	2,044,877
1898.....	1,061,669	1902.....	2,651,263

The increase last year over the preceding year was 606,386 tons, or 29.6 per cent. The coal mined last year was almost three times the quantity reported for 1895.

"Owing to this increase in the business of the company, it has been necessary to add largely to the mining plant and machinery; railway and equipment; shipping piers; houses for employees, etc.; and during the past year nearly \$1,000,000 have been spent on such extensions and improvements. Since the last annual meeting, arrangements for the supply of rolling stock, and for the erection of workmen's houses, have been completed with the Dominion Rolling Stock Company and the Cape Breton Real Estate Company respectively, by which the company has acquired the necessary rolling stock and houses for its business, the expenditure upon these being provided for by terminable debentures, liquidated by equal monthly payments extending over a period of ten years, in which capital and interest at a reasonable rate are included. These payments are met by the earnings of these properties themselves, and at the end of the period they will become the absolute property of the Coal Company, free from encumbrance. The company has succeeded during the past year in placing its coal in the European markets, where it is well thought of, and when Colliery No. 2 is completed the company will have a market across the Atlantic for any surplus that it may not be able to place among its customers in Canada, Newfoundland and the United States.

"The coal-areas of the company have an extent of 140 square miles, and the known seams over 3 feet in thickness are estimated to contain 1,500,000,000 tons. There are six collieries at present in operation known as Dominion No. 1, Dominion No. 2, Dominion No. 3, Caledonia, Reserve and International. These collieries have been equipped with the most modern machinery for mining, hauling and hoisting the coal. They are thoroughly ventilated. The bank-heads, engine and boiler houses, and pit bottoms of the first four are electric lighted.

"Dominion No. 1 Colliery has a capacity of 70,000 tons per month. The coal seam is known as the Phalen, and is 8 feet thick. The coal shaft is 157 feet deep. The mining is done with puncher type coal cutting machines, driven by compressed air; endless wire ropes being used in haulage. The electric locomotive and haulage in the pit has a capacity of 50 tons per trip. A large duplex pump has been installed in the pit for pumping the mine water to the surface.

"The work of opening Dominion No. 2 Colliery was begun in 1899, and it is now nearing completion. The present capacity is 30,000 tons per month. It is expected that by the close of the year the capacity will be increased to 75,000 tons per month, and the ultimate capacity will be 150,000 tons per month. Two coal seams are worked—the Phalen, 7½ feet thick, and the Harbor, 5 feet 8 inches thick. The shaft is 408 feet deep to the Harbor seam and 900 feet to the Phalen seam. The mining is done by puncher-type coal-cutting machines and hand picks. The mine tubs have a capacity of 2 tons each. The coal is weighed and tipped at pit bottom into a tank hoist of 6 tons capacity which dumps automatically. It is the intention to install compressed air haulage in the pit

bottom to handle the coal to the shaft. The steel bankhead, now being erected, will be 125 feet high.

"The capacity of Dominion No. 3 Colliery is 35,000 tons per month. The coal seam worked is the Phalen, and is 8 feet thick. The mining is done partly by hand and partly by puncher-type coal-cutting machines driven by compressed air. The coal is handled by endless rope haulage.

"Caledonia Colliery has a capacity of 70,000 tons per month. The coal seam is the Phalen, 8 feet thick. It is mined partly by hand and partly by puncher-type coal-cutting machines. Endless wire ropes are used for haulage. The shaft is 182 feet deep.

"Reserve Colliery has a capacity of 75,000 tons per month. The coal seam mined is the Phalen, 8 feet thick. The work is done partly by hand and partly by puncher-type coal-cutting machines, with endless wire rope haulage. There are basket elevators for handling slack coal.

"International Colliery has a capacity of 17,000 tons per month. The Harbor seam, 6 feet thick, is mined by hand picks, endless rope and tail rope haulage.

"The company has also a complete coal-washing plant, capable of washing about 2,000 tons per day; extensively equipped repair shops at Glace Bay; a foundry, car shop, etc.

"The Sydney & Louisburg Railway, which is owned by the company, extends from Sydney to Louisburg, making connections with all the mines—40 miles of main line and 57 miles of sidings. The railway is solidly constructed with 80-pound steel rails; the bridges are of steel with stone abutments, and the grades and curves are light. The rolling stock consists of 19 locomotives, 1,355 flat coal cars, and 12 passenger and service cars. There are two piers at Sydney, having each a capacity of 10,000 tons in 24 hours. At the Louisburg terminus there are also two piers—one a high level, the other a low level pier. The high level pier is equipped with the Robins' belt conveyor and slack pocket, with capacity of discharging 750 tons of coal per hour. The company owns five steamships, two tugs and five barges. During the past winter the equipment has been thoroughly overhauled. The company has at present 1,200 substantially built houses rented to workmen; and also has its own stores at Glace Bay and six subsidiary stores at different collieries."

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.

City of Somerville, Mass. Annual Reports for 1901. Somerville, Mass.; published by the City. Pages, 490; with maps and diagrams.

Western Australia. Statistical Register for 1900. Part XI. Local Government. Compiled in the Registrar-General's Office. Perth, W. A.; Government Printer. Pages, 54; with map.

Die Drahtseile. By Prof. Josef Hrabak. Berlin, Germany; Julius Springer. Pages, 220; with 14 tables and 72 figures in the text. Price (in New York), \$3.50.

The Iron-making and Ship-building Interests in Germany. By E. Schroedter. Dusseldorf, Germany; published by the Schiffbautechnische-Gesellschaft. Pages, 60; illustrated.

South Dakota Geological Survey. Bulletin No. 3. Including Mineral Resources of South Dakota. By Cleophas C. O'Harra, and *Mineral Building Materials, Fuels and Waters of South Dakota.* By James E. Todd, State Geologist. Vermilion, S. Dak.; published by the Survey. Pages, 136; illustrated.

Proceedings of the Wyoming Industrial Convention, Held at Laramie, Wyoming, December, 1901. Laramie, Wyoming; Chaplin, Spafford & Mathison. Pages, 176; illustrated.

Annual Statistical Report of the American Iron and Steel Association, 1901. James M. Swank, General Manager. Philadelphia; the American Iron and Steel Association. Pages, 64.

BOOKS REVIEWED.

Commercial Relations of the United States with Foreign Countries During the Year 1901. Volume 1. Prepared by the Bureau of Foreign Commerce, Department of State. Washington; Government Printing Office. Pages, 1,192.

This volume is compiled from information collected by the Department of State through consular reports and from the trade returns of foreign countries. It contains a large amount of information of much value to merchants and manufacturers interested in extending the export trade of the United States. The Bureau of Foreign Commerce has certainly done some excellent work in this direction.

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

This is a reprint of a long and interesting paper, which gives many details concerning the large power plants which form so important a part of recent industrial development in California. It covers the work of the longest electrical power transmissions in the world, and shows what has been done in the way of utilizing the water-powers of the mountain region of the State. It is illustrated by a number of excellent reproductions of photographs.

United States Geological Survey. Water Supply and Irrigation Papers. Nos. 57 and 61. Preliminary List of Deep Borings in the United States. By N. H. Darton. Washington; Government Printing Office. Pages 60 and 64.

These *Bulletins* contain lists of deep borings made in different sections of the United States, with brief notes on the conditions under which these borings were undertaken, and the results obtained from them. The information has been collected from correspondents in all parts of the country, and has been carefully arranged and classified. It includes under the head of "deep borings" all wells, etc., over 400 feet in depth.

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

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

These reports give some results of the work of the Geological Survey of Tasmania in special districts. They give many details concerning the districts which are of value to miners and prospectors. They illustrate the kind of work which the Survey is doing to advance the mining interests of the State.

Transactions of the Fifth Annual Convention of the Pacific Coast Electric Transmission Association. San Francisco; published by the Association. Pages, 210; illustrated.

The proceedings of the Pacific Coast Electrical Transmission Association possess considerable interest from the fact that its members have constructed and are managing some of the most important power transmission plants in the United States. The utilization of water power and the transmission of it to long distances have been important electrical features in California in recent years, and their particulars of the machinery and appliances used here are naturally of value to engineers. The present volume contains a number of papers of this class, accompanied by the discussions, which are not the least interesting part of the book, as they brought out a great many notes of individual experience.

Etude Geologique et Miniere des Provinces Chinoises Voisines de Tonkin. By M. A. Leclere, Paris, France; Veuve Ch. Dunod. Pages, 220; with maps and illustrations.

This volume gives the results of a mission intrusted to M. Leclere by the French Ministry of Colonies. He

was charged with the exploration of the northern portion of the Tonkin and of the provinces of China adjoining the frontier of the French colony; the special object being to examine the region which would be opened up by the extension of the Indo-Chinese Railroad, and the possible traffic of that line in mineral and other products. This work occupied 17 months, during which the engineer and his party travelled 6,000 kilometers on 15 different lines. Nearly all of the routes explored were through a region heretofore unknown to Europeans, which is now for the first time explored and mapped. In studying the general geology the explorer traces out many interesting points, and defines, for the first time, the connection between the geological formations of the Indo-Chinese peninsula and those of Central Asia, about which there have been much doubt and speculation.

Treating of the economic geology, M. Leclere believes that the region explored may become one of the richest mining regions in the world. He studied it very carefully, with a view not only to the location of mineral deposits, but also to the possibilities of their future exploitation. The coal deposits are very extensive, and it is believed that the workable fields include not less than 30,000,000,000 tons of coal. There are also extensive deposits of gold, copper, tin and iron, some of which are already worked by the Chinese in a crude way.

The book is accompanied by maps showing the geography and geology of the country. The description of the explorations and of the characteristics of the region are followed by three supplementary chapters giving respectively the regulations for the sale of tin at Ko-Tion; the treaty relating to the exploitation of coal and iron mines in the province of Chan-Si; and the general legislation on mining in China.

Les Charbons Americains. Production et Prix, Havage et Roulage Mecaniques. By Ed. Lozé. Paris, France; Veuve Ch. Dunod. Pages, 150; illustrated.

This work is the result of a study of American coal mining, made by a French engineer, who passed some time in the United States. His object, of course, was chiefly to draw attention to the special features in which American mining differs from French practice, and also to consider the possibilities for the export of American coal, in so far as they may affect the French trade hereafter. The points of American practice which principally attracted M. Lozé's attention, were the use of mining machinery, and the different systems of mechanical haulage in mines.

The first part of the book treats of American coal mining generally, its past growth and present condition. This is accompanied by a number of tables showing the total output and the proportions mined by hand and by machine. The second part treats of machine mining, describing a number of machines in use in the United States and the results obtained with them. Some comments are also given on the probable reasons for their success or non-success. The third part relates to mechanical haulage in mines, chiefly electrical haulage. In this, a number of motors are described and illustrated. In addition to the three parts above named, there are three supplementary chapters, the first giving a review of the foreign trade of the United States in coal up to the end of 1900, together with figures as to the possible extension of that trade; and also the current prices of coal at the seaboard, with freight rates to European ports. The second and third chapters, which are comparatively short, refer to the use of coal mining machinery in France and Great Britain.

The book is illustrated by a number of drawings of mining machinery and mine locomotives. It has tables of coal production, and also diagrams showing the production of coal for a series of years in the United States generally, and in several of the more important coal mining states, such as Pennsylvania, Ohio, Illinois and Indiana. The report contains a

great deal of information which must be useful to French mining engineers and coal mine operators.

CORRESPONDENCE.

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

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

The Olalla Copper Mining and Smelting Company.

Sir: A letter published in your Journal of April 19, from Mr. W. M. Brewer, contains what appears to me to be an unfair criticism of the Olalla Copper Mining and Smelting Company. I should have replied to the letter sooner, but it escaped my notice. I have personally examined the claims owned by the Olalla Company, and reported upon them, as has also Neil Cochrane, a mining engineer, of Rossland, B. C. Our reports were favorable, and may be obtained, I think, by application to the company.

I do not know who the absolutely reliable authority referred to by your correspondent may be, but I submit that it is better to rely upon one's own judgment than the mere opinion of another. It would appear to even the casual observer that your correspondent's testimony is hardly competent, inasmuch as he has not personally seen the properties.

Personally, I consider that the development work to date on the Olalla claims has brought to view some of the most valuable properties it has been my privilege to examine. From present appearances, the Olalla property will furnish a large tonnage of pay ore, and with the company owning its own smelter, situated as it will be in a most favorable position (having in mind extent of site, water power, and proximity of mines), it should earn large profits. In view of subsequent development, I see no reason for altering in the least degree the opinion I expressed after a technical examination last year.

As regards the capitalization of the company (\$8,000,000), I consider it, in view first of the character and quantity of ore the company has, and secondly, of the extent of its plans, that it is quite conservative.

The company's plans involve the construction of a local road of over 60 miles from Princeton to Penticton, and the construction of a smelter of large capacity for the treatment of its own and custom ores. It should be remembered that the original vendors of the property accepted a portion of the company's stock in payment in full for the properties. The price which the company places upon its first issues is certainly an evidence of sincerity of purpose, as well as of wisdom, and it will insure sufficient money to enable it to bring its properties to a profitable and paying basis, which is exactly what the shareholders desire and expect.

As to the registration of the company, perhaps I should not make any observation on this point, it being one of law rather than of metallurgy, but still, the law in this case is very simple and plain. A foreign company may carry on business either as a registered company, which involves the payment of certain fees, or it may do so through a trustee. The Olalla Company chooses the latter course, at least for the present. Its position, it seems to me, is absolutely sound. When the company desires to be registered, it may do so.

As regards transportation, I have already touched upon this point. I may say, however, that the Canadian Pacific Railway has its line surveyed through Olalla. The Vancouver, Victoria & Eastern Railway is surveyed to within three miles of Olalla, and it is more than likely that the construction of the Vancouver, Victoria & Eastern will be pushed forward from its present terminus, not stopping until it reaches the port; but the Olalla Company is not dependent upon this being done. As I said before, its plans involve the construction of a local road, a distance of over 60 miles from Princeton to Penticton, connecting at the latter place with the Canadian

Pacific Railway. This will enable it to haul its ores, thus saving to it the profits of transportation, and will also carry the large tonnage that must come from many other mines opening up.

I regard the Olalla Company as having a very bright and highly profitable future before it.

It appears to me that the conditions obtaining at Olalla and the Olalla Company itself are much further advanced than were either the Granby Company or the conditions at Greenwood, Phoenix or Grand Forks 3½ years ago. No one lives to-day who will question the magnificent position of the company now, but their number was legion less than one year ago.

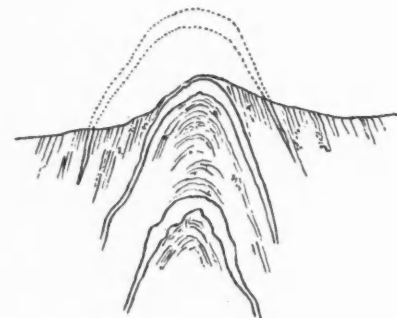
Personally, I believe the Olalla Company will repeat the history of Granby, and will demonstrate it within three years' time.

A. A. WATSON.

Vernon, B. C., May 30, 1902.

The Saddle Reefs of Bendigo.

SIR: In an article under the above heading, by Mr. T. A. Rickard, which appeared in your issue of March 29, the following passage occurs referring to the fact that the saddle reefs are true anticlinal folds which coincide with the bedding planes of the country rock. "It is a curious fact that the true anatomy of the gold-field should have been unknown so long, in spite of the numerous detailed dissections afforded by a tremendous extent of underground workings. This surprise will not be lessened when it is stated that in December, 1888, Mr. E. J. Dunn had published a brief note in one of the Government reports in which he clearly showed that he had correctly diagnosed the case. This contribution of Mr. Dunn's was unknown to the mine managers in the district, and I was not aware of it until he himself drew my attention to it in November, 1890, so that it is a fact that Mr. Dunn and I came independently to the same conclusion."



SKETCH OF SADDLE REEF OCCURRENCE IN BENDIGO GOLD FIELD BY WILLIAM NICHOLAS, PUBLISHED IN 1872.

It is not always easy to obtain all the literature written on a subject, therefore it may not be surprising that the conclusions of others besides, in fact prior to, Mr. Dunn have been overlooked, as the following quotation, which was published in 1872, will prove. That Mr. Nicholas recognized the saddle reefs (to which the quotation refers) were interbedded is made clear by the accompanying sketch, which is copied from the work referred to. Mr. Nicholas writes: "As reefs usually conform with the underlie of the strata in which they occur, it is improbable that an easterly underlying quartz reef would be found in strata dipping to the west. I make this last remark to show that some attention should be bestowed on the underlie of the strata before commencing to trench."

The quotation and sketch are found in a paper entitled "Notes on the Quartz Reefs and Mines of the Bendigo Gold-field," by William Nicholas, published in a book called *The Bendigo Gold-field Registry* in 1872 by John Neill Macarthey, Melbourne.

FRED DANVERS POWER.

Sydney, N.S.W., May 20, 1902.

QUESTIONS AND ANSWERS.

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

Apatite in Canada.—Can you give me any information in regard to the production of apatite in Canada? Is the output increasing? Is any of it exported, and if so where to?—A. M. L.

Answer.—The production of apatite in Canada amounted to some importance as an industry ten or twelve years ago, but has declined to practically nothing. The largest production was in 1890, when the output amounted to 31,753 tons of 2,000 pounds, valued at \$361,045. From that time it rapidly declined until 1896, when it amounted to only 570 tons, worth \$3,420. Production since then has been irregular and no output was reported in 1901. Most of the product in the earlier years was exported.

Bismuth and Uranium Ores.—Will you kindly give me the names of the parties who deal in bismuth and uranium ores, and whether they are in this country or in Europe? I have a large vein of bismuth that will average 7 per cent bismuth and will go from 4 to 10 per cent uranium. Outside of this I have a large deposit of uranium that will go from 10 to 60 per cent, and if I could get a market for this I could ship from 10 to 500 tons a day.—M. L. P.

Answer.—Buyers of Bismuth ores are Charles Pfizer & Co., 81 Maiden Lane, New York; the Smith, Klein & French Company, Philadelphia, Pa.; Robertson & Bense, Stadthausbrücke 13, Hamburg, Germany. The demand is somewhat limited.

The uranium ores mined in this country are nearly all shipped abroad. Poulot & Voillequé, of Cashen, Colorado, are the chief buyers. The quantity mined for several years past has been from 150 to 200 tons yearly. We fear that a supply of 500 tons daily would swamp the market.

Nickel Oxide.—In a recent issue of your JOURNAL you quoted nickel oxide at 60 cents to \$1 a pound, while metallic nickel is given as 50 to 60 cents a pound. I also notice in an article on the "Production and Distribution of Nickel and Cobalt in 1901," published in your issue of June 7, 1902, it is stated that "the price of nickel oxide has been 5 cents lower per pound than the metal." According to your quotations nickel oxide sells at a higher price than the metal. Will you please enlighten me?—M. R. C.

Answer.—Both the JOURNAL and the writer of the article in question are correct. The quotations given by us are for the oxide and not the metal in nickel oxide, while those given in the article are for the metallic contents of the oxide as is sold to smelters. The variations in the price of nickel oxide as we quote it, depends on quality, No. 1 being almost chemically pure, while No. 2 is the ordinary grade. This article is sold principally by chemical manufacturers, who state it is used in the preparation of fine enamel paints.

The Mechernich System.—Will you give the various steps of the system in use at the Mechernich works in Germany?—C. F. H.

Answer.—The system of treating lead ores at the Mechernich works in Germany is thus described in Schnabel's *Metallurgy*: "At Mechernich the so-called 'knottenerz' from the Bunter sandstone is smelted. It consists of a sandstone containing galena in pieces from the size of peas to hazel nuts, and also contains some lead carbonate. The dressed ore is first roasted in the 'fortschaufelungs' furnace, and smelted at the end of the roasting, the sulphur content having been reduced to 0.6 or 0.7 per cent. The roasted ore has the following (typical) constitution: Lead, 62.08; copper, 0.14; antimony, 0.08; iron, 0.56; lime, 1.28; alumina, 4.24; silica, 22.77; sulphur, 0.60.

"It is smelted in rectangular blast furnaces, to-

gether with ferruginous materials—top-cinder, hematite—and limestone. The products are work-lead, with 0.02 per cent of silver, and a matte forming 1.5 to 2 per cent of the weight of the lead obtained, and containing 61 per cent of iron, 8 per cent of lead and 0.8 per cent of copper. As soon as a sufficient quantity has accumulated this matte is roasted in stalls and then smelted by itself for the lead it contains. The slags contain 33 per cent silica, 37 per cent ferrous oxide, 21 per cent lime, 8 per cent alumina and 0.3 to 0.5 per cent lead. If they contain more than 0.7 per cent lead they are added to the first ore smelting."

The method of dressing the ore is thus described in Foster's *Ore and Stone Mining*: "The soft lead-bearing sandstone of Mechernich crumbles to pieces so easily that by the time it reaches the dressing works, after having fallen down in the underground chambers and dropped through chutes into the wagons, most of it is in a fit state for the concentrating machinery. The works are specially designed for treating very large quantities of poor ore consisting almost wholly of galena and quartz sand; their main feature is the use of the siphon separator by which a very large proportion of the stuff is at once concentrated into clean concretions—'knotten'—containing about 22 per cent of lead. This concentrate goes to another establishment, where it is stamped and passed through siphon separators, jigs, revolving tables and round buddles, to separate lead ore fit for the furnace."

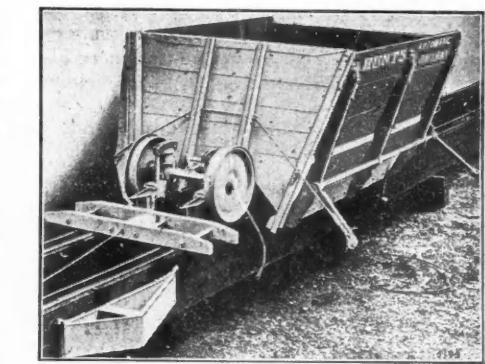
THE HIGHEST POWER STATION COAL HOISTING TOWERS.

After the various railway and electrical companies of Baltimore were consolidated under one management, the United Railways and Electric Company owned 13 power houses. It was impossible to get economic results from these isolated plants, so that a central station was designed, from which current is to be distributed for street railway purposes throughout the city of Baltimore. The site of the new station adjoins the old plant on Dugan's Wharf, erected by the City and Suburban Railway Company in 1895. A fireproof building 94 by 131 feet houses a boiler equipment, ultimately to be of 16,000 horsepower capacity.

In the new boiler house now building, 32 Babcock & Wilcox water-tube boilers rated at 500 horse-

power each are to be located, on two floors, and in four sections. Four stacks, 200 feet in height and 13 feet inside diameter, divide the entire building in two parts, with batteries on either side. Above the boilers are two coal storage bins with a capacity of 6,000 tons. Each bin is 32 feet wide, 24 feet deep and 128 feet long.

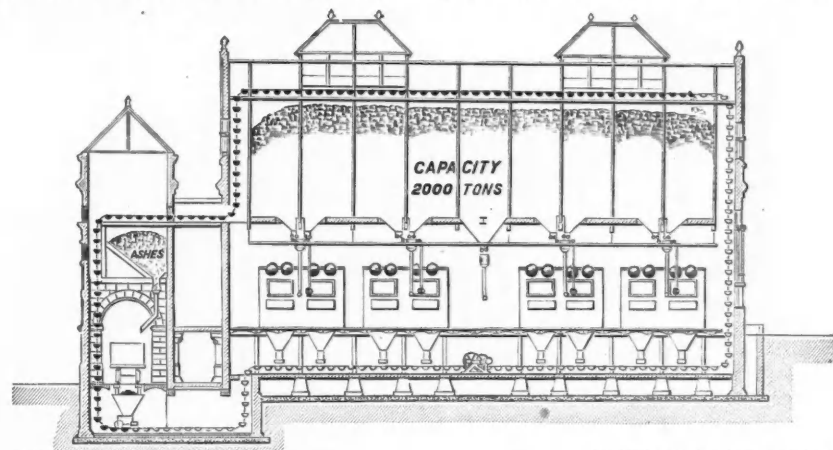
The arrangement of the plant necessitates raising the coal to a great height, which together with a large fuel consumption made the conditions most exacting. The coal hoisting towers and machinery were designed and constructed by the C. W. Hunt Company, New York, while the arrangement of the electrical apparatus in the tower is due to P. O. Keilholtz, consulting engineer of the United Railways and Electric Company.



SELF-RETURNING AUTOMATIC RAILWAY CAR.

boom truck are driven by electric motors geared to the hoisting drums.

When the shovel descends to the coal in the barge, the hoisting motor is started and closes the shovel, fills it with coal, hoists it loaded 151 feet over the tower and dumps the coal into a hopper at the front of the tower on the engine platform. The shovel is then lowered open to the coal, and is ready for another trip. An engineer and assistant regulate the operations of the hoisting machinery from the second platform in the tower, the former controlling the hoisting drum motor, and regulating the speed and direction of rotation; the latter controls the motor hoist actuating the trolley on the boom. The shovel does not twist in hoisting or lowering, notwithstanding the great height of the hoist. The coal passes from the hopper through a Hunt coal cracker,



COAL HANDLING MACHINERY, AS ARRANGED FOR BALTIMORE WATER WORKS.

where the large lumps are broken to the proper size for automatic stokers. By means of a double jawed cut-off valve, the coal is fed into a Hunt automatic railway car (Fig. 2) then weighed. After the car is pushed off the scales, it passes to an inclined track over the bins, and is automatically discharged by a stop previously located at the point where the coal is needed. The inertia of the loaded car on the incline is stored in a counter-weight which, when the load is dumped, returns the car to the scale for another load.

The tower was equipped by the C. W. Hunt Company, and has a capacity of 50 tons of coal per hour. Recent records show that the hoist will deliver con-

COPYRIGHT 1897 BY C.W. HUNT CO.

Recent records show that the hoist will deliver con-

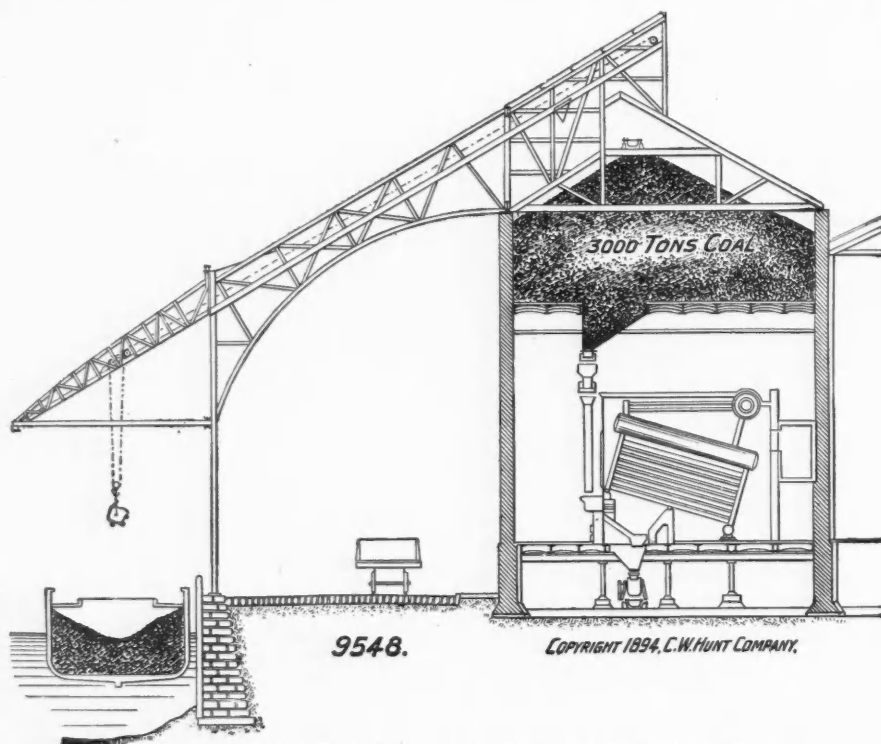
siderably more coal than the capacity given above. While the consumption of coal in a station of this size would probably be 100,000 tons per year, the coal handling plant has a capacity of ten times that quantity of fuel taken from the boat and delivered to the storage bins.

Under each of the boilers is an ash hopper with a cut-off valve. The Hunt noiseless gravity bucket conveyor receives the ashes, which descend into and are removed from the hoppers by gravity. The ashes are carried over the coal pockets and dumped into a chute leading into ash bins in the tower, from whence they are removed by car or boat. This conveyor is 430 feet long, with a vertical lift of 86 feet, and is motor driven. When carrying a load of ashes, it requires but 5 horsepower to keep it moving, which is a demonstration of its mechanical efficiency.

No shoveling or manual labor of any kind is required in receiving, transporting or emitting coal or ashes from this plant, and the machinery is as nearly automatic in its operation as possible. The Pratt Street station is a good example of what can be accomplished with Hunt coal handling apparatus, and illustrates how the fuel and ashes of a metropolitan power house are handled with maximum convenience and economy.

reaction is rapid and in a few seconds the contents of the crucible consist of molten iron and slag. Thermit, as is well known, is a mixture of powdered aluminum and iron oxide.

There are two ways of emptying the crucible—one by pouring from the top, the other by drawing from the bottom. In the former case the slag is poured first, and in the second the iron is drawn ahead of the slag. The nature of the work to be accomplished determines which method is to be employed. The slag is poured first when it is desired to have a smooth even surface after the weld is made. The slag cools more quickly than the iron, and deposits a thin layer on the object it touches, which is thus protected from contact with the molten thermit iron that follows. The latter can, therefore, be applied to hollow iron objects without melting them through or adhering to them. It is especially useful for welding wrought iron or steel pipes, which, on account of the simplicity of the process, can be done in place. All that is required is to clean the welding surfaces, place a mould round the joint, and pour the contents of the crucible. In this way some 15,000 joints of all sizes have been made in the last few months. The weld once made requires no repairs, and stands as high a pressure as the pipe itself.



BALTIMORE CITY CONSOLIDATED RAILWAY CO.— PRATT STREET STATION.

THERMIT FOR MAKING REPAIRS.

Mr. Clarence B. Schultz, the American representative of the Allgemeine Thermit Gesellschaft, Essen Ruhr, Germany, has recently been giving some demonstrations of the qualities of the new reducing agent "thermit," the invention of Dr. H. Goldschmidt. The demonstrations were made in Prof. Chandler's laboratory at Columbia University, and were intended principally to show the effectiveness of the process in welding tubes, rails, shafting, etc., etc., and the making quickly of repairs where a welding of broken parts is necessary. The composition of thermit and the reactions obtained in its combustion, which creates an intense local heat, are already familiar to the readers of THE ENGINEERING AND MINING JOURNAL through a contribution published in its columns nearly two years ago. It is only recently, however, that any attempt has been made to introduce its use commercially into the United States.

The demonstrations made by Mr. Schultz were interesting and successful. The process is quite simple. Thermit of the requisite amount is placed in a special crucible. Not being inflammable by ordinary means, a small quantity of special ignition powder is placed upon it and ignited by an ordinary match. Without the ignition powder the thermit will not burn. The

Angle irons and bars of other sections can be as easily welded in this way, the result being a clean butt weld.

The chief merit of tapping the thermit iron first is that the thermit iron flows out at such a high temperature the surface of the metal with which it comes in contact is melted and amalgamates with it, forming a homogeneous mass of mild steel. It has, therefore, been largely used for welding tram rails, repairing faulty castings up to any size, and many other purposes.

In this case the metal is drawn off through a small opening in the bottom of the crucible provided for that purpose. When the reaction is complete, merely pressing a level forces up a plug, which allows the metal to flow out; the slag follows. The molten thermit iron round the joint can be of any desired thickness, and in the case of rails takes the place of sole plate and fish plates, except that it is welded and not bolted on. For some purposes no crucible is required. For example, where a large roller boss is broken off, the roll is placed on end, a mould formed above it, about 1/2 inch of molten iron is poured on to the broken surface, and thermit added at the rate of about 30 pounds to the superficial foot. It is ignited with the help of ignition powder, except in the case of hot liquid steel, the heat of

which is in itself sufficient to effect the ignition. Cast iron or steel in sufficient quantities to form the new boss are then added and well stirred. Cast iron can be united with steel, and steel with cast iron.

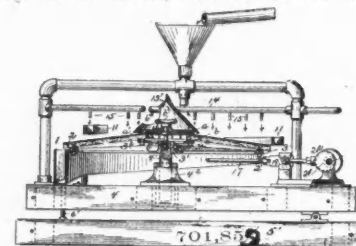
PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

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

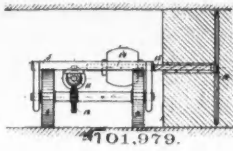
Week ending June 10, 1902.

- 701,851. ORE SEPARATOR AND CLASSIFIER.—Charles Culver, Sandon, Canada. An ore-classifier comprising a cone-shaped hopper forming a settling-chamber, an inflow-conduit leading into the top thereof, a secondary cone-shaped hopper forming an assorting-chamber and having its wide mouth attached to the reduced lower end of the main hopper, a pipe having a branch adapted to form a means for an upward current of water through said hoppers, one or more flues leading from the upper end of said second hopper upwardly, and a trough surrounding the upper end of the main hopper into which said flues debouch.
- 701,856. PEAT PRESS.—Archibald A. Dickson, Toronto, Canada. A compressing machine comprising one part having a die-cavity for the reception of the material to be compressed and a second part consisting of a plunger or piston operating to compress said material within the die-cavity.
- 701,859. ORE-CONCENTRATOR.—Willis G. Dodd, San Francisco. An ore-concentrator comprising an inclined circular table having an unrifled or plain portion adjacent its discharge for the mineral, a series of curved rifled



ing from approximately a radial division of the table onto the plain or unrifled portion thereof, means for imparting an oscillatory motion to the table, and an inclined launder or trough attached to and carried by the table, said launder or trough arranged to receive the middlings from the table and to discharge same thereon for reworking.

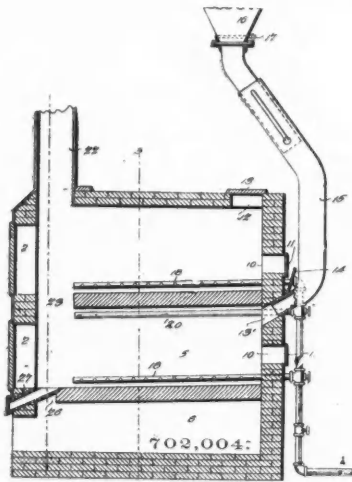
- 701,879. APPARATUS FOR GRINDING AND POLISHING GEMS.—Frederick E. Hilliard, Brooklyn, N. Y., assignor to Lippman Tannenbaum, New York, N. Y. In a machine for cutting and polishing gems, the combination of a standard, means for adjusting same vertically and horizontally, a screwed shaft-support from and revolvably mounted in said standard with means for revolving said shaft, a screw-threaded block arranged to travel on said shaft, means for setting said block rigidly at any point, means for registering the elevation of said block, a shoulder on said block and means for adjusting the angle of inclination of the said shoulder.
- 701,885. RETORT.—Evan H. Hopkins, South Kensington, England. The combination of a retort, a partition perforated with small holes at its inner end, dividing the retort into two chambers, fine lumps of carbonaceous material in the upper chamber, and a block in the upper chamber holding the fine lumps in position and having a cavity for the reception of the zinc.
- 701,898. APPARATUS FOR COLLECTING AND SETTLING DUST.—Christian H. Larson, Chicago, Ill. A dust collecting apparatus comprising a descending intake-leg, an ascending discharge-leg, and a port establishing communication between said intake and discharge legs and forming a dust-trap.
- 701,902. BURNER FOR CRUDE OIL.—Thomas E. Lewis, Albert J. Ray and Miley B. Wesson, Fort Worth, Tex. In a burner for crude oil, a casing having apertures at its upper and lower portions, a wall for forming a flue within said casing, a closure for said upper opening therein, a liquid-conveying surface within said casing, and means for controlling the passage of air.
- 701,957. METHOD OF WORKING CLAY.—Raleigh H. Staley, Springfield, Ill. A method consisting in providing tempered clay, disintegrating said clay in vacuum, exhausting the air from said disintegrated clay and compressing said clay in vacuum.
- 701,979. MACHINE FOR EXTRACTING COAL IN PIECES FROM MINES.—Conrad Wissemann, Gelsenkirchen, Germany. A coal-mining machine composed of a truck, a shaft of angular cross-section projecting laterally therefrom and adapted to cut its way through the coal-bed, a circular saw mounted upon the end of said shaft,



a transverse arm in horizontal alignment with the shaft, and a wedge mounted upon said arm back of the saw.

701,986. **TERMINAL FOR ELECTRIC FURNACES.**—Edward G. Acheson, Buffalo, N. Y. The combination with a graphic carbon electrode, of a connector comprising a plate, means for connecting the electrode and connector, a flange on the connector, and a plate secured to the flange forming in connection therewith and the connector a tank.

702,004. **ORE ROASTER.**—John L. Hopper, Kirksville, Mo. An oil-burning ore-roasting oven comprising front and rear walls having feed and discharge openings, side walls and



flooring, and perforated oil-supply pipes arranged directly within the oven at a point near the opposite side walls and comprising the source of fuel-supply to said oven.

702,009. **PROCESS OF MAKING CEMENT.**—Frederick G. Jordan, Spokane, Wash. A method of making portland cement, which consists in decarbonating a lime-bearing substance, mixing therewith, while in an incandescent state, a suitable quantity of siliceous clay, and then agitating the mixture in the presence of a hydraulic agent.

702,037. **MACHINE FOR WORKING STONE-FURFACES.**—Theodor Stiglitz, Vienna, Austria-Hungary. A stone-cutting machine comprising a bed having longitudinal rails, vertical guides on said rails, means to simultaneously move the vertical guides, a transverse guide-rail vertically movable in said guides, a tool-holder movable along the transverse guide-rail and rotatably adjustable, and means to actuate a tool held in the holder.

702,047. **PROCESS OF RENDERING METALLIC SULPHIDES SOLUBLE.**—Caleb G. Collins, Woodmere, N. Y., assignor to Calvin Amory Stevens, New York, N. Y. A process consisting in drenching the crushed sulphide ore with aqueous ammonia, draining off the excess of ammonia, and exposing the ore thus moistened to the action of an excess of oxygen, whereby the oxygen is brought into intimate contact with the moist particles of crushed ore and the chemical action is accelerated.

702,051. **FILTERING-PRESS.**—Karl Enzinger, Worms, Germany, assignor to Filter, Brautechnische Maschinen-Fabrik, Act. Ges. vorm. L. A. Enzinger, Worms, Germany. Grid for filtering-press, comprising a central grating and an outer frame having apertures, which when the press is assembled constitute the liquid inlet and outlet conduits.

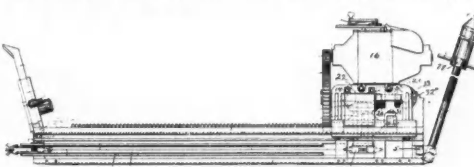
702,084. **SYSTEM FOR CONTINUOUS HEATING AND METAL-ROLLING.** Thomas V. Allis, Bridgeport, Conn., assignor, by mesne assignments, to the International Tin Plate Corporation, a corporation of New Jersey. A system of heating and metal-rolling, which consists of one or more furnaces mounted on a section of track running at right angles to the feeding-line of a rolling-mill situated in close proximity to said furnaces, means for reciprocally propelling said furnaces; a flexible tube for conveying fuel-gas to said furnaces connected therewith and to a winding-drum and communicating.

702,117. **ART OF PRODUCING CHEMICALS IN ELECTRIC FURNACES.**—Edward R. Taylor, Penn Yan, N. Y. A new and improved method of producing chemicals in an electric furnace which consists in introducing a charge into the furnace, passing a suitable electric current through the charge by means of relatively permanent electrodes, continuously feeding upon such electrodes and between the same and the charge fragmentary conducting material, and regulating the electric current by means of such fragmentary material.

702,140. **COMPOSITION OF MATTER.**—Geoffroy Le Roy de Lercheres, Vierzon, France. A novel composition of matter, consisting of a heated and cooled mixture

of simple or double salts of alumina and potash, silica, oxide of manganese, sulphate of lime, sulphate of baryta, a hydrocarbon and gravel.

702,147. **MINING MACHINE.**—James M. McHugh, Boston, Pa. The combination of a frame, two standard I-rails secured to said frame in substantially the same horizontal plane with their webs in a horizontal position and their flanges extending upward, the downwardly extending flanges of said rails having grooves formed therein, a traveling car-



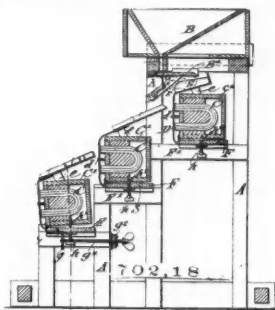
riage resting on the edges of said flanges, inwardly extending lips on said carriage adapted to enter the grooves in the rails, a cutter frame and chain supported by said carriage, and mechanism for moving said carriage along said rails and for driving said chain.

702,153. **TREATMENT OF ORES AND MATERIALS CONTAINING ANTIMONY.**—Jarig P. van der Ploeg, The Hague, Netherlands. A method of extracting antimony from ores, materials or residues containing it, consisting in finely pulverizing the material, mixing it with a suitable quantity of powdered quicklime and then mixing with it an adequate quantity of sulphide of an alkali-earth metal and water, so as to form a solution of the lower and most soluble double sulphides as being the best electrolytes, without the use of artificial heat or application of pressure.

702,171. **PROCESS OF MAKING PHTHALIC AND BENZOIC ACIDS.**—Augustus Bischler, Basle, Switzerland, assignor to Basle Chemical Works, Basle, Switzerland. A process for the manufacture of phthalic and benzoic acids, which consists in heating to a temperature above 200 deg. C. naphthalene derivatives with an oxidizing metallic oxide and an alkali.

702,179. **AMALGAMATING APPARATUS.**—Marguerite Blourne, Paris, France. A sheet iron tank divided into compartments by partitions which do not extend to the bottom of the tank, so that communicating passages are left between adjoining compartments.

702,184. **MAGNETIC ORE-SEPARATOR.**—John W. Carter, Franklin Furnace, N. J. The combination, with a supply-hopper, of a plurality of gangs of magnets, each gang of magnets being arranged in suitable boxes and having the poles in approximately vertical planes, said boxes disposed in step arrangement with vertical spaces between the front



and rear sides of adjacent boxes, septa secured to the front side of said boxes over the poles of said magnets, chutes supported on said boxes, means for horizontally adjusting and tilting said boxes, and means for independently adjusting said chutes in inclined position.

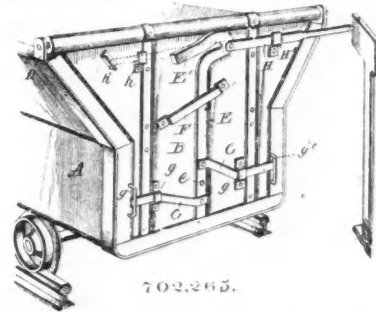
702,194. **CASTING APPARATUS.**—Herbert H. Franklin, Syracuse, N. Y. The combination with a sectional mold of means for holding contiguous surfaces of sections of the mold separated during the entrance of the material to be cast and thereby permitting the escape of air from the mold.

702,195. **SAFETY DEVICE FOR GAS-LINES.**—John C. Furman, Strattanville, Pa., assignor of one-fourth to James W. Jones, Strattanville, Pa., and Irvin M. Shannon, Clarion, Pa. A safety device for gas-lines, comprising a casing in the line and having a transverse partition to form two compartments, of which one is connected with the gas-inlet and the other with the gas outlet.

702,244. **PRECIPITANT FOR TREATMENT OF COPPER-WATER.**—Andrew J. Polmeteer, Whitehall, Mont., assignor of two-thirds to Joseph Mitch and Alberta Q. Dygert, Butte, Mont. A precipitant for copper-water, containing in solution a sulphide and an excess of alkali.

702,265. **MINE CAR DOOR FASTENING.**—James H. Watt, Barnesville, Ohio. The combination of a latch-operating lever pivoted to the door, and a bar connected to said latch-lever and adapted to project beyond the side of the car; with a cam fixed beside the track and adapted to engage said bar and cause it to move the latch-lever and release the catches, and an overbalancing-weight on the latch-operating lever adapted to move the lever still farther so as to retract the bolts and said bar within the confines or area of the car-door.

702,273. **CONVEYER-BELT APPARATUS.**—Alfred M. Acklin, Pittsburg, Pa. In a support for a conveyer-belt, the combination of inclined standards, having sockets or openings therein the lower ends of which are closed, shafts adapted to fit within said sockets or openings and be solely sustained by the same, and pulleys, wheels or rollers fitting around said shafts.



702,305. **PROCESS OF EXTRACTING PRECIOUS METALS FROM THEIR ORES.**—Edward D. Kendall, Brooklyn, N. Y. A process of treating ores carrying precious metals, which consists in treating such ore with a lixiviating solution, consisting of a cyanide, potassium percarbonate and water, and finally extracting the precious metal from such lixivium.

702,325. **APPARATUS FOR THE MANUFACTURE OF NITRO-GLYCERIN.**—Frederic L. Nathan, James M. Thomson and William Rintoul, Waltham Abbey, England. Apparatus for the manufacture of nitroglycerin, consisting of a vessel provided with an air-blast pipe, coils for circulation of cooling-water, pipes for supply of acid and of waste acid, a valved arrangement for supply of glycerin and pipes for discharge of the nitroglycerin produced and of the fumes.

702,354. **SURVEYING INSTRUMENT.**—John Beal, Denver, Colo. The combination of a frame revolvably mounted and provided with two upwardly-projecting arms, a telescope trunnioned on said arms, a graduated semicircular plate, attached to the telescope and occupying a plane perpendicular to the platform, one frame-arm having an offset and projecting upwardly therefrom and outwardly through an opening in the graduated plate, the arrangement being such that the plate is free to move with the telescope as the latter is turned on its trunnion, the graduated part of the plate adjacent the offset of the frame-arm being outside of the latter.

702,357. **DETONATING COMPOSITION.**—Hans von Danmen, Vienna, Austria-Hungary. A detonating composition consisting of a mixture of copper-ammonium nitrate, potassium nitrate, sulphur and aluminum.

702,374. **AIR SUPERHEATER OR CARBURETER.**—Harry M. McCall, Pittsburg, Pa., assignor to Pittsburg Gas Engine Company, Pittsburg, Pa. A device consisting of a heating-chamber, a sphere located in said chamber and adapted to deflect the elements as they are introduced into the chamber against the walls of the same.

GREAT BRITAIN.

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

Week Ending May 29, 1902.

- 7,424 of 1901. **CONCENTRATOR.**—New Standard Concentrator Company, Los Angeles, Cal., U. S. A. An improved concentrating table.
- 10,101 of 1901. **TREATING COPPER SULPHIDE ORES.**—H. Thofern, Paris, and B. D. S. Seine, Widnes. Treating sulphide copper ores in a cupola, by blowing in a mixture of superheated steam and air and a blast of fine sand.
- 10,867 and 10,869 of 1901. **THORIUM FILAMENTS FOR ELECTRIC LIGHTS.**—Siemens & Halske, Berlin, Germany. Making incandescent filaments for electric lamps from thorium, etc., by first making a nitride and then expelling the nitrogen.
- 11,497 of 1901. **BRINE EVAPORATOR.**—F. P. Gutierrez, Santander, Spain. A series of pans for evaporating brine, the steam generated from each going through the next to heat it.
- 13,016 of 1901. **TAMPING BLAST-HOLES.**—L. Scholvien, Grunau, Germany. Tamping blast-holes with a quick hardening cement.
- 19,038 of 1901. **COBALT SEPARATION.**—H. A. Frasch, Hamilton, Ont. Separating cobalt from nickel and copper, by making a cobalt hydroxide or ammonium salt.
- 21,942 of 1901. **TIN RECOVERY.**—P. Nubart, Paris, France. A stripping bath for scrap tin made of sulphuric acid with ammonium sulphate present to prevent the acid attacking the other metal of the scrap, using also a weak electric current.
- 25,776 of 1901. **CARBONATE OF MAGNESIA.**—F. S. Young and W. S. Griffith, Norristown, Pa., U. S. A. Method of precipitating carbonate of magnesia in a heavy form instead of the usual bulky and light form.

PERSONAL.

Mr. Patrick Clark has returned to Spokane, Wash., from a stay of several months in the East.

Dr. Heinrich Ries has been made assistant professor of economic geology at Cornell University.

Mr. J. F. Porter, of the Robb Engineering Company, Amherst, N. S., has been in Victoria, B. C.

Mr. C. H. McCornick, of Salt Lake City, Utah, has gone to Paris to close a Kingman (Ariz.) mining deal.

Mr. Philip Argall, the metallurgical expert, returned to Denver, Colo., last week from a professional trip to Arizona.

Mr. J. L. Goodman has been appointed superintendent of the Hampton Lead Company in Jefferson County, Mo.

Mr. J. W. Dixon, with 5 other Philadelphia men, has been examining the Gordon mines, near Twin Lakes, Colo.

Mr. Ben Blanchard, who is interested in Arizona mines, has left New York City for Prescott on professional business.

Mr. Richard Eames, Jr., is in New York City for a week on mining business. He returns to North Carolina next week.

Mr. M. J. Heller, mining engineer of San Francisco, Cal., is en route to Valdez, Alaska, to look over copper deposits there.

M. Maurice Sartiaux, a North of France mining engineer, is now in this country, studying American mining methods, etc.

Mr. Bertram Hurst, cyanide expert, has returned to San Francisco from Kern County, Cal., where he has installed a plant.

Mr. A. C. Lane, of Lansing, the Michigan State geologist, is at Houghton, Mich., in the interests of the State geological survey.

Mr. J. J. Broughal, of Denver, Colo., representing the Mine and Smelter Supply Company, is in the Lake Superior copper district.

Capt. Duncan McVichie has returned to Salt Lake, Utah, from a trip to Arizona, where he went to examine property for Eastern men.

Mr. H. M. Clagget has resigned as superintendent of the mill at the Vacas mines, Durango, Mex., and has returned to the United States.

Mr. L. W. Tatum, mining engineer of Chicago, Ill., passed through Denver, Colo., last week on his way to Arizona on professional business.

Mr. Frank L. Sizer, mining engineer of Butte, Mont., passed through Denver a few days ago, on his way to Mexico on a professional trip.

Mr. W. A. Paine, of Boston, Mass., president of the Copper Range Consolidated Company, recently visited the Lake Superior copper country.

Mr. C. A. Lamb, of Boston, Mass., president of the Mass Consolidated Mining Company of Michigan, recently returned from a visit to the mine.

Mr. John B. Farish returned to Denver, Colo., a few days ago from a professional trip to Montana and California, and left at once for New Mexico.

Mr. Wm. Quigley, chief clerk of the Penn Mining Company at Leadville, Colo., goes to Mexico as chief clerk for the Chihuahua Mining Company.

Mr. H. Ihseng, the American representative of the Vieille Montagne Smelter at Antwerp, Belgium, is in Leadville, Colo., looking over the zinc situation.

Mr. C. W. Ament, general manager of the Golden Drift Mining Company, is at Grant's Pass, Ore., from Chicago, Ill., and will remain for a month or so.

Col. E. B. C. Hambley, manager of the Whitney Reduction Works of Salisbury, N. C., has been on a trip of inspection to mines at Cripple Creek, Colo.

Mr. Andrew F. Rosenberger, of Nelson, B. C., was recently at Hancock, Mich., to attend a meeting of the directors of the Northwestern Development Syndicate.

Mr. W. Mollmann, of Westphalia, Germany, a mining engineer, is spending a short time in Leadville, Colo., looking over processes for handling low-grade ore.

Mr. Herbert Stanley Jevons, son of the late Prof. Stanley Jevons, has been appointed to a lectureship in mineralogy at the University of Sydney, New South Wales.

Capt. William Dunn, of Houghton, Mich., has undertaken some exploration work on the copper range in Douglas County, Wis., for the Weyerhaeuser interests.

Mr. Benjamin Talbot, the inventor of the Talbot continuous open-hearth process, who has nearly recovered from an attack of typhoid fever, sailed for Europe last week.

At a dinner recently given at Johannesburg to Mr. W. L. Honnold, the well-known American mining engineer, there were 26 engineers and managers present, out of whom 14 were Americans.

Mr. R. A. Trevarthen, late superintendent of the Portland Gold Mining Company at Cripple Creek, Colo., is in California for his health. Mr. D. C. Gabrin succeeds Mr. Trevarthen at the Portland.

Mr. J. S. Jones, of Chicago, Ill., president of the Jones & Adams Company, Catlin Coal Company and the Miller Creek Coal Company, is spending June and part of July at his summer home at Granville, O.

Prof. J. H. Kinealy has resigned the chair of Mechanical Engineering in Washington University, St. Louis, Mo., to go to Boston, Mass., as a member of the engineering firm of Kinealy-Paul Company.

Mr. J. Hildebrand, recently superintendent of the Oregon King Gold Mining Company's properties and the Mayflower Consolidated at Sumpter, Ore., is to take charge of the John T. and Rocky Point mines in Cataract District, Mont.

Mr. W. R. Woodford, formerly general superintendent of the Baltimore & Ohio Railroad, Pittsburg division, will take the position of second vice-president of the Pittsburg Coal Company and be at the head of the operating department.

Mr. P. E. Thatcher, of Chicago, Ill., has been compelled by ill-health to retire from the trusteeship of the Jones & Adams Company and Catlin Coal Company. He is succeeded by Mr. D. W. Heath, who was his predecessor in these offices.

Mr. Wm. M. Cameron, of Leadville, Colo., sails this week for Africa in the interest of Mr. John Hays Hammond. Mr. Cameron has for years been superintendent of the Small Hopes Company's properties. His place is taken by Mr. A. A. Burnand.

Mr. Hugh Kennedy, for many years superintendent of the Isabella furnaces at Pittsburg, Pa., is to become general manager of the Buffalo-Susquehanna Iron Company, which will build 2 large blast furnaces on Buffalo Harbor, adjoining the new plant of the Lackawanna Steel Company.

Senor Zaperino Murga, of Durango, Mex., who has filled the position of private secretary to the present Governor of the State, as well as to several of his predecessors, has been appointed collector of contributions in the Santiago Papatzi District, with headquarters in that thriving camp.

Messrs. G. H. Trumbull, of Milwaukee, Wis.; Franklin D. Eddy, of Grand Rapids, Mich.; Louis Smith, E. S. Kounovsky, B. Friedl and L. Schumacher, of Chicago, Ill., the principal owners of the German-American Consolidated Gold Mining Company, have inspected the company's claims at Ophir, Colo.

Mr. W. B. Rodgers has resigned as local sales agent of the Monongahela River Consolidated Coal and Coke Company, at Pittsburg, and Mr. J. Herman Rodgers has resigned as manager of the sales department. Both resignations take effect July 1. Mr. William B. O'Neil has been appointed to succeed Mr. J. Herman Rodgers.

Mr. W. J. Grace, who represents his mother, Mrs. M. D. Grace, a stockholder in the Vacas Mine, Durango, Mex., recently visited his home in Syracuse, N. Y., and has just returned to Durango to look after the Grace interests in the Vacas property, now being worked under the direction of Mr. B. C. Wheeler, of Colorado.

Mr. William Knox, of Knox, Schlapp & Co., of Melbourne, Australia, is expected to arrive in New York City on June 28. He is one of the original stockholders of the Broken Hill Proprietary and the Mount Lyall Mining and Railway Company, and is a member of the Australian Parliament.

Prof. Charles S. Palmer, for 7 years professor of chemistry in Colorado State University, at Boulder, has been appointed president of the State School of Mines at Golden. President Palmer went to Boulder some 15 years ago from an Eastern university. In his laboratory he has done much work dealing with the mineral resources of Colorado, and has been one of the most popular men of the university faculty. He is about 43 years old.

Capt. Samuel B. Harris, superintendent of the Quincy Mine, Hancock, Mich., for the past 18 years, has resigned his position. His successor has not yet been chosen, but for the present former Assistant Superintendent John L. Harris, his son, will be in charge. Capt. Harris' resignation is caused by advanced years. During his superintendency Capt. Harris displayed marked ability as a manager and miner. Mr. John L. Harris, the temporary superintendent, planned and superintended the sinking of No. 7 shaft. This shaft is sunk on a catenary curve, and is the only one of the kind in the world.

SOCIETIES AND TECHNICAL SCHOOLS.

WESTERN FEDERATION OF MINERS.—Charles H. Moyer, Lead City, South Dakota, is the new president; E. Hughes, Butte, Mont., vice-president; W. D. Haywood, Silver City, Idaho, secretary-treasurer.

NEW MEXICO SCHOOL OF MINES.—This school at Socorro offers courses in chemistry, metallurgy, min-

ing and civil engineering. Short special courses are also offered. One wing of the new main building has been completed to be used as a metallurgical building. The college possesses modern machinery for testing and treating ores, and is well endowed with public lands. The board of trustees is composed of Juan Jose Baca, of Socorro, president; C. T. Brown, of Socorro, secretary and treasurer; F. G. Bartlett, of Magdalena; J. E. Smith, of Socorro, and A. B. Fitch, of Magdalena.

STATE COLLEGE OF KENTUCKY.—This institution at Lexington has a Department of Mining Engineering, authorized by act of the General Assembly in 1898. The course, as a circular sent out by the university states, is laid out with the design of affording the student a thoroughly good foundation for professional work in mining, metallurgy and assaying, and is rendered as "practical" as the limitations of college instruction permit. Iron, coal, lead, zinc, spar and clay mines are stated to be within easy reach of Lexington. The course during the first two years closely follows those of the departments of Mechanical and Civil Engineering, and instruction in the special theme of mining begins in the Junior year.

BUTTE SCHOOL OF MINES.—Many of the sophomores and nearly all of the freshmen classes are now busy in the field work in surveying. Prof. MacDonald, at the head of the department of mining engineering, has charge. The field work will be mostly near and around Butte, and back of the Big Butte. The work will last for 6 weeks. All of the professors during the summer will visit Eastern places of interest. Prof. Bowman, of the department of mechanical and electrical engineering, will spend much time studying systems at the Westinghouse works, East Pittsburg, Pa. Prof. King, who has charge of the department of metallurgy, will make a study of the iron industry at Pittsburg, Pa. Prof. Foote, who is in charge of the preparatory department, is to attend the summer session of Boston University. Prof. Winchell, at the head of the geology and mineralogy department, will make excursions to various parts of the State, in order to gather specimens of different kinds of rock, and later on will visit the Yellowstone National Park. President Leonard will go to Minneapolis to attend the meeting of the National Educational Association, but will return in time to attend the mining congress, to be held in Butte the first of September.

INDUSTRIAL NOTES.

The steamer *Newark* has been fitted with the Little Giant oil burner, made by G. E. Witt, of San Francisco, Cal.

The Phoenix Iron Works, of Portland, Ore., formerly the Wolf & Zwicke plant, was destroyed by fire on June 22.

R. D. Wood & Co., of Philadelphia, Pa., are reported to be figuring on a 1,000 ton lot of cast iron pipe, varying from 3 to 4 in. in diameter, to be shipped to Port Arthur, China.

The Cleveland Pneumatic Tool Company, of Cleveland, O., has appointed the Compressed Air Machinery Company, of San Francisco, Cal., to represent it on the Pacific Coast.

The Magnetic Separating Company, of Joplin, Mo., recently installed for W. J. Scouff, of Rico, Colo., a zinc, iron and lead concentration plant, employing magnetic separation.

The C. W. Raymond Company, of Dayton, O., will build the brick-making machinery for the first unit of the brick-making plant to be built near Madrid, Spain, by the Crisna Company.

The Burt Manufacturing Company, of Akron, O., has recently made important shipments of the Cross oil filters and Burt exhaust heads to London, Eng.; Geneva, Switzerland; Stockholm, Sweden; Melbourne, Australia, and Pireia, Greece.

E. H. Sargent & Co., of Chicago, Ill., have recently combined their stock of chemists' and assayers' supplies with that recently purchased of Richards & Company, Limited, and have moved both stocks and their office to 143-145 Lake street.

The Jeanesville Iron Works Company, of Jeanesville, Pa., has purchased the structural steel work, and will start construction on its new plant between Jeanesville and Hazleton, Pa. The main building will be 106 by 540 ft., with electric traveling cranes.

At the recent meeting of the Board of Directors of the Chicago Pneumatic Tool Company it was decided to exercise the company's option on the purchase of the International Pneumatic Tool Company of England, which manufactures pneumatic equipments at Chippenham, Eng.

The Raymond Brothers Impact Pulverizer Company, of Chicago, Ill., is erecting a building at the corner of Laffin and Harrison streets, Chicago, where, commencing July 1, the company will manufacture its pulverizers and other machinery. The factory will be fitted with the latest machinery.

The Midland Portland Cement Company, of Indianapolis, Ind., has plans completed for a new 2,000-bbl. plant to be erected at Bedford, that will be practically a duplicate of the one now being constructed by the Lehigh Portland Cement Company at Mitchell, Ind. The officers are: Orlando M. Packard, president; Fred. W. Spacke, vice-president and treasurer, and Vanton O. Foulk, secretary.

The San Gabriel Electric Company, of Los Angeles, Cal., has recently purchased a 750-k.w. 2-phase, engine-type Westinghouse generator, to be installed in a sub-station of the Pacific Light and Power Company. The latter company has recently acquired the San Gabriel Company, and the new alternator will be used in connection with its general system of lighting and power in Los Angeles and vicinity.

At a recent meeting of the stockholders of the Burden Iron Company, of Troy, N. Y., the following directors were elected: James A. Burden, I. Townsend Burden, John L. Arts, James A. Burden, Jr., William P. Burden and Arthur S. Burden. The following officers have been chosen: President, James A. Burden; vice-president, James A. Burden, Jr.; general manager, John L. Arts; secretary, Nicholas J. Gable.

The Pelton Water Wheel Company, of New York and San Francisco, is reported to have lately secured contracts from the Sullivan Group Mining Company, of Marysville, and the Payne Consolidated Mining Company, of Sandon, B. C.; the Compania de Transmision Electrica de Potencia, Mex., and the Ardarjarie Electric Power Transmission Company, of Batavia, Dutch East Indies.

The Bolsover Colliery Company, Limited, of Chesterfield, England, has placed a contract with the British Westinghouse Electric and Manufacturing Company, Limited, of Manchester, Eng., for a complete polyphase electric power installation. The power will be used chiefly for hauling and pumping purposes in the colliery. Most of the machinery will be manufactured in Pittsburg, Pa.

The striking machinists of the Allis-Chalmers Company, of Chicago, Ill., have returned to work, after a strike lasting over a year. The men get an increase in wages of approximately 11 per cent, or to the basis prevailing in the shops for some time, and in turn agree to a week's work of 55 hours, 10 hours daily and 5 hours on Saturday. The original demands of the men were for a 12½ per cent advance and a 9-hour day.

The Risdon Iron Works, of San Francisco, Cal., has just completed and shipped one of its largest dredgers, via New York and Hamburg, to West Africa. Edward Blockley, of San Francisco, will accompany the machinery and superintend its erection. The pontoons have been built in England, and will be shipped in sections. The 4 cars leaving San Francisco contain 30 tons each. The Ankobra Tagua & Abossa Development Company, of London, which has purchased the dredge, intends to prospect a concession of 30 miles on the Ankobra River, in the Actim District, Gold Coast, West Africa.

A combine of six of the largest whiteware pottery plants in the country is reported consummated at Pittsburg, Pa. The new company will probably be known as the American Pottery Company and will be capitalized at \$5,000,000. Col. John N. Taylor, of East Liverpool, O., will be president, and L. I. Aaron, of Pittsburg, vice-president. The firms in the combine are Knowles, Taylor & Knowles Company, Homer Laughlin China Company, D. E. McNeil Pottery Company, Taylor, Lee & Smith Company, Edwin M. Knowles China Company and the Harker Pottery Company. Ten or twelve other firms are expected to enter the combine.

The works of the Union Ore and Reduction Company in Denver, Colo., were destroyed by fire recently. The cause of the fire is not known, but the fire is thought to have been of incendiary origin. The plant was erected for the purpose of treating low-grade copper ore. The loss is estimated at \$40,000. At the time of the fire the company is stated to have had on hand about \$1,500 worth of precipitates and about 200 tons of ore, and was contemplating and had in course of erection additions to the plant to cost about \$25,000. The company intends to rebuild at once, and in the meantime will secure a location for a limited amount of work under its process.

The general business offices of the Abendroth & Root Manufacturing Company were removed June 15 to the new and extensive works at Newburg, N. Y., whither all correspondence, excepting that within a radius of 25 miles of New York City will properly come before the sales department is addressed. The New York office, at 99 John street, will continue under the management of Messrs. Hoyt Spelman and C. E. Emerick, who have been with the company some time, and will give careful and prompt attention to all matters pertaining to the sales of the Root sectional water tube boiler and Root's spiral riveted pipe, including the export trade.

The machinists' strike that has been on at the plant of the Morgan Engineering Company, Alliance,

O., since February, is ended. The union demanded the reinstatement of an insubordinate workman, also recognition of the union, 9-hour day and time and one-half for overtime. The company has conceded the 9-hour day to the machinists, and allowed time and one-half for overtime. For 2 years past it has been paying time and one-quarter for overtime, and has worked 55 hours a week. The concession in time thus amounts to 10 minutes a day. The union concedes the right of the company to discharge and hire whom it sees fit, and the plant will be run as an open shop.

The San Antonio Water Company, of Ontario, Cal., W. H. Sanders, chief engineer, has placed an order with the Abner Doble Company, of San Francisco, for a third water wheel unit to be installed at its power plant now under construction in the Sierra Madre Mountains. These 3 wheel units are designed to develop 460 h. p. each at 375 revolutions per minute, under a total head of 694 ft., and will be direct connected to 250 h. p. General Electric generators. With the water wheel units will be furnished Doble patented needle regulating nozzles controlled by Lombard governors. The power will be transmitted to the vicinity of Ontario, Cal., and will be used for motor-driven pumps for irrigating purposes.

The Pelton Water Wheel Company of San Francisco has supplied the Grapevine Canyon Mining Company of Carters, Cal., a 16-ft. water wheel for direct connection to an air compressor. This wheel will operate under 500 ft. head and deliver 200 h. p. when running at a speed of 10 revolutions per minute. The Pelton Company has the reputation of having built the largest impulse wheels in the world—one of which, recently installed at the Morning Mine, Mullan, Idaho, is 33 ft. diameter, the hub alone weighing 33,000 lbs. This wheel operates under a 1,400-ft. head, and is direct-connected to 2,100-h. p. air compressors, which run at a speed of 80 revolutions per minute.

Messrs. Charles H. Besly & Co., of Chicago, Ill., report their business very good. They are receiving orders for Gardner grinders from all parts of the country. Within the past month shipments have been made to California, New York, Rhode Island, Connecticut and New Jersey. The spiral circles in their various forms used in connection with the spiral grooved steel disc, the distinctive feature of the Gardner grinder enable users to do an increased amount of work. Many shipments of Helmet oil, Badger and Bonanza grease cups are being made to all parts of the country. Numerous inquiries for catalogues and circular matter relating to the firm's own specialties as well as requests for general catalogues, estimates and prices on shop equipments, indicate a healthy condition of trade throughout the country.

The engineering department of the Pittsburg Gage and Supply Company, Pittsburg, Pa., has secured, through Victor Beutner, of Pittsburg, Pa., an order for a pair of 600-h. p. Brown Corliss Engine Company, Corliss, Wis., twin engines to drive direct-connected electric generators in the new mill of the Susquehanna Iron and Steel Company at Lancaster, Pa.; also an order for a complete White Star filtering system for the new plant of the West Moreland Light and Power Company, Greensburg, Pa., of which James Bryan, Pittsburg, Pa., is electrical engineer. Another notable order was from the Hoover, Owens & Rentschler Company, Hamilton, O., for supplying 2 cross compound engines of their manufacture with a White Star filtering system. These engines are for the power plant of the Cincinnati, Georgetown & Portsmouth Railway Company.

The We-Fu-Go and Scaife water softening and purifying systems are manufactured only by William B. Scaife & Sons' Company, of Pittsburg, Pa. The We-Fu-Go system, a cold intermittent system, was formerly manufactured by the We-Fu-Go Company, of Cincinnati, which has been absorbed by William B. Scaife & Sons' Company. The Scaife system is a hot continuous system. Some of the contracts recently closed by the manufacturers are: Hecla Portland Cement and Coal Company, North Bay, Mich., 1,500 h. p.; Hecla Portland Cement and Coal Company, West Branch, Mich., 500 h. p.; A. A. Simmonds & Son, Dayton, O., 200 h. p.; American Sheet Steel Company, New Philadelphia, O., 1,300 h. p.; National Mining Company, Pittsburg, Pa., 1,000 h. p.; Antrim Iron Company, Mancelona, Mich., 1,500 h. p.; W. D. Boyce Paper Mills Company, Marseilles, Ill., 1,250,000 gals. per day. The systems are built for any industrial purpose, and for any capacity.

TRADE CATALOGUES.

The Fort Wayne Electric Works, of Fort Wayne, Ind., issue a little pamphlet of 84 pages, containing a price-list of parts of Wood arc dynamos. The pamphlet is neatly printed and illustrated.

The Boston Testing Laboratories, of Boston, Mass., issue an illustrated 48-page pamphlet, describing a

complete list of apparatus and supplies for the study of metals by microscopic methods. The list includes microscopes and accessories, chemicals, etc.

The J. H. Montgomery Machinery Company, of Denver, Colo., has issued a revised edition of its illustrated price-list of machinery and supplies. The devices mentioned in this price-list include arrastras, ore-buckets, mine cars and skips, car wheels and axles, ore-crushers, water-jacket, reverberatory and roasting furnaces, stamp-mills, wire rope and wire rope tramways, mine hoists, power transmission machinery, derricks, whims, classifiers and jigs, screens, ore feeders and windlasses. The various articles mentioned are given in alphabetical order, making the pamphlet easy for reference.

The process of welding steel and iron castings, or even wrought iron, by an aluminum composition, known as "Thermit," patented by Dr. H. Goldschmidt, is described in a pamphlet sent out by the proprietor of the process, the Allgemeine-Thermit-Gesellschaft of Essen-Ruhr, Germany. This process has been described in several technical publications, including the ENGINEERING AND MINING JOURNAL, and seems likely to come into extensive use. The American representative of the company controlling the process is Clarence B. Schultz, who may be addressed in care of the Phoenix Mutual Life Insurance Company, New York City.

Motor-driven air compressors, both stationary and portable, are described in catalogue No. 51, a pamphlet of 24 pages, issued by the Christiansen Engineering Company, of Milwaukee, Wis. These compressors are designed to meet a demand for simple, light and compact machines for general service in operating pneumatic tools, etc., and their capacity ranges from 4 to 1,000 cu. ft. of free air per minute. The compressors include those for various purposes—stationary plants for continuous service, and stationary and portable plants for intermittent service. The compressors are provided with automatic governors, with magnetic blow-outs, and are extremely compact in design.

James H. Walker, of Milwaukee, Wis., manufacturer of fuel-gas appliances, has issued a catalogue and price lists calling attention to some of the benefits to be derived from fuel gas in foundries, machine shops, etc. The advantages claimed for gas over other fuels are increased capacity, cleanliness and a saving in time and labor and in the life of crucibles. The furnaces shown in the catalogue are adapted for melting copper, brass, zinc and also for Babbit metal, type metal and other low-fusion alloys. Other furnaces are for tinning or galvanizing purposes. The manufacturer also shows in the catalogue forges for dressing and welding tools, or for heating rivets for bridge and boiler work.

Best's improved turn-table for inclined railroads is described in a circular sent out by William R. Kroll, 47 Brabanter street, Cologne, Germany. The device, invented by a Prussian inspector of mines, is stated to overcome all the defects common to the various methods in use for switching or turning trucks on inclined planes. The table can be turned 90 degrees to right or left, and is adjustable for inclines up to 28 degrees. It may be used on gravity planes, or in connection with cable traction by steam, air, water or electric power. Its advantages are a saving in time and power, increased security to plant and employees, easy adjustment and low cost. It is manufactured by the Sieg-Rheinische Huetten-Actien-Gesellschaft.

No. 34, of the "Record of Recent Construction" of the Baldwin Locomotive Works, of Philadelphia, Pa., is like its predecessors, neatly printed in French and English, with dimensions and weights given in both metric and English systems. Some of the noteworthy locomotives shown are a compound Mogul locomotive, for the Oudh & Rohikund Railway, in India; a compound 10-wheel locomotive for the Chicago, Milwaukee & St. Paul Railway, which, with engine and tender, weighs 188 tons, the weight on the drivers being 63 tons; a large consolidation locomotive for the Pennsylvania Railroad Company; a compound consolidation locomotive for the Southern Pacific Company, weighing, with engine and tender, 157 tons, the total weight on the driving wheels being nearly 92 tons; a compound consolidation locomotive, for the Atchison, Topeka & Santa Fe Railroad, weighing, with the engine and tender, 157 tons, with a total weight on the driving wheels of 91 tons, also a consolidation locomotive for the Chilean State Railways.

A cloth-bound book of 320 pages, published by the Link-Belt Engineering Company, of Nicetown, Philadelphia, Pa., is entitled "Modern Methods," as applied to the elevating and conveying of materials and the transmission of power. Some of the devices in operation illustrated in the pamphlet, are the Link-Belt car haul, also the auxiliary car haul for delivering mine cars to the down-haul without shock; Link-Belt shaking and revolving screens; the Dodge system of storing anthracite coal; the Link-Belt adjustable chutes for coal docks; coal elevators of various designs for wharves and boiler plants, and the Link-

Belt carrier for handling all kinds of material. The construction of the various parts of this carrier are described in detail, and its many excellent features pointed out. The Link-Belt Company also builds screw-conveyors, dump-cars and the Chamberlain patent electric hoist and conveyor. For power transmission, the company advises the use of the Red Thread brand of Manila rope. The book contains a full description of the various types of link chains and attachments made by the company.

Circular No. 4 sent out by the Webster, Camp & Lane Company, of Akron, O., is a 10-page pamphlet describing the company's electrically-driven hoists. The company states that in the past few years it has built such outfits, ranging in duty from 30 h. p. to 300 h. p., equipped with motors of various types, and in every case the hoists have given the best possible results. The company recommends the use of two motors instead of one on the ground of increased starting power, even running, decreased size of driving gear, and the ability to use one motor in case the other is damaged. The hoists shown in the pamphlet include self-contained outfits, using the railway type of motor. These hoists are double-gear, all gears having cut teeth. Another hoist shown has a 300-h. p. induction motor, with 2 drums, 6 ft. 6 in. by 27 in. face, with one reduction of speed between the motor and the drum, the duty required being to hoist 6,000 lbs. at a speed of 1,000 ft. per minute. This hoist, complete, weighs 75,000 lbs., and was shipped to South Africa. Another hoist, built for Mexican trade, has 2 reels, each with improved friction clutches and brakes. One direct-current motor is used, and the hoisting capacity amounts to handling a load of 5,000 lbs. at a speed of 500 ft. per minute.

Two devices of interest to mining men are described in a neat 48-page pamphlet issued by P. B. McCabe & Co., of Los Angeles, Cal. They are the New Standard concentrator and the Elspass 4-roller quartz mill. The concentrator is of the bump type, and so arranged that the bump can be regulated from the lightest to a heavy blow. The surface of the table has riffles, arranged at a line tangent to the line of bump, causing the water to wash squarely over them. The riffles do not exceed 18 in. long. The table is suspended from the superstructure by means of hooks, and is counterbalanced between a pull-spring and a cushioning spring. It can be raised or lowered to give any inclination desired. The length and speed of stroke are easily adjusted. The bottom and corners of the table are thoroughly bound and braced; the upper surface is covered with linoleum. The slimes from the ores have a travel of 10 ft. over the riffle surface. The table being narrower at the head than at the foot, the heavy particles are kept up to the line of action of the wash-water until the ore is thoroughly cleaned. The use of riffles in this concentrator is under a license granted by the Mine and Smelter Supply Company, owners of the Wilfley patents, and users need have no fear of litigation. The Elspass mill consists essentially of a rigid revolving bed, upon which rest 4 stationary rolls, the pressure of the rolls upon the bed being regulated by powerful springs. Suitable sweeps keep the uncrushed ore under the rolls. The crushing surface of the bed and the tires of the rolls are made of hammer forged steel, such as is used on locomotive tires. Around the circumference of the bed are screens of any desired mesh, that may be quickly and easily changed. The screens have over 20 lineal feet of free surface. The mill is stated to granulate rather than crush the ore, and by the water fed into the revolving bed a rapid screening action is produced which prevents sliming. The capacity on ordinary quartz ores is given as from 30 to 50 tons per 24 hours, using screens from 30 mesh up. Among the advantages claimed for the mill are low cost, minimum wear, easy erection and repairs and small space occupied. Numerous testimonials regarding both the concentrator and the mill are given in the pamphlet.

GENERAL MINING-NEWS.

ARIZONA.

COCHISE COUNTY.

(From Our Special Correspondent.)

Calumet & Arizona.—Work is being rushed on the hoisting plant at these mines, at Tombstone.

Copper Queen Mining Company.—The mines, at Bisbee, are lit by electric lights through the main tunnels, and are said to have over 110 miles of track in the many drifts. A system of telephones connected with the engineer and superintendent's office have been installed.

GILA COUNTY.

Black Warrior Copper Company, Amalgamated.—This company's plant closed recently, throwing upwards of 90 men out of work. It is understood that the shut-down was due to a disagreement between the company and the railroad over freight charges, and it is also rumored that the copper company contem-

plates changes in the plant. About 80 tons of refined copper ore were reported on hand at Black Warrior, and 800 tons of acid.

GRAHAM COUNTY.

(From Our Special Correspondent.)

The camp of Troy is in a prosperous condition. The new Manhattan smelter is almost ready to start.

Jack Rabbit.—Superintendent Bagley, of this mine, Casa Grande District, is sacking high grade ore for shipment, leaving the second class on the dump.

YAVAPAI COUNTY.

(From Our Special Correspondent.)

William Theising has sold 4 claims to E. A. Frankie, of Chicago, Ill. The claims are about 4 miles from Cordes, and are developed by about 500 ft. of work. The ore is said to run as high as \$25 gold, 8 oz. silver and 10 per cent lead.

Joe Dandy and Florodora.—A rich strike of gold ore is reported on these mines, near Wickenburg. Not enough development is done to show the extent of the vein.

CALIFORNIA.

ALPINE COUNTY.

(From Our Special Correspondent.)

Stella.—It is reported that a mill is to be built at this mine.

AMADOR COUNTY.

(From Our Special Correspondent.)

Cost of Shaft Sinking.—E. C. Voorheis, president and manager of the Lincoln Mine at Sutter Creek, has given out a statement showing time and cost of sinking the Lincoln incline shaft from 1,260 ft. to 2,000 ft. The incline is 62½ degrees. The work was done with 3 miners working 8-hour shifts, or 9 miners per day, with a day and night foreman, making 11 men per day.

2,956 days labor at \$2.75.....	\$7,129
350 days' labor day foreman at \$4.....	1,400
282 days' labor night foreman at \$3.25.....	916
<hr/>	
Total labor cost.....	\$9,445

22,450 lbs. Hercules powder used, cost.....	1,307
35,800 ft. fuse, cost.....	125
45 boxes Lion caps, cost.....	46
2,400 lbs. candles, cost.....	288
148 sets timbers, 207,200 ft. lumber, cost.....	3,720
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Total.....	\$14,941

Cost per foot of shaft for labor of drilling and shoveling.....	\$12,764
Cost of powder per foot of shaft.....	1.766
Cost of fuse per foot of shaft.....	.17
Cost of caps per foot of shaft.....	.06
Cost of candles per foot of shaft.....	.39
Cost of timbering, per foot of shaft.....	5.04
<hr/>	
Cost per foot.....	\$20.19

3,864 blasting holes were drilled an average depth of 6½ ft. each, or 5 2-10 holes per foot of shaft; 3 22-100 pounds of Hercules 35 and 40 per cent powder were used to each hole, or 16 74-100 pounds per ft.; 9,456 tons of rock were broken and hoisted to the surface, or 12.77 tons per ft. During the sinking 14,406,200 gals. of water were hoisted, equal to 60,025 tons. "Baby" Giant power drills were used. The actual time of doing the work was 350 days.

Argonaut Gold Mining Company.—Sinking is nearly completed at this mine, at Jackson. J. B. Francis is superintendent.

Defender.—F. B. Joyce, superintendent of this mine, at Defender, has let a contract for a 10-stamp mill.

Montgomery District.—Development work continues in the mines in this district, near Benton, recently purchased by Eastern men. Bad air interferes with progress somewhat.

Sargent.—At this mine, near Middle Bar, a 3-compartment shaft has been started. The hoist, gallowes frame, etc., of the Peerless Mine are being moved to the Sargent.

South Eureka.—This mine, near Sutter Creek, J. F. Parks, superintendent, is sinking below the 2,000-ft. level. The mill is steadily running.

BUTTE COUNTY.

(From Our Special Correspondent.)

Bader.—At this mine, near Magalia, G. W. Morey, superintendent, the company is negotiating for more water for gravel washing. The mine is in shape for working.

Golden Summit.—This mine, near Oroville, owned by United States Senator George C. Perkins and his brother, has been leased to J. E. Weaver and David Reece, who are stopping ore. The mine has a 10-stamp mill.

Golden Trout.—An electric power plant is being put on this mine, near Lumpkin.

Nimshew Gold Mining Company.—At these mines, at Nimshew, George L. Smith, superintendent, a number of men are at work steadily.

P. B. Steifer Mining Company.—This company, at Magalia, M. V. Steifer, of Oroville, secretary, is sinking on the land adjoining the old Magalia Mine.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Blue Jay.—This mine, near Glencoe, under the same management as the Fannie Marie, F. O. Courtmarsh, superintendent, is to have a mill and other machinery.

Duchess.—Machinery from the Big Horn Mine is to be put on this mine, near Vallecito.

Lightner Mining Company.—Superintendent Alex. Chalmers, of this mine, at Angels, has contracted for a new hoist capable of lifting 3-ton cars from a depth of 2,500 ft.

Sloan.—The Sloan Brothers, of Vallecito, are enlarging the reservoir at their hydraulic mine.

What Cheer.—This gravel mine, near Mokelumne Hill, after being shut down for 14 years, is to start again with J. J. McSorley as superintendent.

FRESNO COUNTY.

(From Our Special Correspondent.)

Haskell.—Houses, etc., are being put up on this place, near Clovis, for a new English copper mining company, under management of H. B. Vercoe. Prospecting is under way.

INYO COUNTY.

(From Our Special Correspondent.)

Emily Knot.—W. C. Pidge, acting for San Francisco and Eastern men, has bonded this and 2 other claims near Bishop, and also the Enloe and Leidy mines, near Laws. Prospecting is to start at once.

KERN COUNTY.

(From Our Special Correspondent.)

M. J. Curren, L. M. Underwood, George Letts and A. B. McNitt, of Bakersfield, have located some promising claims in the Rademacher District, near Randsburg.

Havilah District.—The old camp of Havilah, that for many years has done little, is now again active, mainly because the cyanide process has worked well on ores of the district. Among the properties now worked are the Big Four Company's tunnel, the Golden Eagle tunnel, the McKidney Mine, the Warrington Company's plant, the Friday and King Solomon mines. A cheap power supply is expected shortly through the construction of a canal.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Mariposa Commercial and Mining Company.—The mills at Mount Bullion and Mariposa, C. C. Derby, manager, are now run by electric power. It will now be possible with cheaper power to open other properties on the grant.

Mount Bullion Cyanide Plant.—J. R. H. Robertson, representing Denver men, is starting up this cyanide plant to make an experimental run on old tailings or sands.

Princeton.—At this mine, owned by the Mariposa Mining and Commercial Company, of Mount Bullion, C. C. Derby, manager, 20 stamps are to be added to the present 30. Electrical power will be used.

MONO COUNTY.

(From Our Special Correspondent.)

Golden Gate.—This mine, in Antelope Valley, near Bridgeport, I. W. Geary, manager, is running its mill regularly.

NEVADA COUNTY.

(From Our Special Correspondent.)

Fouch Mill.—Dr. Fouch has completed his new 2-stamp mill, near North San Juan.

Iron Clad.—This mine, near Rough and Ready, owned by George C. Hay, keeps the mill running steadily. Sulphurets are shipped to the Selby Smelter.

North Star Mines Company.—A number of suits have been filed against this company, at Grass Valley, A. D. Foote, superintendent, in the interests of the estate of John W. Rely, alleging that the company has extracted ore from the Norwich Mine next to the Massachusetts and North Star mines. The Norwich has not been worked for years by its owners, but ore has admittedly been taken out by the other mines. Opinions differ as to the value and quantity extracted.

PLUMAS COUNTY.

(From Our Special Correspondent.)

Bluff City Mining Company.—The main tunnel of this mine, near Quincy, is in 200 ft., and has 150 to go to cut the vein.

Cataract Mining Company.—This company, Chas. L. Adams superintendent, has 20 men digging a new ditch from Chippis Creek down to Lower Indian Bar. The ground formerly belonged to Camille Gerard. Two large elevators are to be used. A short distance below is Chippis Creek Bar, owned by W. Mayo Cleveland. A fine ditch has been added to this property. At Long Bar, Cook & Co. are working

with an elevator of home construction. All these claims are not far from Spanish Ranch.

Feather River Gravel Mining.—On the North Fork of the Feather River are many gravel claims which are worked more systematically than formerly. The top ground, once thrown aside as worthless, is now carefully washed. Elevators are also used more than formerly.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

California King Gold Mining Company.—Engines and cars for the 6-mill narrow-gauge road are at hand. J. E. Ridgeway has been appointed assistant manager, and Andrew Trumbo is foreman of the cyanide department at Pochacho. Senator John P. Jones is president of the company.

Golden Cross.—Charles W. Pauly, the receiver of this mine, at Hedges, owned by the Free Gold Mining Company, reports receipts for May as \$13,487, of which \$11,693 was derived from the cyanide plant. The mine is closed pending legal settlement of the accounts of Isaac Trumbo, of San Francisco, the former receiver.

High Peak.—The Helvetia Mill has been crushing ore from this mine, at Julian. Water supply is scant.

Palagonite.—What is represented to be a deposit of this material has been discovered in the Aliso District, 3 miles from Escondido on the way to the Encinitas station of the Santa Fe Railroad. Palagonite is a basaltic tufa chiefly consisting of glass lapilli and the products of their alteration, and is known to exist in Italy, Iceland and the Cape Verde Islands.

It is supposed that this San Diego County deposit is the only one in this country. There is claimed to be an immense mass easily accessible. The powdered product is suitable for paints, polishing powders, kalsomining, filler for mineral paints, etc. Some of the material is pure white and other portions show lavender and ochre colors. J. F. Delgado, of San Diego, owns the deposit, and has brought to the State Mining Bureau, San Francisco, various samples. Little development has been done, but steps are being taken to put the material on the market.

Ranchita.—F. E. Jones has closed down this mine at Banner for a time, but will soon erect a mill for the Elevada Mining Company at the same place.

SAN LUIS OBISPO COUNTY.

(From Our Special Correspondent.)

Libertad.—This quicksilver mine, formerly the McEwen & Johnson, is about 15 miles from Cayucos. About 1,000 ft. of tunneling have been done. A company is being formed to purchase and equip the property.

SANTA CLARA COUNTY.

(From Our Special Correspondent.)

Charles P. Breslan, of San Jose, has bonded for \$15,000 a copper claim owned by G. Mineo, near Alma. Some work has already been done on the vein, and Mr. Braslan will do considerable development during the 18 months of the bond.

Santa Teresa.—R. B. Harper is reopening this old quicksilver mine, 3 miles from New Almaden. A furnace will be put up. Twenty men are employed. The old workings are being cleaned out.

Silver Creek.—The new furnace for this quicksilver mine, near Evergreen, is completed. The force at the mines will be increased.

SHASTA COUNTY.

(From Our Special Correspondent.)

Balaklala.—This mine, near Kennett, W. W. Adams, superintendent, is under bond to Pennsylvania men, headed by P. L. Kimberley. The force is to be increased, and a smelter may be erected.

Great Western Gold Mining Company.—This company has bonded the Lowden and Friday copper claims near Kennett, and will begin development at once. The same company has bought the Murray group, near Copley.

Uncle Sam.—This gold mine, near Kennett, at one time owned by the Sierra Buttes Mining Company, and later by B. M. Newcomb and F. H. Dakin, has been bonded by the Trinity Copper Company. The new owner intends to use the Uncle Sam quartz as a flux in its smelters on account of gold values.

SIERRA COUNTY.

(From Our Special Correspondent.)

Crocus Gold Mining Company.—This mine generally known as the Plumbago, near Alleghany, Mason W. Mather, manager, is having air drills installed in the 3 tunnels. The hoisting works are to be enlarged and other improvements made. The mine employs 32 men.

Steamboat.—The red channel has been struck in this mine, near Alleghany. The mine is owned by E. Jones and Lawrence Evans. Very rich gravel is being taken out.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Newkirk, Northcutt & Quigley are opening new ground at the mouth of Beaver Creek, between Honolulu and Walker. By giants and hydraulic elevator they expect to raise pay gravel into sluices.

China Ock.—From this claim, at Happy Camp, Mr. Van Brunt has made 2 clean-ups, realizing \$45,000.

Mattern Mill.—H. Mattern is building a 10-stamp mill near Hornbrook. Twelve men are at work in the mine.

Oro Fino.—This group of mines, near Shasta, is to be developed by William Moran for Berkeley men. The first payment has been made, and arrangements are under way for a mill.

Porphyry Dike.—This claim, 15 miles from Montague, has been bonded for \$10,000 to the Sheba Mining Company. A mill is to be erected for prospecting.

Siskiyou Development Company.—This company will extend the tunnel in the coal mine at Ager.

SONOMA COUNTY.

(From Our Special Correspondent.)

Cloverdale.—In the suit in partition of H. B. Lawley against Kimball, the court at Santa Rosa has found that this quicksilver property cannot be partitioned without great prejudice to the owners of the Cloverdale Mine, and has made an order of sale of the property. Dixie Davis, of Cloverdale, has been appointed referee.

TEHAMA COUNTY.

(From Our Special Correspondent.)

Asbestos Claims.—A. M. McCoy, H. Thompson, T. Strap and S. and C. Kaak have located 5 asbestos claims in Chrome mining district.

TRINITY COUNTY.

(From Our Special Correspondent.)

Gold Dollar.—This property, on Canyon Creek, is owned by J. E. Davis, James O'Neill and Alex. Gilzean, of Junction City. The recent clean-ups are satisfactory, but more reservoirs and ditches are to be built to increase the water supply.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Arbona.—The Equitable Mining Company is preparing to resume work on this mine, at Tuttle town.

Bell.—This mine, at Tuttle town, has been unwatered, and 6 men are running a drift.

Del Monte.—Arrangements are being made for machinery for this mine at Groveland.

Doyle.—A pumping plant is to be installed at this mine, at Sonora.

Draper.—The owners of this mine, at Soulsbyville, are grading a site for a 10-stamp mill.

Lady Washington.—Messrs. Ballard & Martin, who are to reopen this mine, at Carters, will start a new tunnel just above the mill on the north fork of the river.

Mahogany.—On this mine, 5 miles from Carters, J. W. Matheny has a good prospect.

McAlpine.—At this mine, near the Pino Blanco, Big Oak Flat, S. E. Rigg has done much preliminary work. A new shaft will start at the level of the lowest tunnel. The mine was once a large producer.

Mohican.—At this mine, near Groveland, Felix Chappelle, superintendent, 30 men are employed. The mill is running full time with good results.

Nonparcil.—The machinery of the Mississippi Mine, at Big Oak Flat, has been purchased by A. P. Dron for this mine.

Two Brothers Consolidated.—An interest in this mine, at Groveland, has been sold by E. A. Wiltsee to Aug. H. Ward, of Alameda with a 5-acre mill site on the Sheehan Ranch.

VENTURA COUNTY.

(From Our Special Correspondent.)

Barton Mica Mines.—The company which recently took hold of these claims, on Piru and Lockwood creeks, has made 2 shipments of mica, and has 10 men at work. The material has been shipped to San Francisco, and there ground. A mill is being installed. The mica is said to lie blanket-like a short distance below the surface; the thickness varies greatly.

YUBA COUNTY.

(From Our Special Correspondent.)

Miller.—This mine, between Brownsville, Yuba County, and Forbestown, Butte County, Robert Haskell, of Brownsville, superintendent, has its new 10-stamp mill running with 10 stamps ready to be added when required. Dr. A. H. Elftman and James B. Cull, of Minneapolis, Minn., are the principal owners.

COLORADO.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

Burns Moore Tunnel.—A new Root blower has been added. The company is working 3 shifts, and expects to cut one of the wide veins within the next 100 ft. J. M. Shaller, Idaho Springs, is in charge.

Colorado Specie Payment Company.—E. W. Williams, manager, says that the company will install electricity at the mine as soon as the trouble with the Champion Mine is settled. A new air compressor will go in and shaft sinking will continue. Rich ore is found on both sides of the shaft.

Gold Cord.—Since purchasing the Lexington group at Idaho Springs this company has also acquired the Allen Mill, on Chicago Creek, and will handle all the mill ore under stamps.

Sun & Moon.—Manager Sims, of Idaho Springs, says that 2 new air compressors, 16 by 18, Leyner pattern, are to be installed at the shaft and driven by an electric motor with power from the Cascade Electric Company's line, being built from Idaho Springs to Central City. A new hoist will also go in. Connection between the Newhouse level at 2,000 ft., and the surface workings will be made as soon as possible. Production is about 1,200 tons of ore per month, netting \$8,000.

GILPIN COUNTY.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—F. A. Potts et al to the Bates-Hunter Consolidated Company, Bates lode, Gregory District; J. D. Smock et al to A. J. Smith, the Golden Ridge lode, Pleasant Valley District; James C. Nelson to A. J. Smith, the Hammon and Yellow Girl lodes, Pleasant Valley and Russell districts; Robert J. Fulton to Robert Milligan, the Ohio lode, Russell District; August Bedell to the Gold State Mining and Milling Company, the British and Lake Mammoth lodes, Gregory District; F. R. Hughes to Fred Newton, one-fourth interest in Cromwell lode, Enterprise District; James Faulkner to J. W. Baldwin, one-fourth interest in Columbine and East Columbine lodes, Pleasant Valley District; John Owens to Thomas Leeks et al, Mammoth lode, Silver Lake District; E. O. Keeler to Harriette M. Keeler, one-half interest in the Providence, Welcome and Jay Gould lodes, Nevada District; O. H. Macauley to J. Horner et al, the Buckhorn extension lode, Hawkeye District; J. B. McKay to W. Baldwin, one-eighth interest in Columbine and East Columbine lodes, Pleasant Valley District; A. J. Smith to Robert Milligan, the Hammon, Golden Ridge and Yellow Hammer lodes, Pleasant Valley and Russell districts; J. Shinneman to F. N. Werner, the Slide lode, Russell district. James E. Wallis to the Boston-Cleveland Mining and Milling Company, the Morning Star lode, Pleasant Valley District; B. G. Strock to the Blue Grass Mining Company, the Decoration lode, Phoenix District.

Bosen Plume.—Local men have taken a lease and bond on this lode in Russell District, have started to drift at 70 ft., are taking out surface ores which pan well, and intend to ship to the Golden Smelter. W. McLeod, of Central City, is in charge.

Golden Smelter.—On account of an attempted strike by the men at the plant during the past week, no ores are being taken by the Colorado road until the matter is settled. It is claimed that the smelter is paying 30 per cent more wages than Denver smelters, and the members of the Golden union seem inclined to be dictatorial. The employes have been treated very courteously by Manager F. R. Carpenter, and it is believed that the differences may be satisfactorily settled. Gilpin County mine operators are deeply concerned in the matter, as the plant has proved the salvation of a number of low-grade producers.

Golden State Mining and Milling Company.—Eastern men are interested in a lease and bond, and they have started to sink on the British lode. The 200-ft. is to be sunk 200 ft. deeper. Some smelting ores showing yellow and gray copper, carrying average values of between \$35 and \$40 per ton, are taken out.

Hall Ranch.—Eastern parties have taken an option on this group of 15 claims on the south line of this county, touching Clear Creek. Prospecting work has developed some fine claims. J. J. May, of Idaho Springs, is manager.

New Gilpin County Locations.—Many new locations are being filed from the districts north and west of Central City, a large amount of the increased activity being no doubt due to the fact that the Moffatt Railroad is going through that country. Several good properties will be developed it is believed with this season's work. The sections lie about 20 miles west of Central City and about 2 miles north of James Peak, and are about timberline. The ores carry average values in gold and silver and a fair proportion of copper.

New National Tunnel Mining Company.—A new

shaft building, 24 by 36 ft., has been erected on the Horseshoe Mine, and a 12-h. p. gasoline hoist installed. The shaft is to be sunk 375 ft. to connect with the Wabash Tunnel. Chicago men are interested, with John Bruhl, of Central City, superintendent.

Russell Gulch Mining and Development Company.—In sinking at less than 200 ft. a good crevice has been opened, carrying values of 1.28 oz. gold, 25.22 oz. silver and 6.76 per cent copper, or a cash value of \$45.47 per ton. Machinery has been installed. Idaho Springs parties are interested in a lease and bond under the management of G. K. Kimball, Jr., of Idaho Springs.

Saratoga.—A new 100-h. p. boiler has been delivered by the makers, Stroehle & Sons, of Black Hawk. As soon as it is installed sinking is to be resumed and the 800-ft. shaft will go 150 ft. deeper. E. R. Nelson, of Russell Gulch, is superintendent.

Waltham Mining Company.—Idaho Springs and local men have opened a splendid property with less than 100 ft. of development work. The vein in both the shaft and level is between 7 and 8 ft. wide, and the ore is all shipped to the Golden Smelter, the net returns from over 100 tons being \$4.92 per ton. An early sale may be made. Robert H. Hastie, Nevada, is in charge.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Ore Output.—The tonnage of 2,500 tons per day, composed largely of iron, oxide and iron, lead and zinc sulphides, is made up of the following producers: A. M. W., 250 tons; A. Y. & Minnie, 150 tons; Ibox, 250 tons; Resurrection, 150 tons; Penn Company, 50 tons; New Leadville Home Company, 200 tons; Iron-Silver Mining Company, 250 tons; Yak, 200 tons; Small Hopes, 150 tons; Caribou, 100 tons; Sixth Street, 100 tons; Midas, 200 tons; Gallagher dump, 75 tons; Fryer and Carbonate Hill leases, 200 tons; other leases, 175 tons. The New Monarch, which is arranging to renew shipments, will handle 250 tons daily.

Allen Concentration Plant.—Mr. Allen is experimenting on tailings concentration in his plant in Stray Horse Gulch. The slimes from the A. M. W. mill are conveyed to a buddle and a very good separation is made, the inner ring of material being lead, the next zinc and iron and the outer waste. The zinc ore is run over twice in order to cleanse it.

Burmah Mining Company.—This company has a large acreage and a fine mill at Alicante, and last year shipped \$10,000 worth of ore. All work is stopped now on account of litigation over the lease.

California Gulch Dumps.—Various sets of lessees are working different dumps along the gulch. After washing and jigging these dump materials show 15 to 20 ozs. silver and an equal value in lead.

Coronado.—A leasing company headed by E. A. Hanifen and W. O. Reynolds has leased this downtown shaft and other adjoining territory. Work will be through the Coronado shaft. There are enormous deposits of low grade iron opened, but the new company will explore the lower level at 660 ft.

Cullen.—New leasers headed by Follet & Ballou are unwatering the old shaft and will sink deeper.

Diamond Gold Mining Company.—The property is being developed at 900 and 1,020 ft. Machine drills are being used. The company is searching for the extension of the Resurrection shoot.

Dinero Leasing Company.—On the old Dinero vein two levels are being opened at 350 and 400 ft. Much trouble has been experienced with water, but this will soon be overcome by an upraise draining all water to a point where it will be easily handled. Thirty thousand dollars' worth of ore has been shipped by the lessees, but this value has been put back in development work. One of the plans is a 3,200-ft. tunnel to cut and drain all the veins.

Fanchon Gold Mining Company.—In a cross-cut run from the new shaft some fine black sulphurets have been encountered. The new machinery is in position and sinking is resumed.

Fanny Rawlings.—A leasing company headed by F. C. Lanphier and D. D. Colcord has leased the south half of the Rawlings. The intention is to save the zinc sulphides by concentration, making a 40 to 50 per cent zinc concentrate. The shaft is 500 ft. deep and is equipped with a \$14,000 plant. The United States Zinc Company will take the product.

Fryer Hill Mines Company.—The pumps are handling 1,200 gals. a minute, and the management figures that 2 months more will drain the workings. Work in the upper levels of the Dunkin, Jamie Lee, Tip Top and Sliver claims is to start. In the Dunkin there are several high grade veins from which shipments can soon begin. The old Union Leasing Company in 17 months prior to the labor strike of 1896 took \$1,370,000 out of these workings, the average grade of the ore being \$29.93 a ton.

Golden Era.—This 55-acre tract on Loveland Mountain is operated by Colorado and Utah people, who have just opened 6 ft. of ore that assays 50 per cent

lead, 1½ ozs. gold and 15 ozs. silver. The property adjoins the Great West.

Homestake Leasing Company.—Owing to bad roads shipments are light. Much development work is under way, and the vein is growing larger and richer.

La Belle Mining Company.—An ore body is opening, a shipment of \$300 ore has been made, and operations will continue.

Last Chance.—Machinery is in place and the new shaft is being sunk.

Little Louise Mining Company.—Machinery is in place and the new shaft is well under way.

New Jersey Zinc Company.—This company, having a plant at Canon City, is increasing its tonnage from Leadville zinc producers. It is using the Wetherill magnetic separation process, and is handling at a profit a lead-iron-zinc ore carrying 20 to 25 per cent zinc.

Ohio Mining Company.—The company has moved its machinery to another part of its ground and started a new shaft.

President.—Hanifer & Reynolds are at the head of the new leasing company just starting work on this Breece Hill property. At 540 ft. a body of low-grade siliceous ore was opened up in previous work. One stope of this material is 80 ft. high, but the values are only about \$10 a ton. Treatment charges have been reduced and the lessees can ship 75 tons daily.

Small Hopes Mining Company.—At the 1,000 ft. and 1,400 ft. levels enormous sulphide bodies are blocked out in the R. A. M. shaft. Good lead carbonates are being mined by different lessees on other parts of the company's territory.

Tiger Combination.—New lessees headed by Jas. McNece have formed a company to work the Tiger, Venture and General Shields claims. Work will be done through the Venture Tunnel, which will be run in 200 ft.

Triumph.—New lessees have taken hold of this claim near the Ibox group, and will prospect for an extension of the Ibox ores.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

The mining season has fully opened, though there is still some snow in the gulches. Men have been employed in the gulch below the Liberty Bell Mine, searching the slide for the bodies of those who were killed last February, but with no success. The slide is about 20 ft. deep and 300 ft. long.

Blue Lake Mining Company.—This company, recently incorporated to develop and operate mines in Bridal Veil Basin, has started driving the tunnel 150 ft. further. The tunnel is now in 40 ft. The ore is refractory, and will be shipped to smelters for treatment. Its principal values are gold, lead and copper. Manager W. W. Cramer, of Telluride, expects to be shipping ore within 6 weeks.

Butterfly-Terrible Mining Company.—This company is driving the mill cross-cut tunnel from 3 to 5 ft. daily, with 12 to 18 men employed.

Gold King.—This mine, in Gold King Basin, 11 miles southwest of Telluride, is being worked entirely by leasers, and the mill is running steadily. The tramway is running 2 shifts. It is reported that the company will erect a cyanide plant to treat the tailings that have been accumulating below the mill for 15 years.

Gold Metals Mining and Milling Company.—This company is making rapid progress on the tunnel, now in nearly 40-ft. with 50 ft. to go to cut the Gold Metals vein. The Gold Metals and Capital veins will be cut 300 ft. from the surface, but by drifting a depth of 1,500 ft. can be attained. W. E. Brehmer, Telluride, is general manager.

Japan Tunnel.—In May the average amount of ground broken per day was 6½ ft., but in June it has been over 7 ft. The tunnel, when completed, will be 2,500 ft. in length. It is now in over 600 ft. At the present rate it will be finished by January 1. V. U. Rodgers, of Telluride, has charge.

Liberty Bell Gold Mining Company.—The cross-cut tunnel is advancing from 3 to 6 ft. per day. When completed it will be 3,000 ft. in length—the longest in San Miguel County at present. It will intersect the Liberty Bell vein 900 ft. below the lowest of the upper workings.

Modena Group.—This group, in Bear Creek Basin, comprising the Modena, Mary and Gertrude, is being developed, and a rich strike is reported on the Modena, the principal values being silver and lead. The owners expect to ship ore within the next 2 weeks. Charles Peterson is the principal owner.

Suffolk-Globe Mining Company.—Fred Benson and Ben Strum have secured a lease on the mine, mill and dump, and extensive development will start at once. Until sufficient ore is blocked out the mill will run on ore from the dump. Messrs. Benson and Strum have worked in this section for the past 20 years.

Telluride Coal Mining Company.—This company, which is developing a coal vein at San Miguel, 1 mile below Telluride, is driving a tunnel 5 ft. per day on a 2-ft. seam of coal. Joe Barnes, of Telluride, is manager.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

Cripple Creek Re-Survey.—Spencer Penrose, on his return from New York this week, announced that his brother, A. F. Penrose, will make a re-survey of the district. It is understood that President Donaldson, of the Colorado Springs Mining Exchange, and other prominent mining men, are now preparing to secure funds, so that the project can be carried through without waiting for a government appropriation.

Elkton Company.—There is considerable excitement over the contest for the control of the Elkton Company. E. M. De La Vergne, the largest individual stockholder, announces he favors a change in the directors. A short time ago Mr. Aldrich, another member of the present board, sent out a request for proxies, advocating a change of management. The contest is likely to be bitter. It is understood that Mr. De La Vergne is now preparing a circular making very definite charges against the present management; while Mr. Aldrich, it is understood, on his return will also issue one making strong replies to the points urged against putting the company into the hands of a brokerage firm.

La Bella Company.—The machinery for the La Bella power plant has been shipped from an Eastern factory, and the mines dependent on it for air for machine drills will resume work in a few days.

Mary McKinney.—Production is now averaging 100 tons of ore daily, and the mine has never been in a more flattering condition. It has been exploited only to 500 ft., and its future is recognized as very bright.

Prince Albert.—What is believed to be the lost ore shoot on the Prince Albert, from which thousands of dollars' worth of ore were shipped several years ago, has been opened by Messrs. Wilcox & Taylor, who are leasing a block on the property. The ore shows sylvanite and free gold, and the lessees have undoubtedly a good proposition.

IDAHO.

BLAINE COUNTY.

Tiptop.—At this group of mines, near Hailey, a winze is down below the 900-ft. level. On the 900-ft. level a fine body of good grade ore has been opened, and drifts are being run. About 25 men are employed.

IDAHO COUNTY.

Bear Creek District.—There is considerable prospecting going on in this district, owing to many men who were going to Thunder Mountain taking up claims. Roy & Easton took up a group of claims a year ago, on one of which a 2-stamp mill has been running some time. The district may be reached from Florence or Resort.

ILLINOIS.

SANGAMON COUNTY.

(From Our Special Correspondent.)

Riverton Coal Company.—This company, J. A. Agee, of Chicago, general manager, operating 2 large mines at Riverton, has purchased the mine of the Junction Mining Company south of Springfield, Chas. Price, general manager of the Junction Mining Company, has moved to Chicago, and engaged in the coal business.

INDIANA.

GREEN COUNTY.

(From Our Special Correspondent.)

Johnson Brothers, of Columbus, O., have bought mining property near Linton from Terre Haute owners.

PARK COUNTY.

(From Our Special Correspondent.)

The miners of this district are almost unanimous in opposing a strike. Delegates to the Indianapolis convention on July 17 will be carefully selected so as to lessen the danger of radical action.

VIGO COUNTY.

(From Our Special Correspondent.)

J. Kuehner Coal Mining and Supply Company.—This company, of Terre Haute, has been incorporated. Joseph Kuehner heads the directors and is president. The company will mine and sell coal in this county.

Williams Job Coal Company.—This company, of Columbus, O., has closed a deal for 1,000 acres of coal land near Jasonville, southeast of Terre Haute, on the Southern Indiana road. Several shafts will be sunk.

LOUISIANA.

ARCADIA PARISH.

(From Our Special Correspondent.)

The Superior Oil Company, capitalization \$500,000, and the Heywood Brothers Oil Corporation, cap-

italization \$1,000,000, have been organized, and will at once start drilling near the gushers and in other parts of Louisiana.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—Changes will be completed at this mine within a short time which will confine production to A, B and D shafts. The depths of these shafts are as follows: A, 900 ft.; B, 2,500 ft., and D, 2,950 ft.

Copper Range Railroad.—Surveyors are running lines for an extension of this road to the Baltic Mine. The Baltic's rock output is now handled by the Atlantic & Lake Superior Railroad, owned by the Atlantic Mining Company. At the annual meeting of the stockholders at Houghton, these directors were elected: W. A. Paine, E. B. Maltby and Frederick Stanwood, Boston; Cameron Currie and S. L. Smith, Detroit; J. H. Seager, F. McM. Stanton, J. H. Rice, R. R. Goodell, Houghton. E. B. Maltby, of Boston, succeeds the late Thomas B. Dunstan, of Hancock, Mich.

Isle Royale Consolidated.—Preliminary work for exploration on the southern end of the property is under way. Men are clearing the ground of small timber, preparatory to trenching and diamond drill work.

Tecumseh.—Recent developments indicate that the rich copper ground cut at the bottom of No. 2 shaft recently is the Osceola amygdaloid.

Wolverine.—An addition to the dry house, 20 ft. wide and 100 ft. long, has been built. It will accommodate 300 men.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Mohawk.—Work on the new rock house at No. 3 shaft is well advanced. It is 50 ft. by 42 ft., and 46 ft. high. The equipment will consist of 2 rock crushers, with jaws 18 by 24 in.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—Capt. Richard Cocking, formerly assistant mining captain at the Quincy Mine, is now head mining captain here. Work on the stamp mill at Adventure Beach is progressing nicely. The first head is completed, and men are busy on the second. The machinery in the washing department is all installed.

Mass Consolidated.—A consignment of 30 tons of mass and barrel copper has been shipped to the Quincy Smelting Works. The greater part of the output of heavy copper is coming from the drifts at the 7th to 10th, inclusive, west of B shaft. The Mass is securing more heavy copper for the amount of ground opening than any other mine in the Lake Superior District. President Lamb recently inspected the mine.

Victoria.—Capt. Thomas Hooper, superintendent of this property, recently inspected power plants at Fall River, Mass., to note methods employed in utilizing water power. Plans for the developments of power on the west branch of the Ontonagon River, 1 mile from the mine, are under consideration.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—Ore shipments have been decreased by rains. Those buyers who bought liberally on Monday got a good shipment, but rains fell on every following day except Saturday. Production was active, and there is a great deal of ore in the bins. The strike at the Kansas smelters has ceased to be much of a factor in the market. The Edgar Company is running full force with new men. The new Prime Western Zinc Company is now the principal buyer in the market. There was no further advance in the price of top grade ore, but these held firm at \$35. This was paid for a number of choice lots around Joplin. A great deal of medium-grade ores sold on an assay basis of \$32 for 60 per cent ore, an increase from previous prices. The Sheldon, the Kohinor, the Edith, the Glendale and the Vandalia on the Continental land; the Royal Blue on the Granby land, the Perry No. 3 on the Perry land and the Boss and Cumberland on the Missouri Lead and Zinc Company's land, all brought top price. The advent of the Markle Lead Company of St. Louis in the market a week ago, and its buying 5 car-loads of lead ore at \$45.50 a ton, an advance of \$1, caused all buyers to raise the price, and lead ore has brought \$46 per ton all over the district. During the corresponding week last year the shipments were greater by 575,830 lbs. of zinc and 526,820 lbs. of lead, but the value was less by \$16,827. For the corresponding 25 weeks of last year the shipments were less by 4,453,150 lbs. of zinc and greater by 1,645,150 lbs. of lead and the value less by \$418,340. The district

total passed the \$4,000,000 mark 2 weeks ahead of last year. Following is the summary for the various producing camps for the week ending June 21.

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,582,800	244,180	\$48,232
Galena-Empire	1,903,930	203,770	38,098
Cartersville-Webb City	1,308,040	306,030	28,038
Aurora	680,460	9,710	10,468
Duenweg	826,460	38,000	15,697
Central City	238,170	1,880	3,020
Prosperity	384,320	35,610	6,968
Cave Springs	473,900	4,120	7,104
Oronogo	101,480	44,920	2,414
Neck-Alba	203,500	...	4,348
Carthage	203,700	...	3,301
Carthage	149,370	...	2,465
Carl Junction	309,000	19,000	3,978
Stotts City	84,560	...	1,395
Wentworth	38,000	...	627
Imboden, Ark.	96,440	...	1,543
Imboden, Ark.	105,770	...	1,057

Total 9,849,900 907,220 \$178,813
 Total 25 weeks.....261,519,820 31,117,650 \$4,172,575
 Zinc value, last week, \$156,631; lead, \$22,182; zinc, value 25 weeks, \$3,530,138; lead, \$642,137.

Brooklyn.—This new mine, which adjoins the American cornfield tract in Cartersville, was bought Saturday by Frank Nicholson for Eastern clients. The price paid was \$50,000. The property consists of a new mill and a 9-acre lease on the Burgner land. The mine was opened up 4 months ago by Messrs. Burton and Raymond, of Webb City, and is regarded as the richest sheet-ground mine in the Joplin District. It is surrounded by such sheet-ground mines as the American Cornfield, the Homestead and the Richland.

Cora Jeanette.—A 9-16 interest in this mine, at Spurgeon, was sold last week to Illinois men for \$22,500 (equivalent to \$40,000 for the mine) by E. E. Garland, of Carthage and W. H. Tryon and James and John Spixey, of Galena. The property includes a lease on the Bucklin and Willis land, a complete 100-ton mill and a mine that has been producing a car-load of zinc and half a car-load of lead weekly for some time. Those who declined to sell, retaining 7-16 of the mine, are E. N. Williams and S. H. Smith, of Spurgeon, and Charles Cropper, of Pittsburg.

MONTANA.

BEAVERHEAD COUNTY.

Beaverhead Copper Mining and Smelting Company.—At the annual meeting at Walkerville these directors were elected: Benjamin T. Amear, Joseph R. Broughton, Josiah Hodge, Josephus Dawe, William J. Ball. The report of the superintendent showed that the main tunnel had been driven 130 ft., also that a winze had been sunk to 150 ft. Four cars of ore were shipped in May that averaged 14½ per cent copper, 8 oz. in silver and a trace of gold. At present a New York firm has an option on the property, and has until July 14 to get the water out.

(From Our Special Correspondent.)

Ajax.—This property, situated in the upper Big Hole Basin, 80 miles from the railroad at Divide, owned by Messrs. Noyes, Stansfield & Morse, will be equipped with a stamp mill at once. The owners have purchased the plant put on the Climax properties some 12 years ago, comprising boiler, engine, 5-stamp battery, pans and settler. This mill will be used as a test plant, as the company will build a larger one if amalgamation be the treatment required. Several cars of high-grade ore recently sent to the Colorado Smelter at Butte gave satisfactory returns, notwithstanding the 80-mile wagon haul to the railroad. The value is chiefly gold, with a few ounces silver.

FERGUS COUNTY.

Barnes-King.—The bond held by New York parties on this property expired June 18, the necessary payment not having been made. E. W. King has announced that it is the purpose of himself and associates to increase the daily capacity of the mill to 225 tons. Its present capacity is but 110 tons.

FLATHEAD COUNTY.

American Kootenai Company.—The electric plant for lighting and for the electric drills will soon be installed.

Eldorado.—This placer mine, on Libby Creek, is reported producing well.

(From Our Special Correspondent.)

Kalispell & Dayton Mining Company.—This company, with headquarters at Kalispell, operating in the West Fisher District, has increased its board of directors from 3 to 5.

Mollie Gibson Mining Company.—This company has property in Snowshoe Gulch adjoining the Snowshoe Mine. The capital stock is placed at \$150,000 in \$1 shares. The incorporators are: L. H. Faust, John Edgerton and I. Hamburger, of Helena; 50,000 shares of the treasury stock, it is claimed, has been placed with Eastern subscribers. The ore is a silver-lead, and is said to have a value of \$50 per ton for the first class. A concentrator will be built for the low grade. L. H. Faust, of Libby, is president and general manager.

JEFFERSON COUNTY.

Gray Eagle.—A rich strike of gold ore is reported in this mine, near Comet. The ore is free milling. The claim is owned by J. J. Holmes, of Boulder; Mrs. Sponheim, of Basin, and the Dahlman estate, but is worked by August Freeburg under lease.

Katie.—The owners of this mine and smelter, the Basin & Bay State Company, will meet July 15 to take action regarding the sale of the plant. F. Augustus Heinze has considered the proposition of purchasing it, and if he buys it may make it a custom smelter for Cataract District ores.

LEWIS & CLARKE COUNTY.

Calumet & Montana Mining Company.—W. A. Bateman, of Calumet, and J. E. O'Neill, of Hancock, Mich., have organized this company, composed of Calumet and Hancock men, to work a group of 10 copper claims in the Scratch Gravel District, north of Helena. John R. Ryan, of Red Jacket, Mich., is to be the president of the corporation. A contract for sinking a 200-ft. shaft has been let.

(From Our Special Correspondent.)

Midland.—A recent strike of gold and copper in the tunnel on this claim, in Smith Creek country, near the South Fork of Sun River, is reported. The property is owned by J. C. Adams, of Augusta, and A. T. Kyle, of Great Falls. The ore is said to average from \$6 to \$10 gold, and 10 per cent to 37 per cent copper.

Old Amber Mining Company.—Frank M. and A. T. Kerr, of Pennsylvania, have brought suit for an adjudication of title to this property, situated at York, against the Old Amber Mining Company, Helena Hardware Company, Grandon Hotel, Holter Hardware Company, George Ballentine, Tom Travis and others. The plaintiffs allege they are the owners in fee simple, and ask that the defendants be required to set forth the nature of their claims, and that all claims be determined by decree of the court.

MADISON COUNTY.

Keystone.—This claim, in Georgia Gulch, has been leased to Oscar Mesch and William Lyden. It is the property of H. D. Rossiter.

Klondike.—Charley Fuller is operating this dike mine, and will start the arrastra in a few days. The Klondike was formerly worked by W. B. Holmes.

Lake Shore.—Snow has hindered work at this mine, a mile east of the Montana, but a small crew of men is now busy. The president of the company, E. L. Shafner, expects to employ 30 men.

Montana.—The deep snow has retarded operations at this property, near Sheridan, but men are making ready for starting the mill.

Nugget Gulch.—Supt. Eugene Ring, of these mines, near Sheridan, reports work progressing favorably, and says some high-grade ore is being taken out. He is working 14 men, and is preparing to start the mill.

St. Paul & Montana Mining Company.—W. H. Godfrey, of Sheridan, has formed this company, and is preparing to put a small force of men at work on the Little Darling Mine, situated on Old Baldy. The company has secured a lease and bond from Hatfield, Day & Simons.

(From Our Special Correspondent.)

Abbie Alice.—This property, at Rochester, is equipped with a new gasoline hoisting rig.

Silver Belt.—Joseph Smith & Co. have secured this property, situated 5 miles from Virginia City, by lease and bond. A new hoist has been purchased by the lessees. A new shaft will be sunk. The property has produced some very rich gold ore in the past.

Watscaka.—The cross-cut from the 450-ft. station has cut the lead. The ore shoot where cut is reported much larger than and fully as good as it was above.

SILVER BOW COUNTY.

(From Our Special Correspondent.)

Climax.—This property, near Divide Creek, 14 miles south of Butte, owned by C. B. Nolan, of Helena, has been operated by Frank Bevis & Co. under bond and lease since last fall. Ore shipments have averaged 150 ozs. silver and \$10 in gold per ton. The property is an old one, but has been idle for 10 years. It has an eventful history. An Eastern company spent considerable money in equipping it, when known as the Apex, with machinery and a mill, which the company failed to pay for. The company was reorganized under the present name of Climax, but the operations were not successful, owing to mismanagement. The present lessees have opened up the ore body in several places. Two new shafts are being sunk, both having a streak of shipping ore.

NEW YORK.

SAINT LAWRENCE COUNTY.

Clarke and Pike.—These iron mines, about 6 miles from Gouverneur, near Spragueville, are being re-

opened. S. I. Mershon and Frederic Crane, of New York, and J. B. Johnson and O. J. Davis, of Gouverneur, recently made an agreement with the Kimball Ore Company to put the mines in commission. The office of the company formed to work the mines will be in Gouverneur. New buildings will be erected and new machinery installed. A large number of men will be employed.

OREGON.

BAKER COUNTY.

(From Our Special Correspondent.)

I. X. L.—This Sumpter mine has been pumped out and an upraise started from the end of the drift.

Mammoth Gold Mining Company.—This Sumpter company has let a contract to sink the shaft an additional 100 ft.

Virginia.—A 25-ft. vein of quartz is reported on this Sumpter company's ground carrying gold values. The company is installing a hoist and pumping plant.

PENNSYLVANIA.

ANTHRACITE COAL.

Black Diamond Anthracite Coal Company.—This company has incorporated under the laws of New Jersey with \$1,000,000 capital in \$1 shares. The company proposes to open a mine on the Stow land, in Branch Township, Schuylkill County, and will probably ship over the Philadelphia & Reading. Peale, Peacock & Kerr, of New York City, have contracted for the entire output of the mine. Terence V. Powderly, late Immigration Commissioner, and a former president of the Knights of Labor, is one of the incorporators and is president.

LEBANON COUNTY.

Cornwall Ore Bed.—The State Supreme Court has decided that good title can be given to the Cornwall ore beds, and the Pennsylvania Steel Company will proceed to acquire them and certain furnace properties at Robesonia and Lebanon, as arranged about a year ago, when the company was re-capitalized. A special stockholders' meeting has been called for August 12 to authorize the issue of \$7,500,000 5 per cent bonds, to be secured by a divisional mortgage on the ore lands and furnace properties. The underwriting of the new bonds has been arranged for.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Cuyahoga Mining Company.—The company is preparing to patent its ground of 500 acres. A large body of free milling and concentrating ore is reported partially developed.

Grantz Gold Mining Company.—Ore is being sacked at the Roosevelt group, recently purchased, for shipment to Denver. Otto P. Th. Grantz is manager.

Wabash Mining Company.—Ore is reported in the bottom of the shaft, near Custer.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Cleopatra Mining Company.—At the annual meeting of the company in Aberdeen, the following officers were elected: J. M. Lawson, Aberdeen, president; R. A. Mather, Groton, vice-president; A. S. Reed, Aberdeen, secretary, and R. B. Hughes, Spearfish, treasurer and manager. Charles Porter, of Wilnot, is one of the directors. The company is planning to start its 50-ton cyanide plant on Squaw Creek.

Golden Crest.—Good ore is being taken from this mine, near the head of Two-Bit Gulch. The Burlington Railroad is preparing to extend its spur to the mine. Fritz Webber is superintendent.

Hidden Fortune Gold Mining Company.—The company, it is said, received \$23 a ton for 1,200 tons of siliceous ore recently shipped from North Lead Hill to the National Smelter in Rapid City. The excavations for the company's 50-ton cyanide plant in Deadwood are nearly completed and machinery is arriving.

Imperial Mining Company.—Machinery for the shaft in Blacktail Gulch, consisting of boilers, hoist, air compressor and drills, has arrived and will soon be running.

Oro Hondo Mining Company.—A large tract of land at the head of Grizzly Gulch, south of Lead, is being developed by a shaft. George M. Nix, of Lead, is superintendent.

Penobscot Mining Company.—Machinery is beginning to arrive for the cyanide plant to be built at Garden City. The mill will have 40 stamps and a tank capacity of 300 tons. The assay office of R. M. Maloney, in Deadwood, has been purchased by the company.

Squaw Creek Company.—Seventeen patented claims near Carbonate Camp have been leased to C. C. Parmele and S. H. Atwood for 3 years, and miners are driving a tunnel.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Gregory Mining Company.—Excellent free-milling ore is reported in a drift from the main shaft. It will be developed at the 100-ft. level, and the shaft will be continued to 500 ft.

Ohio-Deadwood Gold Mining Company.—B. J. Osborne and J. W. Pero, of Ohio, officers of the company, have been on the ground laying out new work. Asa Baldwin, of Deadwood, manager, is expecting new machinery shortly.

Rapid River Placer.—Three large plants are at work near Pactola, one belonging to the Rapid River Mining Company, one to the Magpie Company and the third to L. A. Richards and associates, of Brooklyn, N. Y. They are removing from 15 to 20 ft. of gravel and handling it at a profit.

University Gold Mining and Milling Company.—The following officers have been elected: W. F. Weber, president; F. W. Medbery, vice-president and treasurer, and Orville U. Pryce, secretary. V. C. Wass, of Centerville, and C. J. Jacobson, of Alsen, are directors. David Ellis was elected manager. The company is said to have found good free-milling ore near Rochford.

TENNESSEE.

KNOX COUNTY.

Roseberry Zinc Company.—This company, capitalized at \$200,000, has purchased a 200-ton concentrating plant at Joplin, Mo., says a Knoxville paper, and is building a railroad siding at Mascot, where the concentrator will be erected. The Roseberry mines have been owned by Mr. Mixer, of Mixer, Eads & Co., but the land at Mascot has not been developed. The officers of the company are: Frank T. Caughey, president; W. K. Anderson, vice-president; James T. Shaw, secretary and treasurer; George E. Smith, general manager.

TEXAS.

JEFFERSON COUNTY.

Lone Star & Crescent Oil Company.—Seligman & Company, and the interests they represent, have gained control of this company, at Beaumont. The capital stock will be increased from \$2,500,000 to \$5,000,000. Interested with Seligman & Company, in the deal are Isadore Newman & Son and H. C. Newman, of New Orleans.

WEST VIRGINIA.

MACDOWELL COUNTY.

United States Coal and Coke Company.—According to dispatches from Pittsburg, Pa., this company, a subsidiary concern of the United States Steel Corporation, will spend in the next year not less than \$3,000,000 in building new coke ovens, dwelling houses for the coal miners and installing machinery in the Pocahontas coal fields. By that time there will be 8 mines producing 9,000 tons daily and 3,000 beehive ovens. William Glyde Wilkins, of Pittsburg, acting as constructing engineer for the United States Coal and Coke Company, has let the contracts for the equipment of the central power plant. The contracts for the electrical equipment were awarded to the General Electric Company of New York City. The engines will be installed by the Harrisburg Foundry and Machine Company, of Harrisburg, Pa. The boilers will be erected by the Aultman-Taylor Machinery Company, of Manchester, O., the contract having been placed through the Cahall sales department of the company in Pittsburg. These contracts for power equipment amount to about \$100,000. The property is covered in a leasehold for 50,000 acres in this county, and is leased from the Pocahontas Coal and Coke Company. The United States Coal and Coke Company, which will act as the operating company, is not yet organized. Thomas Lynch, president of the H. C. Frick Coke Company, and general manager of all the coal and coking operations of the United States Steel Corporation, and president of most of the subsidiary concerns engaged in the coal and coke production for the Steel Corporation, will be president of the new company. The slope openings of 3 of the mines are now being driven, and Bennett & Weakland, of Greensburg, Pa., are busy on the contract for the erection of 950 of the beehive coke ovens. By November 1 300 of these ovens are to be completed, and by January 1 the rest are to be ready. By that time the contracts for the remainder of the group of 3,000 will have been let.

WYOMING.

LARAMIE COUNTY.

Globe Copper Mining Company.—The directors of this company recently elected the following officers: President, A. C. Widdicomb; vice-president, J. A. Morrison; secretary, J. H. House; treasurer, E. H. Widdicomb, George Kirby and Edgar Howbert are the other directors, and E. H. Browne is consulting engineer. The company has 425 acres of copper land in the Silver Crown mining district, 22 miles west of Cheyenne.

GENERAL MINING NEWS.

AFRICA.

TRANSVAAL.

Returns received from a number of the companies now operating show results for the month of May as follows: Bonanza, 8,107 tons crushed. Yield from mill, 4,821 oz.; from cyanide, 2,369 oz.; total, 7,190 oz., or 0.89 oz. per ton. Profit, £20,000. Crown Deep, 65 stamps, 9,684 tons crushed. Yield from mill, 2,488 oz.; cyanide, 1,770 oz.; total, 4,258 oz.; or 0.44 per ton. Profit, £6,400. Crown Reef, 11,637 tons crushed. Yield from mill, 4,649 oz.; cyanide, 2,646 oz.; total, 7,295 oz., or 0.63 oz. per ton. Profit, £15,230. Geldenhuis Estate, 9,594 tons milled. Yield from mill, 2,827 oz.; cyanide, 2,171 oz.; total, 4,998 oz., or 0.52 oz. per ton. Profit, £11,360. Ferreira Deep, 50 stamps, 8,248 tons milled. Yield from mill, 2,859 oz.; cyanide, 1,77 oz.; total, 4,637 oz., or 0.56 oz. per ton. Profit, £12,000. Jumpers Deep, 60 stamps, 9,993 tons milled. Yield from mill, 2,184 oz.; cyanide, 1,320 oz.; total, 3,504 oz., or 0.35 oz. per ton. Profit, £2,600. Rose Deep, 75 stamps, 11,700 tons milled. Yield from mill, 2,846 oz.; cyanide, 2,048 oz.; total, 4,894 oz., or 0.42 oz. per ton. Profit, £3,100. Nourse Deep, 55 stamps, 7,777 tons milled. Yield from mill, 1,181 oz.; cyanide, 930 oz.; total, 2,111 oz., or 0.27 oz. per ton. Profit, £400. Robinson, 60 stamps, 7,912 tons milled. Yield from mill, 5,239 oz.; cyanide, 1,528 oz.; concentrates chlorinated, 750 oz.; total, 7,517 oz., or 0.95 oz. per ton. Profit, £20,000. All the yields given are in fine gold.

The report of the Transvaal Chamber of Mines for the month of April shows 33 mines in operation. The total number of stamps at work was 1,760. The rock raised from the mines was 295,898 tons; the ore milled was 241,141 tons. The average work per stamp per day was 4.94 tons. There were 180,551 tons of tailings cyanided, 34,847 tons of slimes treated by various processes. The yield in fine gold was: From mill, 75,164 oz.; tailings, 37,461 oz.; slimes, 3,402 oz.; concentrates and by-products, 3,563 oz.; total, 119,589 oz., showing an average of 0.496 oz. per ton. The largest yield reported for the month was from the Geldenhuis Deep, 7,851 oz., with 130 stamps at work.

The gold production of the Witwatersrand mines in May is reported at 138,602 oz. fine, against 7,478 oz. in May, 1901, the month in which mining was first resumed. The total for the 5 months ending May 31 has been 514,064 oz. fine gold, or \$10,625,703.

Geldenhuis Deep.—This company reports for May 130 stamps working and 17,600 tons crushed. There were 14,358 tons tailings cyanided and 3,454 tons slimes treated. The yield from mill was 5,825 oz.; tailings, 2,675 oz.; slimes, 292 oz.; total, 7,792 oz. fine gold, or 0.44 oz. per ton. The profit was £16,300.

Langlaagte Deep.—For the month of May this company reports 70 stamps working and 11,396 tons crushed. The yield was from mill, 2,882 oz.; tailings and concentrates, 1,379 oz.; slimes, 96 oz.; total, 4,357 oz. fine gold, or 0.38 oz. per ton. The estimated profit was £5,400.

Robinson Gold Mining Company.—This company's report for April shows 691 ft. of development work done. There were 9,527 tons rock hoisted, of which 2,415 tons were sorted out as waste. The ore milled was 7,212 tons, with 60 stamps running 29¼ days; the average duty being 4.6 tons per stamp per day. The yield reported in fine gold was: From mill, 5,205 oz.; from tailings, cyanided, 1,438 oz.; from concentrates chlorinated, 756 oz.; total, 7,399 oz., or 1.03 oz. per ton milled. The total earnings were £32,198; expenses, \$12,183; profit, £20,015. The averages per ton milled, reduced to United States currency, were: Receipts, \$21.43; costs, \$8.11; profit, \$13.32 per ton.

ASIA.

INDIA—MYSORE.

Kolar Gold-field.—The production of gold in May is reported at 28,093 oz. crude—the smallest in any month for 6 years. This result is due to the stoppage of some of the larger mills for want of water. The total for the 5 months ending May 31 was 189,062 oz. crude, against 210,468 oz. for the corresponding period last year; a decrease of 20,806 oz., or 9.9 per cent. The total this year was equal to 170,696 oz. fine gold, or \$3,528,276.

AUSTRALIA.

QUEENSLAND.

Mount Morgan Gold Mining Company.—This company's statement for May shows 20,643 tons ore treated by chlorination. The yield was 12,294 oz. gold, an average of 0.6 per ton.

TASMANIA.

Mount Lyell Mining Company.—This company's statement for the 4 weeks ending May 28 shows 26,080 tons of ore smelted, the yield being 588 tons black copper, containing 582 tons fine copper, 53,374

oz. silver and 1,751 oz. gold. The average result was 2.23 per cent copper, 2.05 oz. silver and 0.07 oz. gold per ton.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—According to a local paper shipments for the week ending June 14 were:

	Week.	1902.
Granby Mines, Phoenix.....	6,117	161,798
Snowshoe, Phoenix.....	...	690
Mother Lode, Deadwood.....	1,888	61,452
Sunset, Deadwood.....	120	270
B. C. Mine, Summit.....	840	840
Winnipeg, Wellington.....	...	785
Golden Crown, Wellington.....	...	625
No. 7 Mine, Central.....	...	310
Jewel, Long Lake.....	240	1,380
Totals, tons.....	9,205	228,120

Granby Consolidated Company.—This company recently ordered from the Jencks Machine Company, of Sherbrooke, Quebec, a 14-B Farrell-Bacon improved ore crusher, 36 in. by 42 in., to be fitted with chilled iron jaw plates, swing jaw and pitman, and to have a coarse crushing capacity of 150 tons (approximate) per hour. This crusher will be driven by a 100-h. p. electric motor supplied by the Canadian General Electric Company, of Toronto, Ont., which company also will furnish the transformers to convert the voltage of the power company to that of the mining company. The Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa., secured the order for the 2 700-h. p. induction motors for driving the compressor.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Slocan Ore Shipments.—The total amount of ore shipped from the Slocan and Slocan City mining divisions for the year 1901 was, approximately, 30,000 tons. Since January 1 to May 3, 1902, the shipments, according to the New Denver Ledger, have been as follows:

	Week.	Total.
Payne.....	225	225
Ivanhoe.....	255	255
Sunset (Jackson Basin).....	641	641
Reco.....	302	302
American Boy.....	349	349
Arlington.....	1,091	1,091
Hewett.....	596	596
Bosun.....	420	420
Last Chance.....	20	150
Wonderful.....	100	100
Enterprise.....	40	320
Monitor.....	487	487
Queen Bess.....	162	162
Silver Glance.....	35	35
Whitewater (April).....	172	1,870
Ottawa.....	7	7
Neepawa.....	60	60
Hartney.....	20	20
Marion.....	88	88
May.....	5	5
Paystreak.....	5	5
Surprise.....	20	20
Slocan Star.....	42	200
Duplex.....	7	7
Emily Edith.....	20	20
Prescott.....	4	4
Rambler (April).....	460	1,720
Molly Gibson.....	...	1,100
Total tons.....	734	10,670

Last Chance.—This mine will put 50 men to work about July 1.

Rambler.—The electric light plant is being put in shape for use.

Ruth.—This mine is said to be in a position for working on a large scale. The mill is working 5 men. The road to the lower tunnel is finished. The Hope, one of the group, has been under steady development all winter. Since the mine started up a staff of probably 40 men have been employed in and around the mine. It is expected that considerable ore on the Ruth dump will be put through the concentrator.

Wakefield.—This mine has resumed operations with a force of 15 men.

BRITISH COLUMBIA—SOUTHEAST KOOTENAY DISTRICT.

Estella.—This mine, near Steele, will install an air compressor and drills.

North Star.—Development work is pushed at this mine, near Steele. Daily shipments amount to 40 tons.

Ohio & Indiana.—Messrs. Fuller, Lang, Cobb and Cottle, of Steele, are to develop these claims, on Hell Roaring Creek. The ore is copper, carrying values in gold and silver.

Perry Creek Placers.—These placers will receive considerable attention during the remainder of the season. The Perry Creek Mining Company is working a small force, which will soon be increased. The Thompson outfit will commence operations as soon as high water is over.

Wild Horse Placers.—Gold mining on Wild Horse Creek, 4 miles from Fort Steele, is reported gaining ground. New finds and old placer properties are being worked.

ONTARIO—LAKE OF THE WOODS DISTRICT.

(From Our Special Correspondent.)

Twentieth Century.—This mine is at Manitou Lake. Mr. A. Blum has recently been hiring miners at Rat Portage. He says the new 20-stamp mill, boilers and engine sent in over the ice during the winter are being erected. The saw-mill is cutting lumber for buildings. Cross-cutting on the 2d level at 160 ft. has now begun. The north cross-cut shows vein No. 2 to be 28 ft. wide on the first level and over 34 ft. on the 2d level. The south cross-cut on the 2d level shows Vein No. 3 to be 10 ft. wide. The work done at the mine is on 6 parallel quartz veins from 6 to 25 ft. wide. There are now 40 men busy.

MEXICO.

DURANGO.

(From Our Special Correspondent.)

An effort is being made to form a company to secure control of rich mineral ground adjoining the Vacas mines, with the object of developing the same. W. J. Grace is trying to promote the company.

Compania Minera de Penoles.—This company, one of the most important and prosperous in the State, has increased its facilities for handling ore. A number of new furnaces have been built, and 16 are now in operation. The yearly output of the company's mines, known as Ojuela y Annexas, is about 100,000 tons of ore containing silver, gold and lead.

NEW ZEALAND.

(From Our Special Correspondent.)

West Coast Goldfield.—The Consolidated Goldfields Company continues to obtain good results from its Reefton mines. Its last return was £12,030 (\$60,150), from 6,396 tons.

SOUTH AMERICA.

BRITISH GUIANA.

Exports of gold for the 5 months ending May 31 were \$694,479, against \$710,221 for the corresponding period in 1901, a decrease of \$15,742, or 2.2 per cent. Exports of diamonds were 5,711 carats, valued at \$61,210, against 607 carats, valued at \$8,784, last.

MINING STOCKS.

(Complete quotations will be found on pages 814 and 815.)

New York.

June 26.

Early days of the week showed larger bidding in the copper stocks, especially Amalgamated and Anaconda, on Boston selling. Subsequently prices declined, though at the close the market shows some recovery. On the whole it looks as though professional operators are trying to resuscitate the market before the vacation season so that it will present a better appearance when fall trading begins.

Amalgamated in 3 days this week sold more shares than has been reported in as many weeks, at prices that compare with the lowest on record. On Tuesday sales of 38,950 shares broke the price to \$62¼, but later there was a recovery to \$64½. Anaconda also sold at a low level, bringing 110¼ to 105¼ per cent, a drop of \$1¼ per share during the week. On curb a little business has been done in United of Montana at \$34¼@33½; Greene Consolidated of Mexico at \$29¼@28½; Tennessee at \$15½@14½, and White Knob, of Idaho, at \$21¾@20.

Some transactions are reported in Ontario Silver, of Utah, at \$8@8½, and Horn Silver at \$1.40, while Daly reappeared after a long absence at \$1.50.

The Cripple Creek, Colo., stocks are feverish. Portland fell to \$1.75, and Elkton to 63c., while Isabella holds at 28c.

The Comstocks, after their recent rally, weakened again, Consolidated California & Virginia selling off 10c. at \$1.30, Mexican at 42@45c.; Ophir, \$1.10, and Hale & Norcross at 40c.

The California stocks were exceptionally quiet.

Boston.

June 25.

(From Our Special Correspondent.)

The persistent bearish talk on the copper situation, which emanates largely from New York, has resulted in weakening the copper share market, and the continued weakness of Amalgamated has caused many tired holders to part with stocks. There is a certain element which is apparently trying to depress Amalgamated. A well known bear operator in the Exchange made bets a short time ago that the Amalgamated Copper Company would be in a receiver's hands inside of a year, and to-day the same operator offered the next three dividends for \$1.

Calumet & Hecla has maintained its strength, selling at \$590@595, against \$580 a week ago. Bingham dropped \$4, to \$31, with recovery to \$32. No significance is attached to the decline, the selling of 500 shares coming onto a market bare of orders. Mohawk dropped \$2.25, to \$39.75, with recovery to

\$41.50 to-day. There seems to be a good request for this stock on declines. Utah has settled to \$20.75. There is a settled conviction that this company will have to rebuild its smelter, as the present one is not adapted to the ore extracted. Daly-West has recorded a \$3.50 advance, touching \$48 to-day. There has been some talk of an increase in the 40c. per month dividend, but it is thought that the money will be expended on a deep shaft that will be sunk at the Quincy property. The company has some \$300,000 cash in its treasury.

Winona is talked for better prices, as a good grade of ore is being found at the sixth level. A large amount of the ore will be given a mill run to test the value.

Shannon Mining has settled \$2.87½ to \$13, with nothing sold. Mass has broken \$1.50 to \$18, and Adventure has fallen \$1.50 to \$22.50. Osceola has lost \$1.25 to \$60.25. The Kearsarge openings at the Osceola are reported showing well in copper. The 7 heads at the mill are expected to be operating continuously in August. The present output is about 1,000 tons per month.

It is said that many of the present low quotations for copper shares do not represent any real change in their ownership, and this can readily be believed when the general apathy in this class of securities is taken into consideration. United States Oil holds steady around \$15. Dominion Coal is slightly lower at \$135.50, and Dominion Iron and Steel has fallen \$4 to \$51.50. Copper Range Consolidated broke \$4.75 to \$52.25, but recovered to \$53.75 to-day. United States Mining loses \$1.25 lower, at \$19.

Colorado Springs.

June 20.

(From Our Special Correspondent.)

Business was good during the past week, while prices have more than held their own. Some of the leaders have made substantial gains. There is a good feeling, especially in the mines department. This has been brought about in a large measure by the marked improvement in Portland, which sold from \$1.85 up to \$1.90 during the week. The quotations ranged from \$1.80 bid to \$2 asked. It is rumored that this company will pay the next quarterly dividend which falls due on July 5, and this has without doubt been the cause of the strength of these shares. The report is not to be taken too seriously as official confirmation of it cannot be had. The company has called a special stockholders' meeting on August 18 to consider the proposition of reincorporating under the laws of some State other than Iowa in order to avoid the heavy taxation imposed in that State.

Elkton sold between 62½ and 63c. all the week, closing at the latter figure to-day. The contest for the control at the annual meeting on July 14, which was predicted in this letter a month ago, has set in between two of the large stockholders, who are calling for a change in the present management. The fight promises to be a bitter one.

Doctor-Jack Pot gained 13 to 14¼c. during the week. This improvement is unwarranted, as it is announced at the company's office that unless something of importance is discovered during the next two weeks, operation will be suspended on company account, and the property will be opened to leasers.

El Paso was featureless during the week, selling at 53½@54c. Golden Cycle sold down to 58½c. on June 19, owing to the fact that the Union Power Plant, which supplies this mine with compressed air, sustained a mishap which closed it down for 2 weeks, and caused a total suspension of development work for that period. The stock was quoted as high as 62c. during the week, closing at 60@61c. to-day.

Mollie Gibson sold up to 16¼c. this week on a report that the recent strike in the 900-ft. level of the mine at Aspen was much larger than the public supposed. The closing quotation was 13½@14¼c. to-day.

San Francisco.

June 21.

(From Our Special Correspondent.)

The stock market has been rather quiet this week, with less business in evidence than for several weeks past. Quotations have been somewhat lower, with a tendency to recovery towards the close.

Some quotations noted are: Consolidated California & Virginia, \$1.30; Ophir, \$1.15; Hale & Norcross, 45c.; Mexican, 41c.; Overman, 28@29c.; Potosi, 21@22c.; Yellow Jacket, 13c.; Chollar, 10c.

On the Oil Exchange business was rather quiet, though an improvement was evident towards the close of the week. Home oil sold at \$3.30@3.35; Reed Crude, 31c.; Sovereign, 27c.; Occidental, 16@17c. Home continues a favorite, with Occidental leading among the low-priced stocks.

London.

June 17.

(From Our Special Correspondent.)

The South African market continues in a very anomalous condition. After peace was declared everybody expected a general rise in prices, or, indeed, a boom. As a matter of fact, however, the market has been very weak, and in many cases prices

have receded. As I have mentioned before, a great many people who bought at the beginning of the war are now getting out. They would have sold before if there had been any buyers, but, of course, for a long time now the South African market has been practically non-existent, and they only had a chance of selling when peace was declared. There are still very few buyers, comparatively speaking, and market dealers who had options on shares have found little opportunity of exercising them. It is not likely that the market will strengthen for a considerable time.

The decision as to the future tax on gold mines in the Transvaal has been received with a feeling of relief. The tax is practically a 10 per cent income tax, such as we have in England, and is assessed on the net divisible profits after all expenses and allowances for depreciation and redemption of capital have been provided for. Though the figure is high, it is felt that it might have been higher. In fact, many people expected it to be 15 per cent. The advantage of the tax is that it will not interfere with developments nor with low-grade properties. The abolition of various taxes and monopolies that added to the cost of materials and supplies are done away with, though as the railroads are not entirely under government control it is not expected that the charge for freight will be much reduced. A considerable improvement will also take place with regard to labor, as the Kaffirs will not be able to obtain drink and so incapacitate themselves from work. The leading houses are also considering the advisability of arranging a fixed wage at a lower level than hitherto obtained. Many of them, of course, believe in compulsory labor, but public opinion in England would not allow that. On the whole, the leading houses view the future prospects of costs of production with satisfaction.

The promoters are now busy with propositions in other parts of South Africa than the Rand, and it is possible that we shall have land and exploration companies offered to the public in the near future. A company called the Transvaal Proprietary, Limited, is to be introduced shortly, but it is not likely that any public issue will be made. The promoters are Glasgow people, and the company owns extensive territories in the Lichtenburg and Rustenburg districts of the Transvaal as well as in the Vryburg District of British Bechuanaland. The land has value as agricultural land, and it is said that the minerals are of value, though I believe that this is quite conjectural, and that no prospecting has been done. We have also had a new Rhodesian company brought forward—the Golden Valley Mashonaland Mines, Limited. This company is floated by the Mashonaland Consolidated, of which Mr. Frank Johnson is the guiding spirit. The company takes over the Golden Valley and Maida Vale claims, near the Salisbury-Gwelo Railway. A small amount of development has been done, showing veins of 2 to 3 ft. in thickness and assaying about 1 oz. The property is very much like others in the district, and its success will depend to a large extent on the cost of materials.

The Whitaker Wright collapse has been prominently before the public again this week. It will be remembered that Mr. Whitaker Wright gave as one reason for the London & Globe smash the failure of a syndicate of stock brokers to fulfil their contract to support the market in Lake View shares. The London & Globe was engaged in a gigantic speculation in these shares, and had been badly caught by the bears. The syndicate of stock brokers agreed to support the market, but Mr. Whitaker Wright alleged that they had broken their contract by selling on the sly when the shares had risen. The official liquidator was persuaded that the London & Globe had some claim against this syndicate in consequence of this alleged "ratting," but after an extensive hearing of the case the jury found there had been no contract to refrain from selling when the price had advanced. The cost of this litigation must have been enormous, as all the leading lights of the legal profession were engaged, and the only result will be that the assets of the corporation will have thereby been diminished. The action revealed once more the happy-go-lucky and irresponsible methods of Whitaker Wright finance. It is no wonder that speculators are getting tired of the mining market.

A company called the Sapphire Corundum Company, Limited, has been recently formed to float corundum mines in the townships of Methuen and Burleigh, Peterborough County, Ontario. The directors of the company include Mr. Stratton and Mr. Brodeur, well-known politicians in Canada, and one or two other people of position in that part of the world. The same thing cannot be said of the English directors. It appears that Mr. J. Carling Kelly, of Ottawa, has brought the proposition to this side, and I am informed that Mr. Hooley is pulling the strings from behind the scenes. The share capital is £1,000,000, and the purchase price is £900,000, payable as to £200,000 in preference shares and £700,000 in ordinary shares, while 100,000 preference shares are to be offered for subscription to provide working capital. I have no means of ascertaining from this side of the world anything as to the value of the property, but

the price seems much too high for corundum. Perhaps some of your local readers may be able to give you information about the scheme.

I recently mentioned that the Clifton Consolidated Copper Mines of Arizona, Limited, owning properties in the Greenlee District of Arizona, intended issuing debentures to provide further funds. The company has been successful in placing £125,000 debentures bearing interest at 6 per cent, so that operations will be pushed on. It is intended to build a railway from Clifton to the smelter site and an aerial tramway from there to the mines, and to erect dressing plant and smelters. The company has already spent large sums of money in prospecting and developing, and though extensive ore bodies have been struck, they are of irregular value. Mr. W. A. Farish is of opinion that they are well worth developing on a large scale. A large proportion of the shares are held in France, and I understand that most of the debentures have been issued to shareholders there.

The prospectus of a company called the Pyrenees Minerals, Limited, has been issued this week. This company has been formed to take over from Messrs. A. and O. Simon, of Bordeaux, the property of a French company called the Societe des Mines d'Alzen. The mines are situated in the Department of Ariège, on the French side of the Pyrenees. The mineral is gray copper, which is said to run from 50 to 150 oz. of silver per ton, and from 3 to 7 per cent of copper. According to Mr. W. B. Middleton and Mr. Harold Wilson, the engineers reporting on the property, the vein is strong, and shows signs of permanence, and there are about 20,000 tons ready to be taken out. The mine has been worked for a few years, and during 1900 and 1901 the yearly profits have been about £17,000. The ore is picked and shipped to Swansea, but recently a smelter has been erected, and matte will be shipped instead of ore. The vendors require £85,000 in shares and £30,000 in cash. The company has a nominal capital of £160,000. The present issue is of £60,000 debentures bearing 6 per cent interest and convertible into ordinary shares at the desire of the holder. The remaining £15,000 goes as commissions to underwriters, etc.

COAL TRADE REVIEW.

New York. June 27.
ANTHRACITE.

The strike drags its slow length along, but indications multiply that its end is nearing. The optimistic reports sent out by Mr. Mitchell are to be taken with allowances for the necessities of his position. The operators are keeping such mines from flooding as are most important to them, employes are daily going to the mine superintendents and intimating that they would like to return to work, and a few washeries in the Lackawanna Region are in operation. There can be no doubt but just as soon as a company feels that there are enough men ready to return to any mine to insure its working that mine will start. The trade union sentiment is strong in the anthracite fields, the fear of the stigma put upon non-union workers is also strong, but gradually the rank and file among the mine workers are realizing that the labor leaders who precipitated the strike made promises that have not been fulfilled, and another week's idleness will have a powerful effect. Mr. Mitchell's plea for public sympathy ignores the demands put forward by the Shamokin and Hazleton conventions and, besides, has apparently come too late to have much effect.

Trade all over the country is very light. The producing companies have very little coal to sell, and this is still doled out in small quantities to such of their regular customers as are in greatest need. A considerable tonnage is in the hands of jobbers, retailers and speculators. Some of this is changing hands at \$4 above the prices paid for it; some is held by conservative concerns who refuse to take advantage of the market, and are supplying regular customers at about regular prices.

At the head of the Lakes docks are about cleaned up, only odd lots remaining. In Chicago territory trade is dull. There are said to be over 250,000 tons in the hands of shippers and large dealers in Chicago and its suburbs. The large companies have not advanced prices, and are not trying to sell coal. The public is not ordering, perhaps because it believes prices are high.

Along the lower lakes and in all-rail trade the dealers in the small towns and villages, who have not yet learned the importance of ordering coal early in April, are in greater need than those in cities. Fortunately, wood is largely used for fuel in villages and country districts during summer, and the discomfort caused by short supplies of anthracite is not nearly as great as it might be. In Canadian territory the supplies of anthracite are very scant. The strike will doubtless lead to larger shipments of soft coal from Nova Scotia to Quebec and Eastern Ontario, and permanently injure the Canadian market for American anthracite. Along the Atlantic seaboard the situation shows little change from last week. New York harbor is the speculative center, and, owing to the exigencies of the

elevated railroad and of other concerns having suits for violations of the smoke ordinance on hand, some coal has changed hands at fancy prices. Over \$6 has been paid for pea coal, and a sale of a small lot of broken to the elevated railroad is reported at \$9 per ton. The regular retail price for egg, stove and chestnut is still nominally \$7.50. Undoubtedly the tonnage held by dealers and others in and about New York is larger than has been reported, but the supply in first hands is small. At least one large company, however, is still supplying some of its old customers with coal at the regular June price, \$4.20 f. o. b. New York Harbor shipping ports for egg, stove and chestnut sizes of free-burning white ash. At Boston and other cities beyond Cape Cod the bituminous situation is of chief importance. The supplies of anthracite for domestic purpose are large enough to last some time. At Philadelphia, likewise, the supply of bituminous is a more pressing matter than the lack of anthracite.

BITUMINOUS.

In the Atlantic seaboard bituminous trade the heavy demand for coal continues. All producers are shipping all the coal they can within the limitations of car supply and the capacity of their mines. The demand, however, takes all the coal coming to market. Producers are trying to keep up to their monthly quotas on contracts as well as facilities will permit, and, except in cases where strikes at the mines have interfered, have, it is thought, done fairly well. Speculative prices at New York Harbor points now range from \$4.35 to \$4.85 alongside, according to the quality of the coal. Quotations vary from day to day, according to the demand and market rumors. There seems to be a fairly good supply of this speculative coal on the market, but new demands come up continually. The vessel supply for coastwise traffic, including both barges and schooners, is now so good as to permit boats being put in almost at an hour's notice, vessels being held at the shipping ports for orders and awaiting quick charters.

In regard to labor troubles at the mines, reports indicate that the men who struck are gradually returning to work. In the Central Pennsylvania field, where the United Mine Workers ordered a suspension of work 2 days in the week, it is reported that the men did not lay off as generally as was expected. It may be said, however, that were all the men in that field to cease work as ordered the result would not curtail production as much as reports in the daily press have said. Men in this field, according to the mine inspectors' reports, averaged only from 4 to 5 days a week during 1900.

In the far East everybody is trying to get an extra supply of coal on hand, and where possible producers are trying to get it forward anticipating a probable car shortage when the anthracite mines start work again. Along Long Island Sound consumers are calling for all the coal they can get. Vessels have been put in at the shipping ports, expecting about a 3 weeks' delay, and consumers are paying extra freight instead of allowing for lay days. Trade at New York Harbor is cared for fairly well, though this is the chief speculative market. All-rail trade shows a shortage of shipments, and but for the stocks on hand there would have been more industrial plants compelled to shut down.

Transportation from the mines to the shipping ports is up to schedule, though at times irregular. Car supply at the mines is about 90 per cent of the demand. In the coastwise vessel market vessels are in plentiful supply, and rates are weak, discounts of 50 to 10c. from current quotations being granted for prompt loading. Lay days, if given by a vessel, call for 25 to 30c. additional, but this applies usually to Chesapeake Bay ports. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 70c.; Boston, Salem and Wareham, 85c.; Lynn and Bangor, 90@95c.; Newburyport and Saco, \$1. with towages to latter port; Bath and Gardiner, 85@90c. Rates to the further lower ports are 10 to 15c. above these figures.

Birmingham. June 23.

(From Our Special Correspondent.)

Considerable coal is being stocked to be used in case of emergency. The miners' convention has been on a week, and their demands are now being considered by the operators' association. The operators claim that they cannot grant any increases in wages to the miners. There is no telling what is likely to occur, though leaders on both sides say that trouble will be averted. There are rumors of a number of contracts waiting the settlement of the new scale to go into effect July 1.

Alabama has had less fatal accidents in the mines during the first 6 months than any other State in the United States for the number of men employed.

Cleveland. June 25.

(From Our Special Correspondent.)

Shippers of coal by way of the Great Lakes to the Northwest have been getting a better supply during the last week or 10 days than they have known at

any time this year. It is now said that the supply amounts to two-thirds of the demand of the shippers. By this statement the business for the year may be measured. It is commonly understood that the receipts now are about on a parity with what they have been during June for the last few years. In former years this supply was equal to or exceeded the demand, and now it amounts to but two-thirds of the requirements. While the total movement for the season will not amount to anything like a 50 per cent increase over previous years, it is expected that the largest shipment ever known to the lakes will have been made before the season of navigation is over. Contrary to expectations the possibility of a general coal strike as an outgrowth of the Indianapolis meeting has not affected the market here in the least. Some shippers expected the railroads to begin confiscating coal, but they seem to have confidence in the peaceful outcome of the conference.

Pittsburg. June 25.

(From Our Special Correspondent.)

Coal.—There is but little change in the coal situation this week. All the mines in the district except a few on the river are in full operation, and there is but little complaint regarding railroad cars. Operators are somewhat disturbed by rumors that a suspension is to be ordered to aid the strikers in the anthracite region. The leaders of the miners here are opposed to a strike, but will obey orders if it is decided to close the organized mines in the country. It is reported here to-day that the miners in this district are to be called out before the national convention is held in Indianapolis on July 17, owing to heavy shipments from the Pittsburg field to the anthracite markets. The Monongahela River Consolidated Coal and Coke Company will benefit in the event of a strike, as it has 26,000,000 bush., or 1,000,000 tons of coal loaded in boats and barges. The price is \$1.25 a ton at the mine, but strike will soon advance the rate to \$3, it is predicted. The company has 10 coal hoists, and could easily transfer this coal from the river craft to railroad cars.

Connellsville Coke.—Prices of coke are scheduled to advance with the expiration of contracts made the first of the year. While the fixed price is \$2.25 for furnace coke, sales have been made during the week at \$2.75@3. In some instances as high as \$3.50 has been paid. The strike in the anthracite field has increased the demand for coke. There are plenty of cars, and the full production of the region is being turned out. The *Courier* in its last issue gives the production for the previous week at 249,933 tons. The shipments for the week aggregated 12,247 cars distributed as follows: To Pittsburg and river tipples, 4,026 cars; to points west of Pittsburg, 5,226 cars; to points east of Connellsville, 2,995 cars. This was an increase of 162 cars compared with the previous week.

San Francisco. June 21.

(Special Report of J. W. Harrison.)

During the week there has been one coal arrival from Oregon, 400 tons; two from Washington, 7,050 tons; one from Australia (Newcastle), 1,290 tons; one from British Columbia, 2,350 tons; total, 11,090 tons. This is the smallest amount of coal that the writer remembers to have come to hand in any single week. The coal market is pronouncedly showing the inroads that are being made into its consumption by oil. Of course, it is a very marked advantage to all consumers of steam fuel to be enabled to purchase their power at a great reduction on the prices of former years. The prices now ruling for coal are also very materially reduced. The best Australian coals were selling two years ago at fully \$2 per ton more than is being offered to-day. This is a large shrinkage, and is caused principally by the influx of oil. Low priced oil enables the gas companies to produce cheap gas for stoves and grates; this precludes the Wellington Company from changing its present price, unless it would be a further reduction. It is questionable if the prices this year for Australian coals will be repeated next year, as the inclement weather there this season has given the farmers almost nothing to export. The coal strike East will not materially affect this market, except for imitations of Cumberland and anthracite, which doubtless will be somewhat increased in price locally.

Prices.—Current prices in San Francisco are quoted by our special correspondent as follows: Wellington, \$8 per ton; Southfield Wellington, \$8; Seattle, \$6.50; Bryant, \$6.50; Roslyn, \$7; Coos Bay, \$5.50; Greta, \$8; Wallsend, \$8.50; Cumberland, \$12 in bulk and \$13.25 in sacks; Welsh anthracite, \$14; channel, \$11; coke, \$15 per ton in bulk and \$17 in sacks; Rocky Mountain descriptions, \$8.45 per 2,000 lbs. and \$8.50 per ton, according to brand.

Foreign Coal Trade. June 26.

The export coal market here shows no change in condition. The temporarily high prices for bituminous coal at seaboard ports are discouraging for new business, and in fact there is not much coal to spare for export at present. No new charters are noted.

Exports of fuel from Great Britain for the five

months ending May 31 are reported as below, in long tons:

	1901.	1902.	Changes.
Coal	16,525,700	16,481,291	D. 44,409
Coke	319,431	231,742	D. 87,689
Briquettes	410,872	432,357	I. 21,485
Totals	17,256,003	17,145,390	D. 110,673

In addition to exports reported above there were 5,912,177 tons of coal sent abroad for the use of steamers engaged in foreign trade, against 5,290,899 tons in the corresponding period of 1901; an increase of 621,278 tons this year.

The British Consul at Nice says that the facilities for the discharge of cargo at that port are limited, and the work is laborious and slow. Cargoes of coal are discharged in baskets, and no up-to-date methods of emptying vessels are in use. The employment of clumsy old-fashioned expedients causes waste of time and needless extra expense. A good unloading machine, if erected by a British company, would be considered, be likely to be largely used and much appreciated. During 1901, 109,905 tons of coal were imported, as against 61,566 tons in 1900.

Exports of coal from Japan in the year 1901 are reported at 2,922,215 tons, against 2,402,785 tons in 1900; showing an increase of 519,430 tons.

The Belgian naval authorities have placed the contracts for the supply of the briquettes required by the Government mail steamers between Ostend and Dover during the third quarter of the current year. Three lots, each consisting of from 4,600 to 7,200 tons, are required. The price to be paid is equal to \$4.73 per ton.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of June 13 that the general tone of the Welsh coal market continues firm. Best coals are difficult to obtain for this month's shipment.

Quotations are: Best Welsh steam coal, \$4.08@4.20; seconds, \$3.96; thirds, \$3.60; dry coals, \$3.48; best Monmouthshire, \$3.48@3.54; seconds, \$3.24; best small steam coal, \$2.22; seconds, \$2.04; other sorts, \$1.86.

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

The freight market remains quiet and unchanged. A moderate business has been passing at recent rates of freight. Some rates quoted from Cardiff are: Marseilles, \$1.45; Genoa, \$1.38; Naples, \$1.38; Singapore, \$2.64; Las Palmas, \$1.50; St. Vincent, \$1.74; Rio Janeiro, \$3.12; Santos, \$3.42; Buenos Aires, \$3.24.

COAL TRADE REVIEW.

New York. June 26.

Conditions in the iron trade show little change. There is somewhat more demand for foundry iron, and some contracts running well into 1903 have been placed. Producers are generally out of the market for the balance of this year.

Orders for pig iron and steel billets continue to be placed abroad. German basic steel billets are now offered in Eastern markets at prices a little below domestic billets, and it is understood that they are freely taken. It is now known that a heavy order for steel rails for Mexico has gone to foreign mills, as it could not be taken here for this year's delivery.

A number of small strikes and minor labor troubles are reported, chiefly in the Pittsburg District. Some large concerns are reported to be storing coal as a precaution in case of a possible strike of bituminous coal miners.

At a meeting of the Central Freight Association held in Cleveland, O., this week a proposition was discussed to make the minimum car-load for pig iron and manufactured iron and steel 20 tons, instead of 15 tons, as heretofore. The matter went over to the next meeting.

Birmingham. June 23.

(From Our Special Correspondent.)

The pig iron market is firm. The regular quotations still place No. 2 foundry at \$16 per ton, with fancy prices anything from \$1 to \$2 per ton for immediate delivery. Almost all of the larger companies in this district have sold their production ahead, and therefore have practically withdrawn from the market. The small manufacturers are taking orders for small lots, delivery in the near future, and are getting good prices. Furnace companies right now are not inclined to do any business with delivery next year until it is absolutely certain that the production through this year will not be interrupted.

Shipments from this district are still heavy, the railroads being able to supply all needs for cars.

The following regular quotations are given: No. 1 foundry, \$16.50; No. 2 foundry, \$16; No. 3 foundry, \$15.50; No. 4 foundry, \$14.50@15; gray forge, \$14.50; No. 1 soft, \$16.50; No. 2 soft, \$16.

There is still a steady activity among the finished iron and steel concerns. The rolling mills appear

to be extraordinarily busy for this season of the year. The only difficulty reported by the foundries and machine shops is the very high prices of the raw material. Scrap iron is in demand, bringing a good price.

The plans for the two furnaces to be erected by the Alabama Steel and Wire Company have been finished, so it is stated, and as soon as the location has been selected definitely, the contracts for the construction will be given out. This company will also build a steel plant.

Buffalo. June 25.

(Special Report of Rogers, Brown & Co.)

Scarcely a shadow of change has been noted during the week. Buying continues on a fairly liberal scale for the first six months of 1903. As yet there are no signs of reduced consumption, usually in evidence at this season of the year. For this reason the scarcity of pig iron continues, particularly because of the reduced production due to the coal strike. The order curtailing the output in bituminous districts, if successfully carried out, will operate to cut down the coke supply of furnace and still further complicate matters. We quote for cash, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$23.25; No. 2, \$22.25; Southern soft, No. 1, \$23.25@23.75; No. 2, \$22.25@22.75; Lake Superior charcoal iron, \$23.50.

Cleveland. June 25.

(From Our Special Correspondent.)

Iron Ore.—The movement down the lakes has continued very heavy, and the prospects for a big June shipment are brighter than ever. It is estimated now that the aggregate will approximate 4,000,000 tons. The present speed of shipment being maintained, it is expected that some of the shippers will exceed their expectations to such an extent that unless other sales are made later on more ore will be brought down the lakes than has been disposed of. The ports are still all free of blockades, and the rates are steady and the demand for boats very good. Prices do not change from \$4.25 on bessemer old range as a base.

Pig Iron.—The bessemer producers are still talking of 1903 second quarter sales, but none have been made. Discussion still hangs on price that is to be paid, some of the furnacemen holding that it ought to approximate \$20. There is very little iron for sale now. Foundry prices have gone up steadily, and No. 2 is now bringing \$22 in the Valley. This is also being made the basis for next year's prices, much against the wishes of some of the sales agents and furnacemen, who are persuading the consumers to hold off on next year's contracts until after the outcome of the crop report is known. The sales for quick shipment are burdened with the suspicion that some of the furnaces are withholding material from contracts to sell it at a higher price on the open market. The stacks in Southern Ohio banked their fires on account of the coal strike in the Pocahontas District, and production is curtailed by that amount. Basic producers have no iron to sell, and are off the market.

Finished Material.—The demand for plates is very heavy now, and the supply is light, especially for this year's delivery. Some few sales have been made entailing deliveries into next year, but they are parts of ship orders, and do not denote any general rush on the market to cover future needs. The 3-16-in. plates are very scarce, and the prices are higher than any other grade; they would probably bring 2c. were there any material to sell. The demand for sheets is also very active, but the supply is entirely adequate. The basing prices are 2.50c. for No. 10 and 3.50c. for No. 27. Structural steel is being sold in large quantities well on into next year. Speculators are still excluded from the market, and the prices hold firm at 1.70c. The demand for 1903 rails is as active as ever, and the tonnage covered is very large. The price paid is universally \$28, the quotation for 1902. There is also a demand for light rails for immediate delivery, and on these \$40 is quoted, at which some sales have recently been made. The bar trade is active, with bar iron almost off the market, the price being prohibitive at the present price of scrap, and most of the sales going to the mills producing the steel product. The smaller sizes are plentiful, but over 2-in. rounds are hard to find. Nominally quotations hold at 1.60c. Pittsburg for bessemer steel bars.

Philadelphia. June 25.

(From Our Special Correspondent.)

Pig Iron.—The pig iron market in eastern and middle Pennsylvania is quieter than it has been for a long time. Sellers are indifferent as to closing business. The only interesting feature has been the anxiety shown by certain large consumers to place orders for delivery next year. No such deliveries have been arranged for, because of the difficulty of making terms. Quotations for late deliveries may be given at \$23@23.50 for No. 1 X foundry, \$21.50@22 for No. 2 X, \$21@21.50 for No. 2 plain, \$19@19.50 for standard forge, \$20@20.50 for basic.

Billets.—The demand for billets is off for the present. Some arrangements have been made for foreign steel, but it is simply impossible to get at the facts. Home-made steel is quoted at \$35; foreign at \$31@32.

Bars.—Have advanced in asking prices for early deliveries. Refined iron brings 2c. in large lots and 2.10@2.20c. in smaller lots. Steel bars are strong and active, and 2c. is the asking price.

Sheets.—Monday quite a business was done in sheets in small lots. Quotations range from 2.40 to 3.50c.

Merchant Steel.—Very little business has been done this week.

Pipes and Tubes.—Quite an amount of business has been placed for boiler tubes this week, and there are negotiations now pending for considerable quantities which will likely go through on manufacturers' terms.

Merchant Pipe.—For oil and pipe lines is in demand, and prices are very strong.

Plates.—It is impossible to get any news. Fire-box is quoted as high as 2.30c., and some business has been done. Marine is quoted at 2.25c.; universals 2@2.10c.; flange, 2.10@2.20c.

Structural Material.—Beams and channels are quoted at 2.30@2.45c. for foreign.

Old Rails.—Parties who handle old rails say they have instructions from their principals to secure as much material as they possibly can. Short length steel rails are quoted as high as \$22 to-day. Old iron rails are \$25@26.

Scrap.—There is an urgent demand for scrap. Agents have paid as high as \$22 for heavy melting steel, although \$21 is the quoted price. Low phosphorous scrap will bring \$26. Choice railroad scrap is not to be had, but quoted at \$24@25. Iron axles are nominally \$30, and steel axles nominally \$28, but none are to be had. Wrought turnings will bring \$17 and cast borings \$11.

Pittsburg. June 25.

(From Our Special Correspondent.)

The iron and steel market is quiet, and few sales in any line are recorded, but some heavy buying is being done for next year's delivery, particularly in foundry iron. Several small sales of bessemer pig iron were made at prices prevailing last week. The demand for gray forge has fallen off, and prices are lower. There is still a fair demand for nearly all lines of finished products for delivery during the year at the highest ruling rates. No weakness is shown in any line except sheets and wire products. In wire, however, the conditions indicate a slight improvement over last week. Some mills have been closed temporarily, and some have been changed from wire rods to other products. The plan to close all the wire mills in the country on July 1 in order to curtail production likely will be abandoned, as the present method of operation seems to be satisfactory. The principal officers of the American Steel and Wire Company made a tour of inspection of all the plants in the Pittsburg District, which was concluded to-day. Some changes and improvements may be recommended as a result of the visit. The unsatisfactory condition of the sheet industry is due more to the unusually great productive capacity than to a poor demand. The tempting profits in the business during the past few years led to the erection of many new mills until the capacity is beyond the demand, and yet a number of new plants in course of erection. Prices have been kept down as a result, and are lower in proportion to other lines of finished products.

Steel continues scarce, and prices are firm, although an occasional desirable order is accepted at a shade under the prices quoted. The plate market is strong, and prices for early delivery are higher than a week ago. The United States Steel Corporation continues to quote the pool price, but is not booking any orders except for late shipment. A considerable amount of business has been taken for next year, but prices have not been shaded in any instance. Mills that are able to make prompt delivery are getting a premium on all orders. There is but little structural material to be had for shipment this year, and a large tonnage has been booked for delivery next year.

The labor troubles in this district that remain unsettled may prove to be more serious than was at first supposed. The molders and pullers-out in the melting departments of the plants of the Crucible Steel Company of America are still on a strike, and the strikers are gaining in strength. The strike has extended to the 6 plants in the Pittsburg District, and it is reported here that the workers in the Eastern mills have joined in the movement for a 15 per cent advance. If the strike is prolonged another week or two the finishing departments will be affected. Several of the American Bridge Company's works are crippled by a strike of the inside structural iron workers, and yesterday about 500 of this class of workmen employed by the Jones & Laughlin Steel Company went on strike for an advance of 10 per cent. As noted last week, this company granted a 10 per cent advance to all of its day men, but the structural iron

workers were not included, the company contending that they were paid the highest rate in the district. Unless the machinists make a settlement this week a strike will be ordered for July 1 that will affect over 3,000 machinists. They are asking for a 10 per cent advance.

Pig Iron.—About 400 tons of bessemer pig iron were sold this week at \$21.50, Valley furnaces. For the third quarter \$21 is quoted, and for the fourth quarter the price asked is \$20.75, Valley furnaces. Basic iron is about 50c. a ton lower. Foundry iron for this year's delivery is scarce, and No. 2 cannot be had at less than \$22.25, Pittsburg, and some furnaces are asking \$23. A sale of 2,000 tons for delivery in the first half of next year has just been made at \$21.50, Pittsburg. Gray forge has declined, and a sale of 500 tons is noted at \$20.25 Pittsburg.

Steel.—While the nominal quotation for bessemer steel billets for several weeks has been \$35, a sale has been made of 1,000 tons for third quarter delivery at \$34.25 at mill. For late delivery from \$33 to \$34 is offered. Open-hearth billets are about the same price as bessemer, but no sales were made this week. Sheet bars are quoted at \$34@35. Tank plates remain at 1.60c. and steel bars range from 1.60 to 1.70c. For prompt delivery 1.85c. is asked for plates.

Sheets.—The sheet market is in a very unsatisfactory condition. Demand is limited except for heavy gauges. No. 28 gauge is quoted at 3@3.10c., and galvanized sheets remain at 4.45@4.50. in car-load lots.

Ferro-manganese.—There have been no sales of domestic 80 per cent, and prices of the foreign product remain unchanged at \$52@55 for British and \$49 for German.

New York. June 27.

Pig Iron.—Nearly all northern furnaces are sold up to the end of the year, and there are reports of sales for 1903 delivery. Considerable Scotch pig is coming in; it sells for about \$22 at ship for No. 1. We quote for tidewater delivery: No. 1X foundry, \$22@23.50; No. 2X, \$21@22; No. 2 plain, \$21. For Southern iron on dock, New York, No. 1 foundry, \$22@22.50; No. 2, \$20@21; No. 3, \$19@20.

Bar Iron and Steel.—We quote on large lots on dock: Refined bars, 1.95@2c.; soft steel bars, 2c.

Plates.—Demand is strong. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 2.05@2.15c.; flange, 2.10@2.20c.; marine, 2.15@2.25c.; universal, 1.95@2.10c. The basis price for tank is 1.78c., but mills are free to take as high a price as they can get.

Steel Rails.—Standard sections are quoted at \$28 for 1903 delivery; light rails \$30@33, according to weight.

Structural Material.—The scarcity of material for anything like prompt delivery is more marked. Small lots of spot material sell at large premiums. We quote for forward delivery on large lots at tidewater as follows: Beams, 2@2.20c.; tees, 1.95@2.15c.; angles, 1.95@2.25c.

Nails.—Demand is good. We quote for car-load lots on dock: cut nails, \$2.18; wire nails, \$2.20.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 816.)

New York. June 26.

The closing week of June has been very quiet, while prices for manufactured goods have been strengthened by dear raw material.

Heavy Chemicals.—Prompt business is small compared with orders that are being taken for later shipment. Prices on future contracts are somewhat lower than those for immediate delivery, but sellers are not grumbling. Momentarily jobbers are free sellers at fractionally lower prices than first hands, as they want to clean up their stocks for a fresh supply from manufacturers. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 80@85c. for prompt shipment, and 75@77 1/2c. for forward; caustic soda, high-test, \$1.90 @ \$1.95 for early delivery, and \$1.85@1.87 1/2 for futures; bicarb. soda, ordinary, 95c., and extra, \$3; sal soda, 65c.; chlorate of potash, \$7.75; bleaching powder, off-test, \$1.35; best grades mostly under contract. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 90@92 1/2c.; caustic soda, high-test, \$2.25; sal soda, 67 1/2@70c.; chlorate of potash, \$10 1/4 @ \$10 3/4; bleaching powder, prime brands, Liverpool, \$1.75; Continental, \$1.50@1.65.

Acids.—Outside of regular contract deliveries little is being done in any acid.

Exports of copper sulphate from Great Britain in the 5 months ending May 31 were 31,953 long tons, as against 30,675 tons in the corresponding period last year; showing an increase of 1,278 tons.

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

Table listing various chemicals and their prices, including Blue Vitriol, Muriatic acid, Nitric acid, Oxalic acid, Sulphuric acid, etc.

Brimstone.—Importers received 1,100 tons at New York this week. They charge \$23.25 per ton for best unmixed seconds, and \$21@21.25 for best thirds. Shipments are held at \$22.25 for seconds, and \$20.25 for thirds. On the whole, trade is quiet.

Pyrites.—Conditions continue unchanged in the trade, as importers are confronted with strong freight rates and domestic producers have much of their mineral already under contract.

Imports of pyrites into Great Britain in the 5 months ending May 31, 1902, amounted to 270,874 tons, as compared with 292,335 tons in the same period last year, showing a decrease of 21,461 tons.

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, 24@25 per cent, can be bought at \$3@3.02 1/2 per 100 lbs., as the market has become easier. In May the shipments from Great Britain to the United States amounted to about 353 tons.

Nitrate of Soda.—The market continues firm at \$2.05 per 100 lbs., for this and next month's arrivals, while futures are quoted at \$1.92 1/2. Just at present demand is quiet.

Abroad the approaching close of the season for nitrate of soda has brought out prophecies with regard to the future of the industry, based on the past year's consumption. Briefly, the consumption in Europe, especially in Germany, has fallen far short of last year, owing to the unfavorable condition of the beet sugar industry and also to the high prices asked for nitrate.

Phosphates.—Excepting for moderate Continental orders, trade is quiet. Prices for some grades are weaker. Ocean freight rates are firm.

Shipments from the Mount Pleasant, Tenn., field over the Louisville & Nashville Railroad in the 4 months ending April 30 were 83,977 tons to domestic consumers, and 33,962 tons to foreign; a total of 117,939 tons.

We quote phosphate prices below:

Table of phosphate prices showing Phosphates, Per ton F. o. b., C. i. f. Un. Kingdom or European Ports. Unit, Long ton.

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

Liverpool. June 18.

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

The market for heavy chemicals is very steady, but the amount of business passing is only moderate.

Soda ash is firm 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 in demand 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 shows a fair business 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 prices are nominally unchanged, hardwood being quoted at £6 12s.@£6 15s. per ton, net cash, for unbarred makes, with special terms for Continental and a few other export quarters.

Chlorate of potash is quiet at 3d. per pound, net cash.

Bicarb. soda continues steady at £6 15s. per ton, less 2 1/2 per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special quotations for a few favored export markets.

Sulphate of ammonia is flat. Good gray 24@25 per cent, in double bags, f. o. b. here, is now quoted at £12 12s. 6d.@£12 15s. per ton, less 2 1/2 per cent, while buyers hold aloof.

Nitrate of soda is dull and lower at £8 15s.@£9 per ton, less 2 1/2 per cent, for double bags, f. o. b. here, as to quality.

METAL MARKET.

New York.

June 26

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in May and Year.

Metal	May.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports....	\$10,101,177	\$1,968,407	\$24,146,382	\$20,135,754
Imports.....	1,772,834	1,841,044	12,967,226	9,204,551
Excess, E.	\$8,328,343	\$327,363	E. \$11,479,156	E. \$10,931,203
Silver:				
Exports....	\$4,389,376	\$3,782,305	\$23,865,097	\$19,284,558
Imports.....	2,745,622	2,087,548	13,200,829	10,848,278
Excess, E.	\$1,643,754	E. \$1,694,757	E. \$10,664,268	E. \$8,736,280

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 June 26 and for years from January 1, 1902, 1901 and 1900:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$.....	\$5,641	\$134,420	\$20,543	E. \$108,236
1902.....	16,495,762	1,215,232	13,657,670	663,007	E. 28,231,192
1901.....	24,934,098	1,291,313	16,766,585	1,933,890	E. 38,497,440
1900.....	20,521,577	1,519,396	20,290,167	2,146,120	E. 37,116,628

There were no gold exports; the silver went chiefly to London. Imports were from Central and South America and the West Indies.

Financial Notes of the Week.

General trade is somewhat quieter and the speculative markets are dull. Foreign exchange is firmer, and it seems quite possible that some gold may be exported before long. Drafts to the amount of about \$800,000, drawn against shipments of gold from the Klondike, have been received in New York. This is several weeks earlier than similar shipments were reported last year.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending June 21, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts....	\$910,025,800	\$902,755,300	\$889,015,100
Deposits	890,982,600	982,844,200	950,952,600
Circulation	23,033,100	30,887,500	31,250,100
Specie	166,224,200	173,296,900	173,292,700
Legal tenders.....	72,043,300	79,025,500	76,603,700
Total reserve.....	\$238,272,500	\$252,322,400	\$249,896,400
Legal requirements....	222,745,650	243,711,050	237,738,150
Balance surplus....	\$15,526,850	\$6,611,350	\$12,158,250

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. A'd.....	\$173,296,900	\$173,292,700		
England.....	188,908,790	189,963,295		
France.....	493,294,385	\$224,361,670	513,954,795	\$224,673,005
Germany.....	175,745,000	75,320,000	198,985,000	73,690,000
Spain.....	70,015,000	84,720,000	70,735,000	84,185,000
Netherlands.....	28,908,500	28,725,500	23,417,000	33,942,500
Belgium.....	14,855,000	7,425,000	15,800,000	7,945,000
Italy.....	75,515,000	9,817,000	80,775,000	10,505,800
Russia.....	354,470,000	36,870,000	372,395,000	45,030,000

The returns of the Associated Banks of New York are of date June 21, and the others June 19, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market the past week has been sensitive, and while sellers are not by any means pressing bullion, buyers have not been very active. No orders for large amounts could be executed in London without materially stiffening the price, as the long silver in stock is limited.

The United States Assay Office in New York reports receipts of 53,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to June 12 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India.....	£3,632,710	£3,419,575	D. £213,135
China.....	339,125	16,500	D. 322,625
The Straits.....	79,976	70,550	D. 9,426

Totals.....£4,051,811 £3,506,625 D. £545,186.

Arrivals for the week, this year, were £104,000 in bar silver from New York, £4,000 from Chile and £8,000 from Australia; total, £116,000. Shipments were £61,600 in bar silver to Bombay, £35,000 to Calcutta, and £5,000 to Ceylon; total, £101,600.

Indian exchange is fairly strong, as the export season is beginning. The Council bills offered in London were all taken at an average of 15.9d. per rupee. There still is some demand for silver for Indian account.

The foreign merchandise trade of Great Britain for the five months ending May 31 is given by the Board of Trade returns as follows:

	1901.	1902.
Imports.....	£220,724,360	£222,135,337
Exports.....	144,696,330	141,332,905
Excess, imports.....	£76,028,030	£80,802,432

The increase in exports was £1,410,977, or 0.6 per cent; the decrease in exports was £3,363,425; leaving an increase of £4,774,402 in the balance of imports.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	\$0.42 $\frac{1}{2}$	\$0.44
Peruvian soles and Chilean pesos.....	.38 $\frac{1}{4}$	.42
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	3.88
Twenty marks.....	4.77	4.85
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

Date	Silver		Copper				Spelter		
	London	Paris	Lake	Electrolytic	London	Tin, etc.	Lead	N. Y.	St. L.
June 20	4.87 $\frac{1}{2}$	52 $\frac{1}{2}$	24 $\frac{1}{8}$	12 $\frac{1}{4}$	53 $\frac{1}{2}$	28 $\frac{1}{2}$	4.05	5.00	4.75
June 21	4.87 $\frac{1}{2}$	52 $\frac{1}{2}$	24 $\frac{1}{8}$	12 $\frac{1}{4}$	53 $\frac{1}{2}$	28 $\frac{1}{2}$	4.05	5.00	4.75
June 23	4.87 $\frac{1}{2}$	52 $\frac{1}{2}$	24 $\frac{1}{8}$	12 $\frac{1}{4}$	53 $\frac{1}{2}$	28 $\frac{1}{2}$	4.05	5.00	4.75
June 24	4.87 $\frac{1}{2}$	52 $\frac{1}{2}$	24 $\frac{1}{8}$	12 $\frac{1}{4}$	53 $\frac{1}{2}$	28 $\frac{1}{2}$	4.05	5.00	4.75
June 25	4.87 $\frac{1}{2}$	52 $\frac{1}{2}$	24 $\frac{1}{8}$	12 $\frac{1}{4}$	52 $\frac{1}{2}$	28 $\frac{1}{2}$	4.05	5.00	4.75
June 26	4.87 $\frac{1}{2}$	52 $\frac{1}{2}$	24 $\frac{1}{8}$	12 $\frac{1}{4}$	52 $\frac{1}{2}$	28 $\frac{1}{2}$	4.05	5.00	4.75

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.

We regret to be obliged to correct an error in our last week's issue. The price of electrolytic copper—cakes, ingots and wire bars—in the table was given correctly at 12@12 $\frac{1}{4}$ c. In the text, however, a misprint made it read 12@12 $\frac{1}{2}$ c., which was incorrect. In the table also the prices of standard copper in London on June 19 should have been £53 $\frac{1}{2}$, and not £53 $\frac{3}{4}$, as printed.

Copper.—The market is dull and featureless. We learn of but few transactions. Lake copper is quoted at 12 $\frac{1}{2}$ @12 $\frac{1}{4}$ c.; electrolytic in cakes, wire-bars and ingots at 12@12 $\frac{1}{4}$ c., in cathodes at 11 $\frac{1}{4}$ @11 $\frac{1}{2}$ c.; casting copper at 12c.

The London market has been very quiet, spot fluctuating between £53 5s. and £53 10s., and three months between £53 10s. and £53 15s. At the close, we quote spot at £52 17s. 6d., three months at £53. The London Metal Exchange is closed from June 25 until June 30. Refined and manufactured sorts we quote: English tough, £57@£57 10s.; best selected, £58; strong sheets, £68; India sheets, £67; yellow metal, 6 $\frac{1}{4}$ d.

Exports of copper from New York, Philadelphia and Baltimore in the week ending June 25 are reported by our special correspondents as follows: Great Britain, 1,329 tons; Germany, 971; Holland, 1,098; France, 1,165; Denmark, 25; Russia, 150; total, 4,738 tons. Imports were 650 tons copper and 635 tons ore from England and 531 tons copper from Mexico.

Imports of copper into Great Britain for the five months ending May 31 are given as follows by the Board of Trade returns, in long tons; the totals are reduced to the equivalent in fine copper:

	1901.	1902.	Changes.
Copper ore.....	38,661	41,427	I. 2,766
Matte and precipitate.....	34,012	34,614	I. 602
Fine copper.....	27,004	47,802	I. 20,798

Total, fine copper.....47,876 69,252 I. 21,376

Of imports this year 379 tons of ore, 9,320 tons matte and 27,698 tons of fine copper were from the United States; against 364 tons, 5,731 tons and 8,104 tons, respectively, last year.

Our special correspondent reports that during the first half of the current fiscal year—beginning July 1, 1901—the production of copper in Mexico was 14,992 tons, valued at nearly \$4,500,000. This does not include the copper ore exported, amounting in the same time to 5,434 tons, valued at \$1,480,013. These figures show an increase in production of nearly 5,000 tons, as compared with the same period in the preceding year.

Tin.—The market is quiet. Buyers have not taken hold largely in consequence of the decline in London, but as their stocks are depleted, a fair busi-

ness has been done for early delivery. We quote spot at 28 $\frac{1}{2}$ c., July delivery at 27 $\frac{1}{2}$ c.

The foreign market, which closed last Thursday at £126 for spot and £125 for three months, was £128 and £123 15s., respectively, on Friday. On Monday it opened 5s. higher, but declined to £126 10s. for spot, £122 15s. for three months, and on Tuesday went down to £125 2s. 6d. for spot, £120 15s. for three months. On Wednesday the Metal Exchange closed at £125 10s. for spot, £121 10s. for three months.

Imports of tin into Great Britain for the five months ending May 31, and re-exports of foreign tin, are reported as below, in long tons:

	1901.	1902.	Changes.
Straits.....	10,096	9,964	D. 132
Australasia.....	1,147	1,293	I. 146
Other countries.....	2,103	1,383	D. 720
Total imports.....	13,346	12,640	D. 706
Re-exports.....	9,722	9,198	D. 524
Balance.....	3,624	3,442	D. 182

The decrease in receipts was mainly in tin in transit for the United States.

Lead remains unchanged. We quote St. Louis 3.97 $\frac{1}{2}$ @4.05c., New York 4.05@4.10c.

The London market is again slightly lower, Spanish lead being quoted at £11 2s. 6d.@£11 3s. 9d., English lead 5s. higher.

Imports of lead into Great Britain for the five months ending May 31 are reported as below, in long tons, the exports of lead being added:

	1901.	1902.	Changes.
United States.....	19,528	25,005	I. 5,477
Spain.....	34,961	41,510	I. 6,549
Australasia.....	27,390	27,665	D. 325
Other countries.....	5,657	6,554	I. 897
Total imports.....	88,136	100,734	I. 12,598
Exports.....	15,571	14,459	D. 1,112
Balance.....	72,565	86,275	I. 13,710

The lead credited to the United States is chiefly Mexican lead, refined here in bond.

Spelter.—The market has been active and a good business done at last prices, 4 $\frac{3}{4}$ c. St. Louis, 5c. New York.

The foreign market is a little higher, good ordinaries being quoted at £18 12s. 6d., specials 2s. 6d. higher.

Imports of spelter, or metallic zinc, into Great Britain for the five months ending May 31 were 39,052 long tons, against 26,576 tons for the corresponding period in 1901, an increase of 12,476 tons.

Antimony.—We quote Cookson's at 9 $\frac{3}{4}$ @10c.; Hallitt's, 8 $\frac{1}{4}$ c.; Italian, Japanese, Hungarian and United States Star at 8c.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

Platinum.—Consumption continues good. Ingot platinum in large lots brings \$19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 76c. per gram.

Quicksilver.—The New York price is \$48 per flask for large lots; a slightly higher figure is asked for small orders. San Francisco quotations are \$46 per flask for domestic orders, and \$43.50 for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Imports of quicksilver into Great Britain for the five months ending May 31 were 2,025,821 lbs., against 1,562,244 lbs. for the corresponding period in 1901. Exports were 897,333 lbs., against 738,169 lbs. last year.

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%)... 28c.
No. 2, 90% ingots.....	31@34c.	Magnesium.....\$2.75
Rolled sheets.....	4c up	Manganese, pure (N.Y.)... 60c.
Alum-bronze.....	20@22c.	Mangan'e Cop. (20% Mn) 32c.
Nickel-alum.....	33@39c.	Mangan'e Cop. (30% Mn) 38c.
Bismuth.....	\$1.50	Molybdenum (Best)...\$1.82
Chromium, pure (N.Y.)....	80c.	Phosphorus.....50c.
Copper, red oxide.....	50c.	American.....70c.
Ferro-Molyb'dum (60%)	\$1.25	Sodium metal.....50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best).....62c.
Ferro-Titanium (20@25%, N. Y.)	55c.	

Variations in price depend chiefly on the size of the order.

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter	
	1902.	1901.	1902.	1901.	1902	1901
January.....	23.54	26.51	4.000	4.350	4.27	4.13
February.....	24.07	26.08	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.....	29.85	27.12	4.075	4.350	4.47	4.04
June.....	.....	28.00	.....	4.350	.....	3.90
July.....	.....	27.85	.....	4.350	.....	3.95
August.....	.....	26.78	.....	4.350	.....	3.99
September.....	.....	25.31	.....	4.350	.....	4.08
October.....	.....	26.02	.....	4.350	.....	4.23
November.....	.....	26.07	.....	4.350	.....	4.29
December.....	.....	24.36	.....	4.153	.....	4.31
Year.....	.....	26.54	.....	4.334	.....	4.08

Average Prices of Copper.

Table with columns: Month, Electrolytic (1902, 1901), Lake (1902, 1901), London Standard (1902, 1901). Rows include January through December and a Yearly average.

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.

Table with columns: Month, London (1902, 1901), N. Y. (1902, 1901). Rows include January through December and a Yearly average.

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Table with columns: Name of Company, Date, Per Share, Total, Total to Date. Lists various companies and their dividend details.

Note.—The regular monthly table giving all dividends paid will be published on July 5.

*Monthly. †Quarterly. ‡Semi-annual.

ASSESSMENTS.

Table with columns: Name of Company, Loca- tion No., Delinq., Sale, Amt. Lists companies and their assessment details.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices for various dates from June 19 to June 25.

*Per cent.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing companies and their prices for various dates from June 19 to June 25.

Total sales, 503,113 shares. †Ex-dividend

BOSTON, MASS.*

Table of stock quotations for Boston, Mass., listing companies and their prices for various dates from June 19 to June 25.

* Official Quotations Boston Stock Exchange. Holiday. Total sales, shares. †Ex-dividend.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, Pa., listing companies and their prices for various dates from June 19 to June 25.

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 8,151 shares. †Ex-privileges.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 180,171 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

LONDON.

June 14.

Table of stock quotations for London listing companies like Anaconda, C. S., Montana, Coniapo, Chile, De Lamar, Idaho, etc., with columns for authorized capital, par value, last dividend, and quotations.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

PARIS.

June 5.

Table of stock quotations for Paris listing companies like Acieries de Creusot, Firminy, Huta-Balk, la Marine, Anzin, etc., with columns for country, product, capital stock, par value, latest dividend, and prices.

MEXICO.

Table of stock quotations for Mexico listing companies like Durango, Ca. Min. de Penoles, Angustias, Pozos, Guanajuato, etc., with columns for shares, last dividend, and prices.

ST. LOUIS, MO.*

June 23.

Table of stock quotations for St. Louis, Mo. listing companies like Am. Nettie, Colo., Catherine Lead, Mo., Central Coal & C., etc., with columns for shares, par value, and prices.

SPOKANE, WASH.*

June 20.

Table of stock quotations for Spokane, Wash. listing companies like American Boy, Black Tail, Lone Pine-Surp. Con., etc., with columns for shares, par value, and prices.

*From our Special Correspondent.

Total sales 22,000 shares. *Reported by Hunner & Harris.

SALT LAKE CITY.*

June 21.

Table of stock quotations for Salt Lake City listing companies like Ajax, Ben Butler, California, Carissa, etc., with columns for shares, par value, high/low prices, and sales.

TORONTO, ONT.

June 23.

Table of stock quotations for Toronto, Ont. listing companies like Ontario, Olive, British Columbia, Cariboo McKimney, etc., with columns for shares, par value, high/low prices, and sales.

All mines are in Utah. *By our Special Correspondent. Total sales, 73,835 shares.

Total sales, 12,000 shares. †Ex-dividend.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Main table with columns: Category, Cust. Meas., Price. Includes sections for Abrasives, Barium, Barytes, Borax, Cadmium, Calcium, Cement, Chlorine, Chrome Ore, Clay, China, Coal Tar Pitch, Cobalt, Copper, Cryolite, Explosives, Feldspar, Flint Pebbles, Fluorspar, Fuller's Earth, Graphite, Gypsum, Infusorial Earth, Iodine, Iron, Kaolin, Kryptolith, Lead, Lime, Magnesite, Magnesium, Manganese, Marble, Mercury, Mica, Mineral Wool, Nickel, Oils, Paints and Colors, Potash, Potassium, Quartz, Salt, Saltpetre, Silica, Silver, Sodium, Sulphur, Sulphuric Acid, Talc, Tar, Tin, Uranium, Zinc, Zirconium.

THE RARE EARTHS.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.

THE ENGINEERING AND MINING JOURNAL.

ESTABLISHED 1866

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VOL. LXXIII. No. 26.

NEW YORK, SATURDAY, JUNE 28, 1902.

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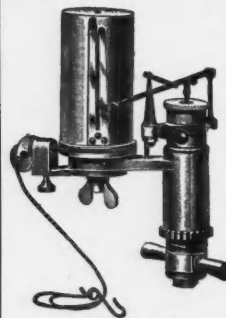
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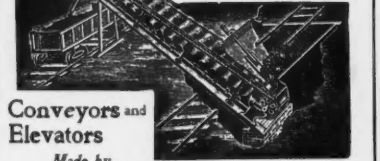
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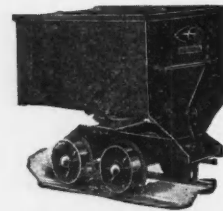
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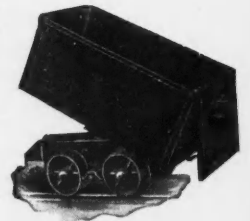
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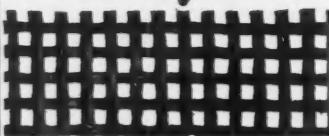
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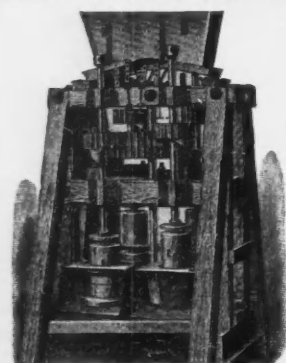
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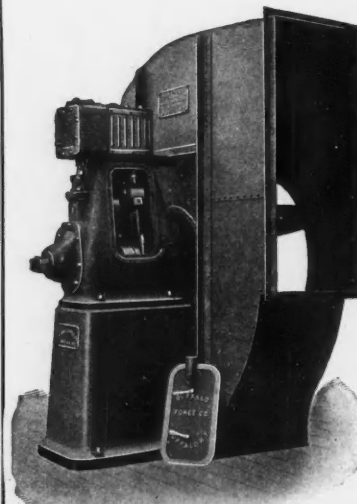
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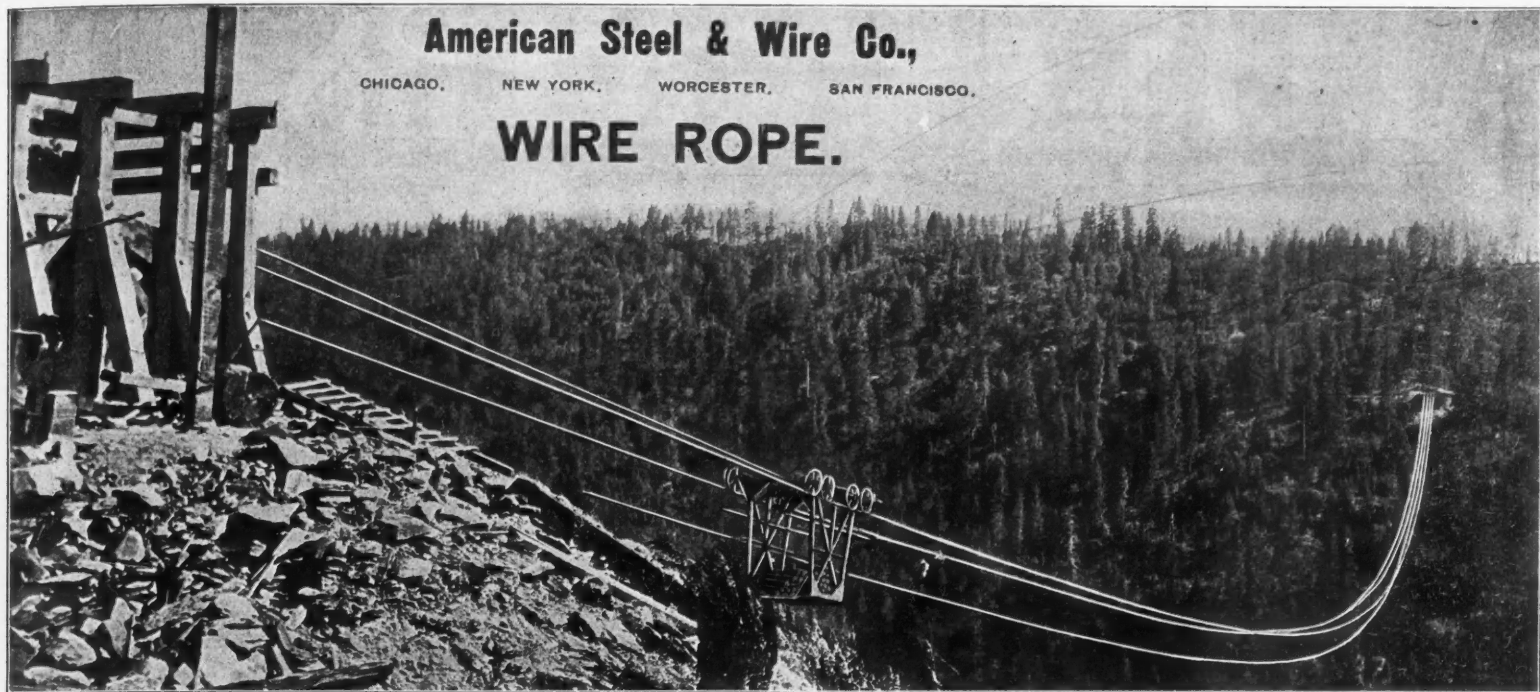


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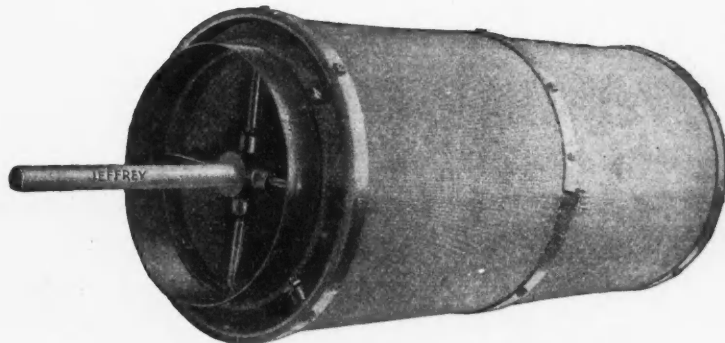
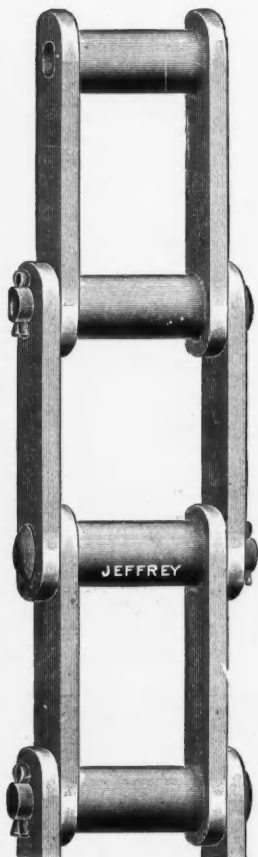
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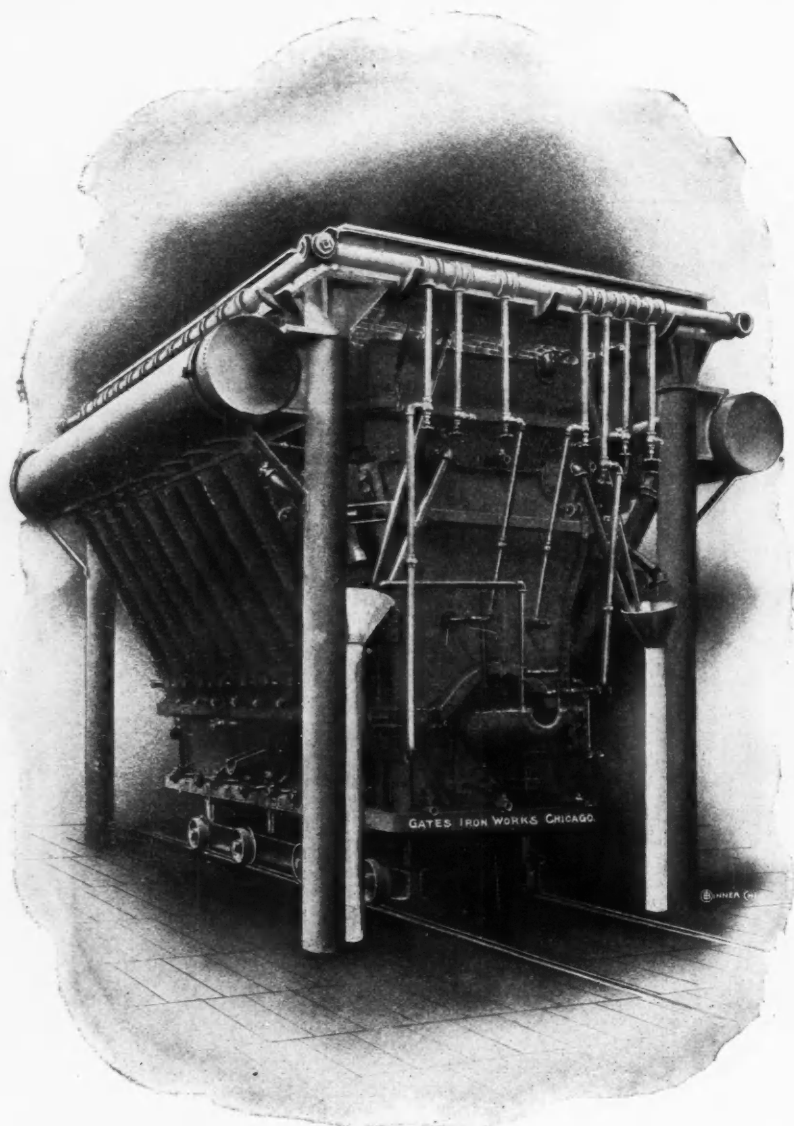
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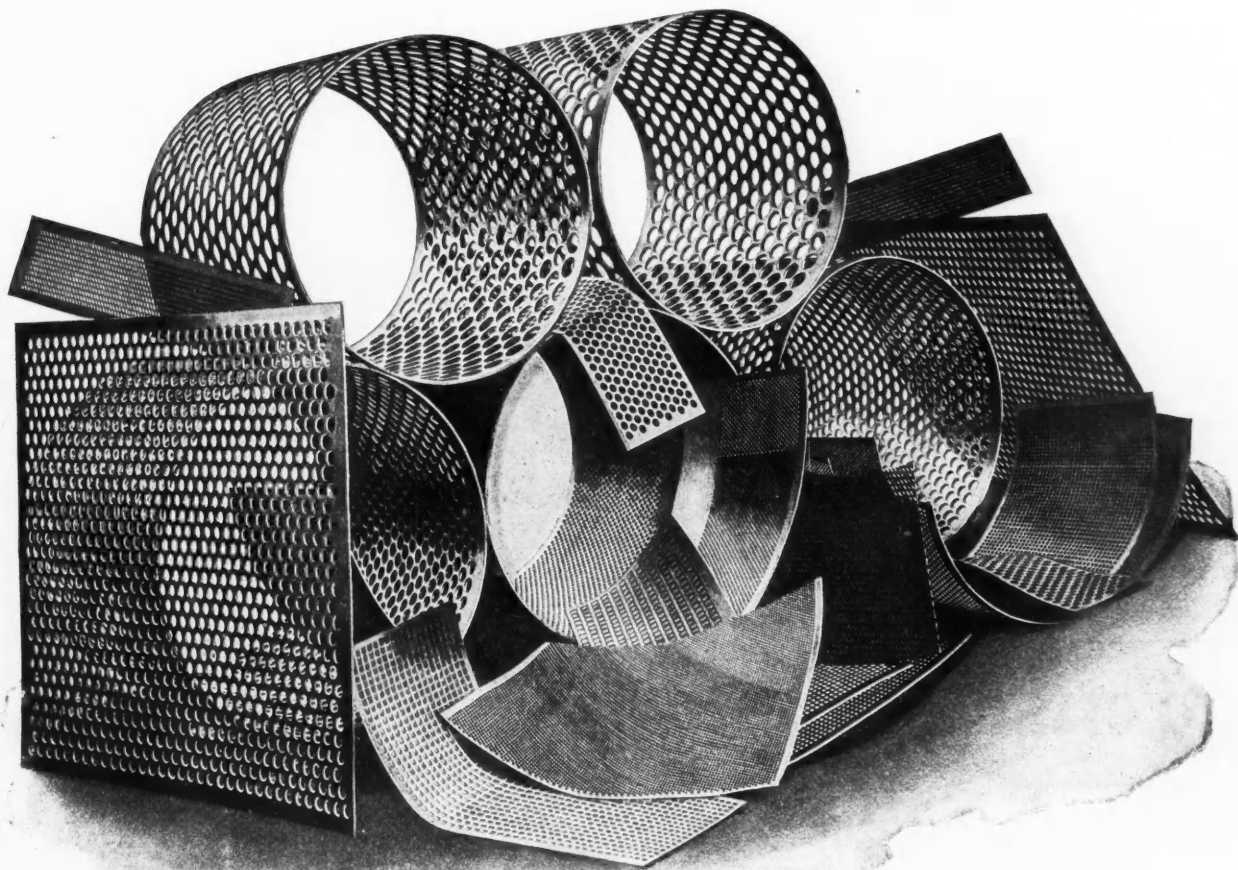
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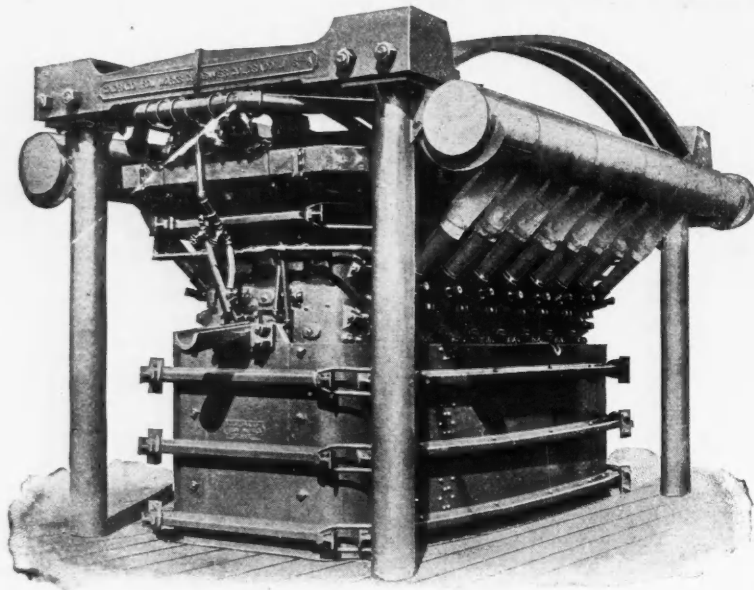
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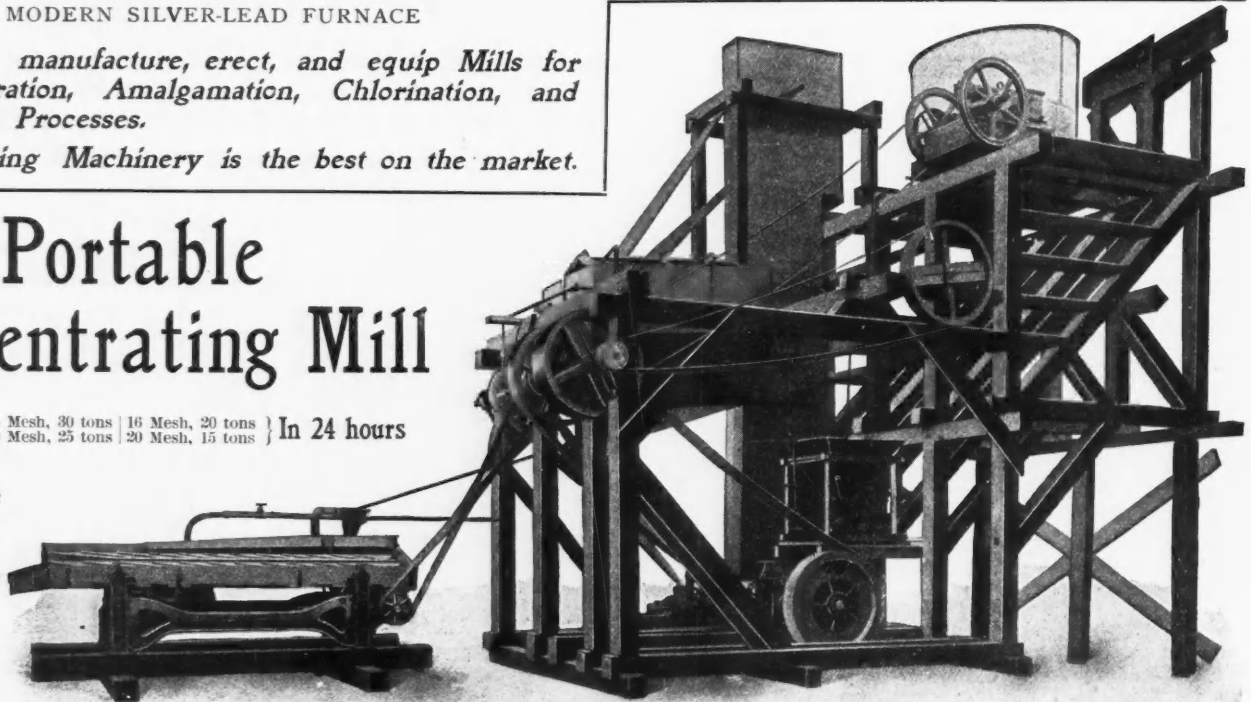
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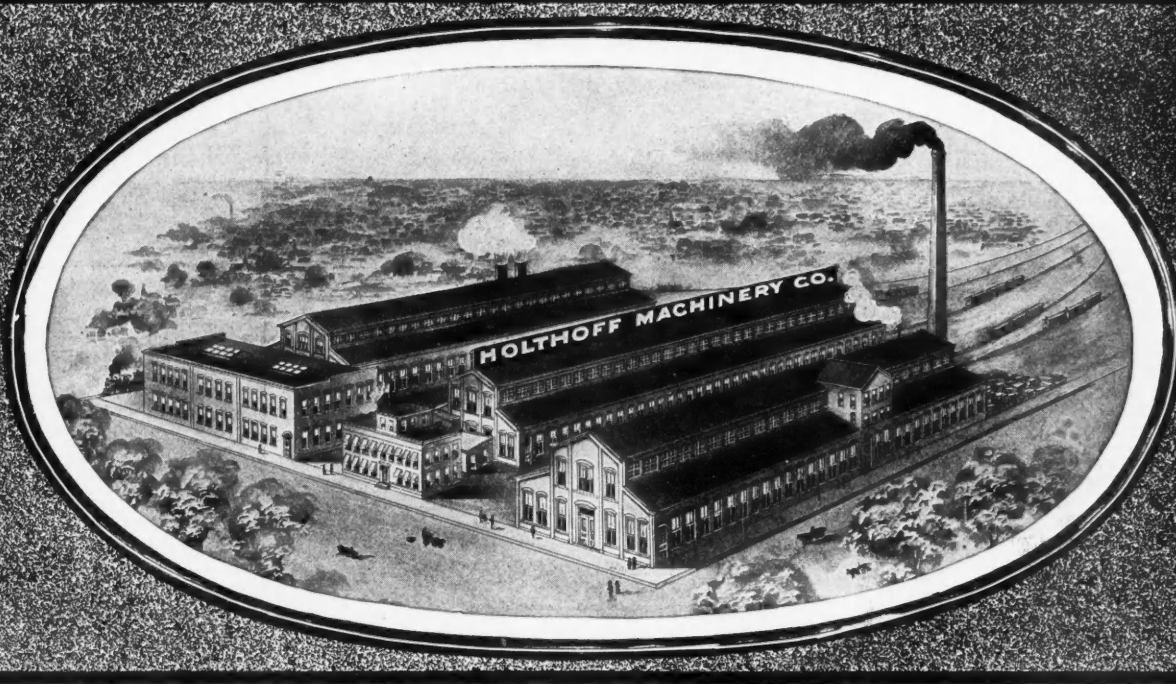


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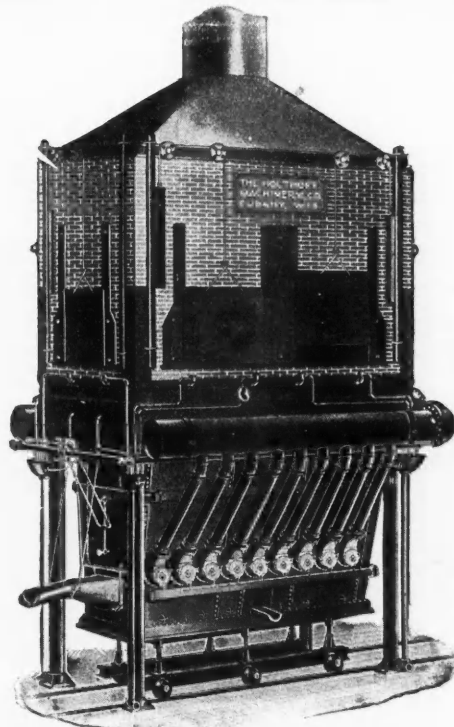
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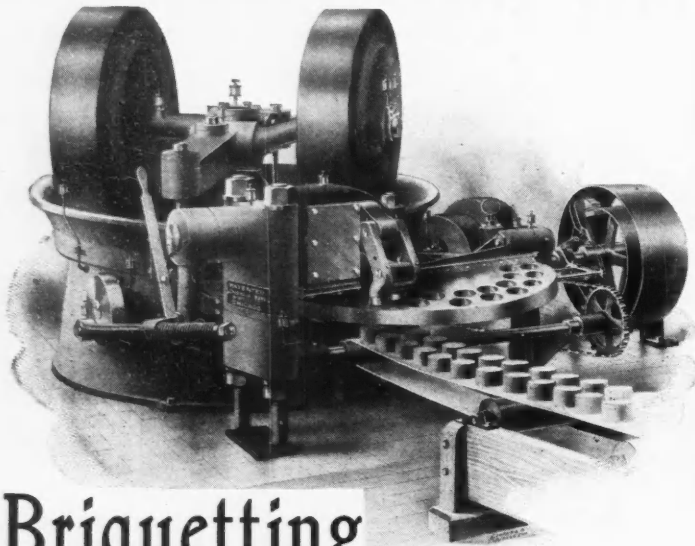
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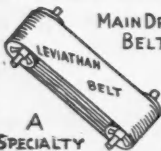
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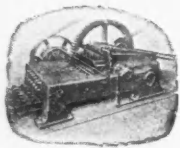


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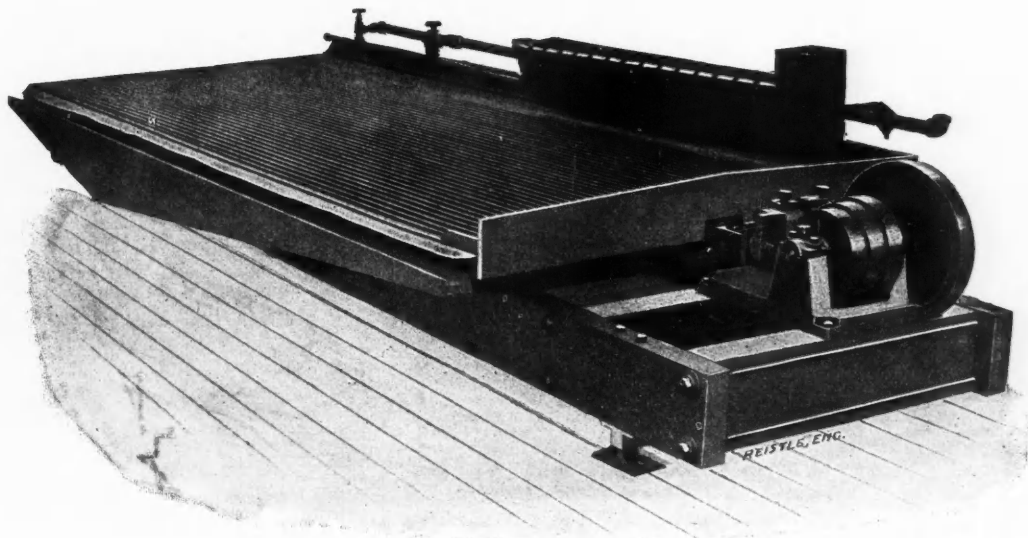
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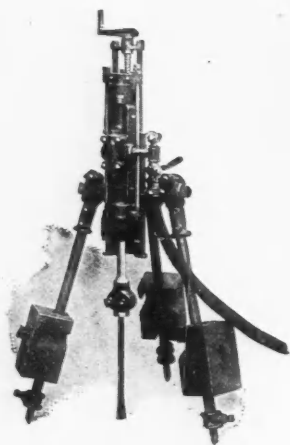
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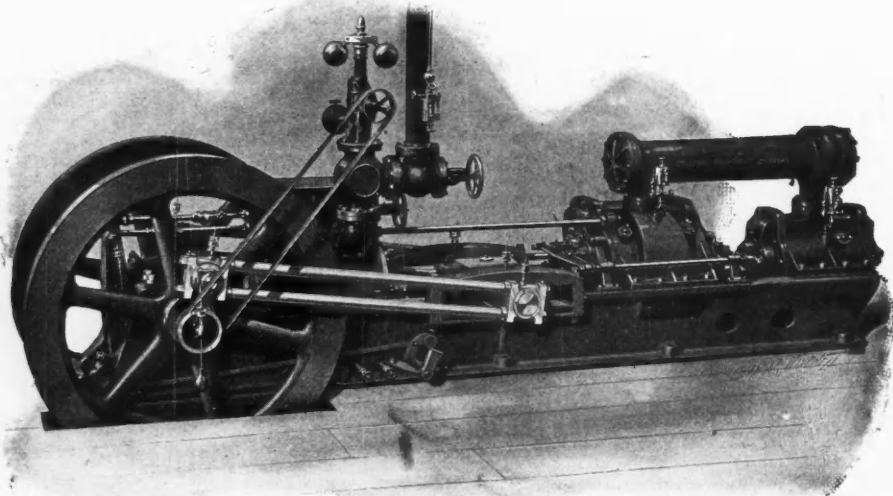
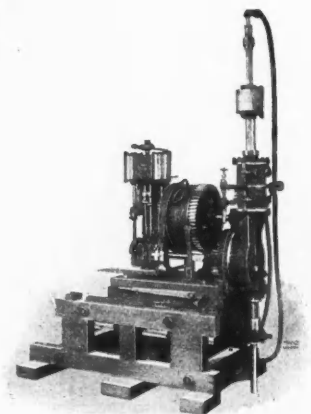
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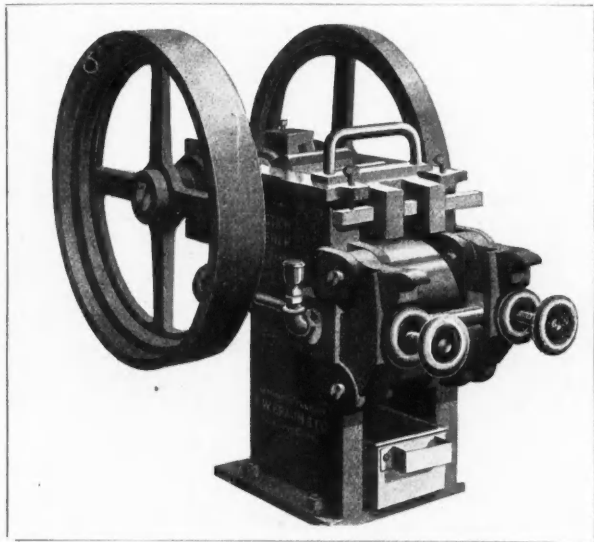
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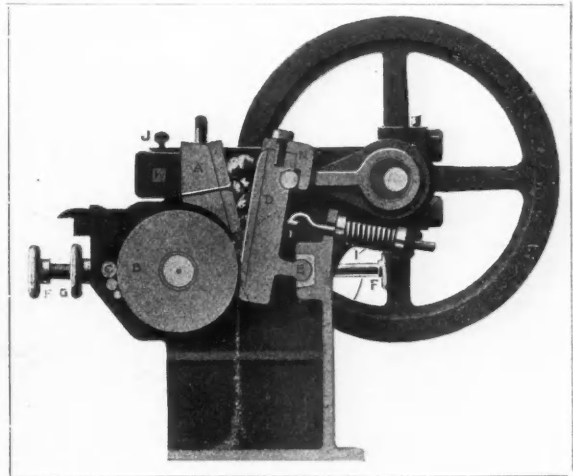
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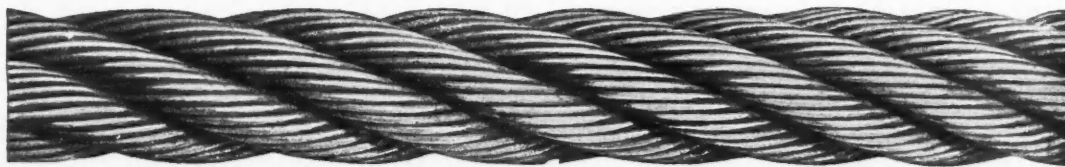


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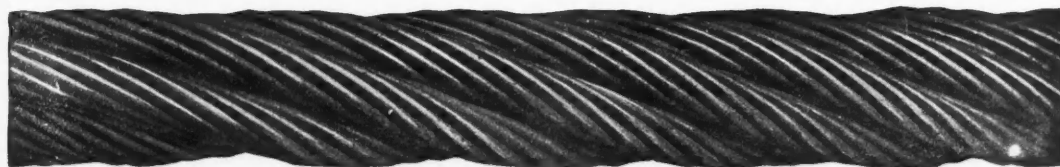
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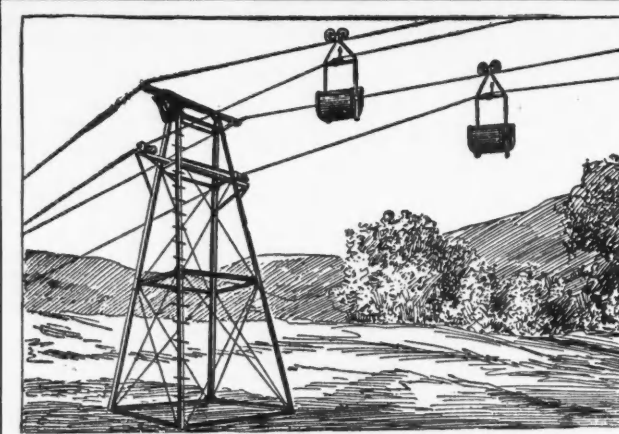
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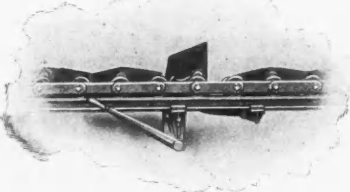
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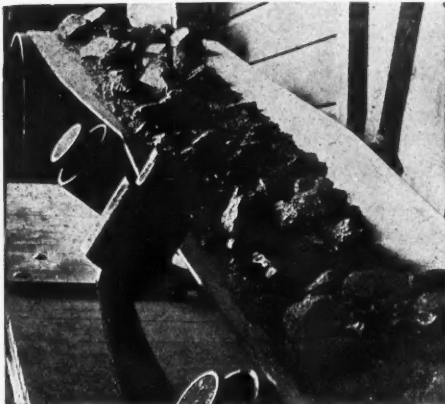
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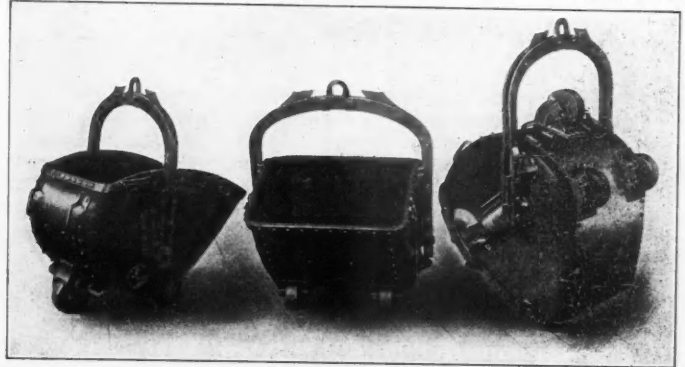
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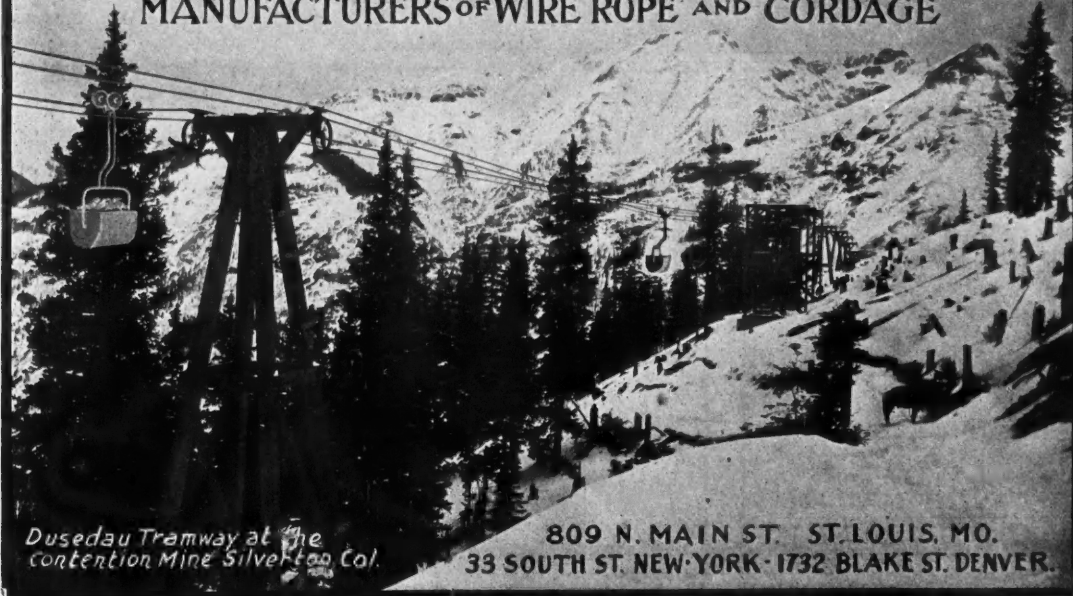
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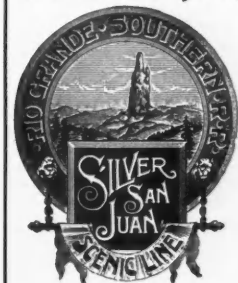
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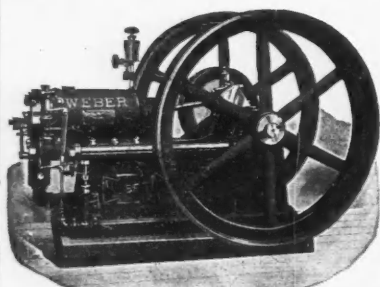
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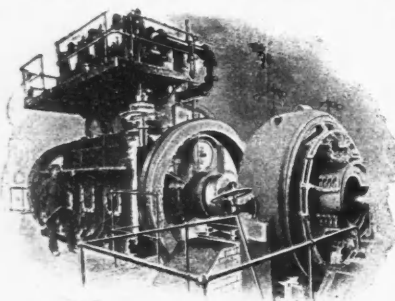
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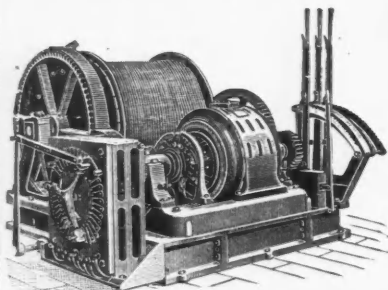
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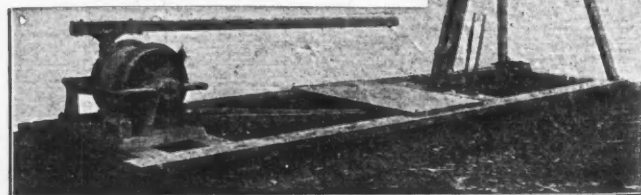
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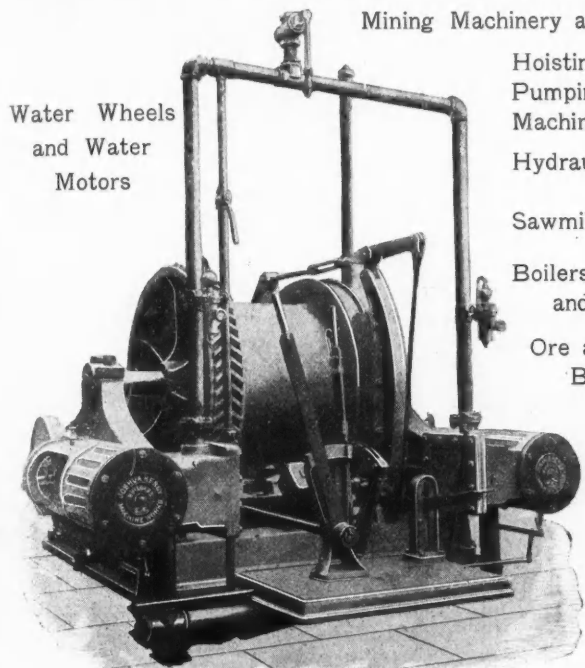
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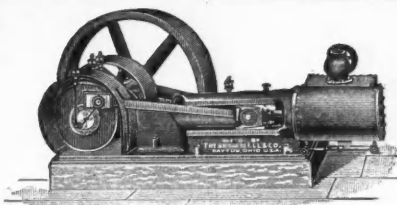
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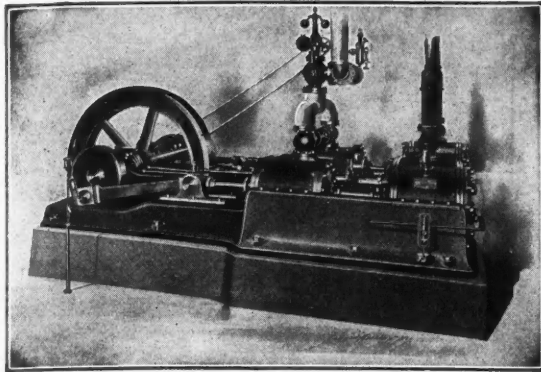
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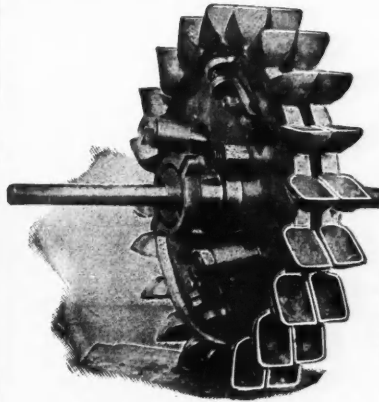
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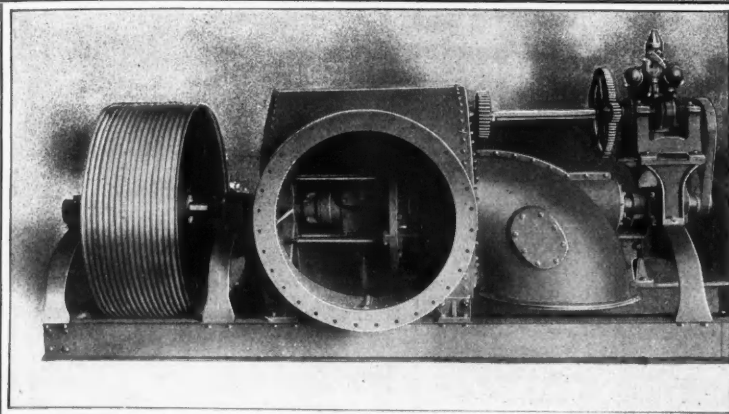
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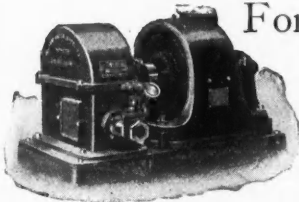
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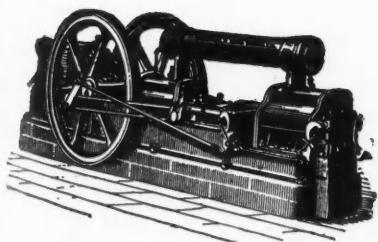
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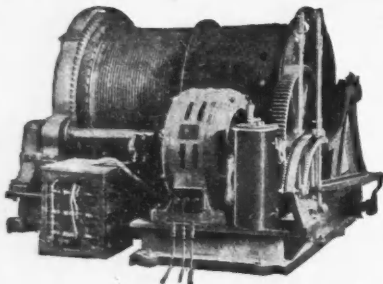
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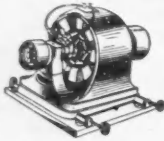
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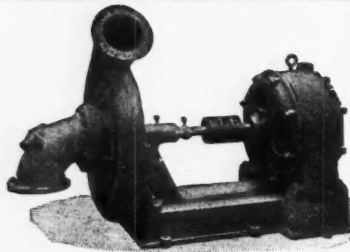
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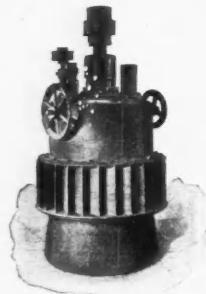
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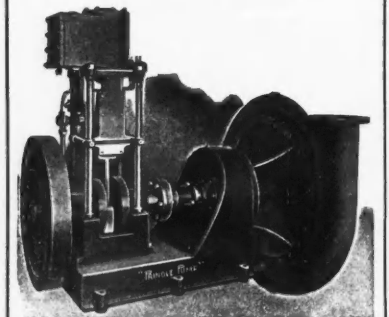
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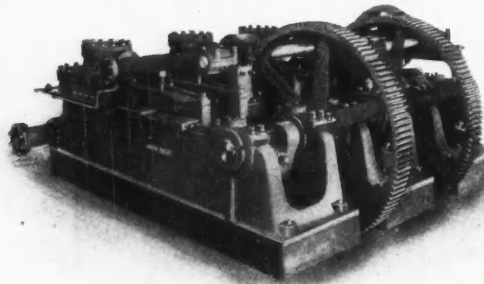
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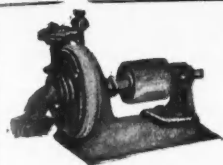


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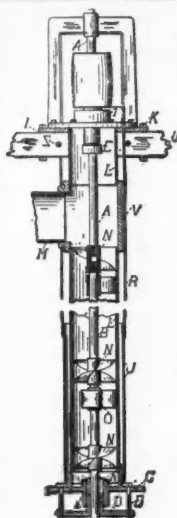


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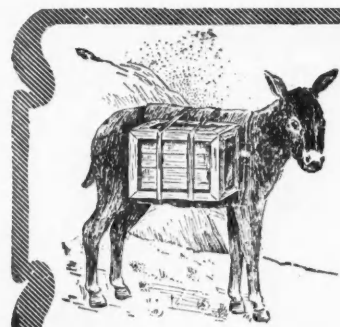
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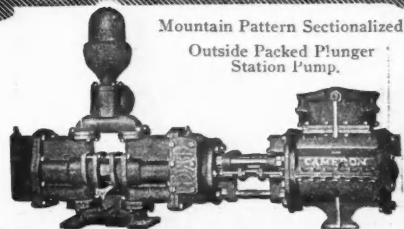
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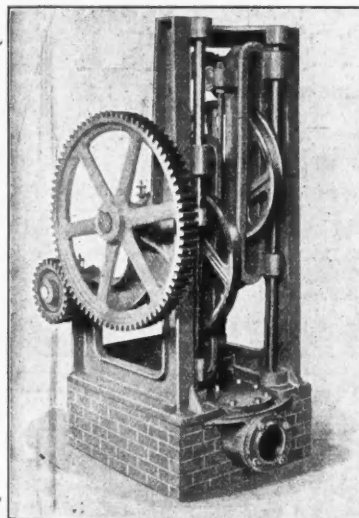
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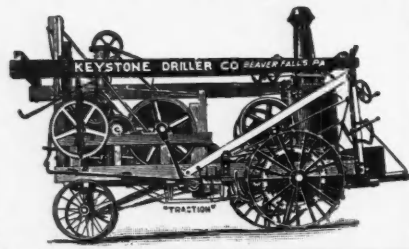
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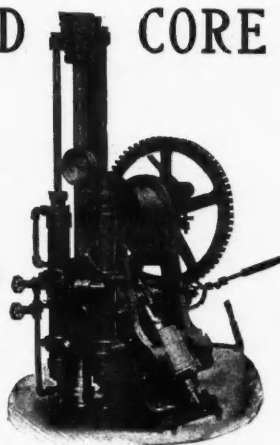
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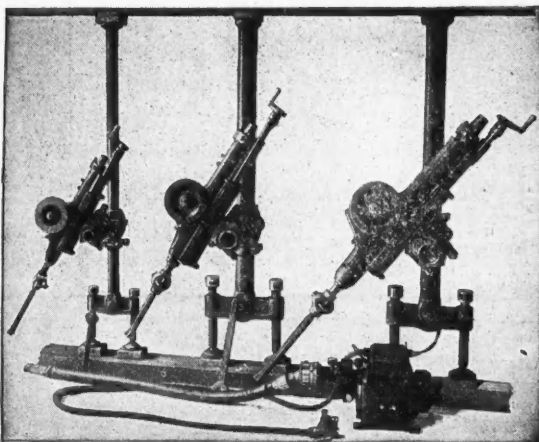
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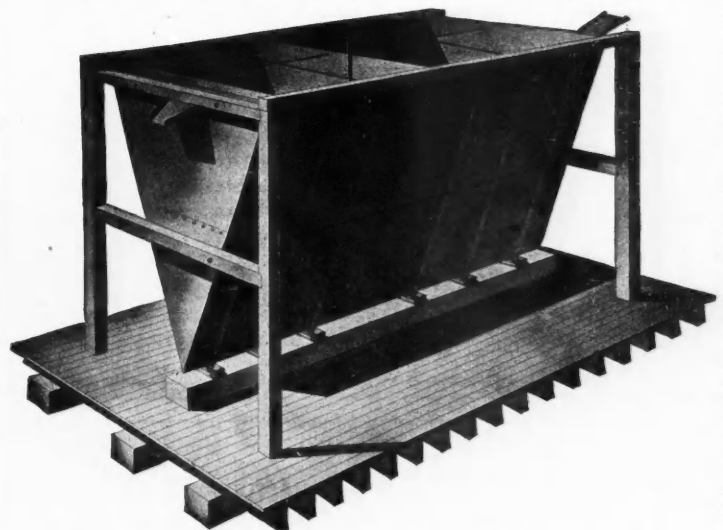
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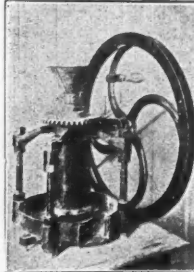
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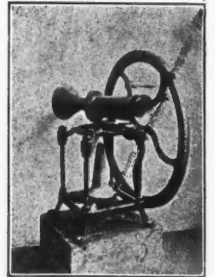
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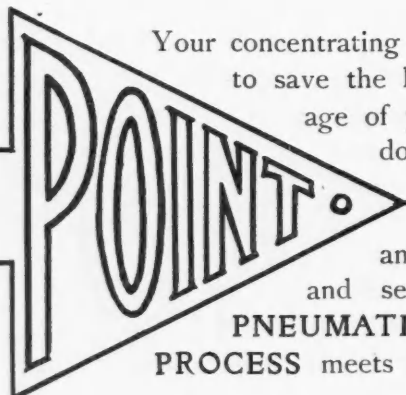


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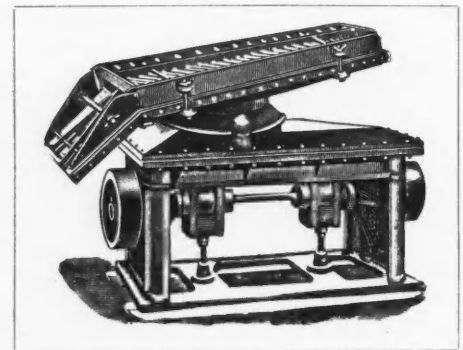
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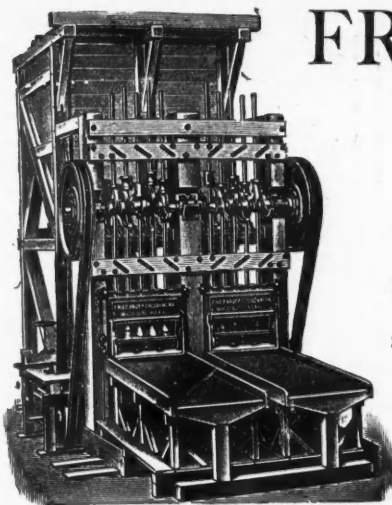
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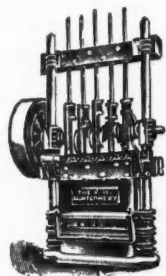
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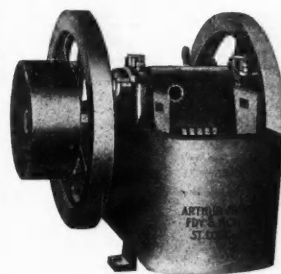
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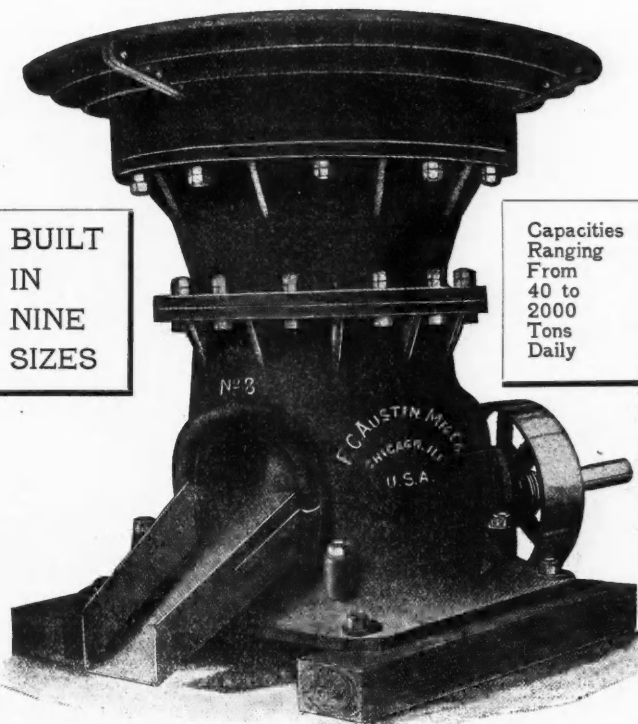
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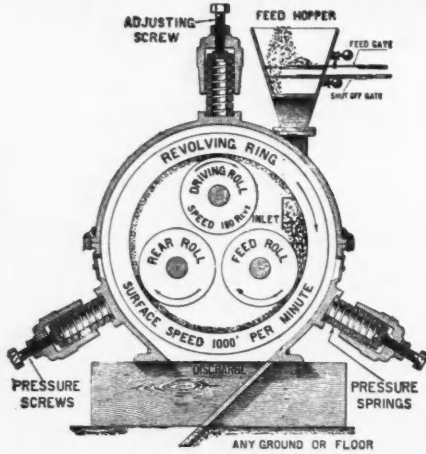
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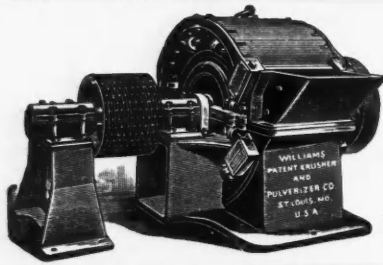
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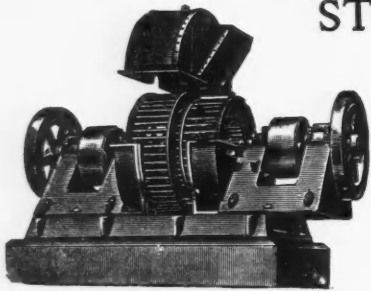
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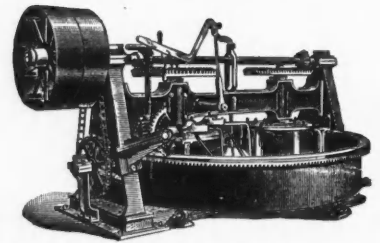
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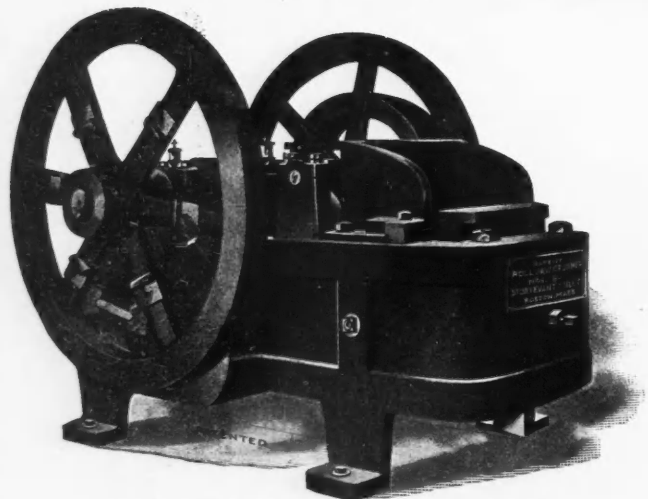
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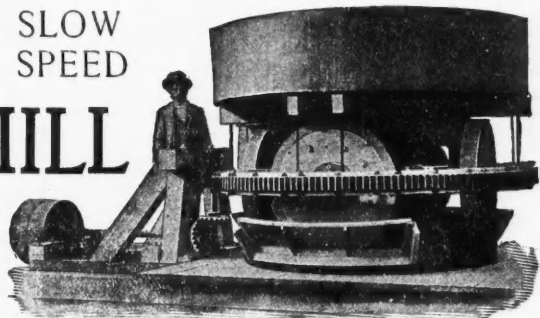
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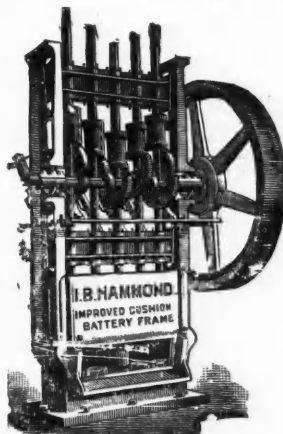
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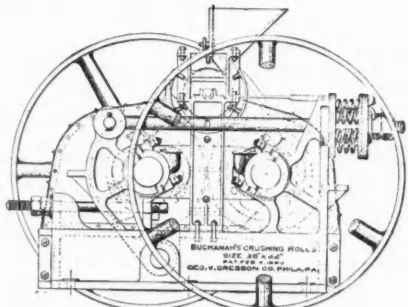
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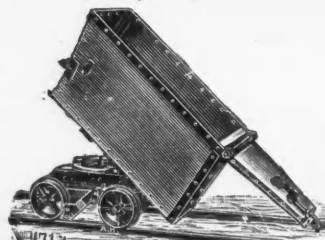
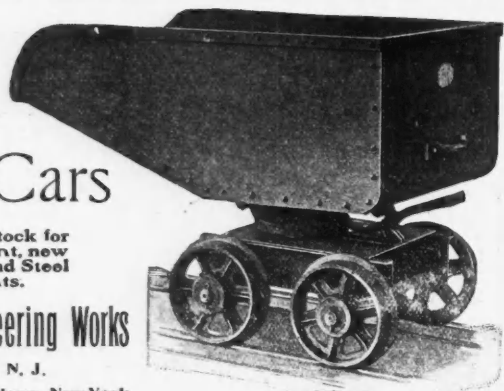
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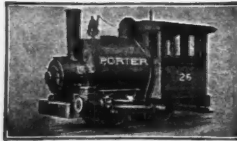
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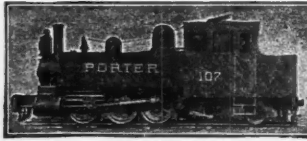
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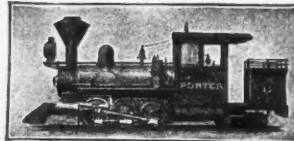
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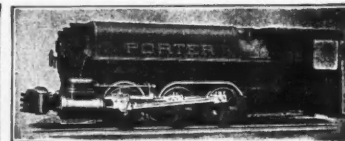
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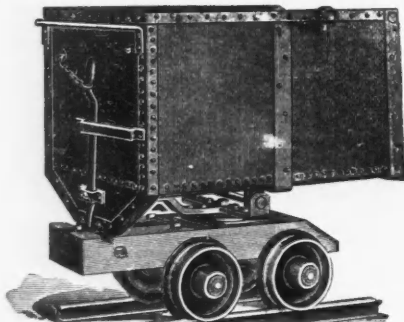
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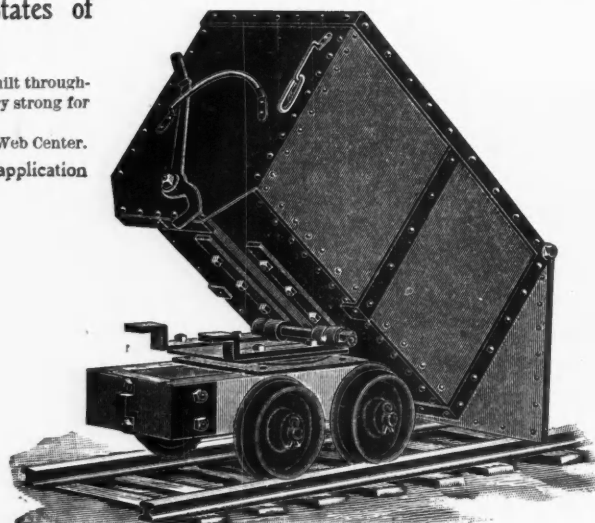
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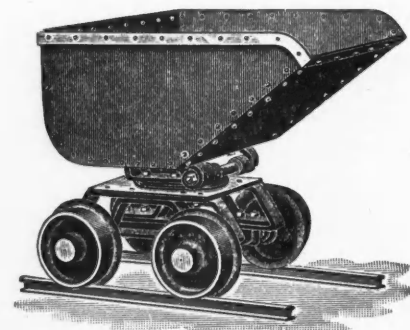
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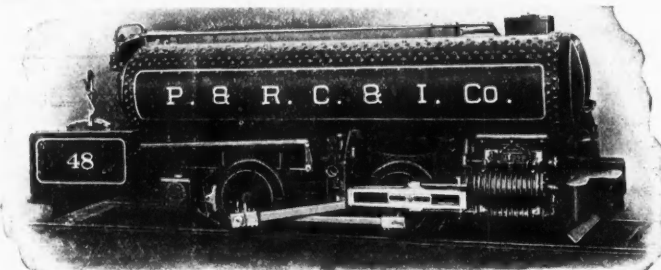
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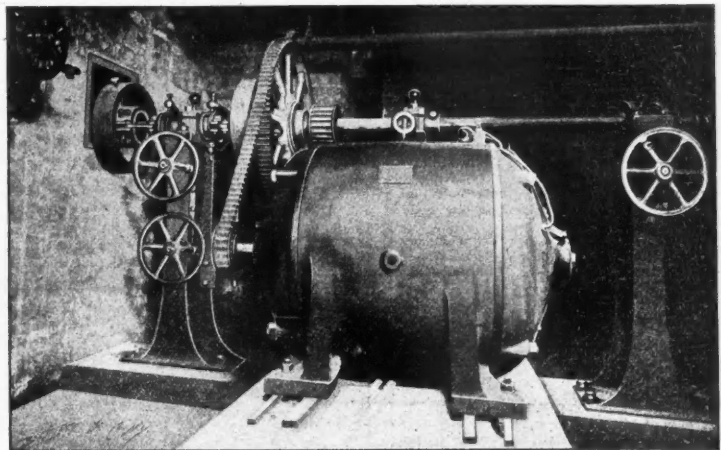
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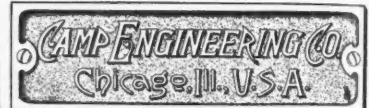
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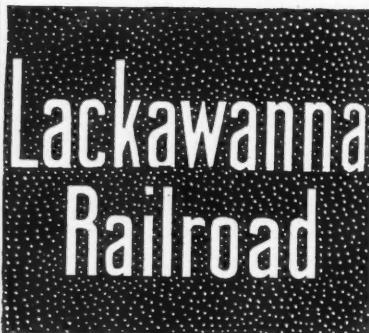
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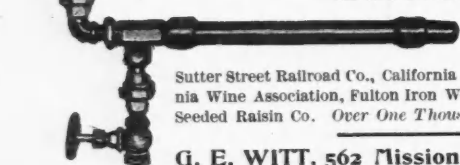
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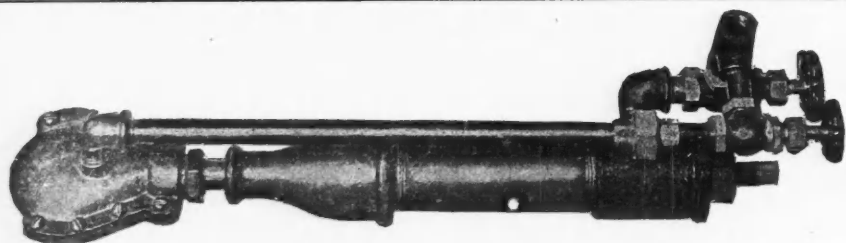
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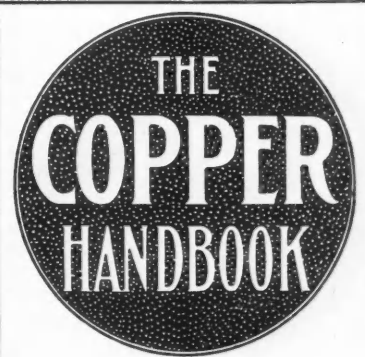
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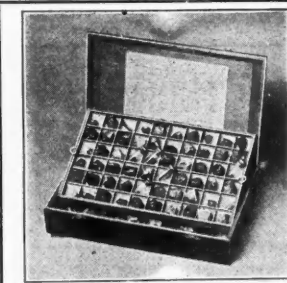
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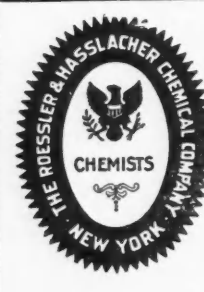
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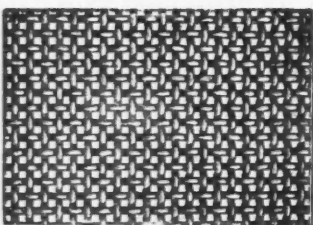
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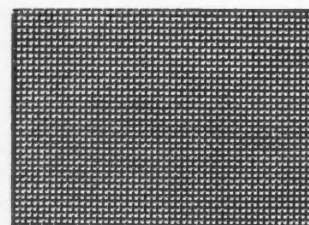


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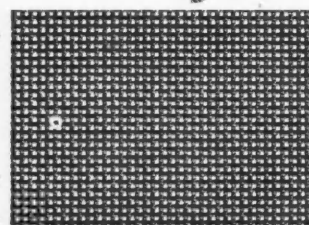
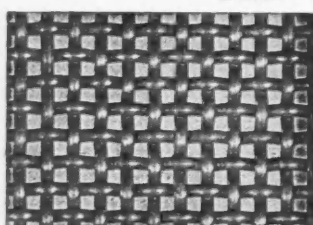
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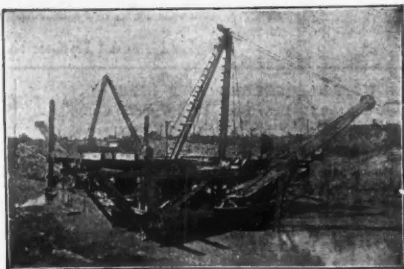
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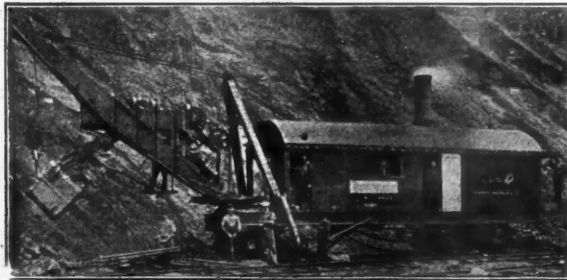
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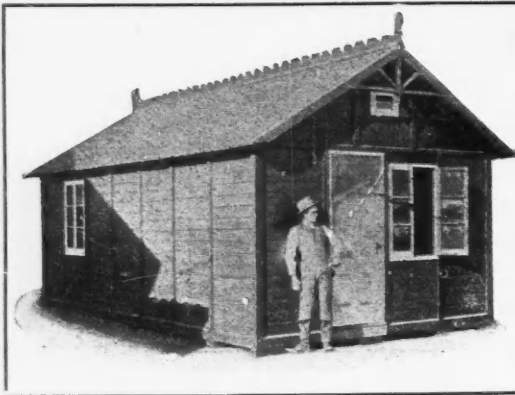
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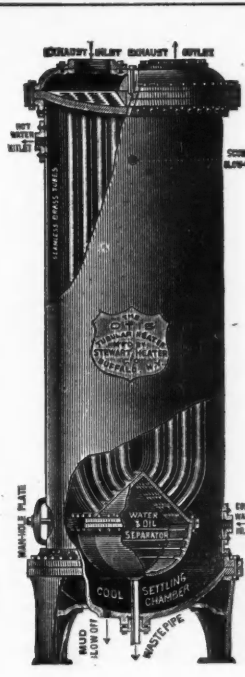
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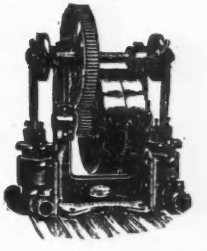


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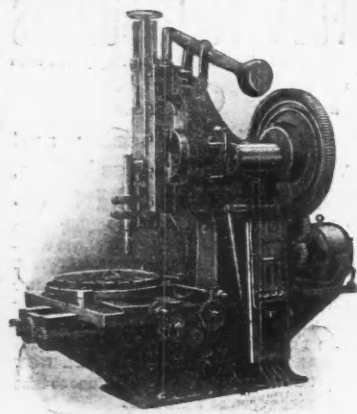
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Besly, C. H., & Co., Chicago, Ill.
Sturtevant Mill Co., Boston, Mass.

ENGINEERS (CHEMICAL). See also pages 58, 59, 40, 41.

Fielding, F. J., New York, N. Y.
Lidner, F. G., New York, N. Y.
McKeena, Chas. F., New York, N. Y.
Simonds & Walnwright, New York, N. Y.

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Whiting Foundry Equipment Co., Harvey, Ill.

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ENGINES (STATIONARY STEAM).

Allis-Chalmers Co., Chicago, Ill.
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 Brownell & Co., Dayton, O.
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 Camp Eng. Co., Chicago, Ill.
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 Colorado Iron Works Co., Denver, Colo.
 Denver Engineering Works Co., Denver, Colo.
 Fairbanks, Morse & Co., Chicago, Ill.
 Fielding, Thos., Denver, Colo.
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 Wickes Bros., Saginaw, Mich.

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FURNACE (ASSAYERS). (See also page 54.)

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 Hoskins & Co., Wm., Chicago, Ill.

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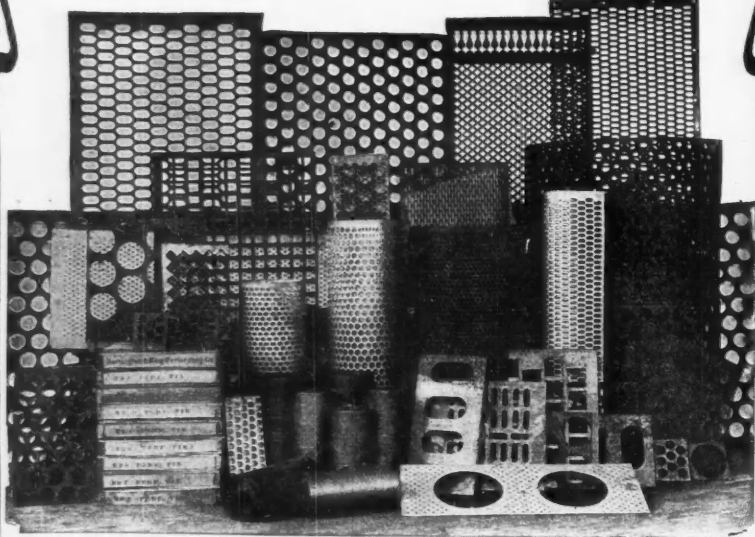
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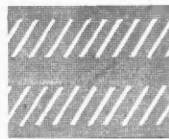
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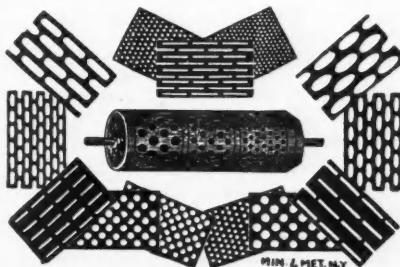
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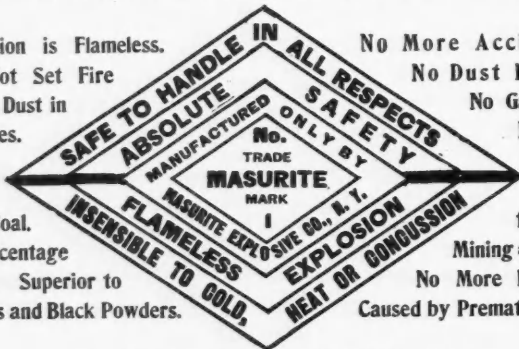
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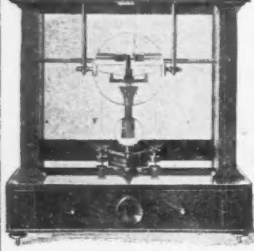
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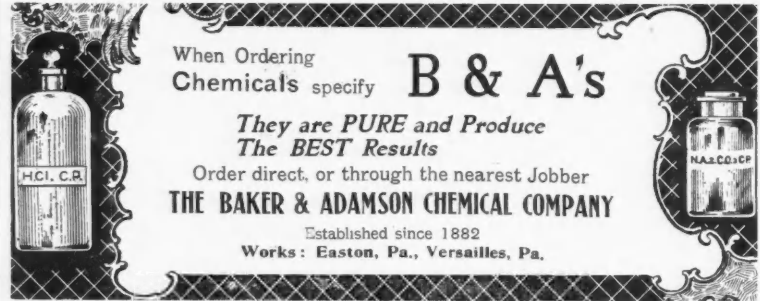


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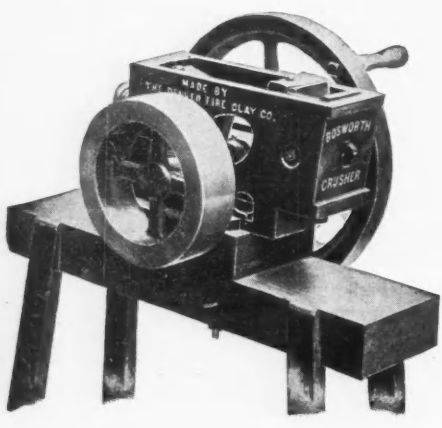

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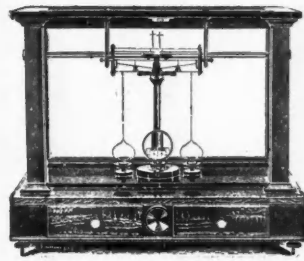


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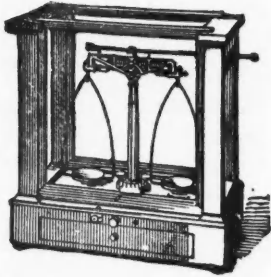
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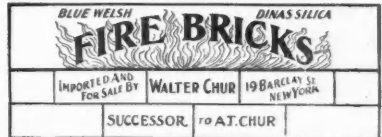
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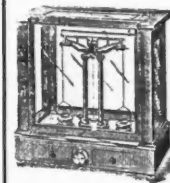
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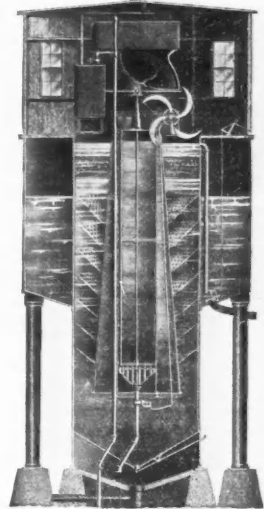
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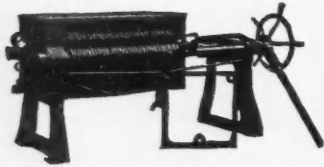


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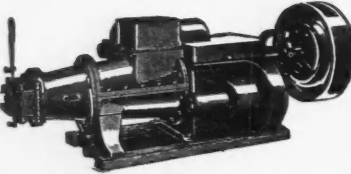
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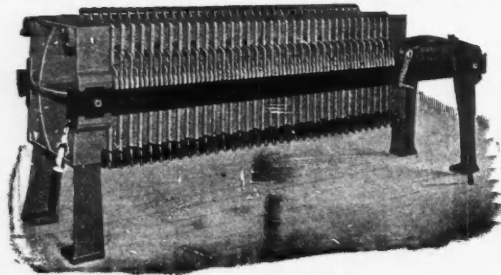


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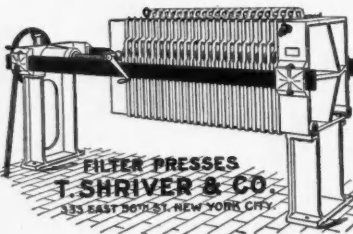
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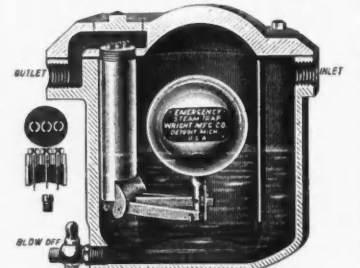
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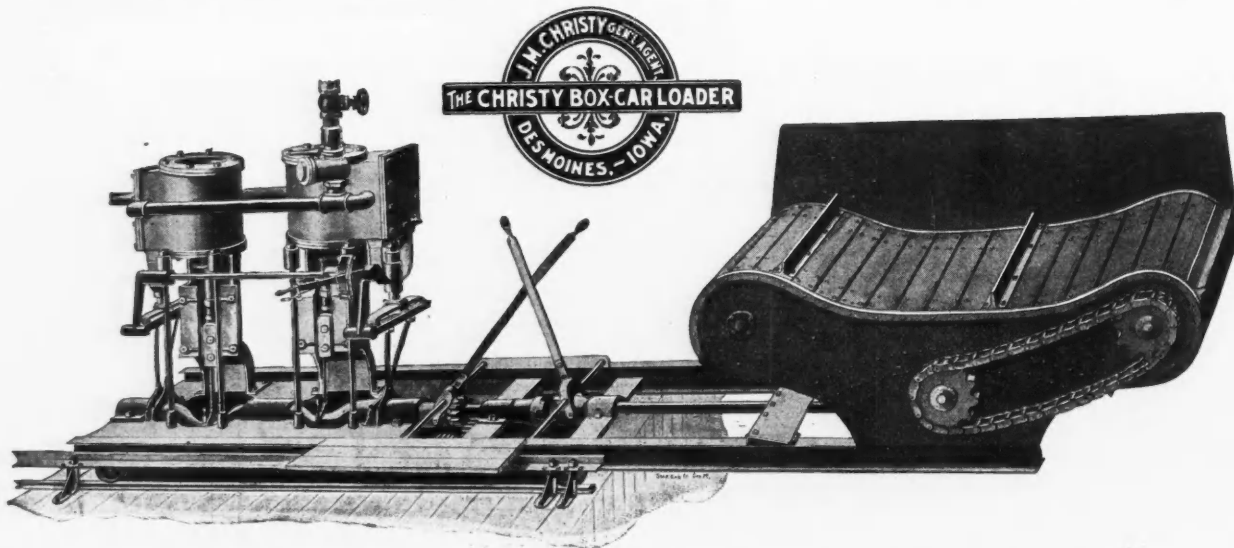
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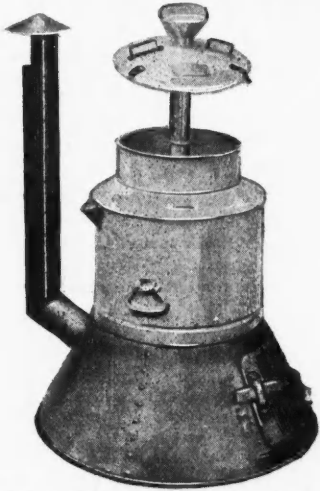
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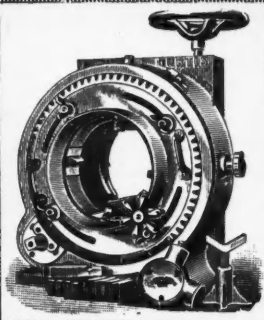
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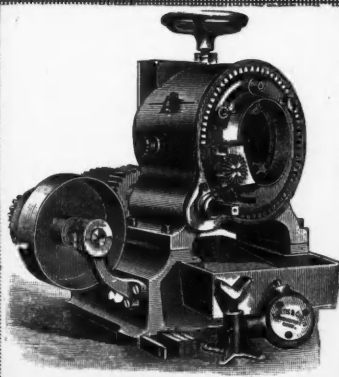
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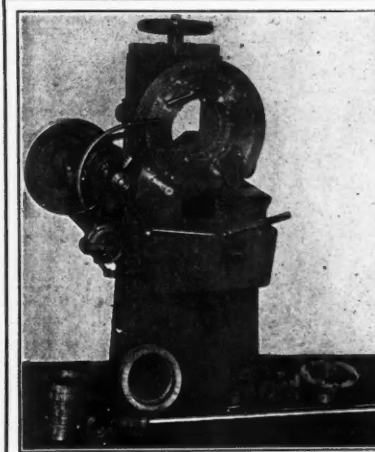
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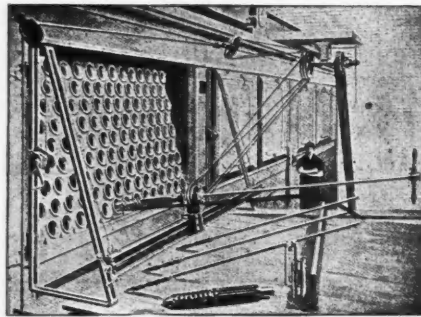
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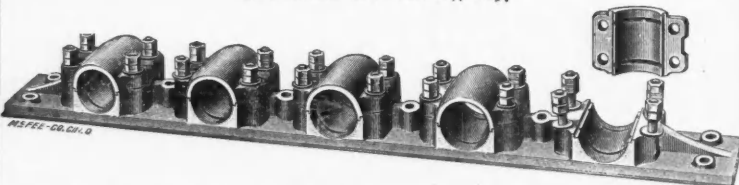
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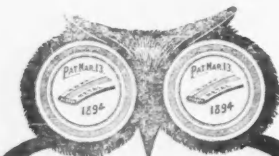
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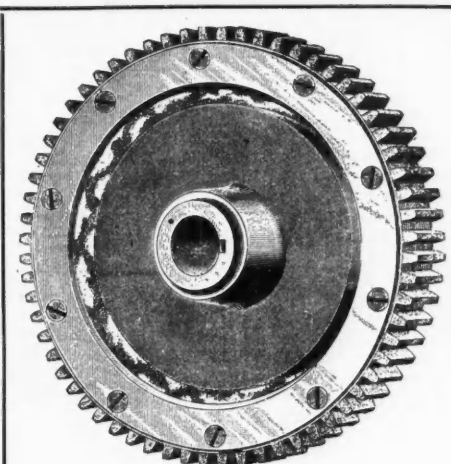
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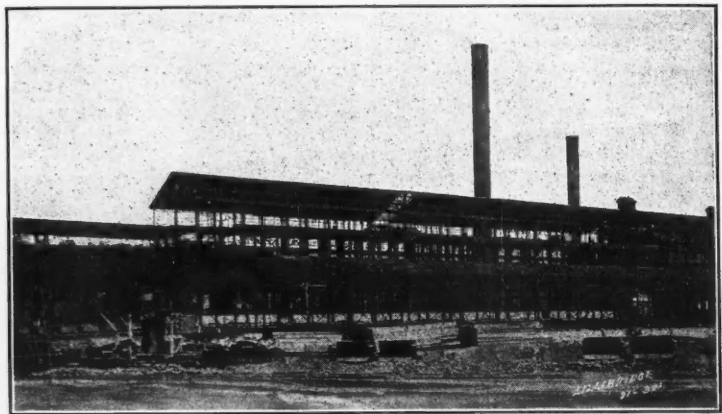
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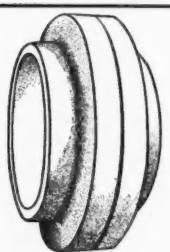
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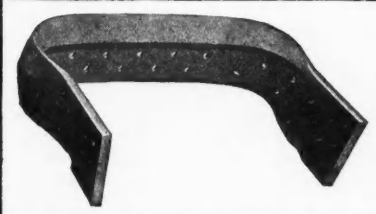
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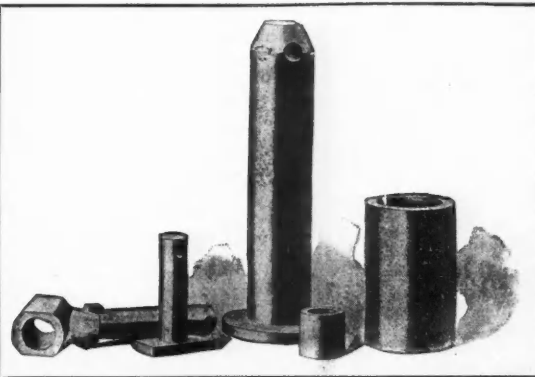
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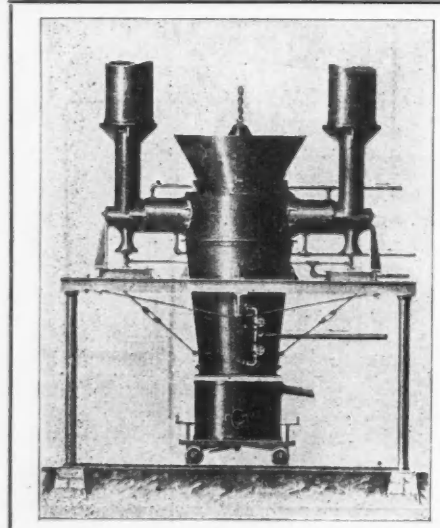
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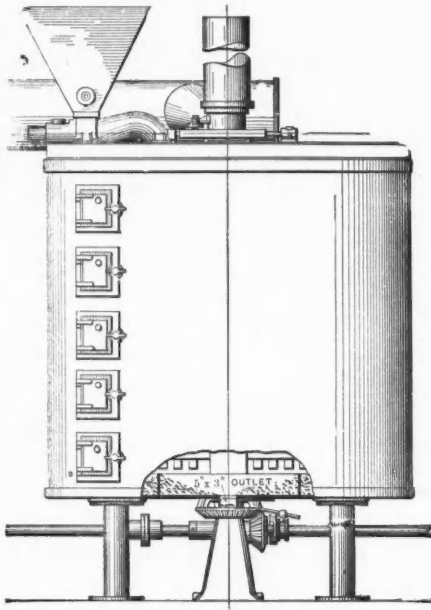
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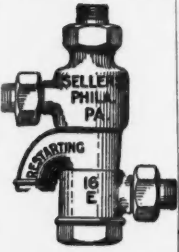
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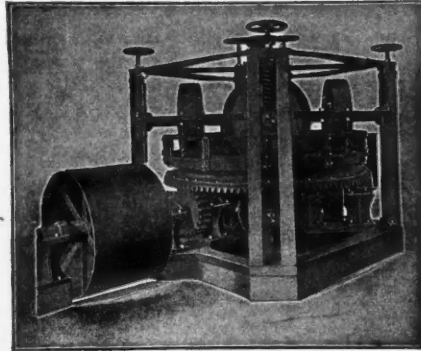
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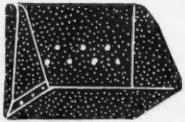
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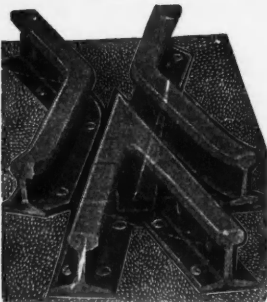
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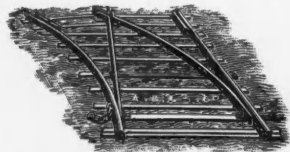
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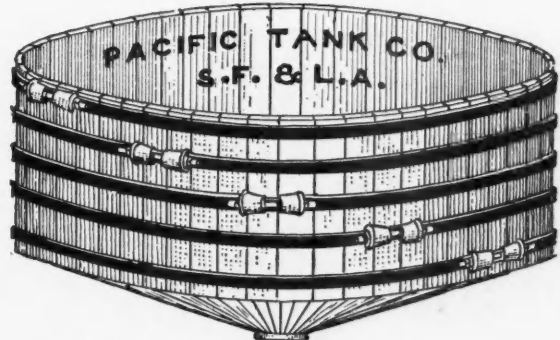
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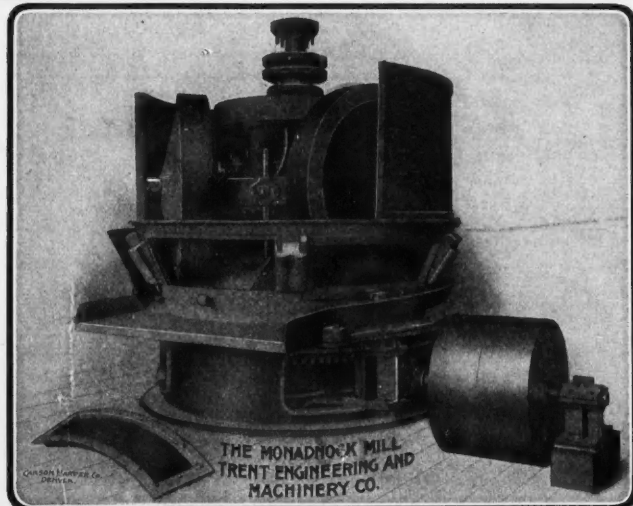
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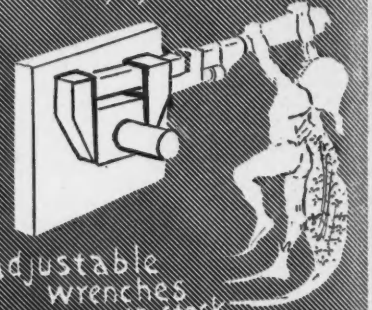


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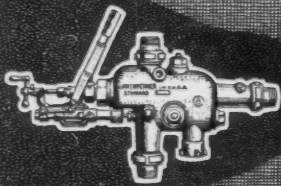
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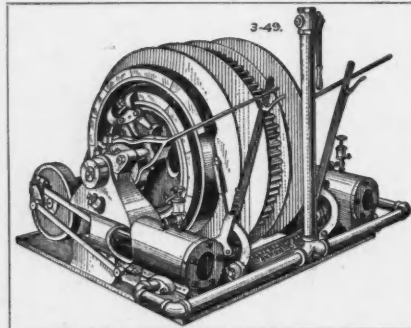


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