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NOTWITHSTANDING the heavy domestic consumption, our exports of mineral products and their manufactures in the 4 months ending April 30 amounted to the large total of \$89,264,636, compared with \$86,340,510 in the corresponding period last year, and showing an increase of \$2,924,126, or a little over 3 per cent. The increase is apparently small and is due to the fact that the total this year has been considerably impaired by the decline in the prices of copper and other leading articles. When this is considered, any increase is significant. Moreover, out mineral exports are growing in importance; last year they amounted to 17.8 per cent of the total for all merchandise, while this year they are equal to 20.4 per cent.

WE HAVE received several letters from correspondents with regard to a communication on the Thunder Mountain District in Idaho, which appeared in our issue of May 24. Some of the writers have failed to observe that the article in question was published, not as our judgment on the district, but simply for what it was—the impressions gained by an engineer in a flying trip to the district. As to the probable value of the Thunder Mountain country, which is now attracting so much attention, there is a great deal to be said. An article on the geology of the region appears on another page of this issue; and we have arranged for further correspondence which will, we believe, enable our readers to form a correct opinion as to the possibilities of the district and its rich developments.

A QUESTION which has not been raised, so far as we are aware, but which seems to deserve some consideration, relates to the patent law which will obtain under the new Transvaal government. As is well known, the courts of the South African Republic held that the MacArthur-Forrest cyanide patents were not valid, and mining companies were freed from the payment of royalties under those patents. But under English law the patents are valid. Will the British decision hold good in the new Crown colony? Will the law of the old government prevail? Or will entirely new regulations be made to govern patent matters? As all the Witwatersrand companies use the cyanide process, this seems to be a point which should be decided at an early date. Of course the law of the old Republic as to mining claims will hold good for all mines located under it; but the continued use of a process is a different matter.

THE POTASH TRUST in Germany has entered into a "community of interest" agreement with the Virginia-Carolina Chemical Company, the big Southern fertilizer combination in America. It will be remembered that some weeks ago certain officials of this concern as well as of the American Agricultural Chemical Company the Northern combination, went to Germany with geological and mining experts ostensibly to arrange for their supply of potash salts. Last year the imports of the potash salts at Atlantic ports alone amounted to 359,260 long tons, which shows a substantial increase over previous years. The value of this product is enormous, and as Germany is the only place where it is produced, the

German Kali Syndicate has the monopoly, and fixes prices accordingly. With the growth of the fertilizer industry in the United States the consumption of potash salts has also increased, and as the Virginia-Carolina and the American Agricultural Chemical companies are the largest buyers, it was but natural that they should desire more favorable terms from the Kali Syndicate. In this, the syndicate did not at first acquiesce, but when the Americans began to buy up or option independent potash properties, the situation changed. Now it is understood that the Virginia-Carolina Chemical Company at least, will receive its supply of potash salts at lower prices, and to bind the agreement the properties which it took up will join the syndicate. It is not unlikely that a similar agreement will be made with the American Agricultural Chemical Company.

CONTRARY TO the fears of many people in the Pennsylvania anthracite region, the miners' strike has been accompanied by little violence and the attempt of the Mine Workers to get out the engineers, firemen and pumpmen has not lead to rioting. Reports from the various districts indicate, as was anticipated by competent observers, that the firemen have paid more attention to the efforts of the Mine Workers than the engineers and pumpmen, and some companies have had a majority of their firemen quit work. This seems to be the case particularly in the Lehigh and Schuylkill regions and may be due to the fact that the eight-hour day is a more important issue there than in the Wyoming and Lackawanna valleys. Throughout the whole anthracite region the pumpmen and engineers have been averse to striking and where they have gone out it is probably only for fear of personal injury of social obloquy. This is partly because engineers and pumpmen, particularly the latter, have easy employment while firemen—at times at least—work hard. In fact, at some collieries where hoisting is steady, two engineers work on a ten-hour shift each an hour at a time, the companies taking this precaution to prevent accidents from inattention. Pumpmen work 12-hour shifts and practically have very little to do but keep awake. Pumpmen and engineers are usually men who have been in the employ of the companies for some time, have families and realize that it will be hard for them to get their positions back if they quit. The firemen have less at stake in striking, and are a class of labor that the companies can pick up at almost any time without trouble.

Reports indicate that some mines are being flooded. As to this, it should be remembered that there are mines nearly worked out that would soon be abandoned anyway, others, for various reasons, are not profitable, and still others have been worked at a loss because of leases which require the mine to be worked until exhausted. Many of these mines will doubtless be allowed to fill for good. As to the really valuable mines that may suffer from the pumps not running, many such were flooded last February and the companies know what to expect if the mines fill again. All the large companies, however, employ many men, clerks, timekeepers, surveyors and others, who have no sympathy with the Union and can be trusted to keep the pumps going

if necessary. Finally, there is no doubt that the chief independent operators and the local superintendents of all the great coal mining concerns are determined not to make any concessions to the Union which would increase its power and enable it to continue interfering with the orderly working of the collieries. As the superintendent of one company has said, "It will be cheaper to have our mines flooded than to get back to the state of things that existed when the 'Molly Maguires' were in control."



MARKET CONDITIONS.

Iron and Steel.—But little that is new can be said of the iron and steel markets this week. Business continues on the same plane of high activity which has been reported for some time past. The only change that can be noted is an increased disposition to contract for supplies of raw material for the first half of 1903. We are informed that the Southern furnaces especially are receiving many inquiries for such supplies and that contracts are beginning to be made. Meantime, there is little or no business possible for early deliveries, and such purchases of that class as are being made are at premiums the amount of which is usually kept private.

In finished materials the pressure just now is for structural steel and there is some complaint about the difficulty of securing deliveries as promptly as they should be made. The Spring reports of crop conditions are generally favorable so far and there seems to be every indication of a continued abundance of money and of activity on construction.

The steel rail manufacturers have agreed—six months earlier than usual—to continue the present basis price of steel rails, \$28 per ton, through 1903. Some large orders have already been placed for next year.

Other Metals.—A slight break in the copper market occurred shortly after the conclusion of our last week's report. It was followed by a recovery, however, and conditions in this market may still be considered good. Consumption in this country continues on a large scale and there is a special demand just now for casting copper from the engine and machine builders, that description of metal being absorbed as fast as it can be supplied.

The demand for tin continues steady and prices are well maintained, although spot supplies are improving somewhat. The question of a future supply of tin is now beginning to meet with serious consideration, since production is not increasing in the same ratio as consumption and new sources of supply are not yet apparent.

Lead continues in good demand at unchanged prices and the consumption of this metal, as of the others, is on a large scale.

Spelter prices continue rather high under the apprehension of a drop in production. Sellers are inclined to hold back, and it is hoped that conditions will soon be adjusted.

Silver has been somewhat firmer, although the increased demand from India has apparently been satisfied for the present. Offerings, however, are not excessive and the market, while rather quiet, is generally firmer than it has been recently.

Coal.—The Western coal markets are in unchanged condition; the railroads are showing some improvement but are not by any means acting up to their promises and the Lake trade is still embarrassed by delays in the arrival of coal at the Lake Erie ports. The demand in the Northwest is pressing and there is much complaint of the present condition of affairs. In Chicago the trade is embarrassed by the

teamsters' strike and there is serious local trouble, the adjustment of which seems to be difficult. In the seaboard bituminous coal trade there is nothing new to report, with the exception of increased demand for coal in Eastern cities, consequent upon short supplies of anthracite. The anthracite trade is, of course, at a standstill and matters depend entirely upon the future course of the strike.

This question is considered in another article.



MAY DIVIDENDS.

Dividend payments by companies identified with the mineral industry of the United States in May were somewhat larger than either April or January, but show a falling off as compared with February or March. It may be stated, however, that only 33 companies paid \$12,614,986 in May. This is the smallest number of concerns reporting in any month this year. A feature has been the declaration of reduced quarterly dividends by the big copper companies. The month's total has, however, been benefited by the payment of \$9,130,497 on the preferred stock of the United States Steel Corporation.

In the five months ending May 31, the dividends reported by 122 companies aggregate \$68,566,699, showing an increase of over \$6,000,000 or 9 per cent as compared with the corresponding period last year. Of this total the gold, silver, lead, copper, zinc and quicksilver properties contributed \$13,753,122, or about 20 per cent, while the balance of \$54,813,577 was reported by the iron and steel, coal and coke, and other industrial corporations, headed by the Standard Oil Company and the United States Steel Corporation.

Supplementing these dividends there were paid during the 5 months dividends amounting to \$556,649 by Mexican mines, lead by the Penoles, which is controlled in Belgium; \$75,000 by a Central American gold and silver mine, owned in New York; while a total of \$717,044 by Canadian properties, in which some American capital is invested.

This shows the large profits of public corporations, while those of private and close concerns are not obtainable although they are understood to be very large.



OUR COAL PRODUCTION.

A preliminary statement issued by the United States Geological Survey shows that the coal mines of this country produced in 1901 an aggregate exceeding 292,000,000 short tons. In its review of the coal trade last year, THE ENGINEERING AND MINING JOURNAL predicted on January 4, that the coal production for 1901 would approximate 300,000,000 short tons, which is within 3 per cent of the tonnage reported to the Survey. Even these figures are subject to revision, as the Survey statement includes actual reports from producers representing only 97 per cent of the total, the output of delinquents having been estimated. These figures are, however, sufficiently close to what the final result will show, to be used as a basis for comparison with our production in previous years and with the statistics of foreign countries, although possibly not accurate enough for final record. The Survey's recently adopted policy of giving promptly to the press the gist of information collected by it (and to be published at some future date dependent upon official delays of diverse natures) is to be highly commended, and adds greatly to the usefulness of the Bureau.

Some interesting facts are brought out by this advance statement of coal production, one of the most significant of which is that while the United States increased her output by over 22,000,000 short tons (equivalent to about 20,000,000 long tons), our chief competitor, Great Britain went backward, according to the Inspectors of Mines, by 6,132,923 long tons, and gave the United States a lead of nearly 42,500,000 long tons. This about reverses the positions occupied in 1887 when the output of the United Kingdom exceeded that of the United States by about 45,000,000 tons. We caught up with Great Britain in 1899, and have in the next two years gained as much over Great Britain as we gained on that country in the preceding 12 years. There is no other country that may be considered a rival of the United States and Great Britain. Germany, who comes third, produced in 1901, 152,628,931 metric tons, or about 55 per cent of the product of this country. Outside of these three no country produced as much as 50,000,000 tons. Our product last year was about one-third of the total world's supply.

In 1868, the first year for which any comparative statistics are available the United States produced less than one-third as much as Great Britain and less than 15 per cent of the total world's production. This percentage has gradually grown until now it is more than double what it was 23 years ago. We have been at the head of the world's coal producers for three years, and the great advance made in 1901 practically establishes our supremacy for many years to come. Moreover, great as have been the records made in 1899, 1900 and 1901, the indications are now that they will be again exceeded when the history for the current year is written.

The anthracite coal trade as a whole was free from labor disturbances in 1901, and the output for the year showed an increase of 9,011,207 long tons or more than 17 per cent over 1900, when the product was curtailed by the miners' strike in September and October. Altogether the conditions in the anthracite region were better than they have been in many years. The average price at the collieries for the coal sold was at an advance of 25 cents per ton over 1900 and reached the highest figure attained since 1888.

Bituminous production increased from 212,513,912 short tons in 1900 to 224,769,091 in 1901, a gain of 12,255,179 short tons or about 6 per cent. The output of bituminous coal has increased annually since 1894, compared with which year the product in 1901 shows a gain of about 90 per cent.

In connection with this statistical statement and with the strike of anthracite coal workers in mind, it may be interesting to draw some comparisons between the records of anthracite and bituminous production in the United States for a series of years. In the first place it may be observed that the production of anthracite coal in 1900 was curtailed by the strike of that year and fell off about 2,700,000 long tons. Compared with 1899 the production of anthracite in 1901 did not show any noteworthy gain, considering the general industrial conditions. The increase in two years amounted to about 6,300,000 long tons. The increase in the production of bituminous coal from 1899 to 1901 was a little over 28,000,000 long tons, equal to nearly 47 per cent of the total anthracite production last year.

Taking the history of coal production for the past 20 years we find that anthracite production has not kept pace with our industrial development. In 1880 we produced 25,580,189 long tons of anthracite and 38,242,641 long tons of bituminous coal. Anthracite in that year represented 40 per cent of the total. The average production of anthracite and

bituminous by five-year periods since then has been in round numbers as follows:

Period.	Anthracite.	Bituminous.	Percentage of anthracite to total.
1881-1885	32,320,000	63,100,000	34
1886-1890	39,240,000	84,300,000	32
1891-1895	47,680,000	112,000,000	30
1896-1901 (6 yrs.)	51,700,000	161,000,000	24

From the above statement it is seen that the percentage of anthracite to the total product has decreased from 40 to 24 per cent. Comparing the production of 1901 with that of 1880 anthracite is shown to have increased about 135 per cent while the bituminous product has increased about 425 per cent.

Various causes have led to this result. One of the most potential of these has been the occurrence of just such disturbances as the one which is now cutting off the supply of hard coal. In every such instance bituminous coal has obtained some advantages which are never overcome. Many manufacturers once driven into the use of soft coal continue to employ it, and anthracite operators see their markets becoming more and more restricted to purely domestic consumption in the Eastern towns and cities. And even here gas and coke, themselves the products of bituminous coal, are daily becoming more formidable competitors. The present strike is in one respect at least only repeating history. Anthracite coal is losing markets now which will not be recovered.

Of course every thing that tends to the restriction of anthracite coal production helps to prolong the life of the fields, and the length of time that anthracite fuel will be used, but this is not one of the benefits for which the miners are supposed to be contending.



COPPER PRODUCTION OF THE WORLD.

We have received the yearly circular of Messrs. Henry R. Merton & Company, of London, giving their estimate of the copper production of the world in 1901. The long experience of this firm and the careful preparation of the figures have made this circular an authority for the countries where official statistics are not obtainable. We give below the estimates of the circular, substituting those collected for the ENGINEERING AND MINING JOURNAL for the United States, and the official statements for Canada. The figures are in long tons, of 2,240 pounds:

	1900.	1901.	Changes.
Austria	865	1,015	I. 150
England	650	600	D. 50
Germany	20,410	21,720	I. 1,310
Hungary	490	320	D. 170
Italy	2,955	3,000	I. 45
Norway	3,935	3,375	D. 560
Russia	8,000	8,000	...
Sweden	450	450	...
Spain and Portugal	52,872	53,621	I. 749
Turkey	520	980	I. 460
Total, Europe	91,147	93,081	I. 1,934
Bolivia	2,100	2,000	D. 100
Chile	25,700	30,000	I. 4,300
Peru	8,220	9,520	I. 1,300
Total, South America	36,020	41,520	I. 5,500
Canada	8,446	18,282	I. 9,836
Mexico	22,050	24,795	I. 2,745
Newfoundland	1,900	2,000	I. 100
Total, North America	32,396	45,077	I. 12,681
Australasia	23,000	30,875	I. 7,875
Japan	27,840	27,475	D. 365
Cape of Good Hope	6,720	6,400	D. 320
Total, outside of U. S.	217,123	244,428	I. 27,305
United States	268,229	270,616	I. 2,387
Total	485,352	515,044	I. 29,692
Total, metric tons	493,118	523,285	I. 30,167

The increase in the total copper production of the world in 1901, as compared with the previous year 29,692 tons, or 6.1 per cent. The increase in the production of the United States was only 2,387 tons, or 0.9 per cent; while that of the rest of the world showed a gain of 27,305 tons, or 12.6 per cent. In

1900 this country furnished 55.3 per cent of the world's supply, while in 1901 the proportion was 52.5 per cent. This again illustrates the point we have heretofore made; that the high prices artificially maintained for a great part of the year stimulated production and exports in other countries, which undersold our producers in foreign markets sufficiently to obtain the trade, leaving a large proportion of our copper in stock.

The important increases shown in production last year were those of 17 per cent in Chile; of 16 per cent in Peru; of 34 per cent in Australasia; of 13 per cent in Mexico; and of 116 per cent in Canada. There were no large decreases anywhere, and most of the changes outside of those mentioned above were not important.

No new producing countries appear in the list this year, and no old producers have dropped out. Spain remains the largest producer next to the United States, though its total was only about one-fifth of our own. Chile probably reached nearly its possible maximum last year. The growing producers are Peru, Australasia, Canada and Mexico; especially the last named country, whose future as a copper producer is only just beginning to be appreciated. In fact, the estimate given for Mexico is a very conservative one, and we believe that the figures for 1902 will show a much larger gain. The large production of Canada in 1901 was chiefly from the British Columbia mines, to which a great deal of attention has been given in our columns during the past year; and from them further gains are to be expected.

The increase in the world's copper production in the five years 1897-1901 has been 111,197 metric tons, or 28 per cent; so that the total gain in 1901 was quite up to the average of those years, notwithstanding the comparatively small increase in the United States. The drop in European consumption last year, though considerable, was less than we had been led to estimate from our own diminished exports; and this loss is being made up by a marked gain in the present year. With the great consumption now manifest in this country, we look for a demand this year very nearly up to the probable production.



PEACE IN SOUTH AFRICA.

The declaration of peace and the end of the war in South Africa, which we record with much pleasure this week, cannot fail to have its effect on the great gold mining industry of the Transvaal. It establishes beyond doubt the restoration of its former extent, and the removal of some conditions unfavorable to its growth.

For the present, of course, the improvement will be slow. The reduction of the military forces in the field will take time, and the control of transportation facilities by the army can only be gradually withdrawn. Probably at least a year will pass before the full resumption of work will be possible. The peace, however, makes that resumption certain and removes the possibility of further complications.

We have a special commercial interest in this peace and the resulting impetus to the mining revival, since there is a fair opportunity for our manufacturers to supply a part of the new machinery that will be needed in the Transvaal mines. Already there is much American machinery there, while American engineers have a prominent part in directing the mine operations.

To enable our readers to realize how great an industry has been affected by the long conflict, a recapitulation of the facts will be of interest; and this can be given from thoroughly reliable data, and without going into the causes of the war.

In 1898, the last full year of operation, the mines in operation in the Transvaal—according to the figures given in Mr. John Hays Hammond's paper read before the American Institute of Mining Engineers—delivered to the mills 7,331,446 tons of ore. This ore was crushed by 4,765 stamps and the gold obtained was valued at \$75,706,880; and of this return a total of \$24,237,525, or 32 per cent., was paid in dividends. In 1899 the output was expected to reach a value of \$100,000,000; and doubtless would have done so, had not the war put a stop to all operations in October, the preliminary agitation having served also to impede operations and lessen production for two or three months before the actual outbreak of hostilities.

In the same year, 1898, the number of white employees at the mines was 9,476, receiving an average compensation of \$130 monthly; while there were 88,627 negroes at work, whose average pay was \$11.94 per month. The average value per ton of ore milled—again according to Mr. Hammond—was \$9.90; the cost of production—counting as such all the earnings not paid as dividends—was \$6.74; and the dividends \$3.16. We give these figures to show the importance of the gold mining industry which was interrupted by the contest which is now closed.

The year 1899, in which there was a gold production amounting to \$71,365,000, is omitted because it was, as already noted, a broken year, in which abnormal conditions interfered with production, costs and dividends. In 1900 there was a small production of somewhat uncertain amount, from a few mines which were worked by the Government of the South African Republic for its own benefit. This ceased when Johannesburg was captured by the British forces, and the mines were idle until May, 1901, when two or three were permitted to start up in a small way. The output that month was only 7,478 ounces; it has gradually increased from month to month, as more mines were permitted to start, until in April of the present year it reached 119,588 ounces of gold, or about one-fourth of the monthly product immediately before the war. The total for the year thus covered has been 614,451 ounces, or \$12,700,702—a trifling amount compared with what it might have been.

So much for the past. As to the future, it will doubtless take, as we have said above, a year before operations can be fully resumed, possibly more. We may then look for a steady increase in production as the new deep level mines are extended and others opened. No gold mining district in the world has its limits and possibilities so clearly defined as the Witwatersrand. The limit of its production will be found in the depth to which mining operations can be profitably conducted. The yearly production may and probably will rise to \$150,000,000. Whether that will be the maximum is to be determined by the future; as is also the probable life of the mines, as to which authorities differ, though only by a few years.

The immediate hope of the companies which have so great an amount of money invested is in a reduction of costs under the new colonial government. Again, taking Mr. Hammond's figures, we find that expenses in 1898 were divided on an average as follows: White labor, 31.22 per cent; native labor (including food), 29.83 per cent; explosives (dynamite, fuse, caps), 9.70 per cent; coal, 9.07 per cent; chemicals (cyanides, etc.), 3.22 per cent; tools, steel, shoes, dies, etc., 3.29 per cent; mining timbers, lumber, 4.05 per cent; candles, lighting, 1.38 per cent; sundries, 8.24 per cent; total, 100 per cent.

The items in which reduction is expected are in white labor, owing to a greater supply; in native la-

bor, owing to better regulation and suppression of liquor traffic; in explosives, from the abolition of the dynamite monopoly; in coal owing to lower railroad rates and better facilities for delivery at the mines; and in lower prices of supplies, labor, explosives, and coal are the more important. An honest administration of the law and the absence of exactions by corrupt officials may also be taken into account.

On the other hand, there is a possibility of increased taxation in some form, but it is not believed that any considerable part of the burden of the war can be imposed upon the new colony. At least that is the opinion of many who are interested; though we are inclined to believe that the British public will have strong objections to make if the mining interest, which will be chiefly benefited by the results of the war, is not called upon to aid in carrying its cost.

In all this we have considered only the mines themselves. The effect on the London exchanges will doubtless be to stimulate speculation for a time; though it is quite possible that the effect of peace has already been largely discounted there. The cessation of the war expenses and the prospect of increased gold supplies cannot fail to have a beneficial effect on trade.



THE ANTHRACITE STRIKE.

IN SUCH a situation as that of the present strike in the anthracite regions, the public mind is sure to be bewildered by conflicting accounts of the issues involved. The leaders of the labor unions, in pursuance of their frankly avowed ethical code, consider their relations to be those of war, and do not hesitate to suppress or allege, deny or exaggerate, in accordance with what they conceive to be the military exigency of the moment. Those newspapers which thrive upon sensational appeals to "the masses," naturally take sides against "capital," whatever the merits of the case; the sentimental philanthropists, especially those of the religious press, attempt a calm and candid treatment of the controversy, based upon total ignorance of the essential facts, modified by the notion that, when one party asserts a thing, and the other party denies it, the truth must lie somewhere between them. Sometimes such organs of philanthropy go so far as to send "special commissioners" (formerly called reporters) to the scene of trouble, to obtain "on the spot" the statements of both sides, and draw their own benevolent conclusions, as to both the facts and the merits of the controversy. Unfortunately these bearers of the oil of peace generally manage to pour it on the fire. Personal virtue and excellent intentions do not supply the lack of knowledge, and, of all the misleading influences brought to bear upon the public, these well-meaning utterances of the kindly kindergarten are perhaps the most mischievous; for they appear to the general reader with the authority of a high, disinterested attitude just when (as now) the public, called to pay the expense of the quarrel, naturally wants one or the other party to surrender at once, and, being informed by its ethical teachers that there is nothing at stake but pique or prejudice—that liberty, justice and the permanent order and welfare of society are not at all involved—take sides against the party which, it thinks, could most easily "make concessions," and, with unreasonable obstinacy, refuses to do so. It is so easy to insist that another shall make sacrifices for our immediate benefit, and so hard to perceive that in standing firm for justice and liberty, even at our cost as well as his own, another may be truly serving us, by doing as we ought to do, if circumstances made us responsible for such a duty to the community.

Of course at this moment, almost everybody cares to know which party will win, rather than which ought to win, and what would be the ultimate effect of the victory. To this burning question of the hour, I have little to contribute. But there are some other questions, not burning, but smoldering under the flame, which are, perhaps, more permanently important. For instance:

1. Who started this strike at this time, and why? Was the majority vote in its favor a fair expression of the feeling of the mine-workers themselves? If not, by what manipulation, and in whose interest, was it secured?

2. The operators have furnished no detailed and authorized statement of their position and the grounds of their action. Why not?

3. They do say this, that the situation in the anthracite districts has become intolerable; that the real issue is that of the control and management of their property; and that they cannot make a single so-called "concession" to the organized power which contemplates, and has already partially established, a reckless tyranny over them. What do they mean? What are the already intolerable conditions? What are the real purposes, apart from the immediate pretexts, of this attack upon the industry they represent?

4. Is the action of the Union in ordering a strike of unwilling engineers and pumpmen simply unwise, or also wicked? Would the flooding a colliery, thus caused, permanently destroy national resources, as well as private property? Are there in the anthracite region any individual operators, holding their collieries under leases which bind them to go on until they have worked out all the coal; who find mining unprofitable under present conditions; and who will gladly submit to a destruction for which they can disclaim responsibility, and which will enable them, as innocent victims of the strike (practically classed by the human legislation of our times with earthquakes and floods, as an "act of God") to escape their legal obligations?

5. The history of the past 50 years shows that bituminous coal is the commercial rival of anthracite; and that every struggle between the two has resulted in the occupation by the former of territory which the latter has never recovered. Is it wise for the anthracite miners to risk the industry by which they live by placing it under the control of an organization dominated and officered by the rival industry? Was the hope held out to the anthracite miners, a fortnight ago, that the bituminous coal miner would strike, to aid their strike? Is it now declared that it would be "unwise" to do this? If this later declaration foreshadows the event, will the anthracite miners have been betrayed, or not?

6. For more than 30 years, an earnest and persistent attempt has been prosecuted to diminish the reckless and irreparable waste in the mining and preparation of anthracite coal. The subject was brought up by the late Mr. Rothwell at the very first meeting of the American Institute of Mining Engineers, at Wilkes-Barre, in 1871, and the *Transactions* of the Institute contain many discussions of it, and records of progress in the investigation and reform of the evil. Great engineers have given much thought to the problem. The State of Pennsylvania has had it studied by a commission of eminent experts. Many of the causes of waste have been eliminated or reduced in effect. But one important cause of such waste has been indirectly championed by the miners' unions, namely, the production in mining of an undue amount of fine coal dust by the excessive use of explosives. Have the present demands of the "mine-workers" any bearing upon this question? Are they insisting upon the liberty to use as much powder as they choose, and be paid for the coal they

destroy? If so, is the question simply one of daily gain to the miner, or of extra cost of marketable coal to the operator, or is it also one of permanent injury to the State of Pennsylvania and the United States of America? This country, no doubt, has coal enough, but its supplies of anthracite are not unlimited; and any deliberate waste of them is a matter worthy of some attention, even from philanthropists.

7. Have the miners of the anthracite districts any special hardships or grounds of just complaint? Mr. Mitchell is reported as saying that he thinks the system of labor and payment in the bituminous regions is preferable. Do the anthracite miners agree with him? Who is responsible for their present system? Who is responsible for irregularity in their employment? Have they kept, for the last year, their promise to abstain from strikes? Would they undertake to work, the year round, eight hours a day, at any given rate of wages,—and if they did, would they keep that promise? Do they now present to those who are invited to "recognize" their organization, any security whatever for the performance of a contract? Will they put up a money guaranty? Will they become incorporated, so that their union can be sued for breaches of contract?

8. Is Mr. Mitchell running this affair, or only running ahead of it, so as to preserve the appearance of leadership, after the power has been lost? So far as can be ascertained, he has personally disapproved of every important measure which he has officially ordered. Is he anything more than a chip before a hurricane? And are his official declarations backed by his estimable personal character, or not?

Upon all the questions stated above, I could say much, from personal knowledge or direct information; and some, at least, among them (not necessarily in the order in which they have been mentioned here) I hope to find time to discuss at an early day. They can wait a week or two. Whatever comes of the present struggle, they will still be worth consideration. Meanwhile, I would call attention to the curious circumstances that a large proportion of these questions has been overlooked entirely by the amateur instructors of the public, in connection with this subject.

R. W. RAYMOND.



ARSENIC.—Among the new industries that have been recently developed in the United States is the manufacture of arsenious oxide, says Dr. Joseph Struthers in *Mineral Resources* of the United States, 1901, Geological Survey, David T. Day Chief of Division. This manufacture was taken up during 1901 by the Puget Sound Reduction Company, at Seattle, Washington, and an output of 300 short tons was placed on the market. Previous to 1901 the world's supply of arsenic and arsenious compounds was derived chiefly from the mines in Cornwall and Devon, England, and at Freiberg, Germany, though recently a considerable quantity has come from Deloro in Canada. The imports of arsenic into the United States during the last five years have averaged about \$340,000 per annum, which seems to show that the exploitation and manufacture of arsenic and its compounds in this country could be profitably developed.

ALUMINUM.—The production of aluminum in the United States during 1901 amounted to 7,150,000 pounds. The Pittsburg Reduction Company, operating the Hall patents, remains still the sole producer of aluminum in this country. The price of aluminum per pound remained practically stationary throughout the year, although the demand for the metal increased. The total imports of all forms of aluminum in 1901 were valued at \$109,748, as compared with \$50,444 in 1900.

THE 50,000-VOLT TRANSMISSION PLANT OF THE MISSOURI RIVER POWER COMPANY.

By W. G. McCONNOR.

Recent remarkable developments in electrical power transmission over long distances in the attendant use of higher voltages are attracting much interest in engineering circles. Although several plants have been proposed for the use of voltages higher than 40,000, the distinction of being the first to place in actual commercial service a large plant employing 50,000 volts transmission belongs to the Missouri River Power Company. This installation was completed, and the apparatus placed in operation about the first of March, and much credit is due to the general manager and engineer of the company, Mr. M. H. Gerry, Jr., who planned and executed the general undertakings, as well as to the Westinghouse Electric and Manufacturing Company, who furnished the electrical equipment.

It is to be noted that since the starting of the plant, there has been no mishap of any kind to the line of apparatus. This, the writer believes, is somewhat exceptional in undertakings of this magnitude and character, since it is generally expected that at the start minor difficulties are to be encountered, which, though possibly not serious, will nevertheless affect the continuous service of the plant.

The present power house of the Missouri River Power Company is located on the Missouri River, about 20 miles almost directly east of Helena, Mont. To those who are familiar with the early history of the Northwest, it will be recalled that, in the famous Lewis & Clarke expedition of 1803-4 up the Missouri River and across the continent to the Pacific, one of the resting-places and points of interest spoken of is Black Rock Cañon, reached soon after entering the Rockies at the "Mouth of the Mountains," some miles to the east. At the mouth of the cañon, which is no longer known by the name of Black Rock, lies the present little town of Cañon

the entrance of the cañon, in which to hold at all times a large volume of water in reserve. At the upper end of the cañon the water spreads out over this valley, forming a lake about 7 miles long by 2 to 3 miles wide. The cañon by which the water comes to the power house is from 400 feet to 700 feet wide, and less than one-half mile long. The water in it does not freeze over in winter, and although the lake above freezes over, water flows to the power house as free from ice in winter as in summer. The amount of water in the river at this

spectively. At Helena, the current was used, after transformation to 2,200 volts, for driving induction motors direct-connected to arc light machines supplying city lights, and for distribution for general incandescent lighting. Two rotary converters furnishing current to the street car system of the city were also supplied. At East Helena the current was used mostly for driving induction motors in the large smelter located there, and for general lighting about the works. One line from Cañon Ferry also furnished power and lights to a large ore concen-

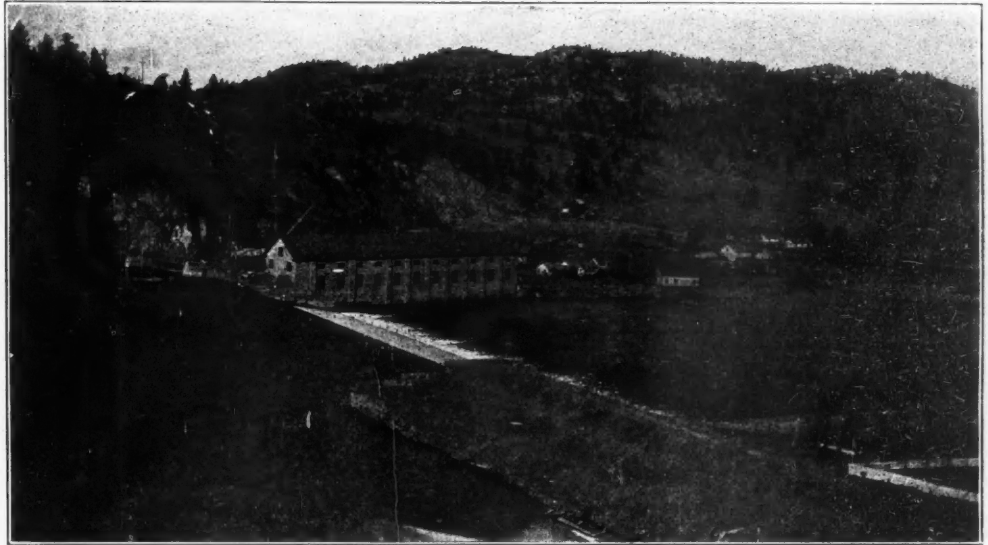


FIG. 1. POWER-HOUSE AND DAM AT CAÑON FERRY.

point is considered sufficient to develop 10,000 horse power the year around.

The project for a power plant at Cañon Ferry was first started about 10 years ago. The men who

trator known as the Peck concentrator, located between Helena and East Helena. The line between Cañon Ferry and Helena consists of but one pole line, carrying, however, four independent circuits, one to East Helena, one to the Peck concentrator, and two to Helena, one of the latter for lighting, and the other for railway work.

In the fall of 1900, work was begun at Cañon Ferry with a view to making considerable extension of the company's plant, the proposition being to enlarge the plant to a capacity of 10,000 horse power by putting in additional generators, with exciters, transformers, etc., and to extend the service to Butte, Mont., where it was expected that all the power the company might furnish could be sold. To this end the company has installed six additional 750-kilowatt Westinghouse generators, with the necessary transformers, exciters, etc. These generators are of the same size and voltage as the first four, but are three-phase instead of two-phase. The water-wheels are 45-inch horizontal McCormack wheels furnished by S. Morgan Smith, of York, Pa.

All generators in the power house are direct-connected to the wheels, flexible couplings being used throughout. With the new generators there was also installed a 225-kilowatt, 150-volt exciter driven by a separate wheel, and a 115-kilowatt, 150-volt exciter driven by an induction motor. To sum up, the power plant now consists of ten 750-kilowatt direct-connected generators, with four exciters, of which two are 90-kilowatt machines direct connected to separate wheels, one a 225-kilowatt machine with a separate wheel, and one 115-kilowatt motor-driven generator. To make the plant uniform throughout, the four old generators have been overhauled and changed from two-phase to three-phase. Fig. 2 shows the row of generators, those in the foreground being new ones and the last four being old machines. The general plan of the station is shown by the outline sketch, Fig. 4, the switchboard gallery being on the right and directly over the water-wheels. Each water-wheel has its own governor; all the new and one of the old wheels having Lombard governors, and the remaining old wheels Replogle governors.

The switchboard gallery shown on the right of Fig. 2 extends the whole length of the building, and, besides carrying the switchboards, carries also twelve 550 to 10,000 volt, oil-cooled transformers for

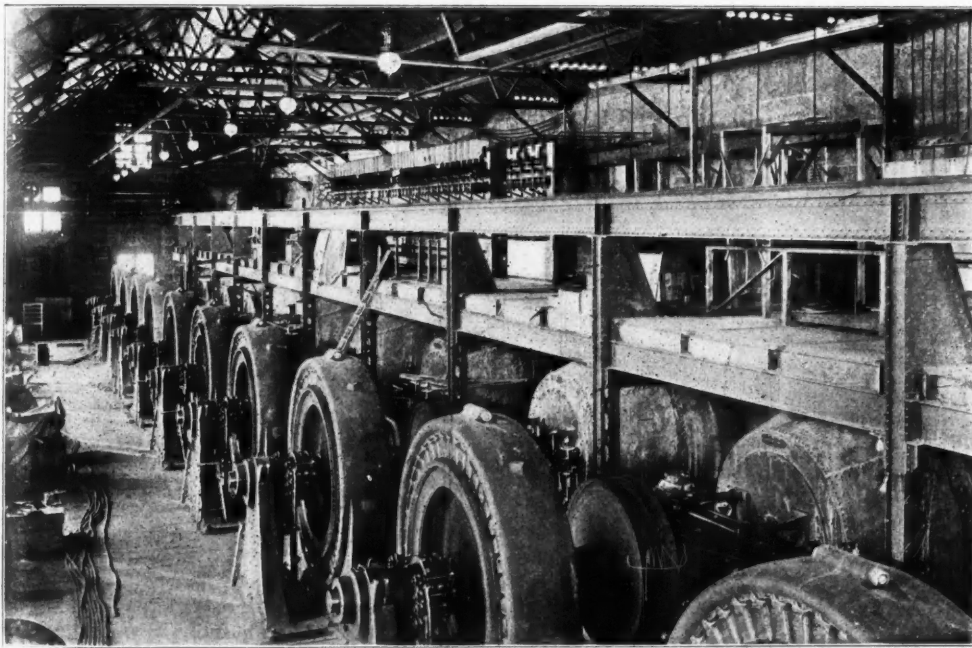


FIG. 2. INSIDE OF POWER-HOUSE AT CAÑON FERRY.

Ferry, and the power house of the Missouri River Power Company. A general view of the power house is given in Fig. 1, which shows a country not as rough as some parts of the Rocky Mountain district, but by no means level. The district immediate about Cañon Ferry has been one of the famous gold mining camps of the West, the discovery of gold having been made here in 1863. Placer mining is the more common way in which mining has been carried on, and it can be seen to-day to a limited extent within a mile or so of the power house.

A dam about 480 feet in length and designed to give a 30-foot head of water has been thrown across the river at the mouth of the cañon. The location of the dam at Cañon Ferry enabled the company to take advantage of a low lying valley just above

probably have taken a more continuous and extended interest in the proposition are Mr. Barton Sewell, of New York City, and Ex-Governor Hauser, one of the pioneers of Montana, and more thoroughly identified, probably, than any other living man, with her history and interests. About four years ago, the decision to carry out the work at Cañon Ferry took definite shape, and work was started on a plant of 4,000 horse power. This plant consisted of four 750 kilowatt, 550 volt, two-phase Westinghouse generators, driven by Dayton Globe Iron Works' water-wheels, with two 90-kilowatt exciters driven by independent wheels. The current from these generators was raised by eight oil-cooled transformers from 550 volts to 10,000 volts, and sent to Helena and East Helena, 20 miles and 14 miles away, re-

the Helena and East Helena service, as well as a plug board for connecting these circuits as needed under various conditions. The offices of the company will be located on the floor extending across the building at the end from which the view is taken.

The main switchboard and exciter switchboard are both relatively simple boards in design, but massive and substantial in construction. The main board is 47 feet 4 inches long, and consists of 17 panels of blue Vermont marble, 2 inches thick. The weight of the board complete is about 20 tons, the copper alone being one-half of this weight. The general arrangement is as follows:

The first five panels at each end are generator panels. The next two panels are feeder panels, and are intended for use with the 550 to 10,000 volt transformers. The eighth panel from the end on each side supplies a bank of transformers, 550 to 50,000 volts, for the Butte lines. The middle panel is a junction panel, so that any set of bus-bars on the two ends of the boards can be thrown together, there being three sets of bus-bars on each end of a board. The instrument mounted on the board consists of 8 750-volt, A. C. voltmeters, one for each set of buses and one at each end for the machines, independently of the buses; 10 direct-current field ammeters; 28 A. C. ammeters, with 16 indicating polyphase wattmeters, and 6 recording polyphase wattmeters. The recording wattmeters are behind the board. The exciter board consists of four panels of blue Vermont marble, similar to the main board, one for each exciter, with two sets of bus-bars. All field rheostats are mounted under the gallery floor and are controlled by hand-wheels, the shafts of which come up through pedestals in front of the boards.

The feature of distinguishing the Missouri River Power Company's plant from all other transmission plants is the high voltage employed on its new lines to Butte. This is 50,000 volts, which is higher than is in use commercially on any other plant at the present time. The distance by pole line from Cañon Ferry to the Butte substation is 65 miles, the route corresponding nearly with that taken by the Great Northern Railroad between East Helena and Butte. The line starts out at an altitude of about 4,000 feet above sea-level at Cañon Ferry and gradually rises until it reaches an altitude of 7,300 feet, where it passes over the Great Divide a few miles east of Butte.

The line itself consists of two lines of poles about 50 feet apart, the cables being arranged in an equilateral triangle, with a spacing of 78 inches between centers. Each line consists of three seven-strand copper cables, each cable having a cross section of slightly over .106 c.m. These cables are transposed five times between Cañon Ferry and Butte. The average distance apart of the poles is 110 feet. It has been found, after making exhaustive tests, that a thoroughly dry oak pin of the length used in this installation boiled in paraffin will readily hold up alone under 50,000 volts. A glass sleeve below the insulator is used to keep as great a length as possible of the pin dry under all conditions of weather.

The transformers at each end of the line consist of six 950-kilowatt oil-insulated transformers with water-cooling coils in the cases. Those at Cañon Ferry transform from 550 to 50,000 volts, and at Butte, the step-down transformer is made from 50,000 to 2,200 volts. The secondary circuits at Butte consist of 600,000 c.m. bare copper cable.

All electrical apparatus in this plant was furnished by the Westinghouse Electric and Manufacturing Company, of Pittsburg.

The customers of the Missouri River Power Company at present number nine, as follows: At Helena and East Helena: Helena Power & Light Company; Helena & Livingston Smelting and Reduction Company; American Smelting & Refining Company; Big Indian Mining Company.

At Butte: Anaconda Copper Company; Butte & Boston Copper Company; Colorado Smelting & Mining Company; Boston & Montana Copper Mining Company; Washoe Copper Company.

The general offices of the company are at Helena, Montana, and the New York office is at 71 Broadway. The officers of the Missouri River Power Company are President, Barton Sewell; vice-president, W. S. Gurner, Jr.; secretary and treasurer, H. Suhr; general manager and chief engineer, M. H. Gerry, Jr.

COAL PRODUCTION IN 1901.

According to returns to the U. S. Geological Survey from producers representing fully 97 per cent. of the entire coal output of the United States, the production in 1901 amounted to 292,240,758 short tons valued at \$348,813,831. As compared with 1900, when the output amounted to 269,881,827 short tons, worth \$306,891,364, this represents an increase of 22,358,931

1899 of 6,297,913 long tons, and except for the strike of 1900, would have shown an increase over that year of 4,500,000 long tons, or about half the actual increase made.

The increase in the value of the anthracite product is still more striking, the amount received at the mines last year showing a gain of \$27,746,169, or more than 31 per cent over that of 1900. This was entirely due to the unprecedented period of prosperity which enabled consumers generally to pay higher prices for their fuel. The average price for the marketed anthracite coal—that is, the product shipped to market or sold to local trade, and exclusive of the colliery consumption which amounted to about 10 per cent of the total—was \$2.05, the highest figure obtained since 1888.

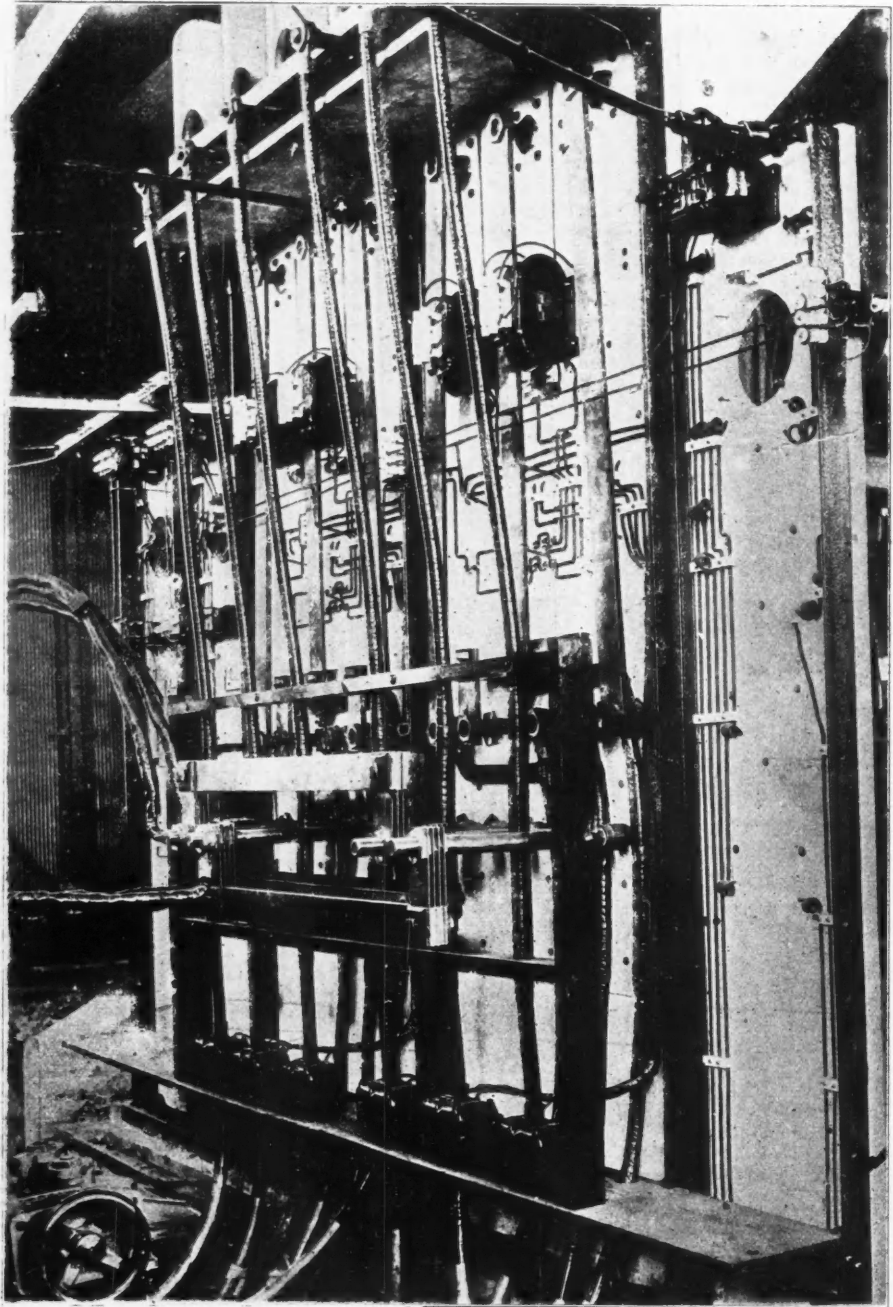


FIG. 3. METHOD USED IN LEAVING OUTSIDE OF BUILDING BY HIGH-TENSION LINES. LONG GLASS TUBES PROTECTED AS SHOWN.

short tons or 8 per cent in quantity, and of \$41,922,467 or 13.6 per cent in value. The production of Pennsylvania anthracite showed a phenomenal increase from 51,221,353 long tons (equivalent to 57,367,915 short tons) in 1900 to 60,242,560 long tons or 67,471,667 short tons in 1901. This represented a gain of 17½ per cent, the largest percentage of gain made by the anthracite trade in 20 years. Part of this increase in 1901 was due to a decreased output of anthracite in 1900 as compared with 1899, as owing to the historic strike of 1900 the output that year was reduced by over 2,500,000 long tons. The production last year shows an increase over

The production of bituminous coal, lignite, cannel coal, etc., including a small amount of anthracite from Colorado and New Mexico increased from 212,513,912 short tons in 1900 to 224,769,091 short tons in 1901, indicating a gain of 12,255,179 tons or about 6 per cent. The value of this product amounted to \$236,309,811 as compared with \$221,133,513 in 1900, an increase of \$15,176,298, or a little less than 7 per cent. The price of the bituminous product did not show any material advance in 1901, the average being about 0.8 cent higher than in 1900.

Of the 27 States producing coal in 1901, all but

four showed increased production. The four whose product decreased were California, Montana, New Mexico and Tennessee. The production by States is shown in the following table:

Coal Production of the United States in 1901.

Bituminous.	Total Product.	Total Value.
Alabama	9,078,677	\$9,987,811
Arkansas	1,784,136	2,033,193
California	151,079	394,106
Colorado	5,999,016	6,441,891
Georgia and North Carolina	354,825	426,685
Idaho	0	0
Illinois	27,313,296	28,452,278
Indiana	6,962,940	7,078,842
Indian Territory	2,406,943	3,887,793
Iowa	5,578,522	8,016,274
Kansas	4,880,526	5,973,381
Kentucky	5,487,994	5,208,094
Maryland	5,113,127	5,046,491
Michigan	1,040,530	1,543,756
Missouri	3,799,993	4,703,174
Montana	1,396,081	2,009,316
New Mexico	1,086,546	1,546,652
North Dakota	166,085	212,635
Ohio	19,695,723	19,789,958
Oregon	69,011	173,646
Pennsylvania	82,914,840	82,099,906
Tennessee	3,546,551	3,969,249
Texas	1,086,612	1,885,083
Utah	1,322,614	1,666,082
Virginia	2,953,999	2,523,270
Washington	2,578,217	4,271,076
West Virginia	23,816,434	20,908,705
Wyoming	4,485,374	6,060,462
Total Bituminous	224,769,091	\$236,309,811
Pennsylvania Anthracite	67,471,667	112,504,020
	292,240,758	\$348,813,831

The preliminary report issued by the Inspectors of Mines for Great Britain shows that the production of coal in the United Kingdom last year was 219,037,240 long tons, a decrease of 6,132,923 long tons from 1900.

Reducing the product of the United States to the same unit, we find that it amounted to 260,929,248 long tons, or 42,439,760 long tons (nearly 20 per cent) more than that of Great Britain. The coal output of her colonies and dependencies (including India) aggregated in 1900 about 17,000,000 long tons, so that taking all the British Empire as one producer it still

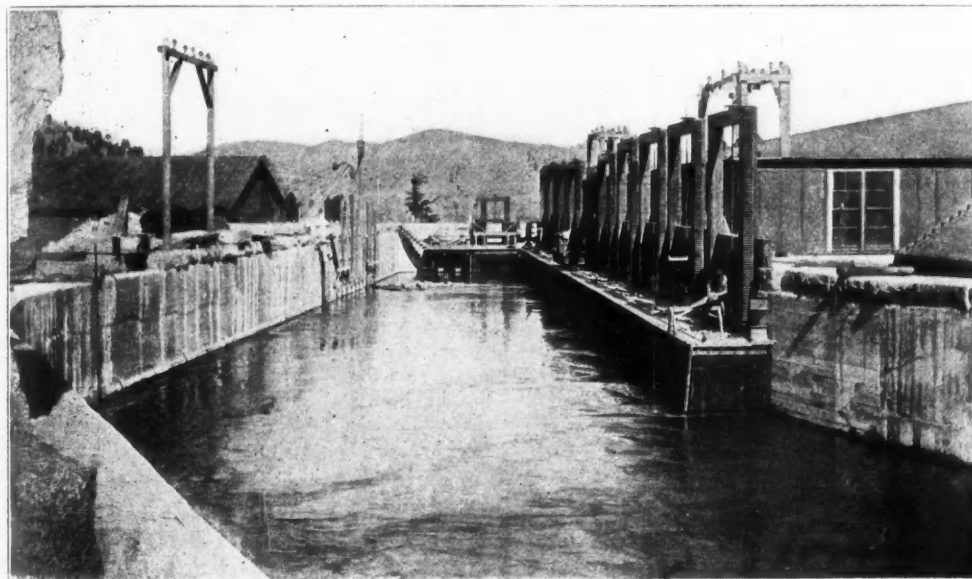


FIG. 4. FOREBAY AND GATES AT CAÑON FERRY.

falls short of the coal product of the United States last year by from 20,000,000 to 25,000,000 long tons.

Our coal production last year was nearly 80 per cent larger than Germany's, nearly 7 times that of Austria-Hungary, and more than 8 times that of France.

STEEL RAILS FOR TURKEY.—Tenders were recently invited for 20,000 tons of steel rails for the Hamidié Railway in Turkey, deliveries to be made partly at Haifa and partly at Beyrout. A first adjudication of rails has just been attempted. Tenders were delivered by the John Cockerill Company, the Tangleur Steel Works Company, Krupp, of Essen, and the Rhenish Steel Works Company, of Ruhrort. The last named establishment delivered the lowest tender, \$27.84 per ton delivered. This price, however, was considered too high for the Turkish authorities, who postponed the acceptance of any tender, in the hope of more advantageous terms being obtained later on.

THE GEOLOGY OF THUNDER MOUNTAIN AND CENTRAL IDAHO.

By ROBERT BELL.

In view of the wide spread advertising and the exaggerated accounts of the gold discoveries of the new Thunder Mountain Mining District in Central Idaho, a brief outline of the geology and topography of the region and the easiest means of access thereto will be of interest to the readers of the JOURNAL at this time.

The central figure of the new district at the present time is locally known as the Dewey Mine. This property is situated near the summit of Thunder Mountain at an elevation of 8,000 feet. It has been under development for about a year and was equipped last fall with a 10-stamp mill. This mill was started up January 5 last, and has since been in continuous operation with very satisfactory results, crushing the brecciated material taken out of the prospect drifts and cross-cuts that are being extended into the

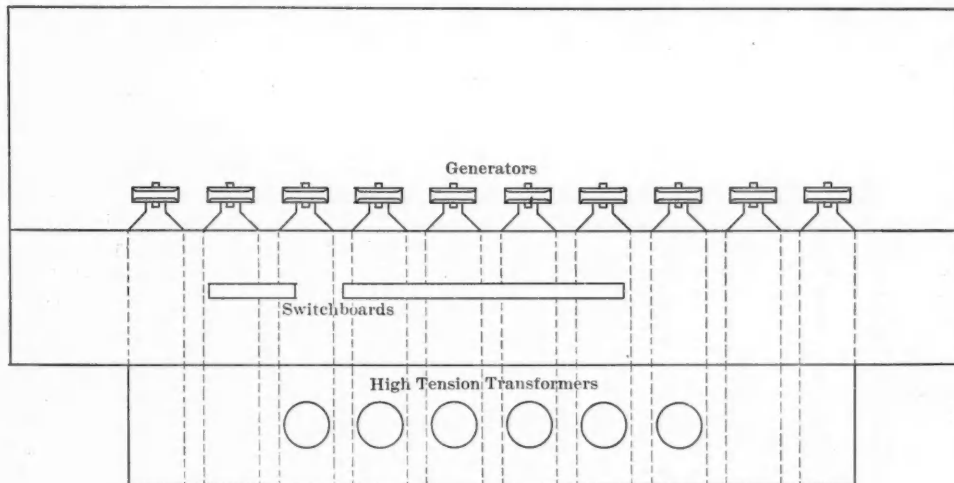


FIG. 5. SUB-STATION BOARD, MISSOURI RIVER POWER PLANT.

The principal facts about this new gold-field so far as they have been established, are that it promises to give to the mining world some enormous bodies of low-grade gold-bearing rock that can be profitably handled, and that will justify the erection of very large milling and cyaniding plants; it therefore warrants a close investigation by mining men.

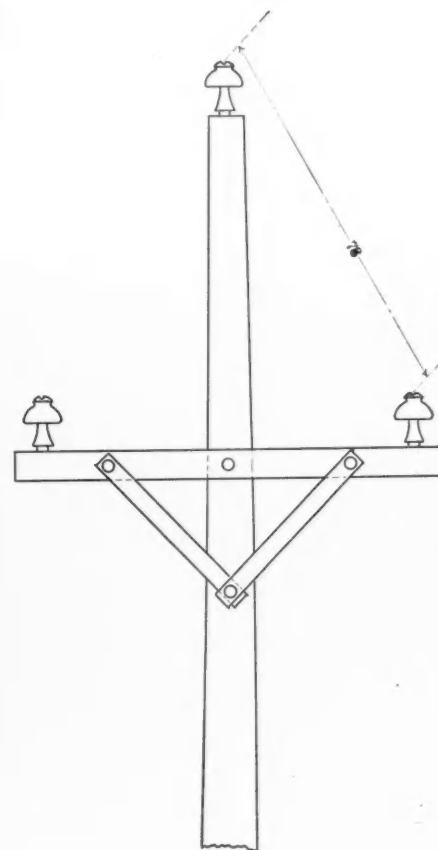


FIG. 6.—ARRANGEMENT OF CONDUCTORS ON TRANSMISSION LINE.

In addition to the great bodies of low-grade milling ore that have so far been discovered in the Thunder Mountain District there have also been found at several points some remarkably rich native gold specimen ore. No regular shipment of this high-grade ore has been made so far, but large pieces of it have been sent out. One of these specimens weighed about 30 pounds and was estimated by capable judges to contain 10 ounces of visible gold. The lowest point of development reached so far in this new field does not exceed 200 feet, and as yet there are no symptoms of base mineral associations, with the exception of an occasional thin sprinkling of simple iron pyrites.

The main body of the gold-bearing material seems to be a rhyolite porphyry, breccia and tuff, with fine native gold disseminated throughout its mass, and the specimen ore occurring as dendritic incrustations in this seems of secondary enrichment as a result of circulating mineral solutions.

These openings now aggregate over 1,000 feet in length and the extent of the deposit is still undetermined. Thunder Mountain is made up entirely of igneous formations, as are the surrounding summits for several miles in extent. This particular deposit seems to consist of a great bed of rhyolite porphyry, breccia and tuff whose thickness has not been determined definitely, but is variously estimated at from 60 to 600 feet.

Its areal distribution is also an unsolved problem, as it is capped over by another massive bed of close-grained gray rhyolite, but there have been several other discoveries made of gold-bearing breccia similar to that of the Dewey Mine over an area several

miles square around Thunder Mountain which point to a very extensive distribution of the mineral. A probable theory of its origin is that dozens of local volcanic events, augmented by mud springs and geysers, covered the undulations of the country with a great blanket of volcanic debris that was subsequently buried by a steadier flow of more massive lava and has been again exposed at various points by erosion.

A piece of fresh broken rock recently taken from the face of the longest tunnel of the Dewey Mine at a depth of nearly 200 feet consists of angular fragments of metamorphic slate, roughly, 1½ inches square, set in a glassy matrix of fine quartz grains with a conspicuous development of small feldspar crystals, both orthoclase and plagioclase, the feldspar very much altered and decomposed and slightly vesicular.

The above specimen assays \$10 in gold, and I am informed that the whole mass as it is being mined from the different prospecting tunnels is averaging about \$7 per ton and yielding over 90 per cent of its assay value to simple plate amalgamation.

With abundant water power, timber and other natural facilities at hand, it is estimated that this great deposit can be mined and milled on a large scale at a low cost, possibly as low as \$1 per ton.

No thorough geological examination of this district will be possible until after the ground is clear of snow, which will not be earlier than June.

A Boise man, who examined the ground last fall before the snow came, described the Dewey Mine as a deposit of sedimentary origin laid down by water, and claimed to have proved it by finding pieces of charred and silicified wood and small pine cones rich in native gold mixed in the matrix; but the conspicuously crystalline structure of the material when the surface of it is broken and the characteristic igneous surroundings expose the fallacy of such a theory. Unquestionably there were great volumes of hot water and mud associated with the eruption of this brecciated material and subsequently circulated through its fracture lines. The organic remains referred to were probably picked up by a stream of rhyolite mud from a pre-existing surface, and are a guide to the age of the deposit. They strongly indicate that it belongs to early Tertiary times, and is probably contemporaneous with the main Cripple Creek disturbance, for similar organic remains of established Tertiary age are found in edges of the same kind of rhyolite deposit at Broughs Hot Springs near Salmon City.

The extent of this great igneous field of which the Thunder Mountain District forms only a small part is enormous, probably equal to about 4,000 square miles in area, within the three counties of Lemhi, Idaho and Custer. It extends southwest from Thunder Mountain in great dikes and isolated masses as far as Boise City and beyond the black lava capping of the Snake River Valley the rich veins of Silver City and DeLamar are contained in rhyolite lavas of the same age and time.

The same white rhyolite, quartz porphyry, trachyte and allied igneous formations, extend east from Thunder Mountain in a broad irregular, but connected belt, for fully 100 miles, entirely across Lemhi County. The greatest center of disturbance of this volcanic field was at Camas Creek, 25 miles east of Thunder Mountain. The whole basin drainage of this stream, 20 by 30 miles in extent, is made up entirely of acidic lavas and breccias. These formations again extend south from Camas Creek 60 miles, through Custer County to Stanley Basin, forming the great mountain masses which constitute the divide between the waters of the main Salmon River and its Middle Fork. Between Salmon City and Clayton, a distance of 90 miles, fully 60 per cent of the formation composing the walls of the main Salmon River Cañon are of igneous origin, the principal varieties being rhyolite and andesite. These formations are gold-bearing throughout. At Stanley Basin, which is an old placer camp, the mountain masses of lava terminate and shoot out great dikes of felsite and quartz porphyry through the regional gray granite.

Some of these dikes have been opened by shallow prospect holes and have produced some remarkably rich specimen gold ore. They are in places accompanied by contact veins of quartz, together with thick bands and bunches of fluorite stain and fluor-spar. A thin sprinkling of iron pyrites occurs in some of the dikes in ore which has from 1 to 6 ounces in gold, although it does not show a color of free gold in the pan. These conditions point to a possible source of tellurium compounds and are well worth a close investigation. A large hot sulphur spring discharges from the wall of one of these gold-bearing dikes where it crosses the bottom of the Salmon River Cañon. The evidence of the great volcanic activity is still manifest over the entire region in numerous hot mineral springs. Hot Lakes, Hot Springs, and Hot and Warm Spring creeks are common names throughout the whole of Central Idaho.

Estes Mountain near Custer is a volcanic cone over 10,000 feet high, of greenish, gray and pink rhyolite. This mountain carries a system of north and south fissure veins that have produced some very high grade gold ore. Among them the Montana and

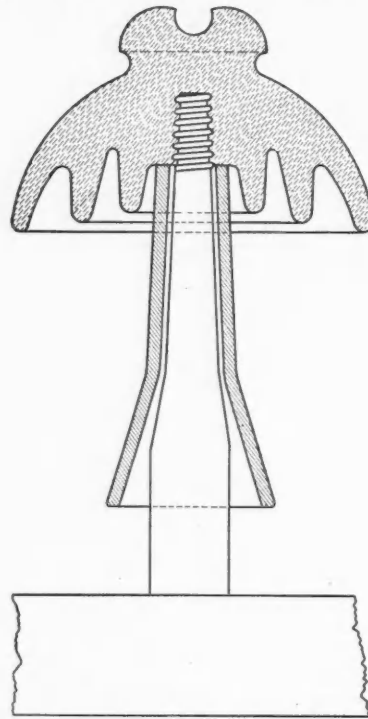


FIG 7.—DETAILS OF INSULATOR.
(See Fig. 6, preceding page.)

Hartford veins have made shipments in car-load lots that netted from \$500 to \$1,000 per ton. On the opposite side of Yankee Fork, 7 miles from Estes Mountain, Custer Mountain, which has almost the same elevation, is composed entirely of massive beds of cyanite porphyry and rhyolite. This mountain carries a system of east and west fissure veins that also have a great record. The Custer Mine of this group has produced \$9,000,000 and the Lucky Boy Mine, adjoining it, with a record of \$2,000,000, is still supplying a 25-stamp mill with 80 tons of ore a day from a depth of 800 feet on the vein and paying monthly dividends.

The white lava formations of Camas Creek, especially of its east tributary, Silver Creek, are rich in fluorites and have a number of prospects and one well-developed mine that carry remarkably high values in gold. In this stream and an adjacent one, called Panther Creek, both in Lemhi County, placer gold is found and along their slopes some beautiful gem opals have been found.

Values from a trace to \$6 or \$8 in gold, associated with occasional rich specimen float, have been found at a number of points along this great igneous belt especially in the immediate vicinity of Salmon City, and it is not unlikely that a thorough sampling and prospecting of these great deposits of soft volcanic material will reveal a sufficiently high average value in a number of instances to pay a profit if handled on an extensive scale.

Central Idaho has produced since 1860, accord-

ing to conservative estimates, fully \$200,000,000 in gold. This great yield of precious bullion was derived principally from placer camps scattered over the interior mountain regions of the State. The rough nature of the country up to the present time has discouraged the investigation of its formations for gold-bearing rock, especially low-grade deposits in such peculiar form as the main body of the Dewey Mine at Thunder Mountain, but with the economic advance in modern gold mining and milling practice the future of this field is promising.

Central Idaho consists geologically almost entirely of granite, crystalline metamorphic rocks and a profusion of dikes and districts of igneous formations, generally of the acidic types and in sharp contrast with the dark basic lavas of the Snake River plains. Central Idaho contains a large connected granite area and its mineral resources embrace gold, silver, lead, copper and a variety of useful and rare metals and minerals. There have also been found in this region some beautiful gem stones, including sapphires, opals, garnets and amethysts, tourmalines and topaz. The topography is extremely rough, conflicting movements, together with the extrusion of masses of igneous rock, with very extensive erosions, has resulted in a confusion of rough mountain summits and deep narrow canons, without any regular range or valley system.

The drainage of the Thunder Mountain region is entirely through the Salmon River and its tributaries. This great stream has a fall of from 10 to 15 feet to the mile, which guarantees water power over its entire drainage. The mountains are not extremely high; very few of their summits exceed 10,000 feet, but the intervening cañons are usually narrow and precipitous and the numerous streams which they convey are dangerously swift and torrential during May and June. The greatest danger to travel at this season of the year is from snow-slides, and three lives have already been sacrificed to this cause on the trail from Warrens to Thunder Mountain this spring.

The snow fall has not been very deep this year and probably does not exceed 7 or 8 feet at the higher elevations, but there is greater danger in crossing a tract of soft snow 2 feet deep on a bald mountain side than if it were 10 feet deep. In the deep snow your tracks simply make a mark; in a shallow snow you cut through to the ground and take away its support, giving it a loose end, when it will settle in great cakes, and if sufficiently rotten and honey-combed underneath, will break away from above the line of your trail and form an avalanche. The snow was less than 2 feet deep that recently killed three miners on the Warrens trail.

The best and easiest road to get to Thunder Mountain is a subject of constant inquiry at present by intending visitors. There are half a dozen routes being very energetically advertised by local merchants. The maps usually show a wagon road line direct to the Dewey Mine, which is a misrepresentation, for as a matter of fact, there is not a single road to the center of the new Thunder Mountain District which does not involve a trip over a rough mountain trail of not less than 40 miles, nor is it likely that a wagon road can be completed in there before August. The writer has traveled over a large portion of all the principal roads now advertised and can say that in the spring of the year they are all bad, but to a man used to the mountains none of them offer very serious obstacles or dangers if due precaution is taken, and they all afford local geographical advantages.

As Central Idaho is unsurveyed, most of the published maps of that part of the State are very indefinite and unreliable. It is situated 20 miles south of the intersection of the 45th parallel with the 115th meridian. Take a Rand & McNally pocket map and find Loon Creek. It will probably be spelled Coon Creek—Loon Creek is a noted old placer camp, and is connected by an excellent trail to Singiser—now measure off 20 miles due northwest from the mouth of Loon Creek and you will have the initial point of Thunder Mountain.

A map of the Central Idaho region published in

the JOURNAL a few weeks ago showed only one railroad branch penetrating it; the Northern Pacific branch, terminating at Stites on the Clearwater. As a matter of fact, there are five other branch railroads heading for Central Idaho from the main Oregon Short Line system further south. They leave its main line at Weiser, Nampa, Shoshone and Blackfoot, and their present terminals are respectively at Council, Emmett, Boise, Ketchum and Mackay. All of these places afford excellent outfitting points for Thunder Mountain, where all the necessary supplies, including horses, saddles, etc., can be purchased.

The Oregon Short Line new branch from Blackfoot was built last year, 85 miles northwest to Mackay, a new mining town 4 miles above the old town of Houston on Big Lost River. This terminus is only 115 miles from Thunder Mountain, and the line has been surveyed and permanently located to the main Salmon River near Challis. The Short Line people are ready to push it on into the new district as soon as conditions will justify its extension.

Another easy and early means of access to Thunder Mountain is to leave the Butte branch of the Short Line at Red Rock, Montana, whence there is a daily stage line running to Salmon City, which is an excellent outfitting point. From Salmon City the stage line extends on to Singiser, where it connects with the Mackay-Challis road, and a short distance beyond Singiser the wagon road terminates and the same trail is followed to the center of the new district, which is a little over 40 miles farther west.

The two routes leaving the railroad at Red Rock and at Mackay offer the best and earliest means of access to Thunder Mountain from the northeast and southeast, with the added advantage that the visitor can commence to study the characteristic lavas of Thunder Mountain along the stage line 30 miles out from Red Rock, and can traverse the same geological field at rapid intervals for the balance of the distance.

Over the Mackay-Challis route the same volcanic formations can be traversed continuously from Challis to Thunder Mountain. Grass, water and wood, and other natural conditions for camping over the entire length of these two routes are not excelled in any other part of the State, and they both enjoy an excellent stage service to the end of the road and saddle horse service the balance of the distance.

My advice to prospectors going into this new field is to provide themselves with pack ponies and camping outfits so that they can move around and be independent of a stopping place. A great deal of the ground has already been located in the immediate vicinity of Thunder Mountain, but as before indicated, the district is very extensive and the chances for finding similar deposits to the Dewey Mine are good over a wide area.

IRON AND STEEL EXPORTS AND IMPORTS.

Exports of iron and steel, including machinery, from the United States in April were valued by the Bureau of Statistics at \$9,320,633, against \$9,081,223 in April, 1901; showing an increase of \$239,410, or 2.6 per cent. This is the first month of the current year in which there has been an increase shown. For the four months ending April 30, the values were \$33,160,184, against \$35,222,752 in the corresponding period last year; showing a decrease of \$2,062,568, or 6.3 per cent.

The chief items of the exports in April are given below, in long tons:

	1901.	1902.	Changes.
Pig iron.....	5,695	1,570	D. 4,125
Bars.....	4,379	4,309	D. 70
Rails.....	41,389	4,501	D. 40,888
Sheets.....	2,629	2,391	D. 238
Structural steel.....	4,478	4,755	I. 277
Wire.....	8,171	10,509	I. 2,338
Nails.....	3,540	2,552	D. 988

Exports of iron ore in April were 3,528 tons. In April, 1901, no iron ore was exported.

Imports of iron and steel in April were valued at \$2,379,892, against \$1,354,543 in April, 1901. For the four months the total imports were valued at \$8,-

272,038, against \$5,362,600 last year; an increase of \$2,909,438, or 54.2 per cent. The items included 52,441 tons of pig iron, against 8,646 tons last year; and 26,106 tons of steel billets and blooms, against 2,350 tons in 1901.

Imports of iron ore were 116,731 tons in April and 335,906 tons for the four months, against 156,403 tons in 1901; showing an increase of 179,503 tons this year.

PLATINUM IN AUSTRALIA.

By JOHN PLUMMER.

Although platinum is known to be more or less plentiful in New South Wales, the quantities at present obtained are limited, the output in 1900 being only 530 ounces, value of £1,007; and the total quantity raised since the beginning of 1894, 8,295 ounces, value £12,432, the great difficulty being the scarcity of water in the districts in which the metal is found. When this obstacle has been overcome, prospecting operations on an extensive scale will be found possible.

Although the existence of platinum in New South Wales had been suspected for many years, its actual discovery, in payable quantities, dates so recently as 1893, and it is probable that, as fresh discoveries are made, an extensive and valuable branch of the State mining industry will be created. The New South Wales platinum is obtained chiefly from the Fifield district, about 322 miles west of Sydney, where it is found associated with gold. Here the principal workings are at Platina, a township situated about 2 miles from that of Fifield, a deep alluvial lead, containing platinum and gold, extending from near the former place for over a mile in length, and varying from 60 to 150 feet in width. The sinking is from 60 to 70 feet, through loam, with some bands of barren quartz drift. The platinum and gold occur in fairly coarse waterworn grains, and, as a rule, are confined to the cavities in the bedrock and to the washdirt for a few inches above it. Occasional nuggets of platinum have been obtained; the largest hitherto found weighs 27 pennyweight, and was purchased for the Sydney Geological Museum. There are two other nuggets in the museum weighing 11 and 8 pennyweight respectively. The washdirt contains from 5 to 12 pennyweight of platinum, and from 1 to 3 pennyweight of gold per ton.

Platinum has also been found in the Broken Hill District, and in many other places; likewise on the beaches of the northern coast, where it is obtained from the auriferous sands. Here, the gold, platinum, etc., which are concentrated on the beaches during stormy weather, are brought down by the action of the waves, from an ancient beach deposit, which occurs at an elevation of about six feet, and which has received the name of black-rock locally. This consists of a layer or bed of black sand-rock, composed chiefly of small zircons, with some grains of ilmenite (titaniferous iron), quartz, garnet, and tinstone, and also small but variable proportions of platinum, platinoid metals, and gold in a very finely divided state. The black color of the sand-rock is due to organic matter, probably derived from swamp vegetation. The ultimate source of the precious metals is not known, but it is probable that, before being deposited in the black-rock they existed, in a detrital state, in a Tertiary quartz pebble drift, which occurs, under basalt, along the coast, and which has undergone a considerable amount of denudation.

COAL SORTING PLANTS IN GERMANY.—

The Concordia Gesellschaft has decided to put down a mechanical coal sorting plant at its collieries in the Siegen district of Germany.

AN OLD MINING CONCESSION.—The London Colliery Guardian says that La Societe Miniere de Vallauria di Tenda is the name of a company which has been formed in Brussels, with a capital of \$200,000, to carry on mining operations in Italy under a concession granted by Napoleon I. in 1807.

AMERICAN EXPORT TRADE.

It is gratifying to see that our manufacturers of machinery and supplies are booking substantial contracts for export in order to keep the trade. This has aroused comment in foreign manufacturing circles. Naturally foreign manufacturers have become apprehensive, and are expending much energy in their efforts to retain their export markets against aggressive American competition. It is interesting to note here that to-day there are many establishments throughout Europe making goods with American machinery and tools on up-to-date American plans. This is the result of the visits of experts to the United States in recent years to educate themselves in the industrial methods that facilitate cheap production. Many of our leading manufacturers have established export agencies in the principal cities of Europe, Australia and Eastern countries; and some of them have even formed subsidiary companies for the purpose of manufacturing their goods on foreign territory, near to the consuming markets, thus investing American capital in foreign enterprises. While this action makes them active competitors in foreign markets, it reduces our export trade to some extent.

Of the customers for American manufactures, Japan is the most promising just now. Its government has placed orders with our manufacturing concerns, while again individual Japanese firms have bought from us, and recently several good orders have been placed for machine tools and heavy machinery. Other large contracts could not be accepted at present as our manufacturers' books are full with domestic orders for some time to come. During the month of April the exports of mineral products and their manufactures from the port of New York alone to Japan amounted to \$433,746.

From China some orders have lately come for machinery. In the Dutch East Indies, the increased operations in the petroleum fields have benefited our manufacturers of drilling outfits, and some large orders have been placed. India has recently placed orders with American firms for hot air engines and other machinery. It is of interest to say that in the Kolar gold-field, mines have lately been equipped with American electrical and other machinery.

Africa took in April \$306,855 worth of mineral and metal products from the port of New York alone. Now that the war is at an end, and the Witwatersrand mines are rapidly resuming their activity, there is a chance for our mining machinery men. In fact, orders already placed are quite substantial in volume, and it is worthy of note that fully 75 per cent of the drills used in the Transvaal mines have been made in America. An important order recently placed is that for the dynamite works of the DeBeers Company. An American has designed the plant, and American firms will supply the machinery to equip it. For West Africa, where gold mining is receiving increased attention by British capital, American dredging machinery has been ordered.

In Australia Americans are securing contracts for tramway systems in the leading cities, and are also booking good orders for structural material. During April the exports to Australia from New York alone aggregated \$1,212,338, of which the major part was machinery.

Although France subjects American imports, with some exceptions, to the maximum rate of duty, it is still purchasing a quantity of its supplies from the United States. In fact, the United States is the second largest exporter to France. And what is more satisfying, American goods in many instances command a better price than others. France is beginning to like our coal. This is significant, since that country produces much less fuel than it uses.

Switzerland, though a small country, has proved a good buyer of American goods. In fact, our exporters of coal have gained in that territory. Our manufactures are growing in favor, owing to the intelligent propaganda by our branch offices in that country.

In North America, one of the most remunerative fields just now is Mexico, where the mining industry

is very active and American capital is being heavily invested. This naturally benefits our manufacturers, and already some large orders for machinery and supplies have been taken. From New York alone the exports of machinery, etc., in April, amounted to \$362,567.

From Cuba some orders of size have been placed for machinery. Export products and their manufactures from New York alone in April amounted to \$279,230, showing a large increase over the previous month.

Summed up, American export trade has gained a position which it would be unwise to neglect even though the home demand just now taxes the full capacity of our works.

MINERAL AND METAL EXPORTS.

In the four months ending April 30 the exports of mineral products and their manufactures from the United States amounted to \$89,264,636, or \$2,924,126 more than last year. This increase was principally in copper, structural iron and steel, certain classes of machinery and hardware, and illuminating oil.

The exports of iron and steel alone aggregated \$32,911,048, which, owing to the heavy domestic demand for steel rails, billets, etc., is \$2,546,194 less than last year. Still good quantities of finished material are being exported to British and German territory.

on the increased exports this year is nearly \$2,000,000, as the average invoice value fell from 16.3 cents per pound to 12.5 cents or nearly 4 cents. Of the total exports of 137,951,966 pounds this year the United Kingdom received 51,842,788 pounds, or 37.6 per cent; France, 20,678,063 pounds, or 15 per cent; Germany, 17,291,313 pounds or 12.5 per cent; other European countries, 46,925,348 pounds, or 34 per cent, while the remaining 1,214,454 pounds went to British North America, Mexico and other countries. Compared with the corresponding four months last year the exports to the United Kingdom have increased 40,020,985 pounds; which is 3,201,885 pounds more than was reported for the whole year of 1901. This enormous increase is chiefly due to the heavy demand from new electric works, in part of which Americans are interested. France and Germany also show an appreciable increase in consumption. The copper ore exported went principally to Great Britain to be converted into metal for marketing. Copper sulphate shipments have fallen off 13,582,521 pounds, or 36 per cent, owing chiefly to the curtailed consumption in Italy.

Nickel exports are nearly 40 per cent less than last year, quicksilver, about 29 per cent, lead 34.4 per cent, and spelter, 9 per cent less. These decreases are due partly to a good domestic consumption. Zinc ore exports to Belgium have increased

PRODUCTION AND DISTRIBUTION OF NICKEL AND COBALT IN 1901.

Mineral Resources of the United States, 1901, published by the United States Geological Survey, and now in press, David T. Day, Chief of Division of Mining and Mineral Resources, will contain the report of Dr. Joseph Hyde Pratt on Nickel, Cobalt, Fluorspar and Cryolite for 1901.

The two principal sources of nickel are the nickeliferous pyrrhotite, the most widely spread of the nickel ores, and genthite, especially the garnierite variety. In this country the domestic product of nickel has been as a by-product from the lead ore of Mine Lamotte in Missouri, since the shutting down of the Gap nickel mine, in Lancaster County, Pa., about fifty miles west of Philadelphia, about ten years ago. This mine was worked from about 1863 to 1880, when work was discontinued because of the abundant supply of nickel matte from Canada. Traces and small amounts of the nickel minerals genthite and garnierite have been found in North Carolina, but not in commercially sufficient quantities, though a deposit of nickel ore averaging 1.5 per cent nickel is reported near Morgantown, Burke County. Similar occurrences of nickel silicate are found in Oregon, where the percentage of nickel ore is much greater than in the North Carolina minerals. The Oregon deposits are on Piney Mountain, in Douglas County, about three miles a little north of west from Riddles, a station on the Southern Pacific Railroad, and a high grade cobalt ore deposit is being developed in the eastern part of the State.

Nickel ore is reported to occur in some quantity at the Congress Mine, in Upper Nine-Mile section, about 14 miles north of Keller, Ferry County, Washington. This section was formerly worked for copper and gold, but was abandoned. In the latter part of 1901 the claims were again taken up and are now being developed for nickel.

The Wyoming nickel ores, near Sheridan, Sheridan County, do not seem to contain nickel in commercial quantity; at Piney Creek, also, nickel ore is reported. Near the northern border of Churchill County, in Cottonwood Canyon, about 45 miles from Lovelock, Humboldt County, Nevada, deposits of niccolite and gersdorffite have been prospected as nickel ores; and deposits have also been reported at Bunkerville, Lincoln County, and near Candelaria, Esmeralda County. They have not yet been producers of nickel ores. It is reported that the Magnetic Mine, near Tucson, Arizona, contains nickel ores in quantity and that they are now being investigated by eastern capitalists.

Nickel ores are reported also as found on Spring Creek, in the Black Hills, South Dakota, about 11 miles northwest of Custer, and at the St. Joe Mine, Blackbird, Lemhi County, Idaho.

A recent discovery of nickeliferous pyrrhotite is reported near the head of Skowl Arm, near Ketchikan, in Southeastern Alaska, where the ore is stated to be in two parallel veins. Nearly all the nickel used in the United States is obtained from the mines in the Sudbury district, Canada, which produces probably one-half of the nickel used in the world. The other chief sources of nickel are the mines of New Caledonia, in the Pacific Ocean, and of Silesia, Austria. Nickel deposits are being developed satisfactorily near Hangesund, in Norway; and a supposed extensive deposit of nickel has been discovered on the headwaters of Tulameen River, British Columbia.

The only nickel and cobalt produced in the United States during 1901, were as by-products at Mine Lamotte, Missouri; and the matte containing the nickel and cobalt was refined at Constable Hook and Camden, New Jersey. There were obtained 6,700 pounds of nickel, valued at \$3,551, and 13,360 pounds of cobalt oxide, as compared with 9,715 pounds of nickel, valued at \$3,886, and 6,471 pounds of cobalt oxide produced in 1900. This is a decrease of 3,015 pounds in the production of nickel, and an increase of 6,889 pounds in the production of cobalt oxide. Elaborate experiments have been made by the Canadian Cop-

United States Exports of Domestic Mineral Products and Their Manufactures.

ARTICLES.	Jan.-Apr. 1901.		Jan.-Apr. 1902.		CHANGES 1902	
	Quantities.	Value.	Quantities.	Value.	Quantity.	Value.
Aluminum, and manufactures of.....		\$46,608		\$14,960	D.	\$31,648
Brass, and manufactures of.....		609,012		549,250	D.	59,762
Bricks, building and fire.....		176,658		152,710	D.	23,948
Cement, bbls.....	88,086	167,404	94,498	148,097	I.	6,412
Chemicals: Acids.....		67,121		82,758	I.	15,637
Ashes, pot and pearl, lbs.....	570,232	29,549	793,197	35,398	I.	222,965
Copper sulphate, lbs.....	37,810,678	1,728,755	24,228,157	974,516	D.	13,582,521
Lime, acetate, lbs.....	21,586,638	403,082	19,605,137	301,340	D.	1,981,501
Coal, anthracite, tons.....	525,572	2,393,470	441,000	2,036,840	D.	84,572
bituminous, tons.....	1,697,167	4,013,735	1,661,936	4,207,487	D.	35,231
Coke, tons.....	135,427	532,800	131,337	589,533	D.	4,090
Copper ore, tons.....	2,372	262,018	9,752	750,688	I.	7,380
ingots, bars, plates and old, lbs.....	64,728,955	10,577,510	137,951,966	17,172,409	I.	73,223,011
Gunpowder, lbs.....	266,471	41,819	516,593	67,540	I.	259,122
other explosives.....		553,110		628,539	I.	75,429
Instruments and apparatus for scientific purposes		2,472,468		1,819,407	D.	653,061
Iron and Steel, and manufactures of:						
Iron ore, tons.....	1,647	4,391	4,524	12,661	I.	2,877
Pig iron, tons.....	39,068	583,190	12,984	218,016	D.	26,086
Bar iron, lbs.....	24,139,134	388,492	16,297,115	290,927	D.	7,842,019
Bars or rods of steel, lbs.....	36,909,220	615,644	15,517,860	327,999	D.	21,391,360
Billets, ingots and blooms, tons.....	25,749	635,568	525	15,546	D.	25,224
Hoop, band, and scroll, lbs.....	1,349,343	30,164	1,837,023	41,053	I.	487,680
Iron rails, tons.....	424	11,798	168	3,150	D.	256
Steel rails, tons.....	125,857	3,417,257	33,125	897,451	D.	92,732
Iron sheets, lbs.....	7,138,864	200,060	2,809,461	84,119	D.	4,329,403
Steel sheets, lbs.....	33,624,731	536,662	8,487,923	188,933	D.	25,136,808
Tin and ternie plates and taggers tin, lbs.....	833,432	41,290	1,449,351	56,878	I.	615,919
Structural iron and steel, tons.....	18,006	1,010,620	31,503	1,479,750	I.	13,497
Wire, lbs.....	59,784,655	1,500,998	71,472,689	1,678,898	I.	11,688,034
Scrap and old, fit only for remanufacture, tons.....	4,002	56,160	4,091	63,287	I.	89
Hardware.....		2,918,750		3,552,890	I.	634,140
Nails, cut, lbs.....	10,007,401	227,822	5,344,880	108,143	D.	4,752,521
Nails, wire, lbs.....	14,861,982	315,806	15,129,140	197,990	I.	267,158
Spikes and tacks, lbs.....	1,580,311	96,393	1,513,459	93,613	D.	66,852
Machinery, electrical.....		2,022,437		1,978,703	D.	43,734
Metal-working.....		996,589		1,124,600	I.	128,020
Pumps and pumping.....		696,824		715,007	I.	18,183
All other machinery.....		8,793,715		11,086,266	I.	2,292,551
Steam engines, and parts of.....		2,403,731		2,163,147	D.	240,584
Pipes and fittings.....		1,550,243		1,636,467	I.	86,224
All other manufactures of iron and steel.....		6,002,829		4,895,446	D.	1,107,383
Lead, pig, bar, and old, lbs.....	4,636,524	208,926	3,042,931	137,167	D.	1,593,593
manufactures of.....		110,523		128,998	I.	18,475
Lime, bbls.....	9,568	10,543	15,911	21,174	I.	6,343
Marble and stone, unmanufactured.....		27,361		51,337	I.	23,976
Roofing slate.....		268,311		233,626	D.	34,685
All other manufactures.....		247,204		231,357	D.	15,847
Mineral oil, crude, gals.....	42,273,533	2,075,600	42,860,228	1,849,583	I.	586,695
Naphthas, gals.....	7,628,511	641,071	6,707,097	497,991	D.	920,414
Illuminating, gals.....	227,986,383	15,175,470	152,962,063	15,622,134	D.	75,024,320
Lubricating and paraffin, gals.....	24,399,777	3,418,643	25,588,989	3,491,066	I.	1,189,212
Residuum, bbls.....	310,571	717,875	263,601	284,700	D.	46,970
Nickel, nickel-oxide and matte, lbs.....	1,805,315	475,638	1,087,576	310,000	D.	717,739
Paints, pigments, and colors—Zinc oxide, lbs.....	2,499,823	106,884	3,198,437	136,392	I.	698,614
All other.....		473,973		471,429	D.	2,544
Phosphates, tons.....	232,304	1,861,849	224,437	1,774,116	D.	7,867
Quicksilver, lbs.....	344,055	191,905	253,678	148,157	D.	90,377
Salt, lbs.....	3,412,335	18,845	3,416,576	21,319	I.	4,241
Tin, manufactures of.....		174,153		178,432	I.	4,279
Zinc ore, tons.....	11,905	371,012	12,370	368,330	I.	465
pigs, bars, etc., lbs.....	3,458,877	147,377	3,144,743	136,683	D.	314,134
manufactures of.....		21,481		36,987	I.	15,506
Total value.....		\$86,340,510		\$89,264,636	I.	\$2,924,126

Copper exports are growing, owing to the improved European demand. The increase in the exports of fine copper this year is equal to 73,223,011 pounds, which is more than the entire quantity exported last year. Unfortunately there has not been an equal appreciation in value, owing to the cut in market prices. It is estimated that the total loss

nearly 4 per cent in quantity. Zinc white is finding a good market abroad as a pigment, and shows an increase in exports equal to 28 per cent in quantity. Exports of mineral oils were valued at \$21,745,474, as against \$22,028,599 last year, a decrease of \$283,125. These exports went largely to Great Britain and Germany, and to far Eastern countries.

per Company to refine, in Canada, the nickel copper matte from the Sudbury mines, but thus far in vain, the greater part of this matte being refined in the United States.

The amount of nickel imported and entered for consumption in the United States in 1901 was 117,364,337 pounds, valued at \$1,847,166, as compared with 57,955,988 pounds of nickel matte, etc., valued at \$1,323,630 in 1900. The amount of nickel produced from matte and ore imported into the United States was 10,497,097 pounds, worth between five and six million dollars. There was a decided increase in the production of nickel from New Caledonia ores in 1901. The price of nickel oxide has been about five cents lower per pound than the metal, while the cobalt oxide has been sold at \$2.20 a pound. The nickel industry is increasing rapidly, and there has been, also, a decided increase in the amount of nickel used in the United States. The export of nickel oxide and matte from the United States in 1901 was 5,869,655 pounds, as compared with 5,869,906 pounds in 1900.

The amount of cobalt oxide imported into the United States in 1901 was 71,969 pounds, valued at \$134,208, as compared with 54,073 pounds, valued at \$88,651 in 1900. As the United States refines the greater part of the nickel matte produced at the Sudbury mines, naturally the United States exported nickel to the amount of 5,869,655 pounds in 1901, or 251 pounds less than was exported in 1900.

The production of nickel in Canada in 1901 was 9,189,047 pounds.

LIQUID AIR.—In a lecture on liquid air delivered to the Société Internationale des Electriciens, which is abstracted in *London Engineering*, M. D'Arsonval mentioned a large number of interesting phenomena noted at extremely low temperatures. Thus the specific heat of air, which at ordinary temperatures is constant at 0.21, increases greatly when low temperatures are combined with high pressures. At 100° C. and 10 atmospheres pressure the specific heat becomes .2585, and at 75 atmospheres pressure and the same temperature it is 0.766, so that in making calculations as to the power needed to operate liquid-air machines it is unsafe to reckon the specific heat of air as a constant. Ozone is, he states, easily prepared by electric discharges through oxygen at a low temperature, and liquefies easily, its boiling point being -118° C. At the temperature of liquid air the liquid ozone is perfectly stable, but at its boiling point it deteriorates on the least shock. The most powerful explosive now known, M. D'Arsonval states, is a mixture of liquid ozone and solid acetylene, both being endothermic bodies—that is to say, heat is liberated by their decomposition. Certain of the lighter petroleum, separated out by fractional distillation at low temperatures are, M. D'Arsonval states, perfectly fluid at -190° C., can be conveniently used in the construction of low temperature thermometers. The latent heat of liquid air M. D'Arsonval finds to be 65 calories, the determination being made in the simplest manner by placing a vacuum vessel containing liquid air on a recording balance, and noting the rate of evaporation. Immersing an incandescent lamp in the liquid and turning on the current, the rate of evaporation was again noted, and the current being measured it was easy to deduce the amount of energy expended in increasing the amount evaporated in a given time. M. D'Arsonval further referred to his method of preparing pure hydrogen from coal gas by a system of fractional distillation at low temperatures. This plan is said to be very economical where large quantities of the gas are required.

PETROLEUM AND COAL IN LOCOMOTIVES.—Some tests recently made on the Rio Grande, Sierra Madre & Pacific Railroad in Mexico, with petroleum from Beaumont and coal from Texas, are said to have shown that from 3.4 to 3.5 barrels of crude oil were equivalent to 1 short ton of coal. At present prices the cost of the equivalent quantity of oil delivered on the road is only from 45 to 50 per cent of that of coal.

GOLD DEPOSITS OF ARIZONA.

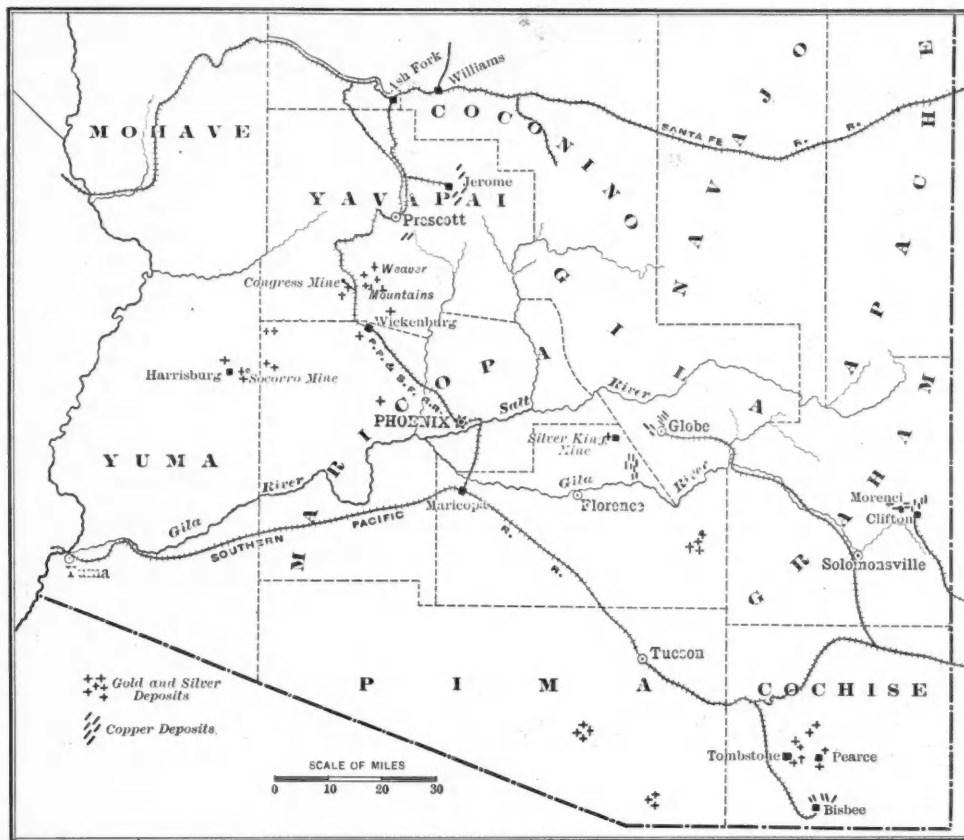
By JOSEPH HYDE PRATT.

In THE ENGINEERING AND MINING JOURNAL of January 4, 1902, under the heading of "Gold and Silver in 1900," the following statement is made: "The attempt to reopen some of the old mines of Arizona while successful in some cases, has been a failure in others, and the territory remains about where it was a year ago so far as gold production is concerned."

This statement is true so far as the actual production of gold and silver bullion is concerned; but it is far from being the case when the actual condition of the gold mining industry in Arizona is considered. There has been in the past year a very decided and encouraging advance in the development of gold mining properties, and at the end of 1902 the results will be apparent in the increased production of gold from this Territory. There has been, and is still, a great deal of wildcat speculation in the gold mining properties of the Territory, and in a number of cases supposed gold mining proper-

miles north and south of that city. Still another is known as the Weaver Mountain Mining District, and it might be well to include in this the mines that are found extending almost continuously in a slightly southwest direction from the Weaver Mountains to the Vulture Mountains. In this district would be included the celebrated Congress Mine, the recently opened Octave, and the Vulture. Forty miles to the west of this district is the Harqua Halla Mountain District which includes the parallel range known as the Harcuvar Mountains. In this district are located the noted Harqua Halla Mines which give prominence to this section, now the scene of active mining and prospecting.

There are a number of other places throughout the Territory where gold has been found, but there is little systematic mining now being done for gold or silver in them with the exception perhaps of the Silver King Mine which is located in the northeastern part of Pinal County and which has been one of the noted producers of the Territory. In many of the copper producing districts more or less gold is found.



MAP OF GOLD PRODUCING REGIONS OF ARIZONA.

ties have been bought and companies incorporated to handle them where the property was known to have little or no value. These methods are, however, now considerably over-balanced by the development of gold properties on a sound and substantial basis.

Extending across the Territory from the southeast toward the northwest is an extensive formation of carboniferous limestone with which a great series of ore deposits are directly or indirectly associated. The principal rocks underlying this limestone formation are granites and gneisses. Other sedimentary rocks, that are found associated with the limestone, are sandstone (which has in many places been entirely metamorphosed into quartzite) and conglomerate. Cutting these sedimentary rocks are large masses of porphyritic rock, quartz porphyry, trachyte, and dikes of diorite.

It is in this mineral belt that the large deposits of copper have been found. The principal gold mines are found in four distinct districts: One is in the southeastern part of the Territory in Cochise County in the vicinity of Tombstone. The principal mine of this district is perhaps the old Pearce near the town of the same name, and now known as the Commonwealth Mine. Another district is in the vicinity of Tucson, where the mines occur thirty

In all the districts referred to there is a great deal of activity and strong companies are obtaining control of mines and claims with the intention of developing them and, if possible, making producers of them. The Weaver Mountain and Harqua Halla Mountain districts, which were recently visited by the writer, were showing up some good properties and both gave promise of developing into regular producers of gold.

The accompanying figure gives a general idea of the location of the gold deposits in these districts.

One noticeable feature of the veins in the Weaver Mountain and Harqua Halla Mountain districts was their regularity and their constant dip at a sharp angle. Many of them are true fissure veins in granite or porphyry. An interesting mine visited is the Socorro, which is owned by the Socorro Gold Company, of Hartford, Conn. This mine is located in Yuma County on the southwestern slopes of the Harqua Halla Mountains about 40 miles in a straight line southwest of Wyckenburg which is on the Santa Fe, Prescott and Phoenix Railroad, and about 3½ miles a little south of east of Harrisburg. The property consists of eight full claims, the general location of which are indicated on the accompanying figure.

The geology of this immediate vicinity is somewhat complex. The main country rock or mass of the mountains is a granite which is overlain with the sedimentary rocks, limestone and quartzite, whose strata are dipping at sharp angles. A mass of porphyry was observed on the Henry Clay and Los Angeles claims, but its exact extent could not be determined. The quartzite was observed between this porphyry and the limestone. While the most of the rock between the porphyry and the limestone is a quartzite, there was one band or dike that was very evidently a quartz porphyry.

The mineral vein has only been encountered on the Henry Clay claim and it was discovered by accident. The alluvial deposits were being treated for their gold contents and as these were removed a quartz vein was exposed. On investigating this it proved to be a true fissure vein carrying high values. The vein has porphyry for its hanging wall,

quired in the locating of the other claims. All of this work was done a number of years ago, ore that was taken out having been hauled by wagon to a stamp mill located at Harrisburg. The main work consists of an inclined shaft that has been sunk on the vein, following its dip for about 250 feet. At the present time the shaft can only be examined to the 244-foot level as water is encountered at this depth; but, judging from the appearance of the bottom of the shaft and from information that could be obtained, the shaft does not extend more than 6 or 8 feet farther. The vein is just as strong at this 244-foot level as at any other point along this distance. To the 150-foot level the ore has been more or less thoroughly taken out by means of drifts and stopes for a distance of 30 to 40 feet on each side of the shaft. Pillars of ore have been left at intervals of about every 15 feet to support the roof. In places these pillars or supports extend along

The mill can be built upon a solid rock foundation and will have plenty of room for the disposal of tailings. Below the mill site there is a flat level stretch on the edge of the gulch which is conveniently located for the erection of the cyanide plant for the treatment of the concentrates. A 20-stamp mill is now in course of erection and as soon as this is completed the cyanide plant will be built. A sufficient supply of water for the stamp mill, cyanide plant and camp is obtained from a well in the valley about $1\frac{1}{2}$ miles east of Harrisburg and 16,000 feet from the mine. This valley or ravine is the drainage for a large section of this mountainous country and there is a strong flow of underground water which is reached by wells from 28 to 30 feet in depth. The water is conveyed from the well to two large tanks of 50,000 gallons capacity each, which are located on a slope of the mountain above the mill.

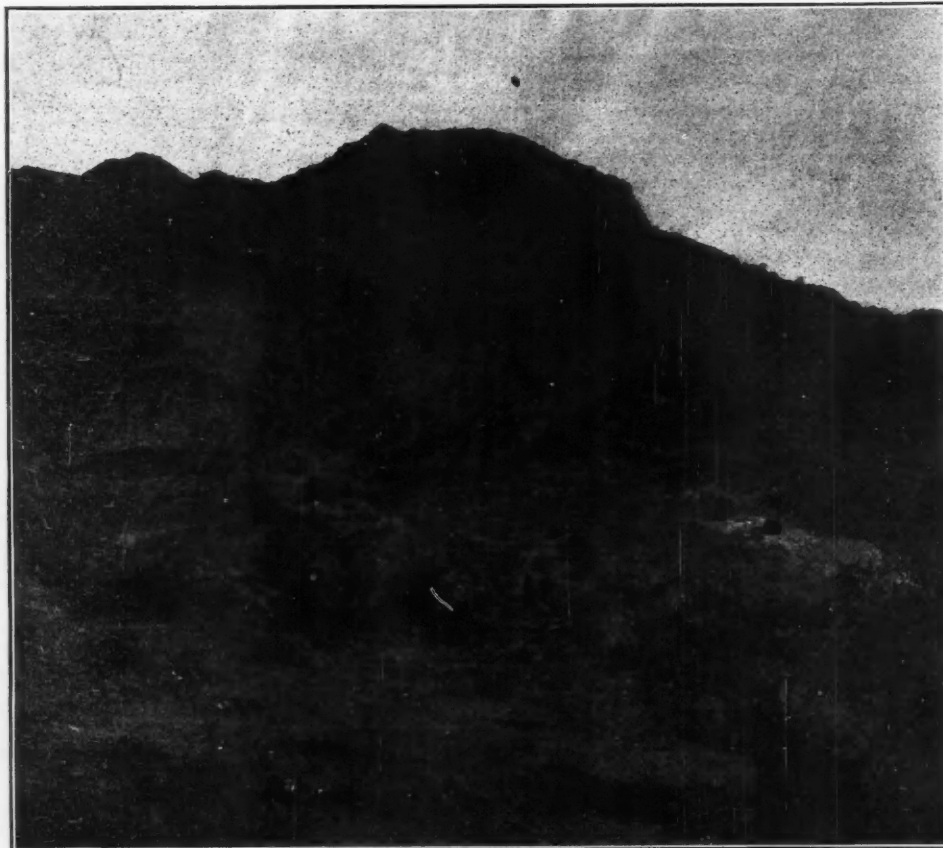
Assays that were made from the ore from this vein show it to be one that will probably carry on the average at least \$20.00 per ton. Many of the bunches of sulphides that were assayed showed values from \$100 to \$150 per ton.

Since the Socorro Gold Company began active operation in this section there has been a great deal of prospecting carried on and a number of other properties opened up, so that although the district is from 40 to 60 miles from the railroad, there is a general air of progress and activity in the vicinity.

FLUORSPAR.

Fluorspar, or fluorite, is generally found in veins in limestones, sandstones, mica slate, clay slate, and gneiss. Although widely distributed, this mineral has been found in commercial quantities in but few localities in the United States. Until 1898 the only source of fluorspar in the United States was the mines in Hardin and Polk counties, Southern Illinois. The same general geological formation extends over to Western Kentucky, and in 1898 deposits of fluorspar were discovered around Salem, Livingston County, and Marion, Crittenden County, Ky. A small amount of fluorspar is also obtained from Caldwell County, Ky. In a number of cases by-products are obtained, as galena, which is saved by the Rosiclaire Lead and Fluorspar Company, the largest operators of the mines in Illinois, and as zinc carbonate, obtained by the Chicago Mining Company from their mines in the vicinity of Marion, Crittenden County, Ky. The Kentucky Fluorspar Company, the Fluorspar Company, and the Western Fluorspar Company have opened mines in Crittenden County, Ky., and are now producers of this mineral. The Eagle Fluorspar Company is producing from deposits in both Crittenden and Livingston counties, Ky. Fluorspar deposits have recently been discovered in Smith, Wilson, and Trousdale counties, Tenn.; and the Tennessee Fluorspar & Mining Company has been incorporated to work deposits near Bellwood, Smith County. In the vicinity of Dome, Yuma County, Ariz., fluorspar occurs abundantly. If the demand for the use of fluorspar for smelting purposes increases, there will be a market for these Arizona deposits. Formerly the chief use of fluorspar was in the preparation of hydrofluoric acid, but only a small amount is now used for this purpose.

The use of fluorspar in the manufacture of opalescent glass is increasing. By far the greatest use of fluorspar is as a flux for iron, in which use many advantages are claimed for it and it is rapidly superseding limestone. Fluorspar can be used to advantage, probably, in copper smelting and in reducing many other metals. The total production of fluorspar in 1901 was 19,586 short tons, valued at \$113,803, as compared with 18,450 tons, valued at \$94,500 in 1900. The average price per ton reported for the product of 1901 was \$5, the same as in 1900. The amount of the ground fluorspar sold in 1901 was 3,700 tons, valued at \$34,100, as compared with 3,000 tons, valued at \$17,000 in 1900—an increase of 700 tons in amount, but of \$17,100 in value, the increase being due to the low price of ground fluor-



A. Shaft.

B. Mill Site.

SOCORRO GOLD COMPANY'S PROPERTY, YUMA COUNTY, ARIZONA.

and, as far as could be judged, porphyry is also the foot wall; but nothing solid was encountered so that it could not be accurately determined what the foot wall was. The vein is very uniform in its dip, which is $24^{\circ} 30'$ toward the north, and it has held this dip to the 250-foot level, which is as far as it could be examined. It has a general N.E.-S.W. strike. As far as could be determined there is no outcropping of the vein on the surface, the only place where it has been exposed being at the scene of the placer working.

The vein is practically perfect in its development, and the whole distance along its dip of 250 feet, and in the length of 160 feet along its strike at the various places at which it has been cut and exposed by means of shafts and stopes, it has held its uniform dip of $24^{\circ} 30'$. Its width varies from 18 to 36 inches and would average 28 inches. Wherever the vein has been exposed, it has on both sides a clay (kaolinized material) selvage, which varies from $\frac{1}{2}$ inch to 5 inches in thickness. This is a true fissure vein, and, although it could not be examined to a depth of 244 feet, yet its uniformity in this distance and its general geological location all point to the conclusion that it will reach to a great depth.

The development work that has been done on this property has all been on the Henry Clay claim with the exception of course of the work that was re-

quired in the locating of the other claims. All of this work was done a number of years ago, ore that was taken out having been hauled by wagon to a stamp mill located at Harrisburg. The main work consists of an inclined shaft that has been sunk on the vein, following its dip for about 250 feet. At the present time the shaft can only be examined to the 244-foot level as water is encountered at this depth; but, judging from the appearance of the bottom of the shaft and from information that could be obtained, the shaft does not extend more than 6 or 8 feet farther. The vein is just as strong at this 244-foot level as at any other point along this distance. To the 150-foot level the ore has been more or less thoroughly taken out by means of drifts and stopes for a distance of 30 to 40 feet on each side of the shaft. Pillars of ore have been left at intervals of about every 15 feet to support the roof. In places these pillars or supports extend along

the strike of the vein so that there is no opening from one stope to another. Here and there, where the sulphides apparently predominated, large blocks of ore have been left. The present company has widened the old shaft and thoroughly timbered it to the 150-foot level, making a shaft with an inside clear measurement of 5 by 8 feet and sufficiently wide for a double track. Nearly 80 feet directly east of the mouth of this shaft is another inclined shaft which has been sunk following the dip of the vein. It can be examined for a depth of 53 feet, but beyond this it has been filled up with waste material taken from the stopes and its exact depth is unknown. At the 38-foot level a stope can be entered which extends for 20 feet on the vein towards the southwest. The other stopes were so filled up with waste material that they could not be entered. The vein here has been worked in a manner similar to that in the other shaft, by drifting and stoping from each side of the shaft. How far that has been continued to the northeast of the shaft is not known as no stopes or drifts could be entered in that direction. The vein wherever observed in this shaft and stope was as regular as that observed in the other.

There is a favorable location for the erection of a stamp mill on a spur of the mountain and a little to the east of south of the shaft as shown in Fig. 1.

spar in 1900, which was only \$5.66 per ton; whereas, in 1901, the average price reported for ground fluorspar was \$9.03.

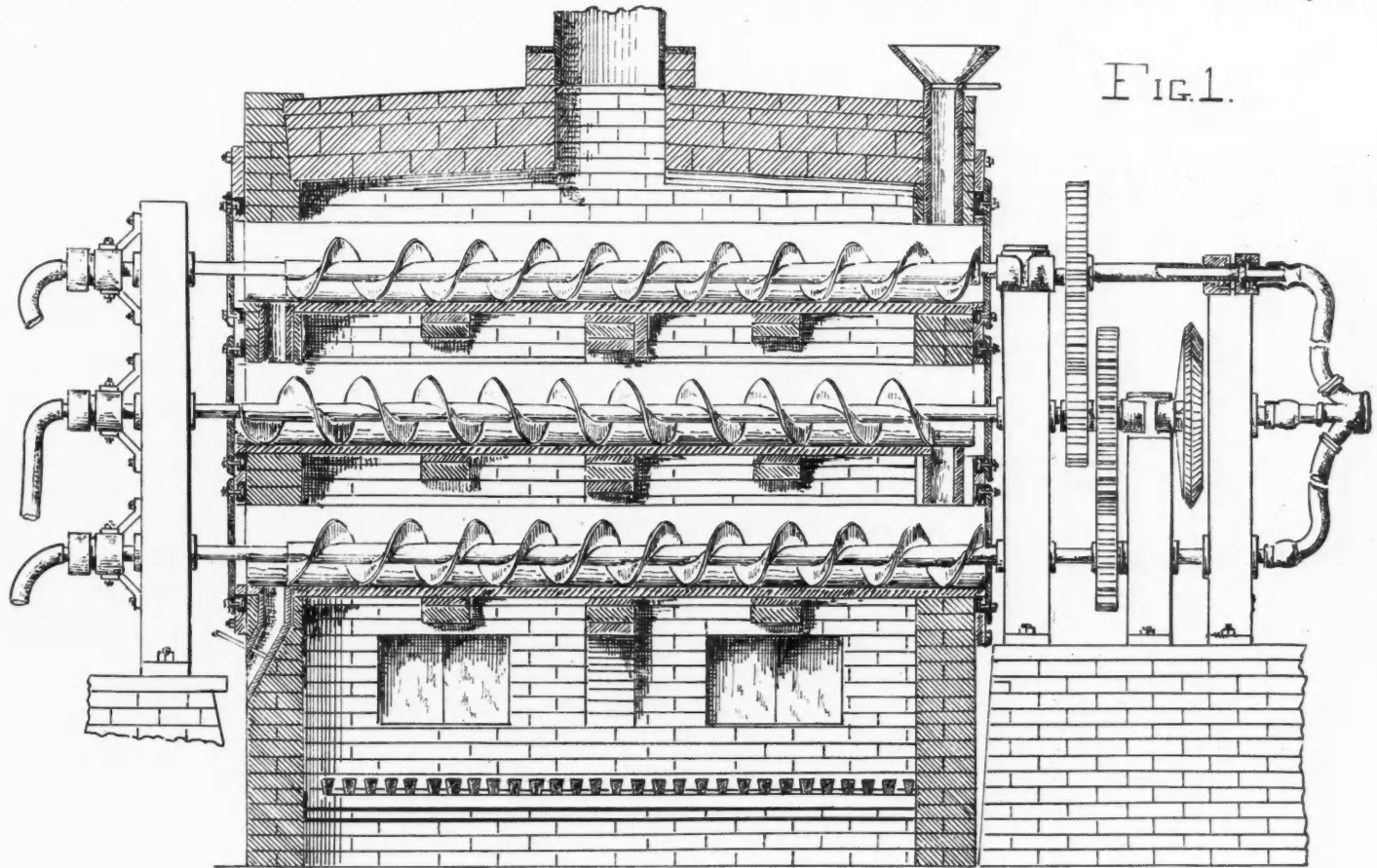
THE CHASE ROASTING FURNACE.

The roasting of sulphide ores is such an old process and so much time and skill have been given to perfecting details of furnace construction that any furnace showing radical improvements is a matter of decided interest. This article describes and illustrates a furnace containing features that are likely to excite comment, while the broad claims of the inventor should call forth some criticism. The furnace is the invention of Capt. A. W. Chase, of the United States Army, and the fact that radical improvements in a metallurgical device should be patented by an army officer is in itself a noteworthy fact. The inventor, while still a student at West Point, had his attention directed toward improvements in ore roasting

the ore. In a standard type of furnace, handling say 10 tons of ore per day, the troughs are about 12 feet long and three are used. The ore is fed into the furnace at one end of the top trough by an automatic device, and is carried forward by a screw conveyor. At the end of the trough it falls into the trough below and is pushed ahead as before until delivered. The conveyor is one of the essential features of the furnace and the remarkable results that have been obtained in experimental runs are due in a large part to its construction. It is made of cast-iron flanges, 14-inch diameter and pitch, in pitch sections interlocking on a hollow-drawn steel axis. Through this axis a stream of water flows, keeping the axis and its bearings cool and preventing the conveyor from warping or becoming distorted under the intense heat. Any particular section of the conveyor can be easily repaired, as the interlocking sections of the helix can be removed separately. The ore passing through the troughs is constantly stirred, preventing caking of fines, and part of it may be elevated enough by the

hard use is practically as good as new. Normal expansions of fire-brick and clay forms are everywhere provided for, and all bearings, closures, etc., are adjustable at will. In experimental runs the temperature has been raised to a full white heat without interfering with the working of the furnace in any way or increasing the power required for the conveyor. By means of protected sight holes at the end of each trough it is possible to see just what is going on inside, and the man in charge can vary the feed or the speed of the conveyors or regulate the fire as necessary.

While primarily designed as a furnace for dead roasting pyritic iron ore to be afterwards, by briquetting, used in a blast furnace, the inventor does not limit the furnace to this particular field, but claims that it is applicable to other purposes and for some possesses great advantages. Its chief merits are the small amount of fuel and power required, its compactness and its cost. One of its suggested uses is in the treatment of low-grade copper sulphide ores. In



THE CHASE ROASTING FURNACE.

and later became interested in the possibilities of a process that would render available as sources of iron ore the pyritic deposits of the Piedmont region between the Potomac River and Tennessee. These deposits are often of large size, but their high percentage of sulphur has practically prohibited their use in the blast furnace. The Chase furnace was primarily devised for these ores, as a furnace that should act automatically and continuously and give a dead roast.

The furnace shown in the cuts is the unit type, two or more of these being grouped in one bank for economy of construction and operation. Each unit, however, is independent in construction and can be cut out for repairs, etc., without affecting the operation of the others. The interior is entirely built of fire-brick and special strength fire-clay forms. The outer part of the double side and end walls may be either fire-brick or red brick. The ends are strengthened by strong face-plates, as shown, and the whole is solidly held together by buckstays and trussed braces. The carefully designed fire-clay troughs, supported on masonry arches, are built in sections to permit of easy replacement and quick renewal. The length of the furnace and the number of troughs may vary; these are points to be determined by the character of

pitch of the helix to fall over the shaft, giving a maximum opportunity for oxidation.

By the construction of the brick arches the heat is thrown down, giving a reverberatory effect. The feed-driving mechanism for the conveyors is so designed that the speed can be easily varied or different conveyors can be driven at different speeds. Owing to the water-cooled bearings and other mechanical details of construction the total power required for operating the furnace is not over one-half horsepower.

From the variable gearing for the different conveyors it is possible to have the upper trough feed the ore faster or slower than it is carried forward in the troughs below, or the bottom trough can be given a faster speed, thus giving opportunity for a wide range of action, the ore being heated most in any desired trough. Producer gas can be used as fuel and the flame allowed to play directly on the troughs, or for certain purposes the source of heat may be outside of the furnace and only a current of heated air led through. There being always a clearance between the hearths and screws, and there being no metal anywhere in the interior construction, there is no buckling or change of form due to unequal expansions under heat, and the furnace shown after months of

such case the fine ore mixed with the necessary amount of salt is given a hot chloridizing roast and the copper chloride leached by any approved method. In case precious metals are present the escaping gases from the stack can be cooled and any volatilized values saved.

Another use suggested for the furnace is as a dryer. In case the presence of products of combustion would be detrimental to the substances dried a hot blast can be used. The construction minimizes flue dust. For the manufacture of portland cement, likewise, it is claimed that the furnace has advantages. Instead of roasting the material to a clinker, as in an ordinary cement kiln, the inventor believes that through the constant stirring action of the conveyors it is possible to burn the ingredients to the right point without large lumps of clinker forming, thus giving a very uniform product with no unburnt portions and saving a large amount of grinding in the subsequent reduction of the clinker. Other possible uses of the furnace may be suggested, but these alone suffice to show its possibilities.

The furnace shown is about 14 feet long and 12 feet high. A block of two such furnaces would thus nearly form a cube. In experimental runs the coal consumption has averaged below 1 ton per 24 hours

of a poor quality of bituminous coal. As showing the capabilities of the furnace, the following results have been obtained with pyrites cinder, screened to 30 mesh and under, containing 3 per cent and over of copper.

Rate per 24 hrs.	Average of S. in charge.	Total S. in dead roasted cinder.	Sol. const. in deadroast.	Remarks.
			S. Cu. Fe. CaO.	
7.2 tons.....	4.40	0.64	0.62 0.20	None. 0.82
9.6 tons.....	5.90	1.51	0.92 0.57	None. 0.82
9.6 tons.....	5.07	1.17	1.01	None. 0.82

Heat not satisfactory.
High heat.

The determination of soluble constituents indicates that all Fe and most of the Cu present in the original material was changed to oxide in the dead roasting process. Calcium in the form of CaSo₄ would remain unchanged.

Broadly described, it is a multiple hearth reverberatory furnace, in which the heat can be applied in degree desired to each and every part of the hearths. The stirring is constant and uniform, the finely divided charge being alternately exposed to heated air and to heated fire-clay and cast-iron. In chloridizing roasting the hearths are run with greater depths of ore than in dead roasting, and the screws at slower speed, to give depth of ore and time for action of gases due to mutual decomposition. Arrangements are now completed for putting the furnace on the market. The driving gear, which differs from that shown in the cut, is to be made by a well-known engineering company, and the fire-clay and brick work will be erected by a prominent constructor. W. H. Adams, of 18 Broadway, New York, will act as agent for the furnace.

ARKANSAS LEAD AND ZINC FIELDS.

During the present summer the United States Geological Survey will continue the study of the lead and zinc fields in Northern Arkansas; this work will be under the charge of George I. Adams, assistant geologist, who will be assisted by Prof. A. H. Purdue, of the Arkansas State University, and by Ernest F. Burchard. In this investigation an attempt will be made to describe all the camps of that important section and in particular will include a careful survey of the territory covered by the Government topographic map sheet known as the Yellville quadrangle, which includes most of Marion and parts of Boone, Newton and Searcy counties. This work will be a continuation in detail of the study of the Ozark lead and zinc region, which includes Northern Arkansas upon which a preliminary report by Baine and Adams was issued in the last annual. The results of the work will be a report upon the lead and zinc field of Northern Arkansas, together with a geologic folio, which will follow other similar folios, issued by the Geological Survey, in giving an accurate geological description of the region, illustrated by maps showing the topography and also the surface economic and structural geologic features.

At the close of his work in Northern Arkansas, Mr. Adams will be engaged in a reconnaissance in Northern Texas for the purpose of determining the stratigraphic relations existing there between the Carboniferous and the so-called Red-beds; it is expected that this work will throw light upon the disputed problem of the extent of the Permian formation in that region. Mr. Adams has recently published a report on the oil and gas fields of the western interior and Northern Texas Coal Measures, and the Upper Cretaceous and Tertiary of the Western Gulf Coast, which appeared as Bulletin 184 of the United States Geological Survey. A documentary edition of this bulletin for free distribution, upon application to the Director, is now available.

COAL IN INDIA.—The output of the State colliery at Warora in the Central Provinces (India) in 1901 was 138,520 tons, compared with 131,584 tons during the previous year. The total earnings of the year amounted to 633,559 rupees, and the total expenditure was 419,171 rupees, showing a net profit of 214,381 rupees, equal to a return of 12.83 per cent on the capital expenditure.

QUARTZ AS AN INDUSTRIAL MATERIAL.*

Those of us who have followed the gradual development of the use of silica as a plastic substance, capable of being moulded into any convenient form and exhibiting properties not possessed by any other material, are aware that the discovery of the vast possibilities of the employment of fused quartz are due to one man, C. Vernon Boys. His beautiful and most ingenious experiments have shown us that quartz when fused can be treated like so much glass, that it is moderately plastic through a certain range of temperature, that it is eminently tenacious, and that its physical condition is approximately constant.

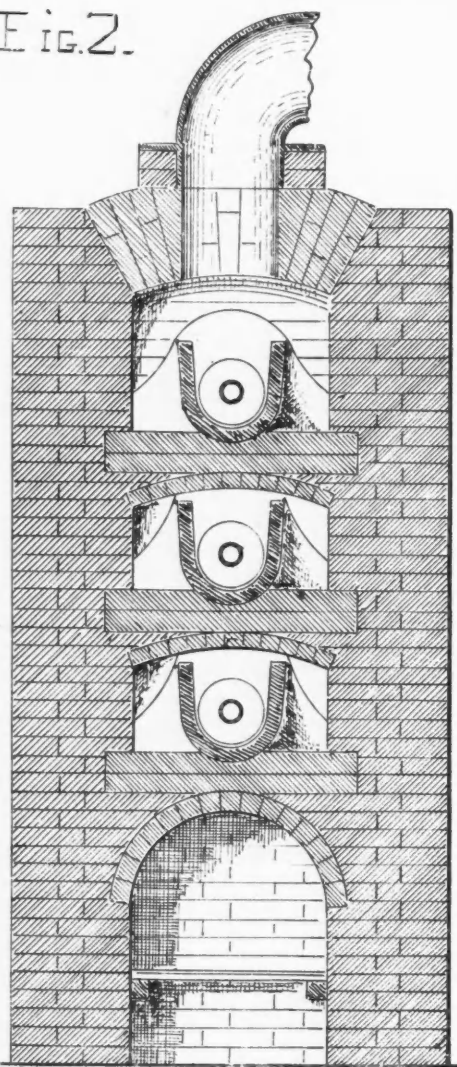
The last clause is the most important. This constancy of condition was turned to account by Professor Boys for the experiments in which he was at the moment particularly concerned, these needing

glassblower, engaged in a more delicate task and endeavored to prepare, and successfully prepared, apparatus made of quartz fused before the oxy-hydrogen blowpipe. The vessels which he was able to make were comparatively small and rough, but they served to demonstrate the important fact that fused quartz when moulded into a tube or bulb can be maltreated in the grossest manner and yet preserve its integrity. It is mechanically strong, and it is so free from internal stresses and is so little affected by alteration of temperature that it can when red hot be thrown into water without breaking. If physics were a little more advanced all this might have been predicted from the original observations of Boys, but with facts as they are and knowledge as it is, the matter had to be determined by experiment.

A short period of repose followed in the history of fused quartz, and then a great stride was made. Mr. R. S. Hutton, of Owens College, Manchester, in studying the behavior of substances at the high temperatures obtainable in the electric furnace, conceived the idea that quartz might be fused by this means, and that apparatus and vessels of fused quartz might be prepared in this manner. To a chemist an obstacle arises in the fact that when silica is heated to its fusing point in contact with carbon it is reduced and volatilized, and quartz as quartz disappears. This phenomenon is general. A humble case is afforded by zinc oxide. Zinc cannot be prepared by heating zinc oxide in hydrogen. But zinc oxide can be volatilized in hydrogen, the metal being momentarily reduced and immediately afterwards re-oxidized; the reaction is jointly dependent on temperature and the relative masses of the substances interacting. Similarly with quartz; the oxide is probably reduced, the silicon volatilized, promptly re-oxidized, and deposited as silica. A striking experiment devised and shown by Moissan consists in heating silica in the electric furnace and collecting volatilized silica in a bell jar set above it. Moissan has not put forth his opinion of what happens to the silica in the process. We are disposed to believe that it is reduced and re-oxidized, and this belief is borne out by Mr. Hutton's experiments. He found that although quartz was freely volatilized in the electric furnace, yet when a current of air was blown into the crucible containing the quartz, volatilization ceased and the mass fused. He describes in a paper lately presented to the Manchester Literary and Philosophical Society his endeavors to turn this observation to account. In the first instance he deflected magnetically an arc upon the quartz to be fused, the arrangement being equivalent to turning a blow-pipe flame upon a substance to be heated. These experiments showed that under proper conditions it is possible to fuse quartz even on carbon supports without reduction occurring; at the worst a temporary reduction takes place, such as happens when lead glass is worked before the blow-pipe. The highly ingenious but faulty thermometers devised a few years ago having an alloy of sodium and potassium as the expandible liquid were characterized by their bulbs, which commonly showed a brown stain. This was due not to lead, but to silicon reduced from the silicates constituting the glass by the action of the alkali metals during the heating of the instrument for expulsion of gas. A similar action occurs with quartz in the electric furnace; silicon is reduced and dissolves in the unchanged silica, giving a dark stain.

The next step in the fusing of quartz was to heat it in a Moissan furnace of the reverberatory type, placing the raw material below the arc and allowing the heat to be radiated upon the charge to be melted, both from the arc and from the arched roof of the furnace. With this arrangement it is possible to fuse quartz round a core of carbon without reducing silicon, and to form a tube of quartz comparable with a tube of rough glass and capable of being drawn and blown. It is interesting to note that when pure white sand is substituted for broken quartz the fused mass obtained is more or less opaque; it is hard to say why this should be, for the substances are chemically identical, and

FIG. 2.



CHASE ROASTING FURNACE.

a thread perfectly elastic. Torque on a hard-drawn wire, on a filament of silk or of glass, puts on the material some permanent strain, and the filament fails to "come back" with accuracy. We do not know whether Professor Boys has determined the modulus of elasticity for quartz, but it is safe to prophesy that it must be high. Another interesting property is that the attraction of the substance for water is so small that an electrically-charged body suspended by a quartz thread preserves its charge almost indefinitely. These facts suffice to indicate the directions in which quartz may be utilized for every-day purposes. In particular, its freedom from internal strains, its quality in this respect being in striking contrast to that of glass, gives it a great mechanical advantage over that material.

Following on the work of Professor Boys came that of Shenstone, who, having acquired for the purpose of his researches the difficult art of the

*Abstract of article in the London Engineer.

if both are fused they must arrive at the same condition; further study is necessary here.

Now as regards the practical bearing of all this. The fundamental facts are the good and useful properties of fused quartz and the ready means of fusing it in the electric furnace; added to this are the direct experiments which we have quoted, proving that there is no practical difficulty in effecting the fusion; the one obstacle—possible reduction—has been completely overcome. The next step is to put this work on an industrial basis. We see no reason why the quartz should not merely be moulded or fused round a core, but actually cast. The applications are numerous. In chemical industries vessels capable of withstanding the action of acids are in serious request. At present they are commonly made of lead, stoneware or glass. All have disadvantages. Lead is by no means incorrodible; stoneware cannot be freely heated; glass is equally sensitive, and is mechanically feeble. Fused quartz is free from all these defects. For concentrating sulphuric acid quartz stills might well be used to advantage. For accumulator cells, for electrolytic tanks, for filter press frames, for pumps, handling corrosive liquids, and for all forms of concentrating apparatus, fused quartz is admirably adapted. There is no reason why its manufacture should not be started at once. There are no tiresome patents; the principles are known, and the directions in which they may be applied have been pointed out by three able observers, who, completely detached from all money-making considerations, have laid down a road for their commercial followers.

COAL RATES IN RUSSIA.—The railway tariff committee of the Russian Government has reduced the freight charges on coal intended for export from the ports on the Sea of Azov to the extent of 1 copeck per pood.

GOLD IN PORTUGUESE EAST AFRICA.—United States Consul W. S. Hollis at Lourenço Marquez, reports that discoveries of extensive gold-bearing reefs have recently been made in the Uanetz District in Mozambique. The district is on Portuguese territory, near the Transvaal border. Arrangements are now being made to work the Macequece gold-fields, in the same territory.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

ISSUE OF PATENT ON MINING CLAIM AFTER NOTICE IS CONCLUSIVE.—The application was for a patent on a whole claim, and carried with it, the implied, if not expressed, allegation that the location was made upon the land at the time open to location, and was therefore prior to any location of same by any one else. The issuance by the government of its patent, after due notice to all the world of the application, and ample notice to every one to contest it, conclusively determined, as against every one whose surface lines conflicted with same, the priority of that location over every other, and conveyed upon the grantees and their successors in interest not only the entire surface of the claim, but as against every one whose surface lines conflicted therewith the extra-lateral rights conferred by section 2322 of the Revised Statutes to follow on their dip outside of the side lines, and within vertical planes drawn through the parallel end lines extended in their own direction, all veins, lodes or ledges, the tops or apices of which lie inside the surface lines of the claim.—*Empire State—Idaho Mining & Developing Company v. Bunker Hill & Sullivan Mining & Concentrating Company.* (114 *Federal Reporter* 420) United States Circuit Court of Appeals, Idaho.

EXTRA-LATERAL RIGHTS IN LODGE MINING CLAIMS.—Extra-lateral rights of a lode mining claim apply only to what is beneath the surface, and never operate to enlarge surface rights which, under the law, are limited to 300 feet in width on each side of the

center of the lode or ledge; and where the lode or ledge is of greater width, so that the outcroppings extend beyond the side line, another claim may be located on same which will carry with it all surface rights within its boundaries, and underground extra-lateral rights, subject to those of the older claim; and where the end line planes of the two claims are not parallel, or do not coincide, the second locator may follow the vein in its dip between the planes of his own end lines wherever not included between the end line planes of the senior location, as against any subsequent locator along the lode beyond an end line of the first claim. It is settled law in the federal courts that, where an action at law is tried by the court, its findings upon questions of fact are conclusive, and that the only matters reviewable in the appellate court are the rulings of the court on questions of law, when properly presented by the bill of exceptions, and, where special findings are made, whether the facts found are sufficient to sustain the judgment.—*Empire State—Idaho Mining and Development Company v. Bunker Hill & Sullivan Mining and Concentrating Company.* (114 *Federal Reporter*, 417); United States Circuit Court of Appeals, Idaho.

CONSTRUCTION OF DEED CONVEYING COAL TO BE MINED BY FIXED DATE.—A deed conveyed "all the coal and the right to mine and remove the same under lands described," and further provided that the grantee "is to mine and remove said coal by May 1, 1891, and no coal is to be mined after that date. By accepting this conveyance, the grantee agrees to mine and remove said coal by May 1, 1891." The court held the language of the deed to be clear and unambiguous; that it could have but one meaning, either to the lay or professional mind, and that meaning was that the grantee's right to mine the coal in the land, as well as the right to the coal not mined on the 1st day of May, 1891, terminated on that day. It is unreasonable to suppose that he bought coal which he agreed never to mine. He was guilty of no such absurdity. No court would place such a construction on the deed unless its language compelled it. The plain language of the deed refutes such a construction. The coal he bought was not all the coal under the land, but the coal that he should mine up to the day his right to mine coal in the land was terminated by the terms in his deed. The right to the coal and the right to mine it are, by the terms of the deed, indissolubly linked together, and expired together. The right to mine and remove the coal is the very substance of the contract. A limitation upon the right is necessarily a limitation upon the coal conveyed, for the coal conveyed is of no use or utility to the purchaser without the right to mine and remove, and there can be no implied right to mine and remove when the right is express and the limitation is expressly put upon the right.

No technical rule of law or construction can be admitted to subvert a fundamental and paramount right.—*Butler v. McGorrick* (114 *Federal Reporter*, 300) United States Circuit Court of Appeals, Iowa.

ABSTRACTS OF OFFICIAL REPORTS.

Pennsylvania Steel Company.

The report of this company for the year 1901, says: "In submitting this, the first annual report of the Pennsylvania Steel Company of New Jersey, your board wishes to place clearly before you the fact that your company is not at present an operating or manufacturing corporation. It is interested as a security-holding company in other manufacturing and mining corporations, but it does not as yet conduct any manufacturing or mining operations itself. Its income, therefore, comes exclusively from the dividends and interest paid on the various securities owned by it, and not directly from the profits of manufacturing or mining. The principal corporations in which you are interested, together with your holdings in the same, on January 1, 1902, were as follows:

"The Pennsylvania Steel Company (of Pennsyl-

vania), whose capital stock consists of \$1,500,000, par value of preferred, and \$5,000,000, par value, of common. Of this you own the entire issue excepting a small fraction of one per cent.

"Maryland Steel Company, whose entire capital stock, \$1,000,000 in par value, is owned by you.

"The Baltimore and Sparrow's Point Railroad Company, of which you own the entire capital stock of \$150,000, par value.

"The Spanish-American Iron Company, whose entire outstanding capital stock, \$2,400,000 in par value, is owned by you.

"The Juragua Iron Company, Limited, of which you own one-half the capital stock, the total issue of which is \$1,395,000.

"You also own \$85,000, par value, of the 5 per cent first mortgage bonds of the Maryland Steel Company, the entire issue of which amounts to \$2,000,000; \$518,000, par value, out of a total issue of \$4,000,000 of the 6 per cent consolidated joint mortgage bonds of the Pennsylvania and Maryland Steel companies; and \$259,430, par value, of the debenture bonds of the Spanish-American Iron Company, being all of the outstanding bonds of that company. You also own an interest in the preferred and common stocks of the Cuban Steel Ore Company. The reports received of the present condition of that company's iron ore mines in the island of Cuba are not encouraging, and if no improvement is shown during the present year, a proper adjustment of values will be made of your interest in the company, in connection with your other Cuban iron ore properties, which have proved more valuable than was anticipated.

"While the business of your company began on May 1, 1901, the following combined statement of earnings of the various operating companies in which you are interested, covers the calendar year 1901 (one-half of the earnings of the Juragua Iron Company, Limited, being taken into account):—

Net earnings.....	\$2,879,272
Add incidental receipts from rents and income from investments and interest.....	323,559
Gross income from all sources.....	\$3,202,831
Deduct interest on bonded and floating indebtedness.....	550,113
Net income for the year.....	\$2,652,718
Deduct reserves for depreciation.....	491,211
Net gain of operating companies for 1901.....	\$2,161,507

"Out of this net gain the operating companies have paid dividends amounting to \$1,150,750, which has gone into the treasury of your company. The balance remaining has been carried to the credit of the profit and loss accounts of the various companies. The amounts charged to depreciation, \$491,211, are felt to be ample. In addition to this sum, \$253,663 has been expended on renewals and betterments, and charged to costs of operation. During the year many additions and improvements have been made or begun by the various corporations owned by your company. The principal of these are as follows: By the Pennsylvania Steel Company at Steelton, the construction of new frog and switch shops, new bridge shops, and a new plant for generating electric power. This company has also acquired a considerable interest in the Cornwall ore banks, and has bought two blast furnaces at Lebanon, Pa. By the Maryland Steel Company at Sparrow's Point, the construction of by-product coke ovens, the building of additional workmen's houses, and extensions to the shipbuilding plant. By the Spanish-American Iron Company in the island of Cuba, the building of a new line of railroad to and the development of new iron ore mines. It is expected that the principal part of these improvements will be completed during the present calendar year."

The balance sheet of the company, on April 10, 1902, shows: Cash, \$680,767; loans, \$266,607; stocks and bonds, \$26,911,651; total assets, \$27,859,025. The liabilities were: Capital stock—preferred, \$16,500,000; capital stock—common, \$10,750,000; surplus, \$609,025; total liabilities, \$27,859,025.

The profit and loss account to April 10, 1902, shows dividends from operating companies and miscellaneous interest received, \$1,215,062. The expenses were \$30,581, leaving as net earnings, \$1,184,481. The dividends paid were \$575,456, leaving a

surplus of \$609,025. Out of the net earnings a dividend of $3\frac{1}{2}$ per cent was paid on preferred stock November 1, 1901, and a dividend of the same amount on the same class of stock has been declared paid on May 1, 1902. No dividend has been declared on the common stock.

Montana Mining Company, Limited.

The report of this company covers the half-year ending December 31, 1901. It is well known that the Drumlummon Mine, for a number of years successfully operated by the company, is approaching exhaustion, and the chief earnings are from tailings cyanided. Last year 12,900 tons of ore were mined and 64,593 tons of tailings treated, with results as shown below:

	Ore.		Tailings.	
	Amount.	Per ton.	Amount.	Per ton.
Gold, ounces.....	3,051	0.24	7,169	0.11
Silver, ounces.....	9,841	0.76	43,237	0.67
Values	\$64,526	\$5.00	\$168,257	\$2.60
Expenses	92,619	7.18	64,707	1.00
Net or less.....	L. \$28,093	\$2.18	N. \$103,550	\$1.60

The total net earnings were therefore \$75,457, from which is to be deducted \$11,161 expended on abandoned properties, leaving a balance of \$64,296.

The directors' report as issued from the London office, says: The revenue account shows a net profit for the half-year of £11,120, which, with the balance of profit amounting to £35,883 brought forward, gives a total of £47,003 to be carried forward to the next half-year. The expenditure during the half-year, charged to capital account, for developments and installation of plant on "Lucky Girl" group of mines, Nevada, amounted to £13,936. For the first two months 30 stamps, and for the remaining four months of the half-year 40 stamps were employed in reducing 12,900 tons of ore, while 64,593 tons of tailings were cyanided, with the results shown.

"The developments in the mine and adjoining claims belonging to the company during the half-year were represented by 1,571 lineal feet of drifts, cross-cuts and winzes. Although no important discoveries were made, 12,900 tons of low grade ore were extracted from various parts and passed through the mill. The expenditure attending this dead work and the removal of the pumping machinery from the lower levels of the mine amounted to £3,358.

"Of the several properties submitted and examined since the directors' last report, two have been selected—one is in course of development and work will shortly be begun on the other. Respecting the group of claims in the State of Montana, referred to in the directors' last report, upon further development it became evident that the phenomenal richness of the lode observable in the earlier stages was not only not maintained, but the ore body gradually became impoverished as depth was attained. The directors therefore had no alternative but to abandon the property. The entire expenditure attending the development of this group of claims, and the search for and development of other outside properties up to December 31, 1901, has charged against the earnings for the half-year.

"The Lucky Girl group in Nevada having been purchased and paid for, milling operations began on January 1. The result of the first two months' operations, together with the concurrent exhaustive experiments by the company's chemist, proved conclusively that the concentrating process, familiarized to shareholders in the treatment of Montana ores, was not suitable to the class of ore met with in Nevada, and that the highest percentage of extraction could only be obtained by cyaniding the entire pulp after passing over the plates. The directors, therefore, immediately instructed Mr. Burrell to order a cyanide plant, which will be delivered and erected as soon as possible. In regard to future prospects, as the result of an exhaustive examination of the mine, Mr. Burrell reports as follows: 'At the north and south ends of the mine I was very agreeably surprised to find the stopes opening up so well. Near the north end of the contact vein, directly over the drift where the vein was about 4 feet wide, the stope opened to over 10 feet of good, clean quartz,

and the same condition was noticeable at the south end, but not to the same extent. I look for large chambers of ore in this massive quartzite. With the present development we could supply 80 to 100 tons of quartz per day of 9 hours to the mill if the mill could crush it. With the saving of the mill improved and the tonnage increased you will realize all or more than you have been led to expect from this property.' A plentiful supply of ore being assured, the erection of additional stamps will be considered by the board as soon as Mr. Burrell advises it.

"The directors have been informed that the appeal of the St. Louis Mining and Milling Company in the two minor cases, Nos. 714 and 715, has been dismissed. The trial of the two important cases known as Nos. 213 and 214 was concluded by the Supreme Court of the United States at Washington, judgment being reserved.

"The policy of the board continues unchanged, to strengthen the financial position of the company as much as possible in order to provide funds for testing new properties, and for their acquisition and development, if found desirable. They, therefore, do not recommend the payment of a dividend at present."

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.

Die Gewichtsberichtigung der Eisenkonstruktion. By Emil Bousse. Leipzig, Germany; Theod. Thomas. Pages, 112; with 58 illustrations.

The Deep-lying Auriferous Gravels and Table Mountains of California. By Henry G. Hanks. San Francisco; F. H. Abbott. Pamphlet, 16 pages; illustrated.

The Michigan Engineer. Proceedings of the Michigan Engineering Society for 1902. Climax, Mich.; published by the Society, F. Hodgman, Secretary. Pages, 172; illustrated.

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.

The Statistical Year Book of Canada for 1901. Seventeenth Year of Issue. Prepared and issued by the Department of Agriculture. Ottawa, Canada; Government Printing Bureau. Pages, 680.

BOOKS REVIEWED.

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

Dr. DeMorgan's book was first published in 1831 and has been a standard for many years. It is too well known to be criticised at this late day. The original edition is out of print, and the publishers have done a service in bringing out the work again. It deserves many readers.

Methods d'Analyse des Laboratoires d'Acienis Thomas. By Albert Wencelius, Paris, France; Ch. Beranger. Pages, 120; illustrated.

This book is compiled mainly from notes and personal experiences. It is a record of the methods employed in the laboratories of the companies manufacturing Thomas or basic steel, showing the different determinations which chemists in such works are obliged to make. It includes the methods used in actual practice for ores, fluxes, fuel, slags, pig iron and other materials; in the determination of different elements; and in the analyses of furnace gases and other by-products. It includes references to methods used in America as well as in France and Germany. A number of useful tables are also given.

Handbook of Technical Gas-Analysis. By Dr. Clemens Winkler. Second English edition, translated from the German with additions by Dr. George Lunge. London, England; Guernsey & Jackson. Pages, 190; illustrated.

Prof. Winkler's *Handbook*, which was a short treatise, intended mainly for teaching purposes, was first issued in 1885. A third edition, largely re-written, was published in 1901, and it is from the latter that the present English edition has been translated. As is well known, Prof. Winkler is the founder of technical gas analysis as a distinct branch of analytical chemistry. He was the first to draw attention to the importance of the subject, to devise complete systems of qualitative and quantitative analyses, and to invent apparatus. He systematized the work of earlier chemists and applied the analysis of gases to practical ends in chemical processes, and also in testing the value of fuels and the efficiency of combustion arrangements in boilers and furnaces. The present edition contains many additions to the original, and includes all the more important processes and apparatus for gas analysis. The work is increased in value by the additions made by Dr. George Lunge, who translated it into English, and whose mastery of the subject is well known.

Standard Polyphase Apparatus and Systems. Third Edition, Revised. By Maurice A. Oudin. New York; the D. Van Nostrand Company. London; Sampson Low, Manton & Company, Limited. Pages, 292; illustrated. Price, \$3.

A third edition of this book has been found necessary to bring it up to date, in view of the constant progress and frequent changes in electrical practice. The applications of the polyphase system have been very largely extended, and its recent features are the increased size of generators and of power consuming machinery and the invention of new devices for their control. The polyphase system has been found to be almost universally applicable, and has largely replaced the two-phase, and to a still greater extent the monocyclic system. The book as rewritten appears to be a very full account of the latest and most generally accepted practice. It is illustrated by a number of diagrams, and accompanied by tables required in making calculations. There are also a number of illustrations of apparatus used.

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

Those who are familiar with the earlier editions of this work know its value as a description of the various systems of turbines in use, with mathematical demonstrations of the principles involved. The present edition is said to be revised and brought up to date; but this is hardly the case with a book published in 1902 which speaks of the hydraulic plant at Niagara Falls as "approaching completion" only. Moreover the section relating to impact wheels—like the Pelton and other types so largely used in the West—is brief and unsatisfactory. A proper revision could surely have given us much later and better information.

Apart from these imperfections the book is a good one. It goes into the theory and practice of turbine construction quite fully, and gives a number of instances, including several of the large and important Swiss, German and French plants, the construction of which has been an important feature of hydraulic engineering in recent years. The student of this book requires a considerable knowledge of mathematics to follow the author's demonstrations. These are generally full and carefully worked out. In the measurement of flowing water the most recent experiments are given, and in some other points the work has really been brought up to current practice.

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 King Solomon Mines.

Sir:—In view of the magnificent promises made in the advertisements of the King Solomon Gold Mining Company, of Calaveras County, California, a little of their past history may be of interest:

The mine is situated in the lowest gold belt of the foot-hills, west of and adjoining the cupriferous serpentine rocks on which are situated the Newton, Campo, Seco and Union Copper mines and 8 miles west of the Mother Lode. These talcose slates all contain gold but are apparently very spotted and never have been successfully treated, which, I unfortunately know from personal and expensive experience. Early in the nineties the King Solomon, then opened by a shallow tunnel, was sold for about \$20,000 and a Huntingdon Mill was installed. The trial was a complete failure. I several times tested the mine for my own satisfaction, but was unable to discover any regularity in the occurrence of the gold, though we would have been quite satisfied to have found \$2.50 per ton, uniformly distributed. The gold itself under the glass appeared to be spherical and a secondary deposition and in the pan or horn gave an exaggerated idea of its value. The statements now made would tend to show a considerable change in the character of the rock if it requires roasting before cyaniding.

CYANIDE.

San Francisco, May 28, 1902.

Mining Opportunities Near Salmon City, Idaho.

Sir:—The country between Salmon and Shoup—both on the Salmon River and 40 miles apart—and in the divides on each side of that river seem to present better opportunities for the prospectors and capitalists than any section of Idaho that I have yet examined. Many good ledges carrying copper, lead, silver and gold have been discovered and it is a country and a formation where many more will be discovered.

True, much, if not all the gold-bearing rock has been found to be refractory with depth, but this is just where the capitalist comes in; a smelter and a railroad are badly needed. Judging from a superficial examination I should say, that, in the country named, the smelter could obtain any ore desired, and with the fluxes near by and obtainable by rail could mix its charge with ease.

What Lemhi County needs is a railroad and some depth in its prospects—for none of them can yet be called mines. Oxidation and disintegration of surface deposits have caused the large amount of free gold and placer ground in this county. Many of the richest veins are mere stringers and will never pay to work, but other large ledges of fair grade ore have been discovered, and with depth, these should develop into valuable deposits of copper and lead-carrying silver and gold.

Salmon, the central point for supplies, is at present 60 miles from any railroad, and is reached by good stage service from Red Rock, Montana. It is a pleasant town of some thousand inhabitants and contains a number of fine buildings, a good hotel, water and electric light plants.

Wood and water are plentiful in this whole section and almost any amount of power can be developed at small expense from the Salmon River and its tributaries. The country rock in the portion of this district that I was able to examine is schist and granite, and the veins largely quartz, many of the best being found in the contact. Some exceedingly rich surface deposits have been discovered, and as I have already said, it is the wash from these that has formed the placer and dredging propositions that have been worked for years past.

I had the pleasure of examining the new dredge on Moose Creek, being constructed for the Pacific Dredge Company, J. G. Hateley, manager. The old dredge, which had been working three years, was wrecked by a boiler explosion last fall. The new one is built under plans of the Bucyrus Company, has a capacity of 2,000 yards per day, is strong and compact, and contains several new features. One is led to wonder, however, why, with wood at \$3 per cord and an abundant water supply, ready to turn on to a wheel, the water was not utilized and the boat worked by electric power.

Under the present conditions of expensive transportation, dredging seems to present the most certain investment in the State. The property can be thoroughly tested and its value exactly determined at a small expenditure before any machinery is ordered; and if the machinery is properly selected and put together, one knows in advance exactly what the extraction is going to cost; so that the element of chance is largely eliminated. Dredging in the section I have briefly sketched has been a success, and it should be in any suitable section if properly introduced and managed.

S. H. BROCKUNIER.

Mackay, Idaho, 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.)

Natural Soda.—Can you tell me if there are being worked any natural deposits of sodium sulphate in the United States; if so, where? Where can one find an article on its commercial uses, the methods used in its fabrication, etc?—J. A. T.

Answer.—The natural soda deposits best known in the United States are in the States of Nevada and Wyoming. There was no production from these deposits last year, though some work was done in previous years.

Your question as to methods, etc., was answered in this column in our issue of May 31 last.

As the imports into China last year exceeded the exports, there has been no trade balance abroad to draw upon for any part of this amount, and it has become necessary to raise it by internal taxation, with the exception of that portion secured from duties on imports. Most of the customs duties are already pledged to secure loans made prior to the last treaty. China is permitted by that treaty to increase import duties 5 per cent; but the amount so raised would be less than one-third of the indemnity payment for the year.

Scheelite.—1. In your issue of February 15th, ferro-tungsten is quoted at 28 cents per pound; tungsten (best), 62 cents; and under the "Rare Earths," calcium-tungstate (scheelite) at 60 cents per pound. I have read and been told that the latter was the native form or ore of tungsten, and therefore think there must be a mistake when there is only a difference of 2 cents between the two.

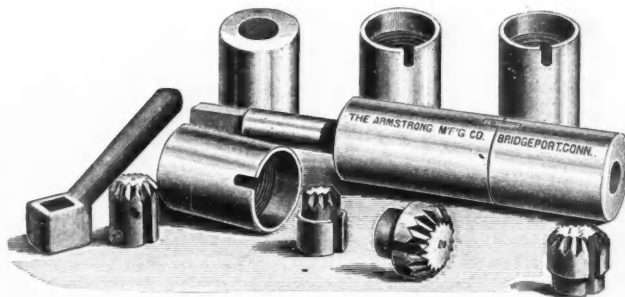
2. I am interested in a mine containing scheelite, and will be obliged if you will inform me whether there is a large demand for tungsten and its compounds, and an idea of the approximate annual consumption of tungsten, ferro-tungsten and tungsten ores respectively, also the name of a buyer or agent (the latter preferred) with whom I could communicate.

3. Is tungsten (best) used in a malleable state or as metallic powder?—H. B. N. Z.

Answer.—1. The quotation for tungsten metal and ferro-tungsten is for large lots sold by the makers directly. The quotation for scheelite or calcium tungstate is not for the ordinary ore, but for the pure salt, powdered and freed from all extraneous material.

2. The demand for tungsten ores is not large. The production in the United States is not over 250 to 300 tons yearly. The production of metallic tungsten and ferro-tungsten is between 150,000 and 200,000 pounds. There are no statistics of the production abroad, but the total output of the metal in the world cannot exceed 200 tons. As to dealers or buyers in the United States, we may name the Primos Chemical Company, Primos, Pa., and Ash & Deininger, Phoenixville, Pa. A list of foreign buyers was given in our issue of May 3 last, page 630.

3. In making steel, tungsten is used chiefly in the form of ferro-tungsten, which is added in the crucible.



ARMSTRONG NIPPLE HOLDER.

THE ARMSTRONG NIPPLE HOLDER.

The accompanying illustration shows a new nipple holder made by the Armstrong Manufacturing Company, of Bridgeport, Conn., to be used in connection with their 00 pipe threading machine. It holds pipe from 1 to 4 inches inclusive by using different threaded rings and backing pieces. It will also hold close nipples, either right hand or left hand, no change of parts being necessary to hold the nipple for threading it left hand. When thread is cut the nipple can be removed with the finger by loosening the screw in the back of the holder. This nipple holder can be furnished to hold as small as 3/4 inch if required.

Chinese Indemnity.—Will you kindly inform us in your "Questions and Answers" column what the agreement is between China and the Powers covering payment of the former's indemnity, in respect to the amount of each installment and the period of time over which these installments are to be paid.—C. B. L.

Answer.—The total amount of indemnity provided for, to be paid by China to the Powers, was 450,000,000 taels, the yearly payment being 30,000,000 taels. The tael is to be taken at a fixed valuation or exchange, which makes the amount about 75 cents per tael. Owing to the fall in price of silver the actual amount to be raised in China this year will be between 32,000,000 and 33,000,000 taels in silver.

UNITED STATES COALING STATION AT MANILA.

One of the most potent factors in the Government policy of holding the Philippine Islands was the advantageous position of Manila Harbor as a coaling station for war vessels in the eastern waters. The naval engineers decided that Sangley Point would be the best location for large coal pockets and coal handling machinery.

Extensive wharves and fireproof buildings are being erected for this purpose. There are two coal sheds each 194 feet wide and 300 feet long, with an interval of 50 feet between them, while the wharf is 416 feet in length and 75 feet wide. The coal handling machinery was designed to remove coal from colliers, by means of hoisting towers, and to distribute it in the storage sheds by automatic railways; also to coal the war vessels at the wharf from the shed. To do this to best advantage required two steeple towers equipped with steam-hoisting engines and duplex steam shovels, twelve automatic railroads and over a mile of track. All this coal-handling machinery, together with accessories, such as railway equipment, cars, coal-tubs, etc., is being built by the C. W. Hunt Company, New York.

Recently 36 flat-top four-wheel cars were completed and shipped to the Philippine Islands. Each car is of one-ton capacity, to be used on the Hunt industrial railway. The gauge for this railway is 21½ inches, out-to-out of rail heads. It is admirably adapted for transporting material on wharves, warehouses, docks and shops.

HOW TO SAVE FLUE DUST.

The present strained relations between the producers and the purchasers of precious metal ores are causing considerable comment. That an adjustment or compromise of some kind will have to be made in the near future there is little doubt. The main trouble seems to be that the producers do not believe that the present method of sampling gives a fair assay. The method in vogue now, at practically all of the smelters, is to crush fine for sampling only one-fifth of each lot delivered. Irregularities exist in each lot of material and the claim is made that it often happens that a large percentage of the high-grade ores is contained in the material from which no samples are taken.

The producers contend that all of the ore delivered should be crushed fine and put through the process of coning and cutting down. The smelter people reply that such a course would result in the waste of so much flue dust that a heavy loss would result. In answer to this dilemma, the manufacturers of briquetting machinery contend that a solution, satisfactory to both parties, is easily obtainable.

Already the White briquetting press, made in Pittsburg, is in use at nearly all of the large smelter plants on the continent, for the putting into solid block form of the flue dust caught by the dust chambers. The manufacturers claim that the gross cost of this briquetting process is so slight in comparison with the value of the material saved, where this press is used, that a large saving is the result.

If the controversy between the producers and purchasers of precious metal ores involves an alleged loss of more than the small sum necessary for briquetting, and in many cases it undoubtedly does, the crushing of the entire purchase of ore and the subsequent briquetting of all or a large part of this before it is treated in the furnace, would be an advantage to both parties. More than this, the advantage would be twofold. It would solve the difficulty now objected to by the miners. It would also do away with a disadvantage with which many smelter managers now have to contend, the loss of valuable flue dust.

PETROLEUM IN NORTHERN RUSSIA.

According to the London *Engineer*, a new petroleum region has been discovered on the White Sea, in the north of Russia. The springs lie in the Paleozoic rocks of Timan, along the River Oukhta, an affluent of the Ischma, in the two governments of Archangel and Wologda.

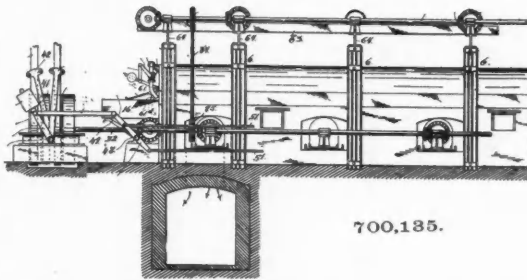
PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

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

Week ending May 13, 1902.

700,135. APPARATUS FOR ROASTING AND COOLING ORES.—William C. Davis, Denver, Colo. In a roasting apparatus, the combination with a roasting chamber and



hearth, of a rabble-carriage located in the roasting-chamber and comprising hollow side bars forming water-receptacles, open to permit evaporation in the roasting-chamber, a transverse bar provided with rabble plows, the side bars occupying positions on opposite sides of the hearth, and means for propelling the rabble-carriage.

700,162. HYDRAULIC CRANE.—Edgar C. Wiley, Radford, Va., assignor to two-thirds to Henry E. McWane, Lynchburg, Va., and George L. Carter, Bristol, Tenn. In a motive-fluid crane, the combination with a jib having a trolley, of a series of motors carried by the crane-mast, said motors comprising means for respectively swinging the trolley, common means for distributing the motive-agent supply to all of the motors, and individual controlling crane on its vertical axis, lifting the load, and operating means for each motor.

Week Ending May 20, 1902.

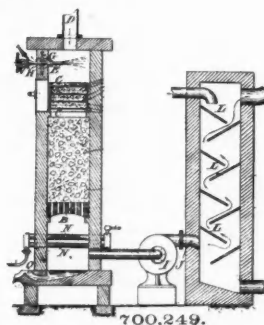
700,181. PROCESS OF REFINING OILS.—Edouard Douillet, La Garenne-Colombes, France. A process for refining oils and the like, which consists in passing a current of alcoholic vapors through the oil, then in passing a current of steam through the oil, and finally in filtering the oil so treated.

700,186. WHEEL OR RAIL TREAD.—Burr C. W. Evans, New York, N. Y. A wheel or rail tread comprising a series of part-cylindrical protuberances contiguously arranged and diagonally disposed with respect to the face of the wheel, said protuberances being formed upon the periphery of the wheel and integral therewith.

700,190. ART AND PROCESS OF CONVERTING PEAT INTO FUEL.—James O. Green and Harry T. Martin, Whitewater, Wis. The process of converting peat into a compact non-fibrous substance for use as fuel by drying, and then simultaneously grinding heating and compressing.

700,198. FURNACE FOR BURNING FINE FUEL.—Richard Herzberg, Stettin, Germany. A furnace comprising a combustion-chamber having a feed-opening at the top, and pipes crossing the combustion-chamber at different levels below the feed-opening, and also incasing the combustion-chamber and the pipes which cross it.

700,224. CENTRIFUGAL PUMP.—John D. McRae, Oswego, N. Y. In combination, in a centrifugal pump, a pump-casing having a discharge, a rotary pump-runner exteriorly formed with runner-arms to act centrifugally on the liquid in the casing and force the same through said discharge, said casing forming an annular water-space circumferentially around said runner, said runner provided with a series of suction-tubes of substantially uniform area and form in cross-section throughout and at their outer ends discharging into said annular water-space, and an axial suction-duct in direct suction communication with the inner ends of said tubes.



700,249. APPARATUS FOR MAKING SULPHURIC ACID.—Amedee M. G. Sebill, Rouen, France. An apparatus for manufacturing concentrated sulphuric acid comprising a vertically-arranged casing formed of suitable bricks, a perforated partition at the bottom part

and within said casing, a thick layer of pumice-stone and asbestos supported on said partition, a series of perforated plates, at the top part and, within the casing, layers of spongy platinum on said perforated plates, a mixing-chamber above the latter, a pipe connected to said chamber for the introduction of sulphurous acid thereto, a steam-pipe discharging steam into the chamber, an air-admission aperture through which said steam-pipe extends, means for regulating the quantity of steam admitted into the chamber, means for regulating the quantity of incoming air, and means for forcing the mixed gases from said chamber through the various layers contained in the casing.

700,268. CHEMICAL APPARATUS.—John A. Wesener, Chicago, Ill. A chemical apparatus comprising a condenser; a chamber communicating with said condenser and having a tubular extension; a resilient sleeve mounted on said extension and forming therewith a hollow stopper; and a steam-pipe entering said extension above the stopper part, passing out through the interior of the stopper, and having a valve outward of its entering part.

700,275. CRUDE-OIL BURNER.—Homer T. Wilson, Fort Worth, Tex. A burner, comprising a series of superposed shelves having an air-space between them, each shelf having oil passages formed in it, whereby oil will be distributed, and suitable supports for holding said shelves in position, said shelves all being hinged at one edge, and means for securing the opposite edges of said shelves.

700,308. CONVEYER-BELT.—James M. Dodge, Philadelphia, Pa., assignor to the Link Belt Engineering Company, Philadelphia, Pa, a corporation of Pennsylvania. A conveyor-belt made of two or more independent endless sections arranged side by side, the abutting edges of the said sections being hinged together.

700,311. TREATMENT OF COMPLEX AND REFRACTORY ORES.—Francis Ellershausen, London, England, assignor to the Sulphides Reduction (New Process), Limited, London, England. A process of treating complex and refractory ores containing lead, silver and zinc, which consists in smelting the raw ores, positively drawing off the fumes and gases, and churning them with water to condense and mix them therewith, settling out the lead, silver and part of the zinc compounds from the resulting liquor, as a sludge, separating and drying the sludge, mixing black ash with burnt lime and passing water therethrough and evaporating the resulting liquid to obtain a molten crude caustic alkali, fusing the dried sludge, with said molten crude caustic alkali, thereby precipitating the lead in metallic form, separating the lead and treating the residual molten mass with water to dissolve out the caustic soda and precipitate sulphide of zinc, treating the liquid from which the sludge was separated and which contains zinc sulphate with the caustic soda thereby precipitating the zinc and converting the caustic soda into sulphate of sodium, and recovering the sulphate of sodium.

700,321. CONVEYING APPARATUS.—Frederick R. French, San Francisco, Cal. The combination of parallel pairs of suspending-cables, supports over which said cables pass, winding-drums around which the cables are movable, trolleys suspended and movable upon the cables, other cables passing around sheaves in said trolleys and a burden-carrier suspended by said cables between the parallel cables, and means by which said burden-carrier may be moved transversely between the parallel cables.

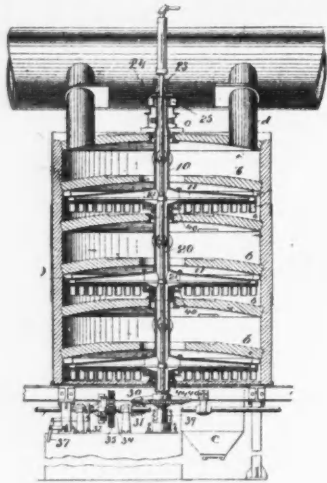
700,342. CHAIN CONVEYOR.—Christopher W. Levalley, Milwaukee, Wis. The combination with a chain formed of articulating links having side bars, of antifriction-wheels attached to the side bars of the chain intermediate of the joints or articulating parts thereof.

700,361. MACHINE FOR MAKING SEAMLESS TUBES OR HOLLOW ARTICLES.—Balfour F. McTear, Rainhill, England. In a machine for rolling hollow cylinders circularly, and internally and externally, the combination of a large horizontal lower driven roller; an upper small non-driven loose roller directly above the lower roller, for rolling on the internal surface; vertical positive adjusting means, for adjusting the top roller positively and keeping it parallel, in relation to the lower roller; external side-supporting rollers on either side for supporting the sides of the hollow cylinder, connected together, and means for moving said side-supporting rollers simultaneously in oblique and opposite upward directions away from the vertical plane of the machine, in the rolling operation, whereby the side supporting-rollers support the body at parts near the horizontal diametrical plane constantly, at this plane shifts during the increase of diameter of the body.

700,328. TOOL FOR OIL WELLS OR ARTESIAN WELLS.—Amos M. Hendershot, Graysville, Ohio, assignor to two-thirds to W. H. Ernst and D. W. Stevenson, Marietta, Ohio. In a device of the character described, an outer casing, an upper and a lower section comprising the inner casing, a spring encircling said lower section and secured to the upper section, a plunger-rod operating through the inner casing, and means carried by the upper section for engaging said plunger-rod, said means being operated by the outer casing for automatically releasing said plunger-rod.

700,339. ROASTING-FURNACE.—Frank Klepetko and William J. Evans, Great Falls, Mont. In a furnace of the class described, a hearth, a roof therefor, a hopper thereabove having a constricted opening, means for agitating the material to be treated in the opening of said hopper

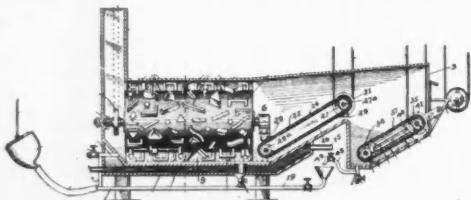
consisting of rotary stirrer-arms projected from the upper outer edge of said hopper to the discharge-opening there-



700,389.

of, and separate means for feeding the material from said hopper to said hearth.

700,379. **AMALGAMATING-MACHINE.**—Gerhard C. Scott, Columbus, O. In an amalgamating-machine, the combination with a casing having an inlet-opening and outlet extension, said casing being adapted to contain a body of mercury and a rotating amalgamating-body within said casing adapted to run through said mercury, of an



700,379.

elevating device containing the said outer extension, said elevating device comprising outer and inner wheels and a traveling apron connecting said wheels and means whereby a shaking or vibratory movement is imparted to said elevator, and a movable amalgamating device interposed between said rotating body and elevating device.

700,389. **ARTIFICIAL FUEL.**—Alexander E. Tucker, Birmingham and Colin Cory, Swansea, England. Blocks or briquettes of artificial fuel consisting in part of an agglutinant formed from the medullary matter of sago-yielding plants.

700,407. **MINER'S SAFETY LAMP.**—Anna M. Dando and Frank H. Stair, Scranton, Pa. A magnetic locking device for miner's lamps consisting in combination with the bowl of said lamp, of a chamber in one side of said bowl, a spring-controlled sliding pin within said chamber, one end of said pin projecting upward and arranged to engage with a recess in the body of the lamp to which the said bowl is to be attached for the purpose of locking it thereto, and the other end of said pin provided with a comparatively large-sized armature lengthened so as to cover both poles of a horseshoe-magnet and slidable within the chamber, the bottom of said chamber provided with a suitable closure, whereby the sliding pin may be drawn downward by the action of an electromagnet when the lamp is placed in close relation to such magnet, for the purpose of disengaging the locking device, and at the same time preventing any physical contact with the armature or pin from without.

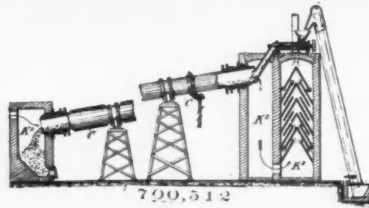
700,406. **HYDRAULIC DREDGE.**—Gustavis L. Cudner, New York, N. Y. A stand-pipe comprising a head-section, an injector-section, an intermediate section, and a discharge-box having an outlet therein, and a supplemental tubular section projected above the outlet in the discharge-box.

700,421. **PROCESS OF MANUFACTURING BRIQUETTES.**—Emil Helbing, Wandsbeck-Hamburg, Germany. A process of manufacturing peat briquettes for fuel, which consists in incorporating milk of lime and oxide of manganese with peat, while the latter is in its natural state, pressing and molding the compound into briquettes.

700,466. **MINING-MACHINE.**—Marshall B. Wylie, Paris, Ark. A mining-machine comprising a fixed main frame, separate supporting device adapted for interchangeable connection with the main frame, and a drill-carriage constructed and arranged for connection with the supporting devices interchangeably for pivotal movement in different planes at angles to each other.

700,512. **PROCESS OF MAKING SULPHURIC ACID AND SULPHUR ANHYDRID.**—Constantin Krauss and Rudolph M. von Berneck, Hocht-on-the-Main, Germany, assignors to Farbwerke, vorm. Meister, Lucius & Bruning, Hocht-on-the-Main, Germany, a corporation of Germany. A process

of making sulphuric acid and sulphur anhydrid with simultaneous combustion of the unoxidized sulphur still contained in the burnt pyrites, which consists in bringing pyrites-burner gases at a lower temperature into contact



with burnt pyrites containing ferrous sulphate, whereby sulphur dioxide is fixed by the burnt pyrites and in then applying a higher temperature the fixed sulphur dioxide being again separated as sulphuric anhydride.

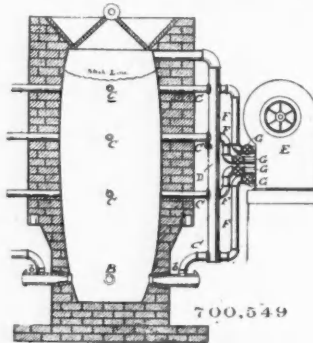
700,526. **GRINDING OR CRUSHING HEAD.**—Volney W. Mason, Jr., New York, N. Y. A grinding or crushing head comprising a conical core having a number of dove-tailed grooves extending from the top to a point near the bottom, each having an abutting shoulder at its lower end, and a set of external segments.

700,529. **FLUXING AND SEPARATING COMPOUND.**—Ananias D. Miller, Mount Pleasant, Pa. A fluxing and separating compound consisting of asbestos and a flux.

700,530. **PROCESS OF TREATING ORES.**—Ananias D. Miller, Mount Pleasant, Pa. A process for the treatment of ores which consists in mixing the ore with asbestos and a flux and in subjecting the ore thus treated to the action of heat.

700,537. **APPARATUS FOR GENERATING SULPHUR DIOXIDE.**—John D. Moore, New York, and Fred M. Martin, Brooklyn, N. Y.; said Moore assignor to the Clayton Fire Extinguishing & Disinfecting Company, a corporation of West Virginia. In an apparatus for generating sulphur-dioxide gas, the combination with a generator in which the gas is produced by the action of air on a suitable substance in a heated state, of a system of outgoing and intake pipes, a valve in the intake-pipe for controlling the passage through the same, and a second valve, in operative connection therewith, for simultaneously controlling the admission of outside air into the intake, and a pump connected with the system of pipes.

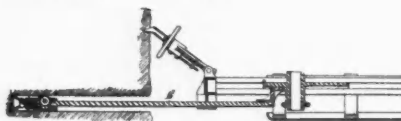
700,549. **BLAST-FURNACE.**—Frank C. Norcross and James Mitchell, Lorain, Ohio. In combination with a blast-furnace, a dust-collecting pipe, a series of injecting-pipes inserted through the walls of the furnace, at inter-



vals from top to bottom, and connected transversely with said dust-pipe, and means, substantially as described, connected to said injection-pipes for forcibly injecting the dust into the furnace.

700,555. **PROCESS OF DETERMINING THE HEATING CAPACITY OF COMBUSTIBLES.**—Samuel W. Parr, Urbana, Ill. A process of determining the heating capacity of combustibles, which consists in mixing sodium peroxide with the combustible in a closed vessel under ordinary atmospheric pressure, placing the vessel in a body of water, igniting the mixture, permitting a reaction of the mixture so that the ultimate products of the reaction will be solid substances, and taking the temperature of the water before and after the reaction.

700,563. **PROCESS OF EXTRACTING METALS FROM ORES AND SCRAP CONTAINING SAME.**—Samuel S. Sadtler, Philadelphia, Pa. A process of obtaining the metals, whose oxides form soluble compounds with the alkali-metal hydroxides, from any material in which these metals are present, said process consisting in treating said material with a solution formed by treating a caustic alkali with one of the halogens and decomposing the resulting solution in an electrolytic cell, the metal being deposited on a suitable cathode.



700,628.

700,628. **MINING-MACHINE.**—Henry B. Dierdorff, Columbus, O., assignor to Joseph A. Jeffrey, Columbus,

Ohio. The combination with the bed, the carriage, resting upon and sliding along the bed and the laterally-acting chain having cutters mounted upon and advanced by the carriage, of the rotating holder mounted at the front of the carriage, and adapted to engage with the horizontal wall of the coal-kerf, and a support for said rotary holder.

700,670. **ELECTROLYTIC REDUCTION OF NITRO OR OTHER COMPOUNDS.**—Max Buchner, Mannheim, Germany, assignor to the firm of C. F. Boehringer & Soehne, Mannheim-Waldhof, Germany. The process of reduction which consists in introducing a substance capable of being reduced by tin into an electrolyte capable of dissolving tin, and passing an electric current through the same in the presence of tin.

700,671. **REDUCTION OF AZO COMPOUNDS.**—Max Buchner, Mannheim, Germany. The process of reducing azo compounds which consists in passing an electric current through such azo compounds dissolved or suspended in an electrolytic fluid capable of dissolving tin in the presence of tin, the azo compound and tin being arranged in the cathode-compartment.

700,672. **REDUCTION OF NITRO COMPOUNDS.**—Max Buchner, Mannheim, Germany. The process of reduction which consists in introducing a reducible substance into the acid electrolyte contained in the cathode-spaces of an electrolytic cell and passing a current through the same in the presence of copper, the electrolyte being one capable of reducing the copper to the ion condition.

700,678. **DRILLING-MACHINE.**—Robert M. Downie, of Beaver Falls, Pa., assignor to the Keystone Driller Company, Beaver Falls, Pa. The combination with a pivoted walking-beam for operating a drill, of means for oscillating the walking-beam, and a counterbalance for the walking-beam, comprising means for opposing a torsional resistance to the movement of the walking-beam, said means having its axis of oscillation substantially coincident with that of the pivot of the beam.

700,711. **ORE-SEPARATOR.**—Frederick R. Waters, Salida, Colo., assignor, by mesne assignments, of one-half to S. O. Malin and Robert J. Powell, Baltimore, Md. In an ore-separator, the combination with a casing, of a stop-flange located in the casing, and a retarding-collar carried by the flange and spaced from the inner face of the casing to form a holding-pocket, said collar being provided with an escape-opening.

700,718. **MINING-CAR.**—Daniel L. Brown, Birmingham, Ala., assignor of one-half to Arthur M. Brown, Birmingham, Ala. In a mining-car, the combination of a body, substantially U-shaped axles secured to the body and provided with laterally-projecting spindles located above the plane of the bottom of the body, wheels mounted upon said axles, and spring-metal braces secured to the axles and provided with engaging members for detachable connection with the sides of the body.

GREAT BRITAIN.

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

Week Ending April 24, 1902.

21,481 of 1901. **MAKING WROUGHT IRON FROM ORES.**—E. Meininghaus, Dusseldorf, Germany. An arrangement of blast and refining furnaces for producing wrought iron direct from ores.

300 of 1902. **STAMP MILL GUIDE.**—E. Mayor, Deadwood, S. Dakota, U. S. A. Improved guides for the stems of steam stamps.

Week Ending May 1, 1902.

7,710 of 1901. **SULPHURIC ACID MANUFACTURE.**—J. Potut, Paris, France. The use of an atomized solution of nitrate of soda for liberating nitric acid used in sulphuric acid manufacture.

7,725 of 1901. **COPPER CEMENTATION PROCESS.**—L. F. Villorola, Santander, Spain. Conducting the cementation process of boiling temperature of the lyes, so producing a pure copper.

11,791 of 1901. **GOLD DREDGING.**—D. Leval, Paris, France. A sizing and washing apparatus for use on gold dredges.

11,792 of 1901. **SULPHURIC ACID MAKING.**—H. Briegleb, Berlin, Germany. Method of heating the contact material used in sulphuric acid processes.

12,510 of 1901. **ZINC SULPHATE MAKING.**—Meister Lucius & Bruning, Hoechst-am-Main, Germany. Method of making a sparingly soluble zinc hydrosulphite by treating a sulphite with zinc dust and an acid.

15,984 of 1901. **MALLEABLE IRON CASTING.**—P. Eyer-mann, Dusseldorf, Germany. A plant for the rapid production of malleable iron by direct heating by blast furnace gases.

130 of 1902. **CONCENTRATOR.**—W. G. Dodd, San Francisco, U. S. A. An improved concentrator of inclined shaken table type.

3,743 of 1902. **MAGNESIUM PEROXIDE.**—A. Krause, Berlin, Germany. A process of producing a substance containing a large proportion of peroxide of magnesium.

PERSONAL.

Mr. John Hays Hammond arrived in New York City this week from London.

Mr. James D. Hague has returned to New York City from San Francisco, Cal.

Mr. Nikola Tesla has moved his office and laboratory to Wardencliff, Long Island, N. Y.

Dr. Arthur Lachman has resigned the chair of chemistry and the deanship of the College of Science and Engineering in the University of Oregon.

Mr. S. V. Newell, a well-known mining man of Central City, Colo., is making a business trip to Chicago, Ill.

Mr. Arthur Winslow, of Kansas City, Mo., has been at Central City, Colo., examining mining property.

Mr. H. W. Fairbanks, of Berkeley, Cal., is at Las Cruces, N. M., studying the geology of the Rio Grande Valley.

Mr. Alfred Skeels, of Chicago, Ill., and Mr. Z. Writ, of London, Eng., have been visiting mining properties in Gilpin County, Colo.

Mr. George D. Meiklejohn, ex-Assistant United States Secretary of War, recently returned to Chihuahua, Mex., from Nebraska.

Mr. Frank H. Buhl has sold all of his stock in the Sharon Steel Company, of Sharon, Pa., and is no longer identified with that concern.

Mr. Joseph A. McDonald has been appointed assistant superintendent of the Ohio Works of the National Steel Company at Youngstown, O.

Mr. C. A. Sandiford has been appointed superintendent of the Anglo-Slocan Syndicate, Limited, for the Wakefield Mine, near Silverton, B. C.

Mr. George Hardy, of Carnegie, Pa., has been examining gold and copper properties in Virginia and Georgia in the interests of Pittsburg men.

Mr. Charles R. Keyes, of Des Moines, Iowa, has been chosen as president of the New Mexico School of Mines, at Santa Fe, N. M., to succeed Mr. F. A. Jones.

Mr. James Colquhoun, who has been manager of the Arizona Copper Company for 18 years at Clifton, Ariz., has resigned and gone to Edinburgh, Scotland.

Prof. John H. Kinealy, head of the department of mechanical engineering at Washington University, in St. Louis, Mo., has resigned to engage in private practice.

Mr. John Berry, of Detroit, Mich., has been in Gilpin County, Colo., visiting the Saratoga property, also the Carpenter Smelter at Golden, in which he is interested.

Mr. C. E. Van Barneveld, professor of mining engineering at the Minnesota School of Mines, has been examining mining properties at Butte and Whitehall, Mont.

Mr. Hal W. Hardinge, of Denver, Colo., is in La Cananea, Sonora, Mex., erecting a 500-ton concentrating plant for the Cananea Consolidated Copper Company.

Mr. H. C. Missimer is now manager of the Last Chance mine and mills near Quartzburg, Idaho, owned by Mr. J. W. Burton and associates, of Salt Lake, Utah.

Mr. W. H. Hoerner, of Central City, Colo., has gone with a party of Easterners to California to examine the mines of the Mount Shasta Gold Mines Corporation.

Mr. Charles T. Arkins, of Denver, Colo., is in Pachuca, Mex., on expert metallurgical work at the Loreto reduction plant of the Compania de Real Monte y Pachuca.

Mr. A. J. Moxam, who resigned as vice-president and director of the Dominion Iron and Steel Company, is succeeded by Mr. L. J. Forget as director and Mr. James Ross as vice-president.

Dr. W. H. Bowen, of Providence, R. I., is visiting in Gilpin County, Colo., where he is interested in the Stewart Gold Mining Company. The company is figuring on the erection of a stamp mill.

Mr. W. R. Woodford, formerly general superintendent of the Baltimore & Ohio Railroad, in the Pittsburg, Pa., District, has accepted the position of second vice-president of the Pittsburg Coal Company.

Mr. P. L. DuBois is now general purchasing agent of the coal companies of the Missouri Pacific Railroad, with offices in the Equitable Building, St. Louis, Mo. Mr. A. M. Fellows is general sales agent.

Mr. Frank Ashton and Mr. L. A. Dockery have opened a mining engineering office in the city of Chihuahua, State of Chihuahua, Mex., and are prepared to examine mines and report on mining properties.

Mr. Erastus W. Hoffman, civil engineer of the Berwind-White Coal Mining Company, Windber, Pa., has resigned and gone to Arkansas, where he will

develop and operate coal land owned by himself and a brother.

Mr. M. D. Stackpole, for a long time on Capt. J. R. De La Mar's staff of expert millmen, has accepted a position with the Cyanide Recovery Company, of Denver, Colo., and has opened an office at 418 Dooly Block, Salt Lake, Utah.

Mr. John Boyt, formerly chemist and assistant furnace superintendent of the La Follette Coal, Iron and Railway Company, is now assistant to Mr. David Baker, general manager of the Dominion Iron and Steel Company at Sydney, N. S.

Mr. E. T. Conner, general manager of the Webster Coal and Coke Company, is erecting a residence at Cresson, Pa., where the company's mines are located. Mr. Conner was formerly with the Lehigh Valley Coal Company at Wilkes-Barre, Pa.

Messrs. Matthew A. McLean, chief draughtsman, and T. S. Scott, assistant chief draughtsman of the Westinghouse Electric and Manufacturing Company of Pittsburg, Pa., are now in England, having accepted similar positions with the British Westinghouse Company, at Manchester.

Mr. Frank McCreary, for several years agent for the Philadelphia & Reading Coal Company at Duluth, Minn., is now superintendent of the Stevenson Mine, at Hibbing, Minn., owned and operated by Corrigan, McKinney & Company. Mr. T. Z. Collins succeeds Mr. McCreary at Duluth.

Mr. G. Crerar, connected with the smelting department of the Montreal & Boston Copper Company, Limited, of Greenwood, B. C., was recently in Republic, Wash., in the interest of his company, taking samples of ore and acquiring information relative to the productive capabilities of the mines.

Mr. Charles A. Brockaway, who has been for several years connected with the *Engineering Magazine*, has been appointed business manager of that journal. We are pleased to note this recognition of Mr. Brockaway's ability, and also of the thorough training he received while connected with THE ENGINEERING AND MINING JOURNAL.

Mr. J. E. Spurr of the United States Geological Survey arrived in New York June 1, on the *Aquitaine* from Havre. Mr. Spurr will continue to hold the position of consulting mining expert to the Sultan of Turkey, but during the summer will undertake some special mining work for the United States Geological Survey. He will make an examination of the Grand Encampment copper district in Wyoming, assisted by Mr. F. B. Weeks, of the United States Geological Survey.

Among the arrivals in New York City by the steamer *Lucania* on May 31 were the following mining engineers: Mr. Rawlinson T. Bayless, managing director of the Exploration Company, Limited, of London; Mr. A. A. Blow, London, consulting engineer for the Ecuadorean Association and for the Australian Smelting and Refining Company; Mr. A. A. Ackerman, assistant to Mr. Bayless; Mr. Robert Hay Anderson, consulting mining engineer of the City of Mexico, and Mr. John Hays Hammond, of New York. Mr. Bayless returns to London this week on the *Majestic*. Mr. Anderson after a few days in New York proceeded to Mexico.

OBITUARY.

John Jermyn, one of the pioneer coal operators of the anthracite region about Scranton, Pa., died of heart disease in that city on May 29. His health had been failing for several months.

Mr. Jermyn was born in Rendham, England, on October 27, 1825, and was 76 years of age. At the age of 20 he came to the United States and arrived in Slocum Hollow, Pa., in 1847. His first day's work was unloading coal, for which he received 75c. He had been in Slocum Hollow only a short time when he got a contract to open the Diamond Mine. During the years 1851 to 1854 he made a contract to develop coal property of the New York & Pennsylvania Coal Company, known as the Rockwell mines. In 1859 he made a contract with Judson Clark for coal lands adjoining the property of the New York & Pennsylvania Coal Company. In 1862 Mr. Jermyn got control of an old, abandoned mine at Rushdale, now Jermyn, and made contracts for the delivery of a large amount of coal. This venture owing to his foresight and energy was very successful.

In 1876 Mr. Jermyn leased coal land in the Green Ridge section of Scranton, built a large breaker, mined a great amount of coal, operated the mine successfully for a number of years, and finally sold his holdings to the Delaware & Hudson and Delaware, Lackawanna & Western companies, which have operated it jointly ever since. In 1880 Mr. Jermyn built a breaker near Peckville, equipped it with modern machinery and a few years later disposed of it to the New York, Susquehanna & Western Railroad Company.

In 1881 he leased what is known as the Price tract, of 900 acres of coal land near Dickson. After conducting this enterprise successfully for a number

of years he disposed of it to O. S. Johnson. In 1886 Mr. Jermyn was made general manager of the New York, Susquehanna & Western Railroad Company, and was the means of bringing that road to Scranton. His private interests were so large that after holding this position for a few years he resigned.

In 1887 Mr. Jermyn leased a large tract of land near Taylor. A mining village sprung up named Rendham, in honor of Mr. Jermyn's birthplace in England. At the time of his death Mr. Jermyn was one of the largest individual coal operators in the anthracite fields.

Mr. Jermyn is survived by his wife, five sons and two daughters.

SOCIETIES AND TECHNICAL SCHOOLS.

CORNELL UNIVERSITY.—The following appointments have been announced: E. J. McCaustland, assistant professor in civil engineering; Herman Diedrichs, assistant professor in experimental engineering.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on May 17 there were 61 members and visitors present. Messrs Benjamin Adams and Elmo G. Harris were elected to active membership, and Messrs. Charles Day, Kern Dodge and Samuel G. Magarge, Jr., to junior membership.

Prof. Oscar C. S. Carter presented a review and discussion of the report of the Mexican Boundary Commission under the title of "The Arid District Between the Rio Grande and the Pacific Traversed by the Engineers of the Mexican Boundary Commission in 1892-'94." He explained the care and thoroughness with which the work was done, and its value in increasing our knowledge of the topography, geography, climate, fauna and flora of this section of our country. In establishing the boundary 250 monuments were erected, of which 219, of iron, were transported across deserts as absolute as the Sahara.

The character of the Colorado Desert (which holds the world's record for extreme heat) was described in considerable detail, and the confusion of jurisdiction between Mexico and the United States was explained as the cause which made necessary a re-marking of the boundary. The condition of the roads and mountain passes and the methods of transportation were explained, and the greatest difficulty to travel was ascribed to the scanty water-supply. The survey, in all its details, lasted nearly 3 years, and cost about \$225,000. Prof. Carter's paper was illustrated by a large collection of photographs, reproduced by the lantern.

At the request of the president, Prof. Carter opened a general discussion on the causes and effects of volcanic eruptions, with especial reference to those which have recently taken place in the West Indian Islands. This discussion was also participated in by Messrs. James Christie, Walter L. Webb, L. F. Rondinella and others.

INDUSTRIAL.

The S. Obermayer Company, of Cincinnati, Chicago and Pittsburg, reports its business in foundry supplies as excellent.

The Harrisburg Foundry and Machine Works, of Harrisburg, Pa., is reported to have received a fair sized engine order from Japan.

The McKiernan Drill Company, with offices at 120 Liberty Street, New York City, has secured some fair-sized contracts from Norway and China.

The Arthur Fritsch Foundry and Machine Company, of St. Louis, Mo., is very busy on orders for mining machinery from various sections of the country.

The St. Louis Well Machine and Tool Company, of St. Louis, Mo., is drawing plans for an addition to its machine and erecting shop, to increase the capacity 25 per cent.

The Stirling Company, of Chicago, Ill., has made a shipment of 32 car-loads of boiler material to East London, South Africa. The shipment will be forwarded to Johannesburg.

The New York Edison Company has placed an order with Charles H. Paine, New York representative of the Taunton Locomotive and Manufacturing Company, for 10 6,000-h. p. units of Wainwright-Evan flow heaters.

The Wellman-Seaver-Morgan Engineering Company, Cleveland, O., is to build a foundry of brick and steel construction in 3 sections, the largest of which will be 73 ft. wide and 300 ft. long. The building will cost \$34,000.

The C. W. Hunt Company, of West New Brighton, N. Y., has made a shipment of 36 flat top 4-wheeled 1-ton capacity cars, to be operated in connection with the new coaling station now under construction at Langley Point, Philippine Islands.

The Allis-Chalmers Company has placed an order with the Pittsburg Gage and Supply Company, of Pittsburg, Pa., for a complete White Star filtering system, to be applied to two of its engines destined

for improvements in the plant of Jones & Laughlins, Limited, Pittsburg, Pa.

The Empire Portland Cement Company, of Warrens, N. Y., is to reconstruct its plant. The plant is to be of steel and brick, and as near fireproof as possible, and will be equipped with the latest improved machinery and will be one of the most modern and efficient in this country.

The Lidgerwood Manufacturing Company, of New York City, has recently received contracts for 2 double drum cableway hoisting equipments from the Temperley Transporter Company, of London, England, and for some double drum mining hoists, through Fogarty & Dickinson, of the City of Mexico.

The Cook Well Company, of St. Louis, Mo., reports an active business. It has recently taken contracts for driving many wells and in addition has taken orders for a complete pumping plant for the Pinnacle Coal and Coke Company, of Mora, W. Va., and for 5 well strainers to go to Mt. Pleasant, N. H.

The Apex Equipment Company, of 11 Broadway, New York City, has sold to the Lackawanna Iron and Steel Company, of Buffalo, N. Y., 100 6-yd. capacity double-side dump cars for use in constructing its plant at West Seneca, N. Y. The Apex Equipment Company will ship the first 25 of these cars by June 15, which appears to be rapid shipment for this busy season.

The Acme Mining Machinery Company, of Salt Lake, Utah, recently secured an order from the Martha Washington Mining Company, of Tintic, for a new engine and blower, with pipe. The Summit Placer Mining Company has ordered of the Acme people a mineral wax extractor, which will be installed at the Kroupa ozokerite mine at Soldier Summit, of which J. A. Butler, of Salt Lake, is manager.

The Sidney Steel Scraper Company, of Sidney, O., has been reorganized by New York and Hamilton, O., men. The company will have a capital stock of \$200,000; one-half common stock and the balance 6 per cent cumulative preferred stock. The new officers are: William Haslupp, president and general manager; Benjamin Strauss, vice-president; J. D. Barnes, secretary-treasurer; directors are the above and W. A. Perry, H. C. Quinby, of New York City, and K. K. Laven, of Jersey City. The capacity of the plant will be largely increased.

The Salt Lake office of the Allis-Chalmers Company reports these sales among others for May: Two converters for the United States Mining Company; 500-ton sampling works for the Park City Sampling Company, of Park City, Utah; 4 matte ladles for the Bingham Consolidated Mining and Smelting Company; 1 150-h. p. return tubular boiler for the Honoring Mining Company, at Stockton, Utah; elevator material for the Utah Fuel Company; 2 converters for the Bingham Consolidated Mining and Smelting Company; 1 No. 6 Gates style "D" crusher for the Lime King Mining Company.

The following orders were among a large number received by the Colorado Iron Works, of Denver, Colo., recently: 2 sets 40 by 16 in. crushing rolls for the Montezuma Lead Company, of Mexico; 2 Bartlett concentrating tables for the same company; 1 42 by 120 in. silver-lead blast furnace for the new Jersey Gold-Copper Reduction Company, of Leadville, Colo.; 4 impact screens for the Valardena Mining and Smelting Company, of Mexico; 10 90 cu. ft. capacity side-roll dump cars for the Compania Metalurgica Mexicana, of San Luis Potosi, Mex.; 8 lead bullion cars for the Ohio & Colorado Smelting and Refining Company, of Salida, Colo.

The Chicago Gear and Mill Supply Company, of Chicago, Ill., is a newly organized company, controlled and operated by W. C. Groetzinger, since selling his interest in the Charles Munson Belting Company. The company only manufactures gears and pinions, making rawhide a specialty. The trade-mark "Derma-glutine," Mr. Groetzinger has made familiar, as he has been manufacturing rawhide pinions 14 years. The company states that its rawhide pinions are of the best material, rawhide of special cure, manufactured under hydraulic pressure until the pinion is finished. The company also cuts metal gears and handles mill supplies, especially the best oak tanned, short lap leather belting.

The Lackawanna Steel Company, that is erecting a great plant near Buffalo, N. Y., has elected these directors: William E. Dodge, of Phelps, Dodge & Co., New York City; Warren Delano, Jr., New York City; D. C. Blair, New York City; B. H. Buckingham, Lebanon, Pa.; J. J. Albright, of Buffalo; Edmund Hayes, of Buffalo; Cornelius Vanderbilt, New York City; Walter Scranton, New York City; D. O. Mills, New York City; Heber R. Bishop, New York City; M. Taylor Pyne, New York City; Moses Taylor, New York City; J. G. McCullough, New York City; H. A. C. Taylor, New York City; A. Iselin, Jr., Iselin & Co., New York City; H. McK. Twombly, New York City; H. Walters, Baltimore, Md.; Samuel Mather, Cleveland, O.; Henry Wehrum, Buffalo; B. S. Guinness and J. Malcolm Forbes, Boston, Mass. The following officers have been elected: President, Wal-

ter Scranton; vice-president, Moses Taylor; treasurer, J. P. Higginson; assistant treasurer, F. F. Graham; secretary, John W. Farquhar; general manager, Henry Wehrum.

The Crocker-Wheeler Company reports a satisfactory increase in orders received during May over those for April. The company is making extensive preparations for its increasing business which during the past year has pushed the present shops to the utmost. A building is under construction, which will enlarge the present floor space by 60,000 sq. ft. and will be for the winding department, a part of the office force, and additional machine shop space. Some of the orders booked during May were: Hanover National Bank, New York City, 3 size 111 100-kw. each; Albert Saxe, New York City, 2 50-kw. and 175-kw. generators; Descubridora Mining and Smelting Company, 1 size 168 150-kw.; J. L. Mitchell, Philadelphia, Pa., 1 size 224 200-kw. generator; Naomi Coal Company, Fayette City, Pa., 1 110-kw generator; Ingersoll-Sergeant Drill Company, 1 80-kw. generator; D'Olier Engineering Company, Philadelphia, Pa., 1 size 111 100-kw. generator; Craig Shipbuilding Company, Toledo, O., 2 150-kw. generators; Maher & Flockhart, Newark, N. J., 1 100-kw. generator and 1 45-h. p. motor; Vandergrift Construction Company, Matteawan, N. J., 1 size 224 200-kw. generator; Niles-Bement-Pond Company, Philadelphia, Pa., 50 crane motors, outputs ranging from 1½ to 50 h. p.

TRADE CATALOGUES.

The American Blower Company, of Detroit, Mich., has issued its catalogue No. 140, a pamphlet of 38 pages, describing its A. B. C. disc ventilating fans. These fans are stated to be totally different in construction from any others on the market, and are built for the noiseless delivery of a maximum volume of air with a minimum expense for power. The mechanism combines strength and rigidity, with lightness and ease of operation. The fans have 12 blades, bolted to large central discs, this increased number of blades, it is stated, assuring greater delivery of air, while the support of the discs gives additional strength and prevents the back flow of air through the center while working against pressure. The fans are made in a variety of sizes, up to 96 in. in diameter, and their capacity ranges from 5,000 to 280,000 cu. ft. of air per minute. The pamphlet gives tables showing the volume and density of air at various pressures, etc.

The Joseph Dixon Crucible Company, of Jersey City, N. J., is sending out printed matter calling attention to the merits of its silica-graphite paint. The company states that the Edison Portland Cement Works, Phillipsburg, N. J., is one of the largest of its kind in the United States, and is entirely constructed of iron and sheet metal. As a permanent plant was required, the question of a protective coating for these metal surfaces was thoroughly gone into by the engineers in charge, and as a result of their investigations Dixon's silica-graphite paint was used exclusively. The company also states that this paint has been on the market for over 40 years, and is being specified by the leading engineers and architects. It is unaffected by acids, gases, heat or cold, being practically indestructible, while, owing to its low specific gravity, a large covering capacity is assured, and the company unhesitatingly claims that Dixon's silica-graphite paint is the most economical on the market to-day where a durable paint is desired.

The Christensen Engineering Company, of Milwaukee, Wis., is sending out catalogue No. 51, a neat 24-page pamphlet, describing its electrically operated, stationary and portable, air compressors. As these compressors can be operated from any railway, power or lighting circuit, they can be installed at the most convenient point of distribution, thereby avoiding expensive piping. They are not steam-driven compressors with a motor attached, but are complete, specially designed, self-contained units of the most compact form. The detail parts are made from jigs and templates, and are interchangeable. The working parts operate in a bath of oil. An automatic governor stops the motor as soon as the air pressure reaches a predetermined maximum, and starts it when the pressure is reduced to a minimum; power is, therefore, used only when work is being performed. The company invites all parties interested to investigate the numerous advantages of these compressors, and can make prompt deliveries.

A little booklet, got out by Arthur Koppel, of New York City, has a unique design on the front cover, carrying out the idea of mining. Gnomes are represented carrying shoes and dies to an exaggerated old shoe, and the booklet is a shoe and die circular. Gnomes were always associated with underground work by the German miner, and that is why they are placed on the front cover. The booklet is a treatise on the Arthur Koppel shoes and dies for stamp mills. The last page of the booklet also illustrates portable railway fixtures—a single switch, right or left hand, and a turntable, made in all styles and sizes, and mine and ore cars. A double side dump car is shown, also one

equipped with grip attachment for coupling, which does not dump. Arthur Koppel manufactures a complete line of industrial railroad equipment, including light steel rails, portable track, switches, turn-tables, and cars of every description, for all purposes and all accessories. A large stock of these goods is always kept on hand ready for immediate shipment. A complete catalogue will be sent free upon request.

Persons contemplating a trip to California or the Southwest will be interested in the electric-lighted Overland Limited trains of the Southern Pacific Railroad. A little pamphlet that the company will send to any one on application states that there are now 10 such trains in service between Chicago and San Francisco, via the Southern Pacific, Union Pacific and Chicago & Northwestern railroads, and the time required for the trip from San Francisco to New York is just 4 days. The trains are lighted throughout with electricity, and the observation, dining and buffet smoking cars are provided with electric fans. Each train has a composite car with bath, barber shop, buffet and a smoking room, with a library and writing desks. The sleeping cars are finished in green and gold, and especial attention has been given to the fittings of the ladies' retiring rooms. Each train also has a compartment car, having a large observation room, a drawing room and 6 private rooms conveniently furnished. In the observation room the same conveniences in the way of books, magazines, etc., are provided for ladies as for gentlemen in the smoking room. In the handsome dining cars meals are served a la carte at remarkably moderate prices. In fact, every comfort that experience can suggest has been provided for the traveler.

GENERAL MINING NEWS.

Petroleum Developments.—A notable increase was recorded in field operations during May, says the Oil City Derrick. The increase in the new production was not commensurate with the increase in wells completed and the activity in field work. Both the Pennsylvania and Lima oil fields show a steadily increasing volume of new operations, although the Trenton rock fields of Ohio and Indiana are the only regions that possess anything very promising in the way of new territory. The greater portion of the new work in the Eastern fields is within what is known as reasonably sure productive areas. More wells were completed in May than for any month since last November, and the new production was greater than for any month of the current year. The May report summed up 1,195 wells completed, 15,195 bbls. production and 221 dry holes. This was a gain over April of 198 wells completed, 2,507 bbls. production and a decrease of 11 in the number of dry holes. For May 31 the new operations in the Pennsylvania and Trenton rock fields footed up 532 rigs and 1,135 drilling wells, a total of 1,667. This was a gain over April of 40 rigs and 128 wells drilling, making a total of 168. These are the largest figures recorded in new work since the close of November.

ARIZONA.

COCHISE COUNTY.

(From Our Special Correspondent.)

Troy.—M. Cutting, superintendent of this copper mine at Globe, has increased the miners' wages 50c. per day.

Uncle Sam.—Miners are at work on this gold mine, about 4 miles from Nogales.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Alpha.—This mine, in Todd Basin District, has been bonded by E. B. Smith, of Los Angeles, who is soon to begin work.

King.—This mine, belonging to John Kay, at Mineral Park, has a 12-in. vein of rich ore. There are 4 claims in the group.

Prince Albert.—Frank Dewey has opened a rich streak of silver ore in this mine, at White Hills. He is leasing on company ground.

Toltec.—McKesson, Davis & Sample are taking out rich turquoise stones from this old mine, at Mineral Park, at a depth of 180 ft.

Virginia.—This mine, in Weaver District, is piling up ore for shipment. Ben Hastings is superintendent for a Detroit (Mich.) company.

ARKANSAS.

BOONE COUNTY.

(From Our Special Correspondent.)

Beulah.—This mine, near Harrison, shipped 44,340 lbs. of zinc ore May 3 and 26,000 lbs. on May 24. The two lots of ore sold for \$1,009 or \$28.70 per ton delivered. The average assay was 58 per cent, which is close up to the average of the Joplin District. The cost of hauling to the cars was \$7.50 per ton, and the freight rate from Harrison to the gas field was \$2.40 per ton. Shipping facilities were much better than for most North Arkansas mines.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Ballard & Martin.—On this claim, near Plymouth, work has begun with W. I. Smart in charge.

Central Eureka.—This mine, near Sutter Creek, W. R. Thompson superintendent, has given up wood fuel, and is using California petroleum. Other mines in the vicinity are doing the same.

Horn.—High-grade ore from this mine, near Defender, is being shipped to the Selby Smelter.

Keystone Consolidated.—At this mine at Amador City, C. E. Bunker superintendent, 8 air drills have been put in. The hoist is run by compressed air.

Oncida Mining Company.—This property, at Jackson, C. C. Derby manager, has its shaft now down 2,100 ft. vertically. A new and powerful pump has been installed.

ELDORADO COUNTY.

(From Our Special Correspondent.)

Mount Pleasant.—This mine at Grizzley Flat, Frank Jackson superintendent, has a 10-stamp mill and 4 concentrators and gives work to 24 men. The company was recently reorganized, with J. Lavaggi, of Plymouth, as president. The principal office is at San Andreas.

Noonday.—This copper mine, near Shingle, owned by Dr. Wren, of Placerville, has been bonded to the Peyton Chemical Company, of San Francisco.

Rio Vista Copper and Gold Company.—This company has bought the Cosumnes copper mine, near Nashville, and is to develop it.

Stillwagon.—This mine, at Omo Ranch, owned by A. V. La Ball, of New York; E. C. Attwood, manager, is being actively developed. There is a 5-stamp mill.

Teats Flat Dredge.—The new Risdon dredge at Teats Flat has started. It is owned by the Syndicate Dredging Company. The machine is being run by electric power. The hull is 86 by 30 ft.

Vandalia.—This mine at Canyon, Chas. E. Seymour superintendent, is crushing its ore with Cornish rolls and then treating it by cyanide. Thirty men are employed.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

Althouse Mining Company.—This new company has been organized at Eureka, its principal place of business, by W. H. Wallace, Edwin McDowell, E. P. Pettigill, Wallace Graves and W. J. McNamara.

Willow Creek.—At this place, 40 miles from Arcata, the Trophy Mine expects a prosperous summer run, there being plenty of water. The Clover Flat Mine is using 1,000 in. of water. The Erlick has been bonded. These mines are near China Flat.

KERN COUNTY.

(From Our Special Correspondent.)

O. H. T. Hansen, of Glenville, has sold his claim, near Granite, to an Oregon Company, which is to put up a mill.

Tom Mitchell.—This old mine at Kernville, owned by Thomas Kerner and W. B. Walker, is turning out rich rock. At one time the mine produced very rich ore, but caved and filled in 1863, lying idle until 1901, when Kerner & Hylen started work in the old tunnel. Hylen got discouraged and sold out for 75c. Kerner ran through rich ore, but did not recognize it, and also quit. W. B. Walker recognized the value of some ore he found and bought a half interest for \$25. The first clean-up of 18 tons of rock is reported to have yielded 14 lbs. of gold, and rock now coming out runs as high as \$150 per ton.

MADERA COUNTY.

(From Our Special Correspondent.)

Copper Discovery.—Fine copper ore is reported found near Daulton by Capt. C. Van Timmons. The find was made near the mine of the Questo Copper and the California Copper companies' properties. About 18 in. of the vein is composed of oxide of copper. The vein was found 28 ft. below surface.

Gambetta Mining and Milling Company.—This company at Grub Gulch, T. T. Lyon superintendent, has bought the interests of E. W. Hopkins, and is now sole owner. The mine has been unwatered, but milling has not started.

MONO COUNTY.

(From Our Special Correspondent.)

Crystal Lake.—R. T. Pierce, superintendent of these properties at Lundy, is arranging with the smelters to smelt 500 tons of concentrates which have been accumulating at the mill.

Standard Consolidated.—The upper cyanide works of this property at Bodie, R. G. Turner superintendent, are to be torn down and moved to the site of No. 1 works, doubling the capacity of the latter plant. A scraper driven by an electric motor is to be used in scraping the tailings pond.

MONTEREY COUNTY.

(From Our Special Correspondent.)

Stone Canyon Coal Company.—These mines, under charge of Frank Horswill, are being extensively developed. A tunnel has been driven on the vein 2,500 ft. The vein is from 14 to 20 ft. wide. The coal is said to be a hard bituminous, and there is very little waste. As the tunnel attains a depth of only about 300 ft., an incline shaft has been sunk about 1,000 ft. from the mouth. The mine is quite wet. Some coal has been shipped to San Jose and other cities, but as yet no extensive shipments are made. The mines are 24 miles from Bradley Station. About 25 miners are employed.

NEVADA COUNTY.

(From Our Special Correspondent.)

A company has been organized to dredge Deer Creek below the Anthony House, and men are at work. A Priestly dredge is to be used to take out about 600 yd. of tailings per day.

Allison Ranch Consolidated Mining Company.—Prospecting operations have been going on for some time near Grass Valley, Robert Robinson is superintendent. A short time since good ore was struck, and it is stated that a mill and hoist are to be erected.

California Gold and Copper Company.—This property is near Spenceville, and C. C. Bittner is superintendent. The mine is being opened by Idaho men, who have been at work for 2 years. The tunnel is in 600 ft. It is proposed to erect a furnace at the mine shortly.

Spenceville Mining Company.—At this mine at Spenceville, Carl Howard manager, little work is done, except to keep the mine free of water. Diamond drill prospecting is to be undertaken.

PLACER COUNTY.

(From Our Special Correspondent.)

Baltimore.—This mine, near Forest Hill, is working 15 men.

Bob Lewis.—This mine, at Damascus, has its tunnel in 1,330 ft., and has been bonded to an Eastern company. Its present name is Julia & Pioneer, and it is in charge of A. P. Chittenden, of Towle.

Red Point.—In this mine, at Damascus, J. A. Ferguson superintendent, owned by the Societe des Mines de Golden River, Paris, France, the distance from the mouth of the tunnel to the breast is 3½ miles. Compressed air is used for hauling the gravel trains in the tunnel.

PLUMAS COUNTY.

(From Our Special Correspondent.)

The Western Power Company has expended over \$100,000 in preliminary work, has bought some 12,000 acres of land, located 130,000 miners' inches of water and is now making surveys for the canals and tunnels. From the North Fork of the Feather River, which drains a large extent of mountainous country, it is practicable to divert 100,000 in. of water and apply it under a pressure of 1,200 ft. to generate electricity. It is proposed to furnish the mines with electric power and to bring power to the cities around San Francisco Bay and along the line.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Bagdad Mining Company.—From the mines of this company at Ludlow, C. Grant superintendent, a good deal of ore is being shipped to the railroad by team. Forty-seven men are said to be taking out 125 tons of ore per day.

Barstow Mill.—This mill is temporarily closed while extensive repairs are being made.

New Gold Strike.—E. W. Spaulding, C. F. Blackburn and Messrs. Cole & Wright have found new gold claims on the north slope of the San Bernardino Mountains, 25 miles from Victor. The ore is free milling. Numbers of miners have gone to the new district.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

Three oil companies—the Mesquite, Cactus and Yuba—have been drilling in the Carrizo Creek Region on the Colorado Desert. It is reported that strong seepages of oil have been struck at depths of from 300 to 500 ft. There are no productive wells in the district.

California Gold King.—On these mines at Pichacho, about 400 men are at work, mainly on the railroad which is to connect the mines with the Colorado River. It is expected that the new reduction works will be completed about July 1.

SAN LUIS OBISPO COUNTY.

(From Our Special Correspondent.)

Madrone.—This quicksilver mine in Josephine District, N. J. Downer, of Arroyo Grande, superintendent, has started its new furnace. The mine has thus far been worked on a small scale.

SIESTA COUNTY.

(From Our Special Correspondent.)

The owners of the iron deposit on the McCloud River have chosen a smelter site and laid out a town-site.

Brushy Canyon.—This mine, near Copper City, has found ore carrying a high percentage of copper.

Great Western Gold Company.—This company, which is to erect a smelter at Copley, has made final payment on the Liberty group, which it has had under bond.

National.—From this mine, at Old Diggings, the Gray Brothers are taking out good ore.

Spanish.—From this mine, in Old Diggings District, the leasers have been taking out very good ore.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

China Oak.—This claim, formerly owned by this Chinese company, at Happy Camp, but now owned by an Oregon company, Mr. Van Brunt superintendent, is paying well this season.

Greenhorn Blue Gravel.—Mr. Mason, owner of this property, near Yreka, thinks of reopening it shortly.

Yellow Butte.—These copper mines, owned by H. J. Sarter and others, are about 12 miles from Edgewood. A little platinum is said to be found in the ore.

SONOMA COUNTY.

(From Our Special Correspondent.)

Basalt Quarries.—From this county most of the basalt blocks for street paving in San Francisco and other cities in Northern California are obtained. The business is not as extensive as formerly owing to the greater use of bituminous rock pavement. A large quarry near Healdsburg has recently been leased by J. J. Dowling & Company, of San Francisco, and 16 quarrymen have been put to work under Superintendent C. C. Borg. New buildings for the men, blacksmith shops, etc., have been erected. The blocks have to be hauled 3 miles to the railroad.

TRINITY COUNTY.

(From Our Special Correspondent.)

Fairview.—Joseph Porter is about to put in a sawmill and 10-stamp quartz mill on this mine, at Minersville.

Trinity Toll Road Company.—This company is hurrying work on the new wagon road from Delta, on the railroad line, to Trinity Center, Coffee Creek and other mining districts, which will materially shorten the haul of machinery, supplies, etc., to the many mines in those regions.

Wiser Brothers.—The Wiser Brothers are putting up an arrastra at Coffee to work ore from a wide ledge carrying small veins of rich quartz.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

There are said to be more stamps dropping at present in this county than ever before in its history.

Cosmopolite.—At this mine, at Groveland, Harry Argall, superintendent, the new boiler is in place, and the engine, hoist, pump, etc., have arrived. Work on the shaft has begun. Ten men are employed.

Hard Tack.—This group and the Reward mines, near Carters, have been bonded from T. F. McAvoy and Andrew White by E. C. Holmes with all machinery and appliances, for \$40,000 for 2 years. The purchaser is to begin work June 1, and pay the owners 25 per cent. of gross profits during the life of the agreement.

COLORADO.

BOULDER COUNTY.

(From Our Special Correspondent.)

Wood Mountain Mining Company.—At a recent meeting of the stockholders of this Wall Street company, the following directors were chosen: Jas. D. Lynch, G. W. Davis and J. E. Norling, of Chicago; J. O. Fife, George M. Gray and M. V. Ingram, of Kansas City, and J. A. Teagarden, of Boulder. The officers are: George M. Gray, president; J. E. Norling, vice-president; M. V. Ingram, secretary and treasurer; W. F. Dubois, superintendent.

CHAFFEE COUNTY.

Buena Vista Smelter.—Manager Morley has laid off all the men at the plant, and has also sent his resignation to the company at Philadelphia, to take effect immediately. It is rumored that the American Smelting and Refining Company has secured control of the plant and closed it. The plant was completed in 1897 and has been in almost constant operation. Last December it was burned to the ground and was rebuilt at a cost of about \$60,000, and has only been running a few weeks. The closing of the plant throws 50 men out of employment and as the smelter was built to treat the Mary Murphy ore, it may be that this big mine will also close, throwing about 100 men out of employment at St. Elmo. The principal stockholders of the company live in Philadelphia, Pa., where the company's main offices are.

(From Our Special Correspondent.)

Among the properties now worked in the northern part of this county are the Hattie Jane, lately secured by the Acme Gold Mining Company; the Waupaca group, consisting of the Waupaca, Humboldt No. 2 and No. 3, the Apex and the Hidden Treasure on the east slope of Mount Harvard. Also the Venture group, now under the control of the Acme Company, and the Belle of Granite and Washington mines in the Granite District.

CLEAR CREEK COUNTY.

Freeland Extension.—This mine, at Freeland, was sold last week to South Dakota men, the consideration being reported as \$100,000. The property was owned by Boston men, who purchased it about 3 years ago from the late Col. F. F. Osbiston. The shaft has been sunk over 400 ft. and considerable development has been done through the various levels.

The Extension is said to have produced over \$200,000 during the last two years from development only. W. A. Haggott, who has had charge of the property for the last two years, acted as the representative of the Boston owners in closing the deal.

Wide West Mining Company.—On application of Judson T. Parker, the Supreme Court of New York has granted an order for the voluntary dissolution of the corporation, returnable August 20. The liabilities are \$1,500, with assets not stated, consisting of 8 mining claims in Colorado. The company was incorporated in 1882 with a capital stock of \$300,000 to develop silver mines. About \$20,000 was spent but the mines did not prove a success and no business has been done since 1882. Henry Siedfried owns nearly all the stock of the company.

EAGLE COUNTY.

(From Our Special Correspondent.)

Charlotte Mining and Leasing Company.—This company, of Redcliff, under the management of C. E. Porterfield, is installing an 80-h. p. boiler on the Percy Chester Mine. The mine is a regular shipper.

GILPIN COUNTY.

(From Our Special Correspondent.)

Gilpin Ore Shipments.—During May the shipments of smelting and crude ores, tailings and concentrates from Black Hawk were 447 cars or 8,270 tons. This was the largest month's shipments in the history of the county, and showed an increase of 128 cars, or 2,368 tons, or 40 per cent over May, 1901. Much of the increase was due to increased shipments to the Carpenter Smelter at Golden, which is treating a large tonnage of the ores formerly handled at the Black Hawk mills.

Clear Creek Mining and Reduction Company.—An order has been placed for another 100-h. p. boiler with Stroehle & Sons, of Black Hawk. Preparations are under way to sink 150 ft. deeper, the present depth being 900 ft. About 70 tons are shipped daily to the Golden Smelter, a 25 per cent increase this month. The property is owned by Berry Brothers, of Detroit, Mich., who also furnished the capital for the Carpenter Smelter at Golden. The working force numbers 125 men. F. R. Carpenter, Equitable Building, Denver, is manager, and R. E. Nelson, Russell Gulch, is superintendent.

Concrete.—Preparations are under way for sinking the shaft, now down 1,226 ft., 100 ft. deeper. Average shipments are 20 tons, all of which goes to the mills. S. V. Newell, Central City, is in charge.

Delmonico Mining Company.—This company is asking for bids to sink its shaft 500 ft., its depth being nearly 800 ft. Development work is in order. The company has its office at Room 745, Equitable Building, Denver.

Federal.—Denver and local parties have taken a lease and bond on this property, in Russell District, and are preparing to install a plant of machinery. The property adjoins the well-known Old Town Mine, which has been making such a splendid record. The lease and bond on the Federal calls for \$35,000. W. B. Lewis, Russell Gulch, is manager.

Golden Wedge.—Returns from a recent shipment gave values of 14.7 oz., gold, 20.3 oz. silver and 14.4 per cent copper per ton, a commercial value of \$366 per ton. The property is operated by the Cashier Mining and Reduction Company, that is to install machinery on the Meeker shaft, making it the main working shaft. B. L. Campbell, Central City, is manager.

Horseshoe Mining Company.—Average monthly shipments have been 300 tons per month, which will be increased. The ores all go to the concentrators and smelters, giving fair returns. A good strike has been made in the 600-ft. level, the ore showing a good proportion of gray copper. Milwaukee men are interested, and Nic. H. Scheuer, Central City, is manager.

Keystone Gold and Copper Company.—Nebraska men have purchased the Klondyke and Texas lodes in Russell District, the reported price being \$3,000. The shaft has been sunk 215 ft., and the company intends

to sink deeper, putting in machinery. J. L. Mitchell, Central City, is manager.

Ontario-Colorado Gold Mining Company.—Canadian men are employing about 50 men and making daily shipments of 30 tons of fair grade ore to the mills. The smelting ores run \$200 per ton for first class. H. C. Eastman, Central City, is manager.

GUNNISON COUNTY.

(From Our Special Correspondent.)

Gold Cup.—The management has let a contract for extensive developments from the 9th level, and has in contemplation a tunnel from Middle Willow Creek. This latter project, however, awaits a decision as to the construction of a railway through Taylor Park. The Whig Mine, in the same district, is placing new machinery, and proposes sinking to 1,000 ft.

Harris-Fairley Mining Company.—W. Porter Nelson, of Aspen, is at the head of this company organized to work in Crystal River District. A tunnel 350 ft. long has been run. The ore is silver and copper.

Silver Rub.—This property in Pitkin District is being worked by a company of Delta men.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

After long delay, owing to the severe winter, work in the Twin Lakes District has opened. The main properties now being developed are the Bartlett mines, on Mount Elbert; the Golden Fleece, on Bull Hill, and the Ruby, in Lincoln Gulch.

Leadville Ore Output.—The figures for May show an increase in tonnage over April of over 10,000 tons, the output being about 75,000 tons of all classes of ores. There will be a further increase in June, as both the Greenback and the New Monarch companies will resume shipments before the month closes.

A Y & Minnie.—A deal is on with Philadelphia men for the sale of the tailings dump of 250,000 tons. If the deal is closed a mill will be erected to handle the stuff, which averages 28 per cent zinc, 22 per cent iron and 8 oz. silver. The new leasing company, managed by S. D. Nicholson, will have its new \$25,000 mill completed by June 15.

Alicante.—The tunnel has been run 250 ft. on the vein, and the ore streak is increasing in value. Shipments will soon start to the Robinson smelter.

Black Prince.—Two sets of lessees, the La Belle Mining Company and the Antelope Mining Company, are working this Breece Hill mine. The former has cut a body of siliceous gold ore. The Antelope is following rich stringers.

Blue Bell Group.—Eastern men are figuring on buying this large tract of land on the gold belt, 4 miles east of the city on Little Ellen Hill. There are 14 patented claims.

Cloud City Mining Company.—Work temporarily suspended a few weeks ago is to be resumed at once. New machinery is being secured, and the 50-ft. shaft is to be sunk another 100 ft., where a drift will be run.

Evalyn Mining Company.—Sinking to 1,200 ft. is completed, and a large plant of machinery is being put in.

Greenback.—Shipments will start very soon, as immense sulphide bodies are now opened in all the workings. The material is a clean iron sulphide, and 200 tons a day can be shipped.

Keystone Mining Company.—The water in the Rex shaft is down to the 200 ft., where the old pump has been recovered in good condition.

Last Chance.—New lessees have machinery in position, and will sink the shaft to the lower contacts. This is virgin ground near the Fryer Hill consolidation.

Printer Boy Mining Company.—Old bills are being settled, and work will be resumed. The water is held at the 200-ft. level.

Red Hook.—The lessees have shipped 150 tons mined during the winter. This ore averaged \$150 per ton.

Rialto Mining Company.—Boston and Colorado men are behind this company, operating on the Pyrenees. It was thought that the property would be sub-leased, but the stockholders disagreed, and the management has closed down and pulled the pumps.

Rubic.—After an idleness of some months Horrihan Brothers have resumed work, and are shipping from a sulphide body, some of which averages 25 per cent lead and 10 oz. silver.

St. Kevin.—Seventy tons of high grade material have been shipped. The stuff averages 100 oz. silver. Frank Lomeister is at the head of the lease.

MINERAL COUNTY.

(From Our Special Correspondent.)

Home Mining Company.—This company, of Creede, modeled on the lines of the Home Company of Leadville, is operating the Bachelor Mine, and the outlook is most favorable. The company is handicapped by the

bad condition of the underground workings. These are being put in order. The ore in the north drift is reported improving in quantity. Like results are being obtained from the Solomon Mine on Campbell Mountain.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

Alta Mines Company.—The company has received 2 sets of rolls, 16 by 30 in., which will be installed as soon as possible. With these in operation the output will be increased. The mill has been closed down several weeks for repairs, but is now shipping concentrates regularly. The rolls and crushers have been thoroughly overhauled, the launders repaired, and a new water-line laid from the lakes recently acquired. With this supply of water the mill can be run at full capacity during the entire year. Albert C. Koch, of Telluride, is manager.

Japan Tunnel.—Lundstrum & Treas threw up the contract for driving this tunnel, and the company is doing the work, driving from 5 to 7 ft. daily. A small force is employed at the mine, and some development work is being done on the 2d and 3d levels. V. U. Rodgers, of Telluride, has charge.

Keystone Placer.—This property, located 5 miles west of Telluride, has over 500 ft. of sluices, and when the line is completed will have over 1,100 ft. of boxes. Much delay has been caused by a great mass of boulders in the old channel of the San Miguel River, and bed-rock will not be reached before July. The company expects to be washing out gold by June 15. Another giant has been ordered.

Peck Cyanide Company.—The company is now running at full capacity, and regular shipments of bullion will soon begin. W. E. Gill is manager, and Wm. Royston is superintendent, at Telluride.

Tomboy Gold Mines Company, Limited.—The timber shed at the mouth of the Argentine tunnel is nearly completed and work on the new bunk and boarding house is starting. A large force of men is employed in grading for the new mill, but it will be some time before the erection of the building begins. J. Herron, of Telluride, is manager.

TELLURIDE COUNTY—CRIPPLE CREEK.

Portland.—Judge Green, of the District Court at Des Moines, Iowa, has denied the application for a new trial of the famous Doyle-Burns suit. The decision grants James Doyle, the plaintiff, \$446,923, to which is added \$8,044 accumulated interest. The decision is based mainly on the opinion that the evidence did not show a co-partnership between Doyle and Burns, but merely common enterprise and cotenancy. There is little doubt that an appeal will be made to the court of last resort.

(From Our Special Correspondent.)

Cripple Creek District Mines.—The mining situation has improved greatly the past few months. There are more men working than for some time, and a large amount of ore is being shipped. The improvement is due to a great extent to a considerable increase in the amount of leasing. Some months ago it was almost impossible to get a lease on a piece of property on good terms, and leasing dropped off. Of late, however, a large number of favorable leases have been granted and a considerable number of them are making money.

Doctor-Jack Pot.—Reports show that the mine is in a fairly good condition and is producing about 30 tons per day of the average value of about \$35 per ton. It is also understood that the company's indebtedness is still about \$60,000 but this is being steadily reduced. When the consolidation was first made a large amount of rich ore was taken out and a large treasury reserve accumulated and \$243,000 paid in dividends. When the ore on the upper level was exhausted and water interfered with development the reserve melted away and the company went into debt. The Doctor Mine has been one of the most famous in the district and has twice run out of ore but each time recovered it.

Elkton Consolidated Gold Mining Company.—This property is now shipping considerable ore, mostly from the 7th and 8th levels. S. W. Mudd, of Leadville, has recently been examining the water flow in the property, and it is expected that his report will soon be made public. At present some of the levels are bulkheaded, but the mine has no difficulty in handling the water that is allowed to escape. The dump is leased, though the work is not on quite so extensive a scale as under Lyons and associates who attempted to work the dump some time ago. On the whole the outlook is fairly good.

Isabella Gold Mining Company.—The strike on the 11th level, while nothing wonderful, is reported as looking quite good and producing a fair amount of ore. Several of the leases are also producing good ore. The dumps of the main shafts on the property have recently been leased to Alex. Miller and associates. It was Mr. Miller who had the lease on the Wild Horse dump.

Stratton's Independence, Limited.—The recent re-

port of John Hays Hammond was read recently before the stockholders' meeting in London. Mr. Hammond answered at some length charges as to his connection with the property and called attention to the fact that his predictions had in almost every case been borne out by later developments.

The treasurer's report showed the following: During the nine months ending March 31, the mine produced 71,978 tons of ore of the gross value of £351,445, and also about £4,800 were received from royalties on dump leases. Dividends to the amount of £75,000 were distributed. The last dividend brings the total amount distributed since the incorporation of the company 2 years and 9 months ago, to £754,172. During this period also there has been added to the treasury reserve about £21,000, making the total reserve £82,000 after adding about £10,000, the profit for April. The results for the 9 months were as follows: Total gross receipts, £356,245; developments, plant, and machinery, £60,156; gross profit £146,155; net profit £86,000.

A great deal of development work has been done, but the outcome of this is not very encouraging.

IDAHO.

BLAINE COUNTY.

Fisher.—Ole Rorem, of Hailey, has bonded this gold mine 40 miles beyond Galena for a reported sum of \$120,000 and has men at work. The mine and mill have been shut down since last fall. The ore is free-milling.

IDAHO COUNTY.

Daisy.—The drifts on the 300-ft. level have been driven about 60 ft. each way and the faces of both are in good ore. An upraise being run from that level for air is said to show 6 ft. of good ore. On the 2 lower levels there are said to be streaks 2 ft. wide that run as high as \$70, while the average of the entire ore body reaches about \$25 on the lower level. The saving on the plates in the mill is reported large, while the concentrates are clean. It is quite probable that a cyanide plant will be put in. It has been determined that the ore will cyanide to advantage.

Ella Hill.—Salt Lake, Utah, men are interested in this mine in Neal District. Work is progressing rapidly in the tunnel to cut the vein at a vertical depth of 300 ft., and 75 ft. more ought to bring the tunnel into ore. From the surface the vein was prospected to a depth of 30 ft., showing 4 ft. of ore averaging well in gold. A shipment of 81 tons is said to have brought \$593. The Ella Hill is close to the Homestake and Daisy mines. It is the intention of Mr. Smith and his associates to begin work on a mill as soon as ore can be stoped from the tunnel.

INDIANA.

GRANT COUNTY.

(From Our Special Correspondent.)

Oil Wells.—Grant County heads the list for completed wells, and during May more rigs were busy than in any month since oil was discovered. Grant County has 92 wells. Figures for May show that throughout the entire oil belt the number of completed wells increased 32, increased daily production 715 bbls., average new production 18½ bbls. The indications are that June will make a better showing than May.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

United States Steel Corporation.—This company has bought 1,200 acres of the richest coal deposits in this section, situated east of Sullivan. The deal was made by D. W. Henry, of Terre Haute. It is generally understood that the company will work the field on an extensive scale to supply its fuel needs. The Effingham division of the Illinois Central penetrates the new field, but a new railroad will be built later.

IOWA.

MONROE COUNTY.

(From Our Special Correspondent.)

Hocking Coal Company.—George SeEVERS, of Oskaloosa, general solicitor for the Iowa Central Railway, acting for that company, on May 31 purchased the 2 mines of this company, near Albia, on the Iowa Central Railway. These are both shaft mines, well equipped, showing about 6 to 7 ft. of coal, and have a daily capacity of 800 tons each. The coal is of good quality, but considerable black slate and sulphur rock are in the seam. Mr. Gibbs, of Oskaloosa, was president of the Hocking Company.

LOUISIANA.

CALCASIEU PARISH.

(From Our Special Correspondent.)

Jenning's Oil Field.—The Southern Oil Company's No. 2 well brought in 3 months ago, which ceased to flow and had to be cleaned out, came in with a rush on May 21, throwing oil high over the derrick. Its capacity has been estimated as large as 50,000 bbls. per

day, and the town is swarming with spectators and speculators.

Southern Oil Company.—No. 4 came in on May 31, throwing oil 110 ft. high. The pressure seems as good as in No. 3, but the volume of oil is less, the well being only a 4-in. one while No. 3 is 6-in. It is stated that No. 4 goes 110 ft. into the oil sand. Jennings is having a miniature Beaumont boom and land anywhere near the gushers is held at high figures. Shipments of oil have already been made. A pipe line 6 miles long conveys the oil to the Southern Pacific and storage for 75,000 bbls. is built.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

Franklin Mining Company.—The output for May was 300½ tons of mineral, comparing with 260 tons in May, 1901. The April output was 511 tons. During May No. 5 shaft was shut down 2 weeks owing to cave-in, causing a falling off in production.

Quincy Copper Company.—At the stockholders' meeting in New York City, Don M. Dickinson, of Michigan, was elected a director in place of Thomas B. Dunstan, deceased. The remaining directors were re-elected by unanimous vote of the 79,705 shares represented in person or by proxy. No other business was transacted.

(From Our Special Correspondent.)

Arcadian.—The equipment at No. 4 shaft, recently sold to the Tri-mountain Mining Company, is being removed. The Wisconsin Bridge and Iron Works, of Milwaukee, Wis., has a crew at work taking down the steel shaft house.

Baltic.—The work of installing the new hoist at No. 3 shaft is about completed. The hoist is a double cone drum duplex Corliss direct acting engine, steam cylinders 24-in. diameter by 60-in. stroke, driving a drum 10-ft. diameter at small end and 15-ft. at center, grooved for 1¼-in. rope. The drum is fitted with a single post brake. The hoisting engine will have a capacity of a maximum gross load of 19,000 lbs., hoisted at a speed of 2,000 ft. per minute up a 73 degree inclined shaft. The hoist is from the Fraser & Chalmers Works, of Chicago, Ill.

Champion.—The daily output averages 220 tons, the rock coming from B, C and D shafts. Twenty-seven power drills are in use underground, and 1,000 ft. of new ground is opened each month.

Elm River.—Work at this property is confined to exploratory operations. Cross-cutting west of the exploratory shaft continues.

Franklin.—No. 5 shaft is again in commission after being closed for 2 weeks. The damage caused by the cave-in, other than loss of production, was slight.

Old Colony.—Sinking is under way in 2 exploratory shafts, one of which is down only a short distance. A complete cross-section has been obtained by the tunnel and diamond drill work.

Quincy.—This mine is stamping 3,200 tons of rock daily, and this year's output will be about the same as that of 1901. No. 8 shaft, on the Mesnard property, at the north end of the mine, is down to 1,400 ft., or the 13th level.

Winona.—A rock crusher will be installed in the rock house at No. 2 shaft. It is reported that the 6th head at the Atlantic Mill will stamp rock from this mine when released by the Champion.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—No. 1 shaft is down to the 5th level, and the skipway is completed to a point below the 4th. A cross-cut from No. 2 shaft at the 2d level is now driving to strike the Evergreen lode. The lode has not been opened at this property, and the cross-cut will strike it 400 ft. from the surface. No. 3 shaft is down to the 5th level in good ground.

Mass Consolidated.—C shaft, on the Butler lode, is sinking to 350 ft. from surface. Little mass copper has been encountered in the shaft as yet, but the quality of stamp rock hoisted is promising. Sinking will be pushed. The shaft will be connected with B shaft by cross-cuts at deeper levels.

IRON—MEMORINEE RANGE.

Menominee Range Shipments.—Shipments are now very large, chiefly by Escanaba, though the Chicago, Milwaukee & St. Paul road is taking a large proportion of ore to its new dock at North Escanaba.

Armenia.—This mine at Crystal Falls is being reopened by the caving system, and the immense pillars that were left in the old mine are all to be removed. Water has always given great trouble.

Flewelling.—Work is to start on this old exploration a few miles above Amasa. It is on the Hemlock formation, and thin seams of ore were found in a shaft 75 ft. deep.

Great Western.—At this mine at Crystal Falls water is being bailed at the rate of 1,300 gal. a minute.

Michigan.—At this mine of the United States Steel

Corporation a stock pile that has been on surface for 3 years is being loaded.

Monongahela.—At this mine, belonging to Jones & Laughlins, the shaft is being sunk to 300 ft., to determine the existence of an ore body of sufficient size. The company has a drill on lands adjoining the Dunn Mine.

MINNESOTA.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

On the extreme west end of the Mesabi Range explorations are progressing. Test pits sunk in section 2, T. 55, R. 25, are without result so far. A seam of lignite coal encountered the other day is as valueless as all the lignite found in the same region and towards the international boundary line. In section 3 test pits are showing lean ore and paint-rock. In section 29, T. 56, R. 24 drill holes have cut a considerable thickness of ore, in some places more than 100 ft., but of rather low grade. Options are out for sale at a low price. In sections 18, 19 and 20, T. 56, R. 23, where the Donora Mining Company last year found some low-grade ore and abandoned the property, a lease has been sold to A. Chisholm, and he will develop the property at once. He has also taken a lot of adjoining lands and will explore them. In section 29, T. 56, R. 24, low-grade ore is said to have been found.

Heavy rains have flooded a few of the open pit mines and some underground properties, but the water is being removed. Shipments have been hindered by the bunching of ships at lower lake ports and delays from blockades. For May Minnesota shipped out about 1,730,000 tons of ore, making the season's shipment 2,700,000 tons.

About 100 miners have been brought in from Houghton, Mich., from the Isle Royale Mine, and all have gone to work in Hibbing and west of there. Probably more men from the copper country will come here, though there is little difference in wages.

Auburn.—The pumps have been pulled, the steam shovel that loaded cars in the bottom of the pit, 100 ft. down, has been taken out, and all machinery moved away. The property will remain idle for a long time, probably until the United States Steel Corporation, its owner in fee, opens it on an entirely different plan. The mine has produced 80,000 tons in a single month from its one shaft, and last year mined almost 600,000 tons, most of it in eight months. There is still a very large quantity of ore there.

Colonial Mining Company.—This company has opened a new deposit in its Kanawha property, and is shipping. This and the Hale are working steadily in a small way. In the new deposit a considerable body of good ore has been shown.

Croxton.—The Bradford Mining Company, which is a Sellwood corporation, is opening the Croxton Mine in section 13, T. 58, R. 20, explored last year. The mine will be underground, and a shaft is going down. In the vicinity of the Croxton, and also in section 13, explorations are under way, and some ore has been found. The value or extent of the find is not known.

Deering Harvester Company.—A pair of boilers have been shipped out to the Hawkins Mine from Hibbing, at a cost for the 12 miles of wagon haul of \$600. Timber for the shafthouse and other supplies have been taken in at heavy cost. The roads are in awful condition, and the railway connection will not be completed till later in the fall than anticipated. N. Trewella has charge of opening this company's Agnew Mine, and is already sinking a 125-ft. shaft, 3-compartment, to the ore.

Jordan.—Stripping operations on the milling pit insure shipments of a considerable tonnage this season. The railroad is building in. A shaft is going down rapidly.

Oliver & Snyder Company.—At this mine, in section 22, T. 58, R. 20, No. 1 shaft is abandoned for the present, and a second shaft is sinking at a point where water is not expected to be so troublesome. No. 1 is 6 by 18 ft. and 110 ft. deep. At that point a stratum of quicksand was met which carried much water. No. 2 shaft is 200 ft. west from No. 1, of the same size and operated by the same machinery—a 350-h. p. double engine, with 2 6-ft. drums of Akron, O., make. The mine will have railway connection with Duluth by July 15, and some ore will be shipped this fall.

Pearce.—At this new property the shaft is down 75 ft. and in ore. A small shipment will be made shortly. This is a Sellwood property, and is a corner of the Chisholm-Clark ore body. At the Morrow Mine, of the same syndicate, stripping is in progress by the new Mesabi Range firm of Halvorsen, Richards & Co. This property joins the Pillsbury on the west and will ship a small tonnage this year.

Pitt Iron Mining Company.—This company, at its Wacouta property, near Mountain Iron, has stopped all work. Some dispute has risen over surface rights to ground available for a stripping dump. It is not

known when operations will resume. For its Pitt Mine, near Elba, a new steam shovel has arrived, and will be put into the small stock pile.

Roberts Iron Company.—This company has started shipping and is sending out about 400 tons a day.

Stevens.—Operations are to be conducted on a large scale. Two steam shovels are already on the ground. A third, with locomotives, will be moved over at once from the Sauntry, while several small locomotives and many dump cars are being taken from the Mountain Iron.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

Kitto.—Alfred Merritt has taken a lease of these lands on Pine Island, Vermilion Lake, paying therefor \$5,000 in cash and 12½c. a ton on royalty. Nothing is known of the property except the outcroppings, about 175 ft. wide and ½ a mile long. The ore shown is an iron schist, something like that of the Champion Mine, Marquette Range. Under the lease Mr. Merritt is to make a shipping mine of the property as fast as possible, and is to mine not less than 100,000 tons a year thereafter. The land is about 2 miles from the Soudan mines, and a railroad track about 4 miles long will be needed to connect it with the main line of the Duluth & Iron Range.

MISSOURI.

BENTON COUNTY.

American Lead and Zinc Mining and Milling Company.—At a recent meeting of the stockholders of this company in Sedalia the capital stock was increased from \$50,000 to \$500,000. The company owns properties in this county, adjacent to the Raymond District, and several shafts have already been sunk. It is reported that the increase of capital means the early installation of modern machinery and the systematic development of the property.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—There has been no advance in the price of top grade ore, but medium and low grade ore brought better prices than for some time, and some of the smelters were unable to get a sufficient supply. The shipment was one of the largest of the year, and there is very little surplus in the bins. The top price was \$34 for ore from the Sheldon, Kohinoor, Vandalia and Glendale mines on the Continental tract, the Royal Blue on the Granby land and the Superior on the Leonard land. Much of the ore at Zincite and Chitwood was not sold, the owners holding for better prices. Lead ore sold at \$44.50 generally, but some exceptional rich ores brought \$46 per ton. The advance in the price of spelter last week should have brought an advance in the price of ore of \$3 a ton, according to the old rule of Robert Lanyon, but the advance was due to the strike in the Kansas gas smelter fields. For the corresponding week of last year the shipments were less by 2,685,780 lbs. of zinc and 82,680 lbs. of lead, and the value less by \$55,438. For the corresponding 22 weeks of last year the shipments were less by 8,606,970 lbs. of zinc and 22,940 lbs. of lead, and the value less by \$417,348. The following are the shipments from the various producing camps of the district for the week ending May 31:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	3,827,500	421,240	\$70,613
Galena	1,517,818	165,330	23,829
Cartersville	1,583,560	337,780	29,685
Aurora	1,665,190	22,760	22,044
Duenweg	1,194,840	82,640	19,762
Prosperity	618,060	29,700	10,550
Cave Springs	224,570	8,550	3,333
Neck City	532,170	.....	8,515
Carthage	31,490	.....	504
Oronogo	200,830	9,710	3,332
Zincite	271,270	17,250	4,589
Spurgeon	171,540	93,280	4,384
Sherwood	52,070	8,810	977
Granby	370,000	45,000	4,035
Wentworth	70,810	.....	1,062
Peoria .....	.....	42,540	947
Total	12,331,580	1,684,590	\$208,161
Total 22 weeks	231,343,620	28,245,400	\$3,647,922

Zinc value, week, \$180,731; lead, 27,430; zinc value, 22 weeks, \$3,070,290; lead, \$576,624.

MONITEAU COUNTY.

(From Our Special Correspondent.)

Standard Mining Company.—The big mill at Fortuna has started, and made a run of 16,000 lbs. of lead and 40,000 lbs. of zinc ore on the first day. Both ores are of high grade and equal the percentage shown by Jasper County ores. The ore level is at 110 ft. The Moro Mining Company and the Delaware Mining Company have drills prospecting south of the Standard Company.

MONTANA.

GRANITE COUNTY.

Montana Gold Mining Company.—This company is working the Sunday Mine in Royal District which it recently bonded from H. C. Meacham, and has purchased the Huntington Mill near Princeton owned by

Martin Breint. At present 12 men are busy at the mine.

MISSOULA COUNTY.

Anselmo.—This old property in Missoula Gulch has been taken under lease by John A. Cannon and Pierre Dalmas in charge of development. There is an old shaft 200 ft. deep on the property but a new compartment one is being sunk which may go to 1,000 ft. The mine was once a large producer of silver ore.

SILVER BOW COUNTY.

Butte Copper Mining Company.—This company is reported to have bonded the Amazon claim east of Butte, from G. W. Stapleton, A. H. Barrett, C. Jacky, J. F. Potting and J. W. Forbes for one year for \$75,000. The contract calls for 200 ft. of sinking. The old shaft is 180 ft. deep. The Butte Company has taken its machinery from the Saratoga claim and put it on the Amazon.

Colusa-Parrot Mine.—The entire surface plant of this mine, which Senator Clark recently sold to the Anaconda Company, has been removed. The Colusa-Parrot is now worked through the Never-Sweat, and its ores are mixed with those of the Anaconda mines and the Parrot.

Moonlight.—The pumps have been pulled out of the Moonlight Mine, one of the Washoe properties, as the mine is now being drained through the Bell and Diamond Mines.

Parrot Silver and Copper Company.—Sinking is being done from the 1,400-ft. level for making a draining connection with the Bell Mine of the Anaconda Company, it being the intention to drain all the hill mines through the Bell.

The annual meeting of the Parrot stockholders on account of injunction by which the stock held by the Amalgamated Company cannot be voted, has been adjourned until July 1.

NEVADA.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

Sheba Gold and Silver Mining Company.—A force of 14 men is working on the Sheba claim proper, and 3 men are to start work on the Mammoth group. A number of assays have been made, showing good values in silver and gold.

NYE COUNTY.

Tonopah District.—What promises to be very interesting mining litigation is making headway in Carson, and many hundreds of thousands of dollars are involved. The Tonopah Mining Company, of Butler, some time ago filed applications with the United States land office in Carson for patents to the land on which the several claims of the company are located. Contests have been filed in the office, and litigation is on. The Tonopah Consolidated Mining Company objects to patent being issued to the Tonopah Mining Company on the Buckboard claim, and the Salt Lake & Tonopah Company objects to an issuance of patent on the Valley View claim. Both these claims are producing ore, the latter having several shafts down to a considerable depth. A number of attorneys are on the ground gathering evidence and having surveys made.

ORMSBY COUNTY.

Carson River Placer Mining and Dredging Company.—The sheriff of New York County, N. Y., recently sold out the office furniture of this company at 18 Broadway for \$82 under an execution for \$27,346 in favor of Pearson Halstead.

The company is a West Virginia corporation organized in 1890 with a capital stock of \$2,000,000. Peter Forester is president.

WHITE PINE COUNTY.

Star.—The 20 stamp mill on this claim at Osceola is running on ore from the Woodman mine. This mill is part of the property sold at sheriff sale in February on an execution in a case brought by John R. Powell of Plymouth, Pa., against E. W. Markle, of Wilkes-Barre, Pa., as trustee. J. H. Marriott is now operating the mill as the representative of the new purchaser.

Star.—Men have been retimbering the shaft in this mine at Cherry Creek, owned by the Glasgow & Western Exploration Company, a Scotch concern which has allowed the property to lie idle for two years.

NEW MEXICO.

BERNALILLO COUNTY.

Algodones Smelter.—A. J. Frank says that the smelter being built by his company at Algodones, a small town 25 miles above Albuquerque, will be ready to blow in about September 1. He also says the Santa Fe Railway is putting in extra sidings and has agreed to erect a depot at the Algodones station.

GRANT COUNTY.

The daily shipments of iron and copper ores from Santa Rita, Fierro and tributary camps aggregate 25 to 30 cars.

Cooney.—This mine has closed down temporarily on account of the high freight rates to Aguas Calientes, Mex., that being the nearest smelter since the El Paso plant cannot take care of the ore.

Owl.—Some time since a lead of high-grade gold ore was uncovered in this claim, owned by A. A. Hamilton, and the first car of ore shipped out ran \$50 per ton. H. Finch and others of Colorado bonded the property for \$20,000, and are taking out and shipping ore.

Red River.—This mine at White Signal, owned by Len Hawkins, has been bought by the Allesandro Mining Company for \$1,000 for the purpose of obtaining a water supply for the new leaching plant to be erected in the Burros.

Volcano Mill.—The gold and silver mill at Volcano, near Lordsburg, was to start operations on June 1.

Wilson Mining and Milling Company.—This company, about 8 miles from Stein's Pass, is a new operation, but is working smoothly. A new engine and 2 boilers have been substituted for the 3 gasoline engines formerly used in the 10-stamp mill. The shaft in the mine is now down 325 ft., with levels every 100 ft. Recent assays are said to show high values in silver and gold. The mill has a daily capacity of 25 tons.

NEW YORK.

ORANGE COUNTY.

Layton Franklinite Zinc Company.—This company has been formed by John W. Simpson to develop and operate the zinc mine discovered a few years ago on the Layton farm at Amity.

OHIO.

Columbus & Hocking Coal and Iron Company.—At the recent annual meeting at Columbus the party in opposition to the management elected the following directors: S. G. McManigal, D. N. Postlewaite, A. L. Thurman, M. L. C. Kachelmacher, F. M. Cronise, Robert Dixon, O. B. Smith, W. F. Goodspeed and Joseph H. Outhwaite. The only members of the old board elected were Messrs. McManigal and Dixon. The opposition stated that the president and the majority of the directors of the company owned only a small amount of the stock. Also that while practically every coal enterprise had shown progress during the past few years, the Columbus & Hocking Company had been going steadily backward. The company was organized nearly 20 years ago.

PENNSYLVANIA.

ANTHRACITE COAL.

Lehigh Valley Coal Company.—The company makes the following statement for April and the 10 months of the fiscal year from July 1 to April 30:

	April.	Ten months.
Earnings	\$2,457,473	\$18,781,319
Expenses	2,474,036	19,154,129
Deficit	\$16,563	\$372,801

For the 10 months there was an increase of \$1,928,194 in earnings; an increase of \$1,754,052 in expenses, and a decrease of \$174,142 in the deficit.

Philadelphia & Reading Coal and Iron Company.—This company makes the following statement for April, and the 10 months of the fiscal year from July 1 to April 30:

	April.	Ten months.
Earnings	\$3,232,050	\$25,160,954
Expenses	3,115,501	23,218,301
Net	\$116,549	\$1,942,653

For the 10 months there was an increase of \$1,686,233 in earnings, and of \$1,423,604 in expenses, leaving an increase of \$262,629 in net earnings.

LEBANON COUNTY.

Cornwall Ore Banks.—Gen. E. Burd Grubb, of Edgewater Park, N. J., recently sold to the Lebanon Valley Furnace Company his interest in the Cornwall iron ore banks, at Lebanon, for \$112,500. The company also bought the Lebanon Valley furnace from General Grubb, John Meily and Richard Meily, for \$112,500.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Alder Creek Mining Company.—The first clean-up at the new cyanide plant on Yellow Creek was \$5,200, about 850 tons of ore having been run in 10 days, the average being better than \$6 a ton. The mill is supplied with quartzite and low grade ore from one of the old dumps. It is to be enlarged from 65-ton capacity to 100.

Golden Crest Mining Company.—Edward Henderson, of Detroit, Mich., is here for the annual meeting. The company has resumed work at the mine, and is preparing for shipments.

Galena Mining and Smelting Company.—H. H. Armstead, Jr., general manager, was in the Black Hills arranging to sell timber on the company's

ground, and also to lease several claims. C. B. Harris has made a shipment of concentrates from the company's old stamp mill to the National Smelter in Rapid City.

Hidden Fortune Mill.—A contract has been awarded the Colorado Iron Works of Denver, Colo., to build the new 500-ton mill in Deadwood. The contract requires the mill to be completed by October 1.

Highland Chief Mining Company.—The cyanide plant has been remodeled, and is ready to resume work. It will treat 100 tons a day.

Monarch Mining Company.—The property in Spruce Gulch is being worked under lease by George Bachman. The ore is shipped to Deadwood.

Rossiter Cyanide Plant.—The tanks are being enlarged, and the lessees, John Lundberg and J. V. N. Dorr, are going to put on a night shift, increasing the capacity.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Black Hills Copper Company.—Work is being continued in both drifts from the bottom of the 800-ft. shaft. The company has purchased the Benedict gold property, near Rochford, and is erecting a steam hoist and quartz mill. The hoist is ready to run, and the mill will start in a few days. Good milling ore is mined.

Castle Creek Mining Company.—An air compressor has been purchased. A 10-stamp mill is being built. Mill tests have been made on the ore at the Imperial cyanide plant in Deadwood, and a 200-ton run is being made at the F. H. Long electro-cyanide mill at Mystic. Richard Clark has succeeded Sydney Smith as superintendent at Mystic.

Empire State Mining Company.—The 5-stamp mill is running steadily, and clean-ups are being made. The company is developing on the 350-ft. level.

Lulu Mining Company.—The machinery is arriving for the steam hoist. The shaft is to be continued from the 100 to the 300-ft. level.

TENNESSEE.

CAMPBELL COUNTY.

The Louisville & Nashville Railroad Company has begun construction on lines from Jellico to Knoxville, and from Jellico to Log Mountain coal fields, in Kentucky. The Knoxville line will pass through La Follette, and will connect there with the Tennessee Northern.

La Follette Coal, Iron and Railway Company.—This company has about completed a 1,500 ton Stewart coal washer and about 200 additional coke ovens. The entire output of this plant will be used at the Searles furnace, which is soon to be blown in. The capacity of the furnace is 100,000 tons annually.

TEXAS.

HARDIN COUNTY.

(From Our Special Correspondent.)

Guffey Oil Company.—This company has started operations on well No. 2 and the Sun Company has also started drilling. High prices demanded for land retard development.

Sour Lake Springs.—The clearing up of the title to 1,000 acres in the vicinity of the present gushers will stimulate operations and determine the extent of the field; one contract has already been made to put down a well 4,000 ft. north of Atlantic & Pacific gushers. The Sour Lake Springs Company's well, which came in last week, is being drilled deeper.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Beaumont Oil Field.—A meeting of all parties interested in Spindle Top is to be held to discuss proposed changes in the methods of bringing in wells. It is almost a unanimous opinion that forcing mud and water into the oil sand should be discontinued. Many claim that this practice and the close drilling of wells is the direct cause of the trouble on the hill and accounts for the rapid decrease in pressure. It is a fact that many companies cannot make contract deliveries, being unable to get air to agitate their wells or to force oil into settling tanks. It is not, however, decreased pressure or scarcity of oil that is causing the rapid improvement in prices, but rather the realization that oil has been selling too cheap, often below cost of production. The storage capacity shows an enormous increase during the last two months, and the owners of tankage are using every endeavor to fill it as soon as completed. The shipments for May, like those of April, will not show any great increase, but a large proportion of the production of the field has gone into tanks and will be held for higher prices. Crude oil is 20@25c. f. o. b. Gladys. The shipments May 1 to May 15 were 407,659 bbls. The completed wells number 257, and wells drilling 60. Operations in the field show a decrease from 103 rigs on April 1 to 60 on June 1, and not all of the 60 are new wells drilling.

Production for May was 930,000 bbls., showing an

increase of about 50,000 bbls. over April. Shippers who do not own cars have difficulty in filling orders; the shortage seems to be caused by the large shipments required to fill storage tanks recently erected by the railways.

The completed iron tankage May 31 is.....	Bbls. 5,403,000
The completed earthen tankage May 31 is.....	1,985,000
The completed wooden tankage May 31 is.....	192,500

Total	7,580,500
Increase since March 31 is.....	1,897,200
Tankage under construction—iron.....	485,000
Tankage under construction—earthen.....	2,490,000

Total	2,975,000
Oil stored in wooden tank.....	143,000
Oil stored in earthen tanks.....	358,000
Oil stored in iron tanks.....	4,082,000

Total	4,583,000
Increased oil in store over March 31.....	483,000
Production Beaumont Field in 1901.....	4,100,000
Shipments January 1, 1901, to May 31, 1902.....	2,668,000
Estimated waste in 1902.....	250,000
Increased oil stored since January 1, 1902.....	3,580,000

Total production to May 31, 1892..... 11,688,000

It is noticeable that while the tankage capacity has increased 1,897,200 bbls. in the last two months, the oil in store has only increased 483,000 bbls.

Michigan Diamond Oil Company.—A consolidation of oil companies, controlled by Michigan capital, has been effected under this name with a capitalization of \$6,000,000. The head office is at Beaumont.

Treadway Oil Company.—This company has suspended work on the well it was drilling a mile north of Spindletop. It claims to have had indications of oil at various depths but not in paying quantities—when abandoned the well was down 2,487 ft. and had cost \$28,000. This was the last wild-cat well in the vicinity of Spindletop and there is little chance of any others being drilled off the hill.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—For the week ending May 24 the banks report the following settlements: Gold, silver, lead and copper ores, \$146,600; gold bars, \$27,100; bullion, \$53,200.

BEAVER COUNTY.

(From Our Special Correspondent.)

Big Fourteen.—An option in favor of Grant H. Smith has been given for \$42,000 on this group at Stateline.

Frisco Shipments.—For the week ending May 24 the Horn Silver reports 7 cars ore shipped to the smelters at Salt Lake.

Johnny.—Bids for the construction of the mill are asked on plans and specifications supplied, and will be held open until June 10. Specifications provide for the 10-stamp mill with cyanide annex. Added space in which the mill may be duplicated will be required. At a meeting of the directors it was decided to raise the capitalization to 400,000 shares; 75,000 shares of the added 100,000 will be used in payment for the Utica, Hard Times, Sleeper and Grand Prize claims on the main Johnny ledge. The remaining 25,000 shares will be placed in the treasury.

Majestic Mining Company.—This company has completed filing on water rights under the State and federal laws in the Beaver River country. It proposes building a dam and reservoir to supply 5,000 h. p. to furnish power for an electric generator and other machinery. The securing of the water rights is in the interest of the new smelter.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—For the week ending May 24 the shipments by car-loads from the camp and various mines are: Bullion Beck, 8 cars ore; Godiva, 2 cars ore; Yankee Consolidated, 6 cars ore; Lower Mammoth, 4 cars ore; Dragon Iron, 15 cars ore; Mammoth, 3 cars ore; Ajax, 1 car ore; Boss Tweed, 1 car ore; Carisa, 7 cars ore; Gemini, 10 cars ore; Grand Central, 3 cars ore; Sioux-Utah, 3 cars ore; South Swansea, 7 cars ore.

Black Jack.—It is reported that a strike has been made in this group, in Tintic, on the 600-ft. level. Over \$150,000, it is claimed, has been expended in this property, and this is the first encouragement received. It is stated that the company intended to close on June 1 had nothing of value been encountered.

Grand Central.—The company has sent 5 cars of ore from its dump to the American Smelting and Refining Company as a trial shipment under the new \$1.50 tariff, now in force between Tintic and the smelter. The smelter results are rated in order to determine whether the remaining tonnage in the dump will be forwarded. Other mines have sample consignments in transit.

Victor Mining Company.—It is reported that a strike has been made, and that developments point to a large ore body. It is claimed that the body is over 30 ft. wide at the 300-ft. level. The conflict between the Victor and the Boss Tweed is being amicably ad-

justed. Both companies have decided to make a joint upraise to determine the apex. In whichever ground the apex is proven the opponent will abide by the result.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—During the week ending May 24 the following cars of ore were sent to samplers in Salt Lake Valley; Erie, 2 cars; United States, 1 car; Montezuma, 1 car; Albino, 2 cars; Mystic Shrine, 1 car; United Bingham, 1 car; Storey, 1 car.

Highland Boy Shipments.—The usual shipments of 4 cars copper bullion approximating 260,000 lbs., were sent to refineries in the week ending May 24.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—Shipments for the week ending May 24 are as follows: Ontario, 1,022,820 lbs.; Daly-West, 3,512,810 lbs.; Anchor, 422,900 lbs.

Apex Mining Company.—Regarding the transfer of the Apex holdings, Treasurer MacMillan is reported as saying that the purchase price of \$25,000 was fair, and he would sustain the action of the board. To open up the property fully will take thousands of dollars which the company has not on hand.

Keith-Kearns Mining Company.—Proceedings to set aside the transfers made by the Apex Mining Company have been started by the minority holders of the Apex Company. The bill of complaint is addressed to H. G. MacMillan, director, secretary and treasurer; C. W. Bennett, director and president; George W. Riter, W. M. Bradley, H. Cohn, directors. The plaintiffs are Mrs. M. V. Rogers, claiming to own 10,321 shares of the Apex stock; P. Schwartz, 2,000 shares; R. P. Wilson, 1,000 shares. The document prays that the officers rescind the action of the directors on May 5 authorizing the sale of all the company's property to Thomas Kearns for \$25,000. Supporting the demand the plaintiffs allege the action was not in good faith, illegal and unwarranted, and that the pretended sale was made to defraud stockholders.

West Ontario.—Final payment has been made, and the 22 locations are now in the hands of Tennessee men who have paid about \$125,000 in the last 8 months. The territory has been opened by a 300-ft. shaft. But little drifting has been done. Prospecting will start in the expectation of tapping the extension of the Quincy vein.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—Shipments for the week ending May 24 are as follows: Ophir Hill, 38 cars lead-silver concentrates; Hidden Treasure, 5 cars lead-silver ore.

Fish Springs Shipments.—The Utah reports 1 car lead-silver ore for the week ending May 24.

Sunshine.—The proceeds of 27 days leaching in the cyanide plant, established by George Moore, were \$9,000, from an average of 100 tons daily. It represents a neat profit.

WEST VIRGINIA.

LOGAN COUNTY.

Island Creek Coal Company.—George E. Miller, Judge Thomas H. Harvey, Mrs. S. S. Altizer and Mrs. Malinda Nibert have sold to a Boston syndicate almost 40,000 acres of coal and timber lands in this county, for a reported price of about \$500,000. The purchasers, who have incorporated as above, will build 20 miles of railway to connect with the Norfolk & Western at Dingess, to give them an outlet and will then begin extensive operations. This same land sold less than 12 years ago for \$3 an acre.

FOREIGN MINING NEWS.

AFRICA.

NATAL.

The Mines Department reports that in March the total coal mined in the colony was 51,194 tons, against 46,285 tons in March, 1901, an increase of 4,909 tons. The labor employed in March last included 186 white men, 1,990 negroes and 1,530 Indian coolies, a total of 3,706 persons; of whom 2,593 were at work underground and 1,113 on the surface. There were 2,820 tons of coal exported and 25,316 tons sold to steamers at the port of Durban.

RHODESIA.

The gold output for April again showed an increase, and was the largest ever reported in a single month. It was 17,559 oz. crude, being 668 oz. more than in March. For the four months ending April 30 the total was 63,609 oz. crude, against 52,311 oz. for the corresponding period in 1901, an increase of 11,298 oz., or 21.7 per cent. The total this year was equal to 56,612 oz. fine gold, or \$1,170,170.

TRANSVAAL.

Bonanza, Limited.—This company reports for March 10,912 tons rock hoisted, of which 2,100 tons were sorted out as waste. The mill, with 55 stamps running, crushed 7,912 tons, the average duty being 4.82 tons per stamp per day. The total yield, in fine gold was from mill, 4,575 oz.; from tailings cyanided, 2,498 oz.; total, 7,073 oz., or 0.89 oz. per ton. The profit was £20,114. The average yield was \$18.09; expenses, \$5.89; profit, \$12.20 per ton.

Witwatersrand Deep, Limited.—This company proposes to increase its capital stock from £400,000 to £550,000, by the issue of 150,000 new shares of £1 each, par value. Of the new stock 100,000 shares will be issued at once, being offered to present stockholders at £4 per share. The current market price is about £4 15s. The issue is underwritten at £3 15s. per share by Van Hulsteyn, Feltham & Fry, the same firm having an option on the remaining 50,000 shares at £4 10s. for one year.

CENTRAL AMERICA.

COSTA RICA.

Abangarez Gold Fields Company.—This company, with Anglo-American capital, is working 3 mines. It has placed contracts for the conversion of its present steam plant into a water power plant. The initial electrical equipment will have a capacity of 300-h.p. The General Electric Company has been allotted the contract for the electrical apparatus. The Pelton Water Wheel Company has secured the water wheel contract as well as an order for 1½ miles of pipe. The company, it is reported, is also about to add to its cyanide plant.

MEXICO.

DURANGO.

(From Our Special Correspondent.)

According to official figures the total production of the principal mines of this State in 1901 was as follows: Peñoles, \$4,500,000; Velardeña, \$1,600,000; Promontorio, \$1,200,000; San Andreas, \$1,200,000; Caudalaria, \$700,000, and Descubridora, \$530,000.

The total value of the mineral production of the State, not counting the very small mines, was \$14,565,000, apportioned thus: Gold, \$1,125,800; silver, \$12,964,140; copper, \$368,800; lead, \$76,260.

Candelaria Mining Company.—Work is active and the mines produce a large monthly output of bullion. Eighteen new Merrill stamps are being constructed.

Descubridora Mining and Smelting Company.—This company is building a standard-gauge railway from Conchos, a station on the Mexican Central, to the mines, a distance of 50 kilometers.

Viceroy Mining Company.—This company is sinking a 1,000-ft. shaft in the hope of reaching the vein now worked by the Compania de Peñoles. The Viceroy Company bought the grounds adjoining the Peñoles, and the shaft is being sunk by contract.

SOUTH AMERICA.

BRITISH GUIANA.

Exports of gold for the four months ending April 30 are reported at 31,258 oz. crude, an increase of 127 oz. over last year. The exports this year were equal to 26,402 oz. fine gold, or \$545,722.

MINING STOCKS.

(Complete quotations are given on pages 817 and 818 of stocks dealt in at):

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

New York. June 5.

Sales of copper stocks are narrow, while prices are weak. The Amalgamated Copper Company held its annual meeting this week, re-electing the old officers and directors. There were represented by person and proxy 907,562 shares, or 59 per cent of the outstanding capital stock, whereas at the last annual meeting 66 per cent of the old capital was voted. It is also noteworthy that during the year the stock fluctuated widely, losing nearly 50 per cent, while the dividend rate has been cut from 8 to 2 per cent on the capital stock, which has been increased from \$75,000,000 to \$155,000,000.

This week Amalgamated sales were among the smallest on record, the price being \$69¼@67¼. Anaconda was uninteresting at 116½ per cent (\$29¼). The curb coppers were sympathetically quiet. United, of Montana, "when issued," sold at \$35¼@34¼; Tennessee, \$13¼@13; British Columbia, \$9¼; Montreal & Boston, \$2½@2¼; Greene Consolidated of Mexico, \$29@27, and White Knob, of Idaho, \$23¾@22¼.

Ontario Silver, of Utah, gained a fraction at 88%, but later receded to 88¾.

Quicksilver, common, of California, went at 33½. The Cripple Creek, Colo., stocks are quiet. Portland weakened to \$1.70, notwithstanding the starting of the mill. Elkton made a sale at 67c. and Isabella at 32c. Comstocks are sluggish. Consolidated California & Virginia brought \$1.45, Ophir \$1.25, Mexican 45c., and Potosi 35@34c.

Boston. June 4.

(From Our Special Correspondent.)

The copper share market is not dead, merely sleeping; at least this is the consensus of opinion. Trading has been exceptionally light, which is in keeping with the general market at present. Fluctuations have been moderate but slight declines are the rule. Tamarack and Osceola, are the exceptions. After breaking \$5.50 to \$169.50, Tamarack spurted to \$185. The announcement that the dividend had been passed brought some selling, but support was lent particularly in Tamarack, which brought about the recovery. Lawson paid \$1 and \$2 per share to call this stock at \$200 per share for 60 days and found plenty of takers. Osceola fell \$2 to \$59, but recovered to \$63. A circular issued by President Bigelow said: "Considering the present condition of the copper market the board unanimously voted not to take any action on the question of dividends until the end of the fiscal year."

Bingham has fallen \$1.75 to \$34.75, with recovery to \$35.50. The decline was the result of shifting of accounts.

United States Oil has been firm around \$17. The preannounced programme was carried out at the special meeting and it is expected that with any kind of a market this stock will be one of the most active. The stock certainly is well held.

Shannon copper, which was recently listed, has settled \$2.75 to \$15, but no significance is attached to the decline. Mohawk has lost \$1.25 to \$42.50. Mass has been steady at \$19.75@20.25. The plan of the consolidation is not likely to come out now until the market is ripe for such an event.

Dominion Coal has risen \$4.25 to \$142.50, and Dominion Iron and Steel has sold between \$55 and \$57, closing to-night at \$55. The annual meeting of these two companies will be held in Montreal June 12. Proxies for the Dominion Coal meeting run to H. M. Whitney and James Ross. Special meetings will be held immediately after for the purpose of annulling existing agreements between these two companies, dated June 30, 1899, and authorizing the execution of a lease of the Coal property to the Steel Company.

The Ross-Cox party are said to have secured about one-third of the new 50,000 shares of Dominion Iron & Steel stock. The claim is made that they own 75 per cent or 150,000 shares.

Colorado Springs. May 29.

(From Our Special Correspondent.)

The market has lost a great deal of the buoyancy which characterized it two weeks ago. The declines, however, were about offset by advances, so that affairs closed in fairly good shape. The softness of the market can be traced directly to the decline in Doctor-Jack Pot shares, the price falling from 30c. two weeks ago to below 20c. this week. The break was caused, as forecast in last week's letter, by the failure of the ore-bodies in the 700-ft. level. The exact condition of the mine at this point cannot be ascertained as the officers refuse to divulge anything. The public in consequence is believing the worst side. The stock sold May 23 at 22¼c., but dropped to 19½c. the day following, when 51,000 shares were thrown on the market. There was a hurried meeting of the Board of Directors, at the conclusion of which it was announced that an official statement would be made on June 15. The stock sold to-day at 20c. and down to 18c.

This decline was offset by the advance in Elkton, which gained from 59c. to 63c. during the week. These shares have been rather inactive, although there was more than a demand for all that came out. El Paso held firm at 51c., selling to 51½c. to-day. The company is rushing its new \$50,000 hoisting plant, which it expects to have in operation in 6 weeks, when the extraction of the rich ores in the lower level will be resumed. Golden Cycle shares sold at 63@64c. during the week.

Portland was stronger than for some time past, selling at \$1.75@1.76. The first trial run at the new chlorination mill of the company at Colorado City, was made this week, and proved entirely successful. The plant will be tested in various parts during the next week or so, and will start in full operation about June 15.

Isabella was fractionally weaker, and sold from 31½c. May 28 to 29c. to-day. The excitement over the recent strike in the eleventh level has worn off, and the stock is finding a natural level.

The report of John Hays Hammond submitted at the annual meeting of the shareholders of Stratton's Independent, Limited, held in London May 17, has just

been received, and shows that the mine produced £534,716 gross value for the 12 months ending June 30 last. From July 1, 1901, to March 31, 1902, the mine produced a gross value of £551,445. In concluding his report Mr. Hammond says that it is his opinion that another dividend can be declared.

Salt Lake City. May 31.

(From Our Special Correspondent.)

The market for the week showed an improved tone toward the close. The general tend of the market is upward. The expected reaction caused by the low tariff from the different camps made by the railroads and smelters for the benefit of the low-grade properties has not put in much of an appearance. It is yet expected, and if the results of the smelter tests prove to be as has been claimed the market will surely benefit by the concession.

The most active traders during the week were Ajax at prices from 38c. to 34c., selling 5,200 shares, and Carisa which maintained prices from 30c. to 31c. with 7,500 shares coming out. Consolidated Mercur has advanced over last week's prices and sold 1,800 shares at \$1.95@1.98. Daly Judge, of Park City, registers a sale of 500 at \$6.80. It was affirmed that a bunch of stock sold on the curb at \$8.50, but this could not be confirmed. Daly West marketed but 55 shares at \$44@45. Lower Mammoth opened at \$1.20 and \$1.17 on Monday and closed at \$1.34, having sold 2,000 shares in all.

May Day maintains a steady decline from the opening of 25¼c. marketing 16,000 shares and closing at 20¾c. Ontario registers a sale of 200 shares at 88. Sacramento advanced to 24¼c. on sales of 3,300 shares. Star Consolidated maintained its high average this week, although the sales were light; 1,500 shares sold at 23@24c. South Swansea opened at 40c. and at the close, after having sold 2,000 shares, registered 40½@38c. Uncle Sam lowered its average price, selling 6,900 shares at 33@32c. Victor placed 14,000 shares at an advance of 3 to 5c., the closing quotations being 27@25c. Yankee Consolidated, which has been on the decline, is on the recovery; 6,300 shares were sold this week, opening at \$1.16 and reaching a maximum of \$1.54, closing \$1.33. Ben Butler maintains its usual price of 9½@10c., marketing 6,000 shares. California placed 24,100 shares at 13 high and 11c. low. Century, of Park Valley, sold 2,000 shares at 55@52c.

The total of the trading on the board for the week was 116,440 shares. With but two exceptions the whole list moved upward toward the close of this week.

San Francisco. May 31.

(From Our Special Correspondent.)

Business has been fair on the Exchange especially for a week cut short by a holiday. Prices have fallen a little, but on the whole are better than might have been expected in view of the free offering of stocks. Some quotations noted are: Consolidated Cali-

ASSESSMENTS.

Name of Company.	Location.	No. Delinq.	Sale.	Amt.
Alta	Nev.	May 26	June 20	.05
Andes	Nev.	June 18	July 18	.05
April Fool	Nev.	June 7	June 28	.05
Belcher	Nev.	June 14	.....	.50
Best & Belcher	Nev.	June 28	July 23	.15
Champion	Cal.	June 14	July 3	.50
Eutonia	Utah.	June 7	June 30	.00½
Hale & Norcross	Nev.	May 27	June 20	.10
Jenny Lind	Cal.	June 25	.....	.01½
Justice	Nev.	June 16	July 9	.05
Little Chief	Utah.	June 19	July 7	.01
Madeleine	Utah.	June 9	June 30	.00¾
Mayflower	Utah.	June 5	June 21	.10
Sierra Nevada	Nev.	July 1	.....	.10
Silver Bow	Utah.	May 30	June 17	.00¾
Silver King	Ariz.	May 27	June 24	1.00
Spence	Cal.	June 26	.....	.03
Utah Con.	Nev.	June 18	July 11	.05
Victor	Utah.	June 9	June 30	.03
Yellow Jacket	Nev.	May 10	June 19	.10

DIVIDENDS.

Name of Company.	—Latest Dividend—		
	Date.	Per Share.	Total to Date.
*Bald Butte, Mont.	June 10	.06	\$15,000 \$1,207,148
*Central Lead, Mo.	June 15	.50	5,000 298,000
*Cherry Hill, Cal.	June 15	.00¼	2,500 47,500
*Daly-West, Utah.	June 15	.40	72,000 204,500
†Breece, Colo.	June 2	.05	10,000 180,000
*Con. Mercur, Utah.	June 9	.03	30,000 300,000
*La Fortuna, Ariz.	June 9	.05	12,500 1,163,500
†National Lead pf.	June 16	1.75	260,820 12,405,200
†Ontario, Utah.	June 20	.30	45,000 14,827,000
†Republic I. & S., pf.	July 1	1.75	355,371 4,264,451
†U. S. Red. & Ref., com.	July 1	1.00	58,850 117,700
†U. S. Red. & Ref., pf.	July 1	1.50	58,850 294,249
*Silver King, Utah.	June 10	.66½	100,000 5,350,000
†St. Joseph Lead, Mo.	June 10	.15	37,500 3,534,500
St. John Del Rey.	June 10	.12	64,144 13,928,619
†Standard Oil.	Aug. 16	10.00	9,700,000 49,485,000
Thomas Iron, Pa.	Aug. 1	4.00	100,000 200,000

*Monthly. †Quarterly.

fornia & Virginia, \$1.40; Ophir, \$1.30@1.35; Mexican, 50c.; Hale & Norcross, 33@34c.; Ophir is still in demand, though at a lower price.

Business on the Oil Exchange was good and sales large. Prices were generally firm. Some sold at \$3.40; Sterling, \$1.70@1.75; Reed Crude, 34c.; Monarch, 17c. There was a good deal of inquiry for Sterling.

Dividends for May on stocks listed on the Exchange reached a total of \$62,250.

London. May 20.

(From Our Special Correspondent.)

The London mining market continues lifeless. There is practically nothing being done in South African shares of any kind, though the outlook for peace is more hopeful. An idea is abroad that the Boers are negotiating for peace because their ammunition is giving out, and are bluffing so as possibly to obtain more favorable terms by bargaining for a surrender than if they were obliged to capitulate in the field. This view is to some extent corroborated by the fact that large captures of Boers are being made with practically no casualties on the British side. This feeling that the war is nearer the conclusion than is usually supposed has heartened city men somewhat, and they are getting ready their schemes for the flotation of all sorts of exploring and mining companies to operate in other parts of the Transvaal than the Rand. In the meantime, however, there is no speculation in the shares of any existing company.

The West Australian market is still in a very depressed state, owing to the bear raids that I have written of recently. Almost all the leading shares have suffered, but nothing new has transpired this week in the way of news or rumor so that the market has not shown anything but apathy.

The position of things with regard to Le Roi is getting from bad to worse. This week the board has issued a circular giving the main points of Mr. McKenzie's written report supplementing the cable report sent 3 weeks ago. From this report it appears that not only are the metal contents of the ore very low and hardly payable, but that the losses in smelting are considerable, being no less than 22 per cent. of the copper. The estimated profits published monthly made no allowance for these losses, so that since December 1 last there has in fact been a loss instead of a profit. The company also finds itself in a fix owing to the depreciation of the metallic contents of ore on hand.

The loans from the bank were secured on this ore, and as they were on a generous scale the overdraft from the bank is now greater than the assets. What the directors are to do in this situation is not quite clear, but when they have formulated a scheme the shareholders will be called together. In all probability it will be necessary to reconstruct with an assessment on the shares in order to liquidate the debt to the bank. It may also be deemed advisable to cease shipments for a time in the hopes that the price of coke will drop, and that of copper rise. The outlook for shareholders is certainly gloomy, and the £5 shares can now be had for £1. The group of City men who made the onslaught on Whitaker Wright and obtained control of the company are disgusted with the turn things have taken. As they acquired large numbers of shares at £7 each, it is obvious that their venture has landed them with a considerable loss.

COAL TRADE REVIEW.

New York. June 5. ANTHRACITE.

The production of anthracite is still at a standstill, with little prospect of an immediate change. The operators so far have adopted a purely defensive policy, maintaining that they could not afford to make the concessions demanded at the Hazleton convention without some guarantee that the United Mine Workers would not renew demands or, as certain officials of the union have talked of doing, make an agreement only to break it. In line with this policy the operators have made no attempts to work their collieries, but have simply tried to keep the mine pumps and fans running and protect their property and employes from mob violence. This policy is not likely to last much longer, and if some of the larger companies find that they cannot rely on local authorities for protection other tactics may be adopted and an aggressive policy assumed. But it is safe to say that there will be no change until some of the more hot-headed among the United Mine Workers begin to incite violence or use fire or dynamite, or until the principal coal mining concerns have agreed upon a policy and completed all arrangements. It looks now as if the turbulent element among the strikers would be heard from soon and arson and bloodshed may not be far away. Open violence will certainly do more to hasten the end of the strike than anything else.

The strike is affecting trade at all points. At the head of the lakes no anthracite whatever has been received for 10 days, and the total receipts since the

opening of navigation amounts to but little over 50,000 tons. Some coal was on the docks at the opening of navigation; owing to light receipts this is being cleaned up. In Chicago territory no anthracite is arriving. Demand is not particularly strong, however.

In the all-rail trade for the East and along the Atlantic seaboard the market is still nervous and excited, and people who should know better are paying high prices for coal. Sales at all sorts of figures are reported, and it is impossible to give exact quotations. None of the large producers has any coal to sell, but each had some coal on hand when the strike came, and has been quietly doling this out to regular customers. The shortage of coal in the retail trade is almost as marked in the towns in the anthracite region as in New York, and for the same reason, the strike was not expected. Dealers about New York who were fortunate enough to get in a supply for several months in April are now selling this coal at a nice profit, believing that before winter comes they can get all they want for considerably less than the other fellow now offers. This is good business policy. We have heard of some coal being shipped back to New York Harbor from yards beyond Cape Cod.

The June circular shows the usual 10c. advance, and the prices named for free-burning white ash, f. o. b. New York Harbor shipping ports, are: Broken, \$3.95; egg, stove and chestnut, \$4.20. Coal has sold as high as \$8 in small lots.

BITUMINOUS.

The demand for coal in the Atlantic seaboard bituminous trade is large but more or less fictitious. The lower grades of coal are being offered freely at the top prices, about \$4, for Clearfield f. o. b. New York Harbor shipping ports. Apparently some of the smaller operators are going shy on their regular contracts in order to sell a cargo or so at the top figures. The trade generally is using considerable discretion in selling to contractors. Each contractor seems to want coal enough to supply him for from 3 to 6 months at once, perhaps in order to keep out of danger. Producers are aware of this and are watching conditions closely to make the coal in hand go around and are shipping to contractors about the monthly proportion, to which the latter are entitled by contracts. The center of speculation at present is around New York Harbor, but the speculative tendency of the market is spreading to other territories. Car supply at the mines has affected shipments this week, and the number of empties returned has run down to a minimum of 50 per cent of the whole number wanted.

Trade in the far East is active, though the supply of coal there is better than was anticipated and the market easier than one might expect. Along Long Island Sound demand is very heavy and the supply not as good as desired. The demand is partly due to orders in excess of needs, but stocks generally are probably light and at some points are known to be. Around New York Harbor there is no stringency of coal among contractors, and producers are keeping a sharp eye on speculators. All-rail trade shows a heavy demand with a struggle to get coal at all points along the various lines; but the quick necessities are not thought to be as great as in other quarters. Transportation from the mines to tidewater shipping ports is prompt, cars coming through on schedule time. Car supply at the mines is variable, ranging from 50 to 80 per cent, with producers not knowing what to expect between those limits. In the coastwise vessel market vessels are in large supply. The supply is shorter at New York Harbor than at the lower ports, but vessels are seeking charters. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 75c.; Boston, Salem and Portland, 90@95c.; Portsmouth and Bath, 95c.; Lynn and Wareham, \$1@1.05; Newburyport, \$1.05; Gardiner, \$1@1.05; Bangor, \$1.10; Saco, \$1.10 and towages.

Birmingham. June 2.

(From Our Special Correspondent.)

The Coal Operators' Association meets this week for a general discussion of the situation. The general belief is that the miners and operators will get together on a scale without any trouble. The miners will ask for eight hours to a day's work and payday every two weeks. It is likely that a better minimum price will be asked with a possibility of an advance also on the maximum. The Bessemer Land and Improvement Company is now pushing a new slope at Belle Ellen in Bibb County and in a few weeks will be shipping coal. The Calumet Coal Company, with \$50,000 capital stock, was organized during the past week with R. C. Middleton, of Birmingham; J. H. Bankhead, Jr., of Jasper, and others interested. The company will open mines near Jasper in Walker County.

Chicago. June 3.

(From Our Special Correspondent.)

The wholesale stock of anthracite in this city is practically exhausted and no more shipments are on the way from the mines. Dealers have been cleaned

out in the last week, supplying orders of customers. New orders have been refused generally. No advance has been made in the price for car-load lots, except the expected one of 10c. per ton over the May price, making the June price \$5.70.

The trade in bituminous coal has profited out of the strike situation; retail dealers and consumers have been busy laying in stocks that will last through a probable siege due to stoppage of production. Smokeless coals have advanced 15c. per ton on account of the active demand for anthracite substitutes; smokeless lump and egg are now quoted at \$3.40; smokeless nut at \$3.15, and smokeless run-of-mine at \$3.15. Other grades continue as last week: Hocking, \$3; West Virginia, \$3.12; Youghiogheny, \$3.20; Indiana block, \$2.45; Indiana semi-block, \$2.10; Clinton lump, \$1.90; Indiana lump, \$1.80; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2; blacksmith's coal, \$3.40.

As a consequence of the strike apprehension most retail dealers have advanced prices for Chicago delivery, to-day's quotation for anthracite being at most places, \$6.95.

Cleveland. June 4.

(From Our Special Correspondent.)

Coal shippers have experienced a great relief from a shortage of material at the Lake Erie ports on the coal that is to be sent to the head of the lakes. The car supply for the coal trade is increased through the lack of demand for such equipment in the anthracite district and through a similar lessening of demand in the merchant furnace district. All of these industrial misfortunes have directly benefited the lake shippers of soft coal. While the supply of cars is easier and while the movement of the material is very much more brisk than it has been, the receipts of coal at the Lake Erie ports are altogether inadequate to the season's needs. This of course is partly due to the enormous increase in the prospective movement up the lakes. The consumption of coal at the head of the lakes is very much in excess of what it has been in former years, hence the total movement up the lakes this season is likely to exceed by a very large amount more coal than has ever been sent up the lakes. In addition the lake coal men are exporting a great deal of fuel to Canada, most of which is being sent to the Georgian Bay region, where it is turned over to the Canadian railroads. The rates of carriage have not been changed, remaining at 30c. to Duluth and 45c. to Milwaukee.

Pittsburg. June 4.

(From Our Special Correspondent.)

Coal.—The demand for coal in this district continues to exceed the supply. No attention is being paid to inquiries from the East as the operators have all the business they can care for now on the books. There was an improvement in railroad cars for shipment to the lake ports, but many more cars are needed. The strike in the anthracite region has not benefited the coal producing companies here. The strike of miners in West Virginia scheduled to begin on Saturday will cause an increased demand for Pittsburg coal. Prices are unchanged, but in some instances a premium is paid for prompt delivery. About 1,000,000 bu. of coal were sent down the river during the week but the water receded before the Monongahela River Consolidated Coal and Coke Company could get out the heavy tows it had ready. Over 20,000,000 bu. are loaded but it will not get out until there is a good coal boat stage of water.

Connellsville Coke.—The production was a trifle greater last week but there was a falling off in shipments. The strike of blast furnace workers will cut off shipments to the valleys and enable operators to take care of some of the orders received from the East. Furnace coke is still quoted at \$2.25 to \$2.50, and foundry at \$2.75. The Courier in its last issue gives the production for the previous week at 248,571 tons, an increase of over 2,000 tons. The shipments for the week aggregated 12,054 cars, distributed as follows: To Pittsburg and river tripples, 3,596 cars; to points west of Pittsburg, 5,968 cars; to points east of Connellsville, 2,490 cars. This was a decrease of 159 cars compared with the shipments of the previous week.

San Francisco. May 31.

(Special Report of J. W. Harrison.)

During the week there have been three arrivals of coal from British Columbia, 13,530 tons; two from Oregon, 560 tons; one from Washington, 3,500 tons; two from Australia, 6,066 tons; total, 23,656 tons. The quantity delivered here this week is fully equal to any demand that may spring up in the next few weeks. The complaint from domestic and foreign importers is very general; that is, that it is difficult to find buyers at covering prices. Services of steamers and sailers for coal carrying are being very freely offered by owners at very generous rates, lower than heretofore known for years, still at the reduced rates, very few engagements are being made. Freights from Australia in this direction are exceedingly low, in consequence of the comparative

failure of the grain crops throughout the colonies; on arrival here owners will find very little remuneration for their property, in the present schedule of outward grain freights. The coal strike in the East only affects this market, as far as hard coals are concerned, of which but very little is now being used here. Fuel oil continues to be the favorite fuel with steam producers. It is both effective and economical. The unpleasant weather so far this spring has helped to increase the sale of coal for household purposes.

Foreign Coal Trade. June 5.

There is little new in the export trade here. About the average business is being done with the West Indies, and some with French and Italian ports. Supplies have been somewhat affected by the demand for bituminous coal in the seaboard cities in consequence of the anthracite miners' strike.

Ocean freight rates are unchanged, with no new charters reported.

The Austria State Railroad management in Vienna and Krakau has asked for tenders for 4,441,000 metric tons of coal to be delivered in 1903. Bids will be received until June 16.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of May 24 that the Welsh coal market remains about steady for all descriptions of coal. The Whitsuntide holidays do not appear to have affected prices to any appreciable extent. Quotations are: Best Welsh steam coal, \$3.90@4.02; seconds, \$3.84; thirds, \$3.54; dry coals, \$3.30; best Monmouthshire, \$3.36@3.48; seconds, \$3.24; best small steam coal, \$2.28; seconds, \$1.98; other sorts, \$1.80.

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

The general tone of the freight market is exceedingly quiet; tonnage is offering freely and orders are scarce. Rates of freight to the South American ports show some improvement, however. Some rates quoted from Cardiff are: Marseilles, \$1.45; Genoa, \$1.44; Naples, \$1.44; Sabang, \$2.76; Singapore, \$2.76; Las Palmas, \$1.50; St. Vincent, \$1.74; Rio Janeiro, \$3.12; Santos, \$3.48; Buenos Ayres, \$3.36.

IRON TRADE REVIEW.

New York. June 5.

The strike of the blast furnace workers in the Pittsburg District and in the Mahoning and Shenango valleys, which was appointed for June 1, does not seem to be a success, though a number of furnaces in the Valley District are banked, temporarily reducing production at an awkward time. A few furnaces in Eastern Pennsylvania are banked on account of the anthracite strike, but their production is not important.

The pressure for structural steel continues very great, while bars and merchant steel are also showing heavy retail demands. In other lines of finished material there are no signs of any falling off in the requirements of consumers.

The business in foreign iron and steel is on the increase. Large orders for steel billets and some for structural material have been placed; while others are under negotiation.

The steel rail makers have already fixed prices for 1903, taking this action nearly six months earlier than usual. The basis of prices for next year is \$28 for heavy sections, the same as for this year. It is said that a large tonnage for next year is already placed. Some increase in prices had been anticipated, but this action shows a tendency to maintain the level as far as possible.

Birmingham. June 2.

(From Our Special Correspondent.)

Inquiry has already been received in this district for iron to be delivered next year and the furnace-men have not so far shown any anxiety to sell. However, prices which are not quoted are given per for 1903, and it is believed that placing of iron for that period will commence now shortly. There is yet some demand for immediate delivery iron in small lots and this is being paid for at the rate of \$18.50 for No. 1 foundry, with \$18 for No. 2.

W. H. Hassinger, Southern manager of the Republic Iron and Steel Company, now makes a positive assertion that the big furnace at Thomas, which will have the largest output of any furnace in the district, will be put in operation during the next seven days. President A. W. Thompson, of Chicago, will come down for this event.

The following are the published quotations at present: No. 1 foundry, \$16.50; No. 2 foundry, \$16; No. 3 foundry, \$15.50; No. 4 foundry, \$15; gray forge, \$14@14.50; No. 1 soft, \$16.50; No. 2 soft, \$16.

The Alabama Steel and Wire Company, by the purchase of ore lands in Cherokee County, further demonstrates its intentions of erecting two or three blast iron furnaces in this district at an early date. The company now has coal and ore lands and is

dickering for limestone and other fluxing material. It is further stated that the company intends erecting a steel plant to furnish its own steel.

The Sloss-Sheffield Steel and Iron Company has purchased the Lady Ensley Furnace property, consisting of coal and ore lands beside some coke ovens. The company is said to be dickering for the coal mines of the Ivy Coal and Coke Company, in Walker County.

The conditions in the finished iron and steel circles are active and a full complement of men are still at work.

Buffalo. June 3.

(Special Report of Rogers, Brown & Co.)

The scarcity of iron continues unabated, and on account of strikes and rumors of strikes the outlook into the future is not promising. The market in itself is featureless, showing no activity of any kind. It is disappointing to everybody, that for one cause or another so many furnaces are now compelled to be out of blast. There being no especial change in conditions we report quotations of last week. These are on the cash basis, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$22.25@22.75; No. 2, \$21.75@22.25; Southern soft, No. 1, \$21.75@22.50; No. 2, \$21.25@22; Lake Superior charcoal, \$22@23.

Chicago. June 3.

(From Our Special Correspondent.)

Prices of Southern iron show a tendency to advance; the quotations for actual sales to-day are \$20.65 for No. 2 and the customary 50c. higher for No. 1. The range of Southern No. 2 in the last week has been \$20@21. Northern is firm at the same prices as last week: \$21.50@22 for No. 1 and \$21@21.50 for No. 2. Sales have not yet run into 1903 to any considerable extent and furnace men are hoping that they will not.

Coke from West Virginia ovens brings easily \$5.50 now; there is no Connellsville product to be had at any price, on account of the coal strike. This condition of things is not assuring to pig iron men and they are inclined to tighten lines about business as much as possible.

Cleveland. June 4.

(From Our Special Correspondent.)

Iron Ore.—The week has seen a material improvement in the supply of cars with which to take ore away from the lake docks and in that measure the delays to the boats have been offset. Shippers are now making their estimates of the amount of material moved during May and the expectations are that when all figures are in the total shipment will exceed 3,500,000 tons, approaching close to 4,000,000 tons. As this indicates, the scarcity of railroad equipment has been only comparative, the supply of former years having been exceeded, but the present supply being inadequate to the enormous and growing needs. Rates of carriage remain stable. The selling prices of ore do not change. They are \$4.25 for bessemer old range; \$3.25 for non-bessemer old range and bessemer Mesabi; and \$2.75 for non-bessemer Mesabi.

Pig Iron.—The pig iron scarcity has been emphasized this week by the beginning of a strike among the furnace workmen of the merchant furnaces in the Mahoning and Shenango Valleys. All the merchant furnaces are banked and the strike yesterday spread to the furnaces of the Steel Corporation, all but three of the stacks in the Mahoning Valley being out of business. The Steel Corporation furnaces in the Shenango Valley have not been touched so far. Most of the furnaces now idle have been producing bessemer and basic iron which went to Steel Corporation converters. Through this means a shortage of steel is threatened which is not inviting just now. Prices hold firm on the few sales now being made, \$21 being quoted on No. 2 foundry, Valley furnace and \$21.75 on bessemer and basic. Sales are light since the material is scarce and since those who have any are holding it back to fill contracts.

Finished Material.—The Steel Rail Association held a meeting during the week and continued the price of rails at \$28 for the ensuing year. The price having been fixed a number of sales have been made which entail deliveries past January 1, 1903. The big business in next year's selling remains of course to be done but it is expected to come soon. This is the earliest date in history for the selling of rails for the coming year. The sale of structural material for 1903 delivery also continues. Sales also for immediate shipment are made at greatly enhanced prices. It now develops that some of the mills withheld their tonnage from the market earlier in the spring and are now selling at store prices, ranging from 2½ to 3c. It is also learned that the same mills are taking large profits on the sale of large-sized steel bars, getting 1.80c. Pittsburg for the bessemer product, which is \$4 a ton over the association price. This is due to a scarcity of the larger sizes of bars, the smaller ones being more plentiful. The sale of steel sheets is continued in about the same quantities as heretofore noted, the orders being a little ahead of production but not seeming to gain any.

Old Material.—The market has been brisk, the demand for foundry scrap increasing almost equal to the call for mill scrap. The price of cast scrap has been increased to \$16 a net ton. Other prices have remained unchanged.

Philadelphia. June 5.

(From Our Special Correspondent.)

Pig Iron.—Pig iron conditions are mixed up. The anthracite strike has introduced a new and unsettling factor. Brokers and agents for furnaces here say they have been requested within the past 24 hours to name prices on both foundry and forge iron, but the unsettled condition has prevented the closing of any important contracts. Several small lots sold today, particularly of No. 2 foundry. All quotations are off. The prices named are nominal. No. 1X foundry is \$21.50; No. 2 plain, \$20; gray forge standard \$19; ordinary \$18.50; basic \$19.50@20.

Muck Bars.—Two or three orders have been placed for muck bars at prices which are not to be had.

Billets.—Rumors prevail in billets of an advance of \$2 per ton; basic open-hearth quoted at \$35 to 36.

Merchant Bar.—Quite an active demand has sprung up for merchant bar and all the storekeepers in the city report inquiry with an improvement in distribution this week over last. Quotations are nominal but 2c.@2.10c. for refined iron is generally given. Steel bars are 1.90c.@2c. less.

Sheet Iron.—All the local representatives say that a more active demand has sprung up, for July No. 10 is quoted as high as 2.40c.

Merchant Steel.—Quite a number of orders were sent in since Monday for merchant steel for hardware and shop purposes. Early deliveries were marked up a trifle, but how much it was impossible to obtain.

Skelp.—There is no possibility of mill people agreeing upon prices while buyers and makers are unable to agree upon dates of delivery.

Pipes and Tubes.—Prices have been marked up for early deliveries, but the amount of the advance is not given.

Plates.—In plates everything is unsettled. The only demand for the present is from small buyers. The quotations are for ¼-in. iron are 2@2.10c.; universals 2c.; flange 2.20c.

Structural Material.—Some of the larger interests of structural material are now confident that they will be accommodated from abroad. Beams and channels, 15 in. and upward, 2.30c.@2.60c.

Steel Rails.—Are reported active in small lots and for heavy sections.

Old Rails.—Quotations are as high as \$26 and there are rumors that considerable business has been done at this price.

Scrap Iron.—There is quite an excitement in the scrap iron market over reports of some heavy purchases of scrap by Western parties which will draw some of their supply from Eastern territory. Heavy melting steel is \$22; steel rails, short lengths, \$22; choice railroad scrap, \$25@26; machinery cast, \$18; steel axles nominally \$25.50 and not to be had.

Pittsburg. June 4.

(From Our Special Correspondent.)

The principal event of the week is the strike of the blast furnace workers in the Mahoning and Shenango Valleys which began on Sunday, and as a result the markets are extremely quiet. Furnace owners had ignored the demands of the men for a change from a two-turn to a three-turn system as it was not believed the officers of the National Association of Blast Furnace Workers and Smelters would carry out their threat to tie up the furnaces. A proposition providing for an increase in wages, it is admitted, would have been entertained by the manufacturers. There are 33 blast furnaces in the Valleys, 9 of the National Steel Company, 4 of the Republic Iron and Steel Company, 1 of the Sharon Steel Company and the others are merchant furnaces. When a strike seemed certain 5 furnaces that needed repairs were closed for that purpose and as a result of the strike 16 furnaces are banked. Twelve are in operation as usual although strong efforts are being made to close them. They are the Cherry Valley, of the Cherry Valley Iron Company and the Seneca, of the Salem Iron Company at Leetonia, the furnace of the Sharon Steel Company at Sharon, and the 9 furnaces of the National Steel Company. All of the 34 furnaces in the Pittsburg District are in operation. The strike leaders declare they will be able to close the Edith and the Neville Island furnaces of the American Steel and Wire Company before the end of the week. Several independent companies have agreed to grant an increase in wages and it is probable that terms will soon be arranged. If the strike is prolonged it will seriously affect the independent rolling mills and steel plants that are dependent on the Valley furnaces for raw material. Unless it can secure iron elsewhere the Republic Iron and Steel Company will be forced to shut down some of its plants, as will other union mills operating

under the Amalgamated Association scale. None of the non-union mills are affected by the strike.

No sales of pig iron have been made since the strike began, but late last week orders were placed for nearly 20,000 tons of bessemer iron for delivery during the last quarter of this year and the first quarter of 1903. A large independent interest has just closed contracts for Virginia and Alabama basic iron aggregating 5,000 tons for delivery during the last four months of the year. The price is delivered at Pittsburg. About 6,000 tons of German steel billets and sheet bars were sold this week for shipment in July and August. The price is said to range from \$32 to \$33 delivered in this district.

Official announcement is made that the rail prices for 1903 have been fixed at this year's rates, \$28 for standard section, 50 lbs. and over in lots of 200 tons and over; \$30 for car-load lots and less than 200 tons, and \$32 for less than car-load lots. It is admitted that some large orders have been booked for delivery next year but the tonnage has not been given out. Prices have never before been fixed at so early a date, the announcement usually being made in October or November. The production last year amounted to 2,800,000 tons and some contracts made were not filled until this year. It is likely that some of this year's orders will go over as the production is not likely to be any greater than in 1901. The Lackawanna Iron and Steel Company has not made any rails this year owing to the removal of its plant from Scranton to Buffalo, but it may produce some at the new works before the close of the year. Rails are being rolled at the Youngstown works of the National Steel Company which did not contribute materially to the rail tonnage last year.

The Carnegie Steel Company is adding another blast furnace to the Carrie group at Rankin, work having been commenced on Monday. The plant at present has four furnaces of 900-ton capacity each. The new stack will be known as No. 5 and will be of 800-ton capacity as this size is said to have proved the best. It will have every modern contrivance and will be similar in design to the two furnaces in course of erection at the Edgar Thomson plant at Braddock.

Pig Iron.—From 15,000 to 20,000 tons of bessemer pig iron were sold late last week for delivery from October 1 to April 1 at an average price of \$21, Valley furnaces. No sales of gray forge or foundry iron are recorded. Gray forge is quoted at \$20.25@ \$20.75, Pittsburg, and Foundry No. 2 at \$21@ \$22, Pittsburg.

Steel.—Bessemer steel billets are offered at \$36. There is a very limited supply and also a limited demand at that figure. No sales of any consequence were made. Steel bars are still quoted at 1.60c. Plate prices are unchanged.

Sheets.—There is but little change in the sheet market. But few orders are being booked but the mills have orders that will keep them busy for several months. No. 28 gauge black sheets are quoted at 3.10@3.15c. and galvanized sheets at 4.50c.

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

New York. June 6.

Pig Iron.—Iron is as hard to get as at any time within the past two months. Furnace yards are bare. We quote for tidewater delivery: No. IX foundry, \$20@ \$22.50; No. 2X, \$20@ \$21.50; No. 2 plain, \$20@ \$21. For Southern iron on dock, New York, No. 1 foundry, \$20.50@ \$21.50; No. 2, \$19.50@ \$20.50; No. 3, \$18.50@ \$19.50.

Bar Iron and Steel.—Business is good. We quote on large lots on dock: Refined bars, 1.95@2c.; soft steel bars, 1.83c.

Plates.—Demand is heavy. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 2@ 2.10c.; flange, 2.05@2.15c.; marine, 2.15@2.25c.; universal, 1.95@2.05c.

Steel Rails.—There have been some large orders placed for 1903 delivery. The mills have agreed to keep prices for standard sections at \$28. Light rails are \$30@ \$33, according to weight.

Structural Material.—Demand is still large, and sales of imported material continue. 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.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 820.)

New York. June 5.

The anthracite coal miners' strike has lessened the fuel supply of nearly all Eastern chemical manufacturing plants, which must be felt in the production.

Should the strike continue for any length of time many of the chemical works may have to cease operating. Fortunately this is the quiet season for a number of chemical lines, still there are others that have to run full time to meet the demand.

Heavy Chemicals.—The market is stronger nearly all around, owing to moderate stocks and an improved demand. Further orders for 1903 domestic high-test caustic soda are noted at \$1.85@ \$1.90 per 100 lbs., f. o. b. works. Next fire sodium sulphate continues to sell in a large way at 80@82 1/2c. per 100 lbs., f. o. b. works. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 85@ 87 1/2c. for prompt shipment, and 75@77 1/2c. for forward; caustic soda, high-test, \$1.92 1/2@ \$1.95 for early delivery, and \$1.85@ \$1.90 for futures; bicarb. soda, ordinary, 95c. and extra, \$3; sal soda, 55c.; chlorate of potash, \$8@ \$8 1/4 for prompt, and \$7.75 for forward contracts; bleaching powder, off-test, \$1.35; best grades mostly under contract. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 92 1/2@95c.; caustic soda, high-test, \$2.25; sal soda, 65@67 1/2c.; chlorate of potash, \$10 1/4@ \$10 3/4; bleaching powder, prime brands, \$1.60@ \$1.87 1/2, according to make.

Acids.—Consuming demand is pretty good, and prices continue firm.

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

Blue Vitriol.....	\$4.50@4.62 1/2	Oxalic, com'l.....	\$4.60@ 5.00
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg.,	bulk, ton.....
Muriatic, 20 deg.	1.62 1/2	.....	13.50@15.50
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg.	1.00
Nitric, 36 deg....	4.00	Sulphuric, 60 deg.,	bulk.....
Nitric, 38 deg....	4.25	.....	18.00@20.00
Nitric, 40 deg....	4.50	Sulphuric, 66 deg.	1.20
Nitric, 42 deg....	4.87 1/2	Sulphuric, 66 deg.,	bulk.....
		.....	21.00@23.00

Brimstone.—Uninteresting. Best unmixed seconds sold on spot at \$23 per ton, while shipments are quoted around \$22 1/4. Best thirds are about \$2 1/2 less than seconds.

Pyrites.—Imports are more frequent. This week 7,851 tons Spanish iron pyrites came to New York, while last week 3,715 tons copper pyrites arrived at Philadelphia. This shows a good business in foreign pyrites, and judging from the active operations at domestic mines our producers are equally prosperous. 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.—The firm market abroad is still reflected here, and sellers of good gas liquor ask \$3.10@ \$3.12 1/2 per 100 lbs., according to position of shipments.

Nitrate of Soda.—Owing to the exhaustion of spot supplies the market is again firmer, and June arrivals are quoted at \$2 per 100 lbs., while futures are held at \$1.92 1/2.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, June 1, gives the following interesting statistics:

	1902.	1901.	1900.
	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1902, to date.....	375,862	566,708	420,513
From Europe.....	.....	.....	2,063
	375,862	566,708	422,576

Stock in store and afloat June 1, 1902, in N. Y.....	1,543	34,256	28,467
Boston.....	.....	.....	.....
Philadelphia.....	36,000	.....	.....
Baltimore.....	.....	8,000	1,500
Norfolk, Va.....	.....	.....	.....
Charleston.....	.....	.....	.....
Savannah.....	.....	.....	.....
To arrive, due Sept. 15, 1902.....	351,000	332,110	292,000
Vis. supply to Sept. 15, 1902.....	388,543	374,366	321,967
Stock on hand Jan. 1, 1902.....	77,517	13,446	9,586
Deliveries past month.....	85,960	131,827	117,151
Deliveries since Jan. 1 to date.....	415,836	537,898	402,195
Total yearly deliveries.....	.....	1,308,820	1,176,651
Prices current, June 1, 1902.....	\$2.10	\$1.85	\$1.75

The shipments of nitrate of soda from the west coast of South America to the United States in the 5 months ending May 31 are the largest in several years. The total is 588,000 bags, or 8,000 more than last year. At present writing fully 362,000 bags have been loaded and chartered for this country.

Concerning the market in Chile, Messrs. Jackson Brothers, of Valparaiso, advise us under date of May 3 that there has been another dull fortnight, owing partly to the failure of a Hamburg firm which was unable to meet its engagements, thus causing a decided fall in the price in Europe; and on the other hand to the continued decrease in consumption up to

April 30, which is calculated at 140,000 tons less this year than last. The only interest shown has been for the refined quality which has been sold at 6s. 11d. @6s. 9d. for May-July, alongside. We quote 95 per cent May-June, 6s 7 1/2d.; July-December, 6s. 8d., and 96 per cent, 6s. 9d. for any delivery, all ordinary terms. The price of 6s. 7 1/2d. with an all-round freight of 17s. 6d. stands in 8s. 3d. per cwt., net, cost and freight, without purchasing commission. Sales during the fortnight were 200,000 qtls.

Saltpeter.—Consumption is somewhat less than last year. Crude on spot is quoted at \$3.40@ \$3.50 per 100 lbs., and shipments \$3.20. Refined continues unchanged at \$4.25@ \$4.62 1/2. Imports into the United States in the 5 months ending May 31 amounted to 22,849 bags, or 8,918 bags less than last year. Deliveries during this period were 23,749 bags, against 32,067 bags in 1901, showing a falling off of 8,318 bags. The visible supply on June 1 is estimated at 12,167 bags, or 4,102 bags more than at the same time last year.

Phosphates.—The European demand continues to improve, and prices are pretty steady. Domestic consumption is moderate.

New deposits of good phosphate rock are to be worked in Lawrence County, Tennessee, and in Alabama, while in Florida some of the hard rock companies are moving to new localities.

We quote phosphate prices below:

Phosphates.	Per ton F. o. b.	C. I. f. Un. Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)	\$6.50@ \$7.00	6 1/4 @6 1/4d.	\$9.75@10.53
*Fla. land pb. (68@73%)	3.00@3.25	4 1/2 @5d.	6.65@ 7.00
*Fla. Peace Riv. (58@63%)	2.25@2.50	4 1/2 @5d.	5.70@ 6.00
†Tenn., (78@80%) export.	3.50@3.75	5 1/2 @6d.	8.58@ 9.36
†Tenn., 78% domestic.....	3.00@3.25	.....	.....
†Tenn., 75% domestic.....	2.75@3.00	.....	.....
†Tenn., 73@74% domestic.....	2.40	.....	.....
†Tenn., 70@72% domestic.....	2.10@2.25	.....	.....
‡So. Car. land rock.....	3.25	4 1/2 @5d.	5.67@ 6.90
‡So. Car. river rock.....	2.75@3.00	.....	.....
Algerian (63@68%).....	.....	5 1/2 @6 1/2d.	7.48@ 8.45
Algerian (58@63%).....	.....	5 1/2 @6d.	6.30@ 7.20
Algerian (53@58%).....	.....	5 @5 1/2d.	5.50@ 5.78

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

METAL MARKET.

New York. June 5.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in April and Year.

Metal	April.		Year.	
	1901.	1902.	1901.	1902.
Gold.				
Exports.....	\$4,916,905	\$2,844,204	\$14,045,205	\$18,167,347
Imports.....	2,249,038	1,834,767	13,894,393	7,563,507
Excess. E.	\$2,667,867	E. \$979,437	E. \$3,150,812	E. \$10,603,840
Silver.				
Exports.....	\$4,969,047	\$3,739,660	\$19,478,721	\$15,502,253
Imports.....	2,370,114	2,051,251	10,455,297	8,460,730
Excess. E.	\$2,598,933	E. \$1,688,409	E. \$9,023,424	E. \$7,041,523

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending June 5, and for years from January 1, 1902, 1901 and 1900:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$12,500	\$9,986	\$446,495	\$1,577 E.	\$447,432
1902.....	16,474,665	1,098,062	12,989,552	497,326 E.	27,868,329
1901.....	23,411,990	1,159,508	14,803,765	1,772,725 E.	32,298,522
1900.....	14,372,796	1,412,045	17,154,944	1,329,732 E.	28,185,993

The gold exported this week went to the West Indies; the silver to London. Imports were from Central and South America and the West Indies.

Financial Notes of the Week.

Little that is new is to be recorded this week, trade continuing generally unchanged and speculation comparatively quiet. Money is less plentiful, and there is some tendency to contract loans apparent.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending May 31 gives the following totals,

comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$800,268,600	\$866,314,700	\$885,572,600
Deposits	887,954,500	952,398,200	948,326,400
Circulation	22,459,300	31,093,600	31,245,300
Specie	170,231,300	181,190,000	72,536,600
Legal tenders	71,880,600	78,162,000	76,474,000
Total reserve	\$242,111,900	\$259,352,600	\$249,010,600
Legal requirements	221,988,625	238,099,550	237,081,600
Balance surplus	\$20,123,275	\$21,253,050	\$11,929,000

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.	\$181,190,000	.....	\$172,536,600	.....
England ..	180,356,930	.....	179,724,070	.....
France ..	492,027,575	\$222,457,205	515,002,255	\$223,514,075
Germany ..	109,870,000	72,800,000	200,930,000	74,315,000
Spain ..	70,010,000	74,020,000	70,625,000	93,395,000
Neth'lds ..	26,823,000	28,722,500	24,367,000	33,920,000
Belgium ..	14,770,000	7,375,000	16,053,335	8,016,667
Italy ..	75,515,000	9,873,500	80,810,000	10,948,000
Russia ..	352,195,000	30,630,000	370,275,000	44,555,000

The returns of the Associated Banks of New York are of date May 31, and the others May 29, 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.

Silver has advanced under good inquiry with moderate supplies; but to-day the market is satisfied, and offers at 24 1-16d. are not acceptable to buyers. Eastern exchanges are still below the silver equivalents.

The United States Assay Office in New York reports receipts of 39,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to May 22 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£3,273,210	£3,049,725	D. £223,485
China	339,125	16,500	D. 322,625
The Straits	79,976	62,650	D. 17,326

Totals

Arrivals for the week, this year, were £106,000 in bar silver from New York, £8,000 from Chile, and £4,000 from Australia; total, £118,000. Shipments were £67,000 in bar silver to Bombay, £62,500 to the Straits, £10,000 to Calcutta, £5,000 to Madras, and £5,000 to Malta; total, £149,500.

Indian Exchange has remained steady, the Council bills offered in London having been taken at an average of 15.9d. per rupee. There has been a good deal of silver taken for India, which somewhat affected the sale of bills.

The coinage executed at the Mints of the United States in May and the 5 months this year is reported by the Bureau of the Mint as below:

Denominations.	-May-		-Jan.-May-	
	Pieces.	Value.	Pieces.	Value.
Double eagles	213,000	\$426,000.00	118,126,900.00	.....
Eagles .....	.....	.....	520.00	.....
Half eagles .....	.....	.....	240.00	.....
Quarter eagles .....	.....	.....	84,062.50	.....

Total gold	213,000	\$426,000.00	\$18,211,722.50
Dollars	1,500,000.00	1,500,000.00	8,336,377.00
Half dollars	452,000	226,000.00	2,113,825.50
Quarter dollars	124,000	31,000.00	2,312,247.25
Dimes	1,160,000	116,000.00	862,037.70

Total silver	3,236,000	\$1,873,000.00	\$13,624,487.45
Five c. nickels	900,000	45,000.00	547,658.25
One c. bronze	1,535,000	15,350.00	311,001.05

Total minor	2,435,000	\$60,350.00	\$858,659.00
Total coinage	5,884,000	\$2,359,350.00	\$32,604,869.85

Total, 1901.....	14,450,882	\$12,738,424.10	\$70,708,647.10
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The coinage this year is exceptionally small, and shows a decrease of \$38,013,777 as compared with 1901; due principally to the curtailed mintage of the higher-valued gold pieces.

The Treasury Department's estimate of the amount and kinds of money in the United States on June 1 is as follows:

	Totals.	In Treasury.	In Circulation.
Gold coin (inc. bullion in Treasury) ..	\$1,184,588,889	\$246,554,393	\$631,891,627
Gold certificates .....	.....	.....	306,142,809
Silver dollars	538,684,786	21,859,606	68,875,784
Silver certificates .....	.....	.....	447,949,416
Subsid. silver	95,432,492	12,793,627	82,638,865
Treas. notes of 1890 ..	31,307,000	164,323	31,142,677
U. S. notes	346,681,016	8,536,279	338,144,737
Nat. Bank notes.....	356,747,184	9,117,164	347,630,020
Total	\$2,553,441,367	\$299,025,392	\$2,254,415,975

Population of the United States June 1, 1902, estimated at 79,003,000; circulation per capita, \$28.54. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the government. This statement of money held in the Treas-

ury as assets of the government does not include deposits of public money in National Bank depositaries to the credit of the Treasurer of the United States, and amounting to \$118,512,039. The total amount in circulation June 1 shows a decrease of \$6,334,267 as compared with the statement for May 1; but an increase of \$79,839,085 as compared with June 1, 1901.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$0.41 1/2	\$0.44
Peruvian soles and Chilean pesos.....	37 1/2	41 1/2
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.89	3.88
Twenty marks.....	4.74	4.85
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

May-June	Silver			Copper			Spelter		
	Sterling Exchange	N. Y. Cts.	London Pence.	Lake Cts. per lb.	Electrolytic per lb.	London £ per ton.	Lead per lb.	N. Y. Cts.	St. L. Cts.
30 .....	.....	23 1/2	.....	12 1/2	12 1/2	54 1/2	4.05	4.75	4.50
31 4.86 1/2	51 1/2	23 1/2	.....	12 1/2	12 1/2	54 1/2	4.05	4.75	4.50
2 4.87	51 1/2	23 1/2	.....	12 1/2	12 1/2	54 1/2	4.05	4.87 1/2	4.62 1/2
3 4.87	52	24	.....	12 1/2	12 1/2	54 1/2	4.05	4.87 1/2	4.62 1/2
4 4.87	52 1/2	24 1/2	.....	12 1/2	12 1/2	54 1/2	4.05	4.87 1/2	4.62 1/2
5 4.87 1/2	52	24 1/2	.....	12 1/2	12 1/2	54 1/2	4.05	5.00	4.62 1/2

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.

The price of silver in London on May 27 was given in our table of daily prices last week at 24 3/4d. through an error in proofreading. The correct price in London for that day was 23 3/4d.; as would readily have been seen by those who compared the figure with the New York price on the even date.

Copper.—The market is quiet but firm. While the business reported during the week has not been very large, manufacturers both here and abroad are exceedingly busy. Although there has been some talk of lower prices, we can find no pressure whatsoever to sell; in fact, producers generally appear to be sold heavily for some time to come. We quote Lake copper at 12 1/2@12 3/4c.; electrolytic in cakes, wire bars and ingots at 12 1/2 @ 12 3/4c.; in cathodes, at 11 1/2@12c.; casting copper at 12 1/4c.

The London market for speculative sorts has been dull. It closed last Thursday at £54, advanced 5s. on Friday, and on Monday it was £54 12s. 6d. for both spot and three months. The balance of the week it ruled at about £54 for both deliveries.

Statistics for the second half of May show a decrease in the visible supplies of 1,300 tons.

Refined and manufactured sorts we quote: English tough, £57@£57 10s.; best selected, £58@£58 10s.; strong sheets, £59; India sheets, £66; yellow metal, 6 1/4d.

Exports of copper from New York and Baltimore in the week ending June 4 are reported by our special correspondents as follows: Great Britain, 549 tons; Germany, 989; Holland, 513; Belgium, 20; France, 301; Austria, 345; Italy, 176; total, 2,553 tons. Imports were 858 tons of copper.

Tin.—The market has been quiet, buyers holding off in view of the decline in London. However, when the middle of the week lower prices were established, a good buying movement set in. Spot remains scarce, and we quote this delivery at 30c.; June at 29 1/4c.; July, 29c.

The London market, which closed last Thursday at £136 for spot, £133 for three months, opened on Monday at £135 for spot, £131 2s. 6d. for three months. On Tuesday it declined to £132 5s. and £128, respectively; on Wednesday it was £132 and £129; and on Thursday the closing quotations are cabled as £132 15s. for spot, £129 7s. 6d. for three months.

Statistics for the month of May show an increase in the visible supplies of 2,200 tons.

Stocks of tin in sight on June 1 are estimated as follows, in long tons, of 2,240 lbs.:

	Store.	Afloat.	Totals
London	3,823	3,717	7,540
Holland	2,711	368	3,079
U. S., exc. Pacific ports.....	2,862	3,537	6,399
Totals	9,396	7,622	17,018

This shows an increase of 27 tons as compared with the stocks reported on June 1, 1901.

Exports of tin from the Straits in May are cabled as 4,160 long tons, against 4,170 tons in May, 1901.

Lead.—The market is unchanged, and we quote 3.97 1/2@4.05c. St. Louis, 4.05@4.10c. New York.

The foreign market is slightly higher, Spanish lead being quoted at £11 7s. 6d.@£11 8s. 9d.; English lead, £11 12s. 6d.@£11 13s. 9d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull but steady. Missouri brands sell at 3.97 1/2c.; desilverized lead at 4.05c.

Spelter.—The strike which has threatened for some time has broken out, and while it is doubtful if it will spread to all the smelters, some of the works have already had to close down. Under the circumstances prices have advanced considerably, although little business has been done. We quote 4 1/2@4 3/4c. St. Louis, 5c. New York.

The foreign market is a little higher, good ordinaries being quoted at £18 7s. 6d., specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: The strength in spelter continues unabated. Latest sales are on a basis of 4.65c. East St. Louis and spot spelter is exceedingly scarce even at these rates.

Antimony.—We quote Cookson's at 9 1/2@10c.; Hallett's, 8 1/4c.; Hungarian, Italian, Japanese and United States Star at 8c.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

Platinum.—Consumption continues good. Ingot platinum in large lots brings \$19.50 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Quicksilver.—The New York price is \$48 per flask for large lots, with a slightly higher figure asked for small orders. In San Francisco quotations are \$45.50 @ \$46.50 for domestic orders, with \$42.50 @ \$43 quoted for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb.	Per lb.
Aluminum.....	.....	.....
No. 1, 90% ingots.....	33@37c.	Ferro-Tungsten (37%)... 28c.
No. 2, 90% ingots.....	31@34c.	Magnesium
Roller sheets.....	4c up	Manganese, pure (N.Y.)... 60c.
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn) 32c.
Nickel-alum	33@39c.	Mangan'e Cop. (30% Mn) 38c.
Bismuth	\$1.50	Molybdenum (Best).....\$1.82
Chromium, pure (N.Y.)... 80c.	.....	Phosphorus
Copper, red oxide..... 50c.	.....	American
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	26.68	4.075	4.350	4.15	4.01
March	26.32	26.93	4.075	4.350	4.28	3.91
April	27.77	25.98	4.075	4.350	4.37	3.98
May	29.85	27.12	4.075	4.350	4.47	4.04
June .....	.....	28.60	.....	4.350	.....	3.99
July .....	.....	27.85	.....	4.350	.....	3.85
August .....	.....	26.73	.....	4.350	.....	3.89
September .....	.....	25.31	.....	4.350	.....	4.08
October .....	.....	26.62	.....	4.350	.....	4.23
November .....	.....	26.87	.....	4.350	.....	4.29
December .....	.....	24.36	.....	4.153	.....	4.31
Year	26.54	.....	4.334	.....	4.08	.....

Average Prices of Copper.

Month	New York		London	
	Electrolytic.	Lake.	Standard.	1901.
January	11.053	16.25	11.322	16.77
February	12.173	16.38	12.378	16.90
March	11.882	16.42	12.188	16.94
April	11.618	16.43	11.986	16.94
May	11.856	16.41	12.226	16.94
June .....	.....	16.38	.....	16.90
July .....	.....	16.31	.....	16.61
August .....	.....	16.23	.....	16.50
September .....	.....	16.25	.....	16.54
October .....	.....	16.25	.....	16.40
November .....	.....	16.224	.....	16.33
December .....	.....	13.845	.....	14.36
Year	16.117	.....	16.53	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1902.		1901.		1900.	
	London.	N. Y.	London.	N. Y.	London.	Y. Y.
January ..	25.62	55.56	28.97	62.82	27.30	59.30
February ..	25.41	55.09	28.13	61.06	27.40	59.76
March	25.00	54.23	27.04	60.03	27.59	59.81
April	24.34	52.72	27.30	59.29	27.41	59.59
May	23.71	51.31	27.43	59.64	27	

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Acacia, Alamo, Amalgamated, etc., with columns for par value, shares listed, and prices for various dates from May 29 to June 4.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations for New York, listing companies like Am. Agr. Chem., Am. Car & Fdy., etc., with columns for par value, shares listed, and prices for various dates.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, PA, listing companies like Am. Alkali, Am. Cement, etc., with columns for par value, shares listed, and prices for various dates.

MEXICO.

May 24.

Table of stock quotations for Mexico, listing companies like Durango, Ca. Min. de Penoles, etc., with columns for shares, last dividend, and prices.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Adventure Con., Aetna Cons., etc., with columns for par value, shares listed, and prices for various dates.

Official Quotations Boston Stock Exchange. Total sales, 29,115 shares. †Ex-dividend. *Holiday

ST. LOUIS, MO.*

June 2.

Table of stock quotations for St. Louis, MO, listing companies like Adams, Am. Nettie, etc., with columns for shares, par value, bid, ask, and sales.

*From our Special Correspondent.

SPOKANE, WASH.*

May 23.

Table of stock quotations for Spokane, Wash., listing companies like American Boy, Black Tail, etc., with columns for par value, shares, bid, ask, and sales.

Total sales 36,000 shares. *Reported by Hunner & Harris.

SALT LAKE CITY.*

May 31.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Anchor, Bullion Beck, etc., with columns for shares, par value, and prices.

*By our Special Correspondent. Total number of shares sold, 116,440.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., and their prices for various dates from May 26 to May 31.

Total sales 377,800 shares. *Holiday.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph), listing companies like Acacia, Alamo, and their prices for dates from May 29 to June 4.

MONTREAL, CANADA.

June 2.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, and their prices for June 2.

LONDON.

May 24.

Table of stock quotations for London, listing companies like Anaconda, Copiapo, and their prices for various dates from May 1901 to May 1902.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-dividend.

PARIS.

May 15.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Huta-Bank, and their prices for May 15.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, Olive, and their prices for dates from May 27 to June 2.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.

COAL, IRON AND INDUSTRIALS.

May 24.

Sellers.

2. 8 d.

3 9

4 0

5 1

6 2

7 3

8 4

9 5

10 6

11 7

12 8

13 9

14 0

15 1

16 2

17 3

18 4

19 5

20 6

21 7

22 8

23 9

24 0

25 1

26 2

27 3

28 4

29 5

30 6

31 7

32 8

33 9

34 0

35 1

36 2

37 3

38 4

39 5

40 6

41 7

42 8

43 9

44 0

45 1

46 2

47 3

48 4

49 5

50 6

51 7

52 8

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76 2

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81 7

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83 9

84 0

85 1

86 2

87 3

88 4

89 5

90 6

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares (Issued, Par Val), Dividends (Paid 1902, Total to Date, Latest Date, Amt.), and Sellers.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares (Issued, Par Val), Dividends (Paid 1902, Total to Date, Latest Date, Amt.), and Sellers.

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares (Issued, Par Val), Dividends (Paid 1902, Total to Date, Latest Date, Amt.), and Sellers.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasive—		Cust. Meas.	Price.	Barium—		Cust. Meas.	Price	Graphite—Am. f.o.b. Provi-		Cust. Meas.	Price	Paints and Colors—		Cust. Meas.	Price
Carborundum, f.o.b. Niagara Falls, Powd., F. F. FFF..	lb.		\$0.08	Oxide, Am. hyd. cryst.....	lb.		\$0.02½	dence, R. I. lump.....	sh. ton		\$8.00	Metallic, brown.....	sh. ton		\$19.00
Grains.....	"		.10	Sulphate (Blanc Fixe).....	"		.02	Pulverized.....	"		30.00	Red.....	"		16.00
Corundum, N. C.....	"		.07@.10	Barytes—				German, som. pulv.....	lb.		.01¼@.01¾	Ocher, Am. common.....	"		9.25@10.00
Chester, Mass.....	"		.04¼@.05	Am. Crude, No. 1.....	sh. ton		9.00	Best pulverized.....	"		.01¼@.02	Best.....	"		21.25@25.00
Barry's Bay, Ont.....	"		.07¼@.08¼	Crude, No. 2.....	"		8.00	Ceylon, common pulv.....	"		.02¾@.03¼	Dutch, washed.....	lb.		.04¾
Crushed Steel, f.o.b. Pittsburg.....	"		.05¼	Crude, No. 3.....	"		7.75	Best pulverized.....	"		.04@.08	French, washed.....	"		.01¼@.01¾
Emery, Turkish flour, in kegs.....	"		.03¼	German, gray.....	"		14.50	Italian, pulv.....	"		.01¼	Orange mineral, Am.....	"		.07¼@.08
Grains, in kegs.....	"		.05@.05¼	Snow white.....	"		17.00	Gypsum—Ground.....	sh. ton		8.00@8.50	Foreign, as to make.....	"		.08¼@.11¼
Naxos flour, in kegs.....	"		.03¼	Bauxite—Ga. or Ala. mines:				Fertilizer.....	"		7.00	Paris green, pure, bulk.....	"		.12
Grains, in kegs.....	"		.05@.05¼	First grade.....	lg. ton		5.50	Rock.....	lg. ton		4.00	Red lead, American.....	"		.05¼@.06
Chester flour, in kegs.....	"		.03¼	Second grade.....	"		4.75	English and French.....	"		14.00@16.00	Foreign.....	"		.05¼@.06
Grains, in kegs.....	"		.05@.05¼	Bismuth—Subnitrate.....	lb.		1.40	Infusorial Earth—Ground.....				Turpentine, spirits.....	gal.		.48
Peekskill, f.o.b. Easton, Pa., flour, in kegs.....	"		.01¼	Subcarbonate.....	"		1.65	American, best.....	"		20.00	White lead, Am., dry.....	lb.		.04¼@.04¾
Grains, in kegs.....	"		.02¼	Bitumen—"B".....	"		.08¼	French.....	"		37.50	American, in oil.....	"		.05¼@.05¾
Crude, ex-ship N. Y.: Ab-bott (Turkey).....	lg. ton		26.50@30.00	"A".....	"		.05	German.....	"		40.00	Foreign, in oil.....	"		.07¼@.08¼
Kuluk (Turkey).....	"		22.00@24.00	Bone Ash.....	"		.02¼@.02¾	Iodine—Crude.....	100 lbs		2.45	Zinc, white, Am., ex dry.....	"		.04¾@.04¾
Naxos (Greek) h. gr.....	"		.26.00	Borax.....	"		.07¼@.07¾	Nitrate, com'l.....	lb.		.05	American, red seal.....	"		.01¼
Garnet, as per quality.....	sh. ton		25.00@35.00	Bromine.....	"		.40	True.....	"		.04	Green seal.....	"		.07
Pumice Stone, Am. powd.....	lb.		.01¼@.02	Cadmium—Metallic.....	100 lbs.		2.00@2.50	Oxide, pure copperas col.....	"		.05@.10	Foreign, red seal, dry.....	"		.05¼@.08¼
Italian, powdered.....	"		.01¼	Calcium—Acetate, gray.....	"		1.30	Purple-brown.....	"		.02	Green seal, dry.....	"		.06¼@.08¼
Lump, per quality.....	"		.04@.40	"brown.....	"		.90	Venetian red.....	"		.01@.01¾	Potash—			
Rotenstone, ground.....	"		.02¼@.04¼	Carbide, ton lots f.o.b. Niagara Falls, N. Y., or Jersey City, N. J.....	sh. ton		75.00	Scale.....	"		.01@.03	Caustic, ordinary.....	"		.04¼@.06
Lump, per quality.....	"		.08@.20	Carbonate, ppt.....	lb.		.05	Kaolin—(See Clay, China.)				Elect. (80%).....	"		.06¼
Rouge, per quality.....	"		.10@.30	Chloride.....	sh. ton		9.00@10.00	Kryolith—(See Cryolite.)				Potassium—			
Steel Emery, f.o.b. Pittsburg.....	"		.07	Cement—				Brown.....	"		.07¼@.08	Bicarbonate cryst.....	"		.03¼
Acids—				Portland, Am., 400 lbs.....	bb. l.		1.70@1.90	Nitrate, com'l.....	"		.06¼	Powdered cr gran.....	"		.14
Boric, crystals.....	"		.10¼@.11	Foreign.....	"		1.65@2.25	True.....	"		.04	Bichromate, Am.....	"		.08¼@.08¾
Powdered.....	"		.11¼@.11¾	"Rosendale," 800 lbs.....	"		.75	Oxide, pure copperas col.....	"		.05@.10	Scotch.....	"		.08¼@.09
Carbonic, liquid gas.....	"		.12¾	Slag cement, imported.....	"		1.65	Purple-brown.....	"		.02	Carbonate, hydrated.....	"		.04@.04¼
Chromic, crude.....	"		.20	Ceresine—				Venetian red.....	"		.01@.01¾	Calcined.....	"		.03¼@.03¾
Hydrofluoric, 36%.....	"		.06	Orange and Yellow.....	lb.		.12	Lime—Com., abt. 250 lbs.....	bb. l.		.80	Chromate.....	"		.35
48%.....	"		.05	White.....	"		.13¼	Finishing.....	"		.90	Cyanide (98@99%).....	"		.23
60%.....	"		.11	Chalk—Lump, bulk.....	sh. ton		2.50	Am. Bricks, f.o.b. Pittsburg.....	"		175.00	Permanganate.....	lb.		.09¼@.10¼
Sulphurous, liquid anhy.....	"		.05	Ppt. per quality.....	lb.		.03¼@.06	Magnesite—Greece.				Prussiate, yellow.....	"		.18¾@.14
Alcohol—Grain.....	gal.		2.41	Chlorine—Liquid.....	"		.30	Crude (95%).....	lg. ton		6.50@7.00	Manure salt, 20%.....	100 lbs.		.66
Refined wood, 95@97%.....	"		.60@.65	Water.....	"		.10	Calcined.....	sh. ton		14.00@15.00	Double Manure salt, 48@53%.....	"		1.12
Purified.....	"		1.20@1.50	Chrome Ore—				Bricks.....	M		170.00	Muriate, 80@85%.....	"		1.83
Alum—Lump.....	100 lbs.		1.75	(50% ch.) ex-ship N. Y.....	lg. ton		24.75	Am. Bricks, f.o.b. Pittsburg.....	"		175.00	95%.....	"		1.86
Ground.....	"		1.80	Sand, f.o.b. Baltimore.....	"		33.00	Magnesium—				Permanganate.....	lb.		.09¼@.10¼
Powdered.....	"		3.00	Bricks, f.o.b. Pittsburg.....	M		175.00	Carbonate, light, fine pd.....	lb.		.05	Prussiate, yellow.....	"		.18¾@.14
Chrome, com'l.....	"		2.75@3.00	Clay, China—Am. com., ex-dock, N. Y.....	lg. ton		8.00	Blocks.....	"		.07@.03	Sylvinit.....	unit		.39¼
Aluminum—				Am. best, ex-dock, N. Y.....	"		9.00	Fused.....	"		.20	Quartz—(See Silica.)			
Nitrate.....	lb.		1.50	English, common.....	"		12.00	Nitrate.....	"		.60	Salt—N. Y. com. fine.....	sh. ton		2.00
Oxide, com'l, common.....	"		.06¼	Best grade.....	"		17.00	Sulphate.....	100 lbs.		.75@.95	N. Y. agricultural.....	"		1.50
Best.....	"		.20	Fire Clay, ordinary.....	sh. ton		4.25	Manganese—Powdered,				Saltpetre—Crude.....	100 lbs.		3.45@3.50
Pure.....	"		.80	Best.....	"		6.00	70@75% binoxide.....	lb.		.01¼@.01¾	Refined.....	"		4.25@4.62¼
Hydrated.....	100 lbs.		2.60	Slip Clay.....	"		5.00	75@85% binoxide.....	"		.01¼@.02¼	Silica—Best foreign.....	lg. ton		10.00@11.00
Sulphate, pure.....	"		1.50@2.00	Coal Tar Pitch.....	gal.		.08	85@90% binoxide.....	"		.02¼@.03¼	Ground quartz, ord.....	sh. ton		6.00@8.00
Com'l.....	"		1.15@1.25	Cobalt—Carbonate.....	lb.		1.75	90@95% binoxide.....	"		.03¼@.05¼	Best.....	"		12.00@13.00
Ammonia—				Nitrate.....	"		1.50	Carbonate.....	"		.16@.20	Lump quartz.....	"		2.50@4.00
Aqua, 16°.....	lb.		.03	Oxide—Black.....	"		2.26@2.30	Chloride.....	"		.04	Glass sand.....	"		2.75
18°.....	"		.03¼	Gray.....	"		2.28@2.40	Ore, 50%, Foreign.....	unit		.20@.21	Silver—Chloride.....	oz.		.65
20°.....	"		.03¾	Small, blue ordinary.....	"		.06	Domestic.....	"		.30	Nitrate.....	"		.85
26°.....	"		.05¼	Best.....	"		.20	Marble—Flour.....	sh. ton		6.00@7.00	Oxide.....	"		85@1.10
Ammonium—				Copperas.....	100 lbs.		.30@.35	Mercury—Bichloride.....	lb.		.77	Sodium—			
Carbonate, lump.....	"		.08¼@.08¾	Chloride.....	lb.		.18@.19	Nica—N. Y. gr'nd, coarse.....	"		.03@.04	Bichromate.....	lb.		.06¼
Powdered.....	"		.09@.09¼	Nitrate, crystals.....	"		.35	Fine.....	"		.04@.05	Chlorate, com'l.....	"		.07¼@.08¼
Muriate, grain.....	"		.05¾	Oxide, com'l.....	"		.19	Sheets, N. C. 2x4 in.....	"		.30	Hyposulphite, Am.....	100 lbs.		1.60@1.65
Lump.....	"		.08¼	Cryolite.....	"		.06¼	3x3 in.....	"		.80	German.....	"		1.70@1.90
Nitrate, white, pure (99%).....	"		.12	Explosives—				3x4 in.....	"		1.50	Peroxide.....	lb.		.02¼@.03
Phosphate, com'l.....	"		.09	Blasting powder, A.....	25 lb. keg		2.65	4x4 in.....	"		2.00	Prussiate.....	"		.10¼@.11
Pure.....	"		.12	Blasting powder, B.....	"		1.40	6x6 in.....	"		3.00	Silicate, conc.....	"		.05
Antimony—Glass.....	"		.30@.40	"Rackarock," A.....	lb.		.25	Mineral Wool—				Com'l.....	"		.01
Needle, lump.....	"		.05¼@.06	"Rackarock," B.....	"		.18	Slag, ordinary.....	sh. ton		19.00	Sulphate, com'l.....	100 lb.		.82¼
Powdered, ordinary.....	"		.05¼@.07¼	Judson R. R. powder.....	"		.10	Selected.....	"		25.00	Sulphide.....	lb.		.01¼
Oxide, com'l white, 95%.....	"		.09¼	Dynamite (20% nitro-glycerine).....	"		.13	Rock, ordinary.....	"		32.00	Sulphite crystals.....	"		.02¼
Com'l white, 99%.....	"		.12	(30% nitro-glycerine).....	"		.14	Selected.....	"		40.00	Sulphur—Roll.....	100 lbs.		1.85
Com'l gray.....	"		.07	(40% nitro-glycerine).....	"		.15	Nickel—Oxide, No. 1.....	lb.		1.00	Flour.....	"		1.90
Sulphuret com'l.....	"		.16	(50% nitro-glycerine).....	"		.16¼	No. 2.....	"		.60	Flowers, sublimed.....	"		2.15
Arsenic—White.....	"		.06¼@.06¾	(60% nitro-glycerine).....	"		.18	Sulphate.....	"		20@.21	Talc—N. C., 1st grade.....	sh. ton		13.75
Red.....	"		.06¾@.07	(75% nitro-glycerine).....	"		.21	Oils—Black, reduced 29 gr.:				N. Y., Fibrous, best.....	"		10.20
Asphaltum—				Glycerine for nitro (32 2-10° Be.).....	"		.12¾@.13	25@30, cold test.....	gal.		.09¼@.10¼	French, best.....	100 lbs.		1.25
Ventura, Cal.....	sh. ton		32.00	Feldspar—Ground.....	sh. ton		8.00@9.00	15, cold test.....	"		.10¼@.11¼	Italian, best.....	"		1.62¼
Cuban.....	lb.		.01¼@.03¼	Flint Pebbles—Danish, Best.....	lg. ton		14.75	Zero.....	"		.11¼@.12¼	Tar—Regular.....	bb. l.		1.85
Egyptian, crude.....	"		.05¼@.06	French, Best.....	"		11.75	Summer.....	"		.09¼@.09¾	Oil barrels.....	"		3.75
Trinidad, refined.....	sh. ton		35.00	Fluorspar—				Cylinder, dark steam ref.....	"		.08¼@.10¼	Tin—Crystals.....	lb.		.20
San Valentino (Italian).....	lg. ton		16.00	Am. lump, 1st grade.....	sh. ton		\$14.40	Dark, filtered.....	"		.11¼@.15¾	Oxide.....	"		2.25@3.00
Seyssel (French), mastic.....	sh. ton		21.00	2d grade.....	"		13.90	Light filtered.....	"		.14¼@.17¾	Uranium—Oxide.....	"		.07@.08¾
Gilsonite, Utah, ordinary.....	lb.		.03	Gravel and crushed, 1st gr.....	"		13.40	Extra cold test.....	"		.21¼@.26¾	Zinc—Metallic, ch. pure.....	"		.07@.08¾
Select.....	"		.03¾	2d grade.....	"		12.40	Gasoline, 86°@90°.....	"		.14@.19	Carbonate, ppt.....	"		.09
Barium—				Ground, 1st grade.....	"		17.90	Naptha, crude, 68°@72°.....	bb. l.		9.05	Chloride solution, com'l.....	"		.02¼
Carb. Lump, 80@90%.....	sh. ton		25.00@27.50	2d grade.....	"		16.50	"Stove".....	gal.		.12	granular.....	"		.14¼@.04¾
82@84%.....	"		26.00@29.00	Foreign, lump.....	"		8.00@12.00	Linseed, domestic raw.....	"		.63@.65	Dust			