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RETURNS OF British coal companies for 1901 as a rule indicate heavy reductions in profits, though the latter are still good. Thus the statements of seven large companies recently issued show aggregate net profits for 1901 of £489,650, against £708,008 in 1900; a decrease of £218,358, or 31.2 per cent. The aggregate dividends paid by these companies were £319,218 in 1901, against £426,512 in the preceding year. Most of the English coal companies have been strengthening their positions by adding considerable sums to the reserve, or working capital, while business was good and prices high.

THE FACT that the Rio Tinto Company has been able to pay an interim dividend at the rate of 37s. 6d. per share, against 35s. paid a year ago, emphasizes the point to which we called attention some time ago, that the high price of copper maintained here too long turned business away from this country and into the hands of our foreign competitors. The European companies, which were ready to meet the conditions of the market, increased their production and sold all of the increase; while copper produced in the United States was piled up in stock. The result has been that the surplus was marketed in the end at prices considerably below those which might have been secured by reasonable concessions earlier in the year. The reports of copper companies for 1901, which are now appearing, show some of the results of this policy—and they are not pleasant reading.

THE DEVELOPMENT of Dr. Ludwig Mond's system of fuel gas production is going on rapidly in England. Recently the public has been invited to subscribe to the Trafford Power and Light Supply, Limited, which has been formed to start an installation at Trafford Park, the new industrial suburb of Manchester which is growing up on the banks of the Manchester Ship Canal. This is a particularly suitable place for the application of this process, for the works erected there are on modern principles, and after the style of the best American workshops. In fact, quite a number of American manufacturing firms are building branch works there, a notable example being the Westinghouse Electric Company. The gas supply will be used for heating purposes and for the generation of electric light. The shares in the company will be readily taken up and should prove a profitable investment.

THE RISE in prices of pig iron warrants of all classes in Great Britain recently is said by local authorities to be due to steady buying, the market having been quite free from any speculative element since the collapse of the corner in Scotch warrants last December. It is believed that a good deal of the buying has been on American account. It is not understood that this means immediate shipment, since it is probable that the iron is bought only to secure the purchases against a possible shortage here. Recent quotations are \$12.80 per ton for Scotch pig; \$11.33 for Cleveland iron; and \$14.40 for hematite or bessemer pig.

A recent curiosity in the British iron market has been the shipment of some large lots of foundry iron from South Russia to England. This is a result of the depression in Russia, the furnaces be-

ing forced to sell at a low price; while freights from Black Sea ports are also low.

THE COLLAPSE of the short lived boom in "Ashantis"—Gold Coast gold mining companies—in London is shown by the fact that the total stock exchange value of the shares of 16 representative companies, as compiled by the London *Economist*, was £30,147,796 at the height of the boom, and is now £7,738,749; showing a loss of £22,409,047, or 74 per cent, in a year. Many of these stocks were bought by people who expected to see the companies make money, not from gold, but from the flotation of new companies and the transfer to them of properties owned by the companies. These hopes were frustrated by the early collapse of the boom. Some of the falls in individual stocks are heavy. Thus Ashanti Gold-fields shares have dropped from £32½ to £12½; Gold Coast Amalgamated from £18 to £7; Obbuassi, from £9½ to £2¼. Even Wassau, which is an old company and about the only steady gold-producer, has fallen from the £9½ per share reached during the boom to £5. Even the present prices are believed to be much too high.

WE HAVE NOW the reports of three anthracite coal companies for 1901, which may serve to show what effect the increase in wages last year had upon the cost of coal. These reports give the total expense of mining and preparing coal per ton as below, for two years past:

	1900.	1901.	Changes.
Delaware & Hudson	\$1.30	\$1.53	I. \$0.23
Delaware, Lackawanna & Western	1.48	1.50	I. .02
Lehigh Coal and Navigatin Co.	1.26	1.55	I. .29

While the results in 1901 were very near together, the changes show a considerable divergence, which indicates that the increases were not all the result of higher wages paid. Thus the Lehigh Coal and Navigation Company had to meet considerable expenses due to damages done some of its collieries by flood; while the Delaware & Hudson suffered in the same way. On the other hand the Delaware, Lackawanna & Western instituted some improvements and economies which partly offset the higher wage-cost. The conclusion to be drawn is that the resulting increase in cost was not large; in all probability not over 5 cents a ton at the outside.

THE CONFERENCE committee of the Colorado Legislature has agreed to the Senate amendment to the section of the revenue bill on mine taxation. The main features of the amendment briefly stated are as follows: Mines are separated into two classes—producers and non-producers. A producer is a mine with a gross yearly production of \$5,000 or more, and shall be assessed at not more than one-fourth its gross proceeds, providing the net proceeds of the property do not exceed one-fourth the gross proceeds. In the latter case the mine shall be assessed for the full amount of the net proceeds. The net proceeds are to be determined by deducting from the gross proceeds the cost of extracting, shipping and treating the ore. Non-producers shall not be assessed at more than the smallest producer in the same locality.

Why the basis should be that of one-quarter of the gross output instead of the entire amount is not made

clear. It would appear to be exceptional, and of that class of special legislation which may provoke a great deal of legal controversy. The basis for non-producers seems also open to objections.



THE PROPOSED change by which the United States Steel Corporation is to substitute \$200,000,000 in 5 per cent mortgage bonds for an equal amount of its 7 per cent preferred stock, and to raise \$50,000,000 working capital by the further issue of an equal amount of the bonds, seems likely to be carried through. On the face of it this looks like an actual saving in charges, since, even allowing for the additional \$50,000,000, there would be an apparent saving of \$1,500,000 yearly. If the matter is more closely examined, however, we think that the proposed change will appear as a departure from the wisely conservative policy which the corporation has heretofore followed. In a business which is subject to such fluctuations as the iron and steel trade, it is never wise nor safe to substitute fixed charges, which must be met, for dividend payments which can be postponed in a bad year. This is an axiom which even so powerful a company cannot disregard. Moreover, the raising of working capital by placing additional liens on the property at a time when exceptional profits and prosperity should permit the application of a part of the earnings to a surplus fund is a further departure from conservative finance which is not to be commended.



THE RETURN of the mineral production of Great Britain in 1901, which we published last week appears this year with commendable promptness. In general it may be said to show a decreased output, though there were some exceptions to the rule. The iron ore production is not quite complete, since the returns from the quarries, or open workings, are not included; but the falling off in this item is about what was expected from the condition of the blast furnaces.

The most important figure was that for the production of coal, which was 219,037,240 long tons in 1901, showing a decrease of 6,132,923 tons, or 2.7 per cent, as compared with 1900. In part this decrease seems to have resulted from smaller exports; but it was due more to a lesser demand for fuel from the blast furnaces and iron works. This is the first decrease shown in eight years, and though not very large in quantity, it is not regarded lightly by coal operators, who dread a further falling off.

The production in 1901 was equal to 245,321,709 short tons, and was therefore about 50,000,000 tons less than the output of the United States for the year.



THE SMELTING Corporation, Limited, of Ellesmere Port, England, which came to grief last year on the failure of the Fry process to treat zinc-lead sulphides economically, is to be resuscitated as a copper refinery. The injunction obtained by neighboring landowners for the cessation of noxious fumes made it quite impossible to use any roasting or smelting process at the works. In fact, the liquidator of the corporation, Mr. John Peters, found that he was not allowed by law even to experiment with such processes with a view of ascertaining if any could be worked without objection from the neighbors. Mr. Peters has therefore proposed to start an electrolytic copper refinery and the shareholders have agreed to a scheme for raising £100,000 by the issue of new debentures. The blister copper and copper bars containing precious metals are to be obtained chiefly from companies working in Chile with

which Mr. Peters has business connections, but what amount is available from these sources is not at all certain, as the companies in question are not large producers. In the open market it will be difficult to buy such materials in competition with the old established smelters and refiners. The capacity of the plant is to be 10,000 tons a year. It is doubtful whether, with this output, a sufficient profit can be made out of the refining operations to pay interest and dividends on the heavy capitalization. It would naturally be part of the scheme also to adapt the smelting furnaces to treating copper ores or to put up a bessemerizing plant for mattes bought in the market, but probably both these plans would be prohibited by the injunction obtained by the landowners. This injunction is particularly mortifying, as the location is within 10 miles of Runcorn, Widnes and St. Helena, a district of world-wide celebrity for its chemical works and their devastating fumes. In addition the place is admirably situated for river and railroad transport and the works are equipped with machinery which is up to date and of the best kind.



SILVER SHIPMENTS to the East from the United States and from London are now reported for the two months ending February 28. The values of these shipments are given in the table below, with the approximate quantity of silver in ounces:

	1901.	1902.	Changes.
British East Indies:			
From London.....	\$8,471,003	\$6,606,422	D. \$1,864,581
From San Francisco.....	30,000	.....	D. 30,000
Total.....	\$8,501,003	\$6,605,422	D. \$1,894,581
China:			
From London.....	\$364,465	\$55,967	D. \$308,498
From San Francisco.....	337,158	961,201	I. 624,043
Total.....	\$701,623	\$1,017,168	I. \$315,545
Japan:			
From London.....	\$97,333	.....	D. \$97,333
Total value.....	\$9,299,959	\$7,623,590	D. \$1,676,369
Total, ounces.....	15,014,464	13,779,647	D. 1,234,817

The total decrease in shipping values was 18 per cent this year, as compared with 1901, but the fall in average prices for the two months was 10.7 per cent, so that the reduction in the quantity of silver taken was only 8.2 per cent. The falling off in the shipments to the British East Indies was in part due to the fact that the Indian Government has taken no silver for coinage this year; but it is also true that the lower price of silver does not seem to induce buying in the Indian bazars, as it has generally done heretofore. It is also to be noted that comparatively little silver has gone to the Straits this year, although tin exports from that district have been large. China shows a comparatively large increase this year, though the total is still small. There has been an improvement in trade, but business is still unsettled in that country. Australian shipments there have also increased, though we have not the exact figures yet. The larger demand from China this year was supplied almost entirely from San Francisco.



PETROLEUM ON CALIFORNIA STEAMERS.

The use of petroleum fuel in place of coal on coasting steamers, tugs, ferry-boats, river steamers, etc., is becoming quite common in California since the discovery of large oil-fields in that State. Most of the coal formerly used for this purpose came from outside of the borders of the State, California having only small coal fields, from which an inferior product is obtained. The oil is found to be much cheaper and more convenient. As all the docks and wharves in San Francisco Bay, as well as most of the buildings on the water front, are of

wood, the State Board of Harbor Commissioners, having jurisdiction over San Francisco wharves, etc., have adopted new regulations for handling oil on the water front of that city. They are as follows:

Rule 1. All vessels carrying oil for fuel must store the same in steel or iron tanks.

Rule 2. No vessel carrying oil for fuel in wooden tanks or wooden compartments shall be allowed to lie alongside or make fast to any other vessel while the same is lying at any dock, pier or wharf or to lie alongside or make fast to any structure under the jurisdiction of the Board of State Harbor Commissioners.

Rule 3. All oil for fuel purposes must be delivered through a steam pump so as to pump the oil into the vessel to be supplied as quickly as possible, and all vessels carrying oil for fuel must be kept clear of rubbish, etc., which is liable to catch fire from sparks.

Rule 4. No vessel loaded with Coalinga oil or any other oil which will flash below 110° shall be permitted to haul alongside of any vessel or structure.

Rule 5. No vessel shall discharge fuel oil into any other vessel lying at any dock, pier or wharf except between the hours of 7 a. m. and 5 p. m.

Rule 6. No vessel carrying fuel oil shall be allowed when empty to haul or lie alongside any vessel, dock, pier or wharf, and vessels after having discharged oil must immediately haul away from vessel or structure.

These should be carefully noted by oil consumers in San Francisco Bay, who are becoming quite numerous. They appear to be reasonable in the main.



FREIGHT RATES ON COAL.

A correspondent recently propounded a question in relation to the freight rates on anthracite, and the reason why they should be so much higher than those on bituminous coal. The question is not a new one, and has been sharply discussed in times past, though of late little has been heard about it, and changing conditions in the trade have deprived it of most of its former importance. To explain the matter briefly, it may be said that bituminous coal has always been a competitive traffic, and has been subject to the same conditions which have brought about the gradual reduction of railroad rates on all through freights. More than this, the fact that such coal could be hauled in full trains, and that there has been a sharp competition among different regions served by different roads helped to reduce rates even below those charged on ordinary merchandise.

Anthracite production, on the other hand, has been very largely under control of the transportation companies. Much of the coal has been owned by the companies which carried it, and the rate charged was largely a matter of bookkeeping. The point to be decided was whether the profit realized should be credited to the coal department or the railroad department of a company's operations. Until recently another motive in keeping up the rates was the existence of the individual operators, and it was the shippers of that class who agitated the question, claiming that the transportation companies took an exorbitant proportion of the receipts. To some extent this was true; but since the disappearance of these individual operators as an important factor in the anthracite trade, this motive no longer exists. The old method of dividing charges, however, is still kept up by most of the companies. In certain cases where large tonnages were involved—such as those of the Pennsylvania Coal Company and the Delaware & Hudson winter shipments to tidewater—there is no doubt that contracts existed under which anthracite was carried at as low rates as bituminous coal.

Under present conditions the question has lost most of its importance, since it matters little to the buyer at tidewater or at other points what proportion of the price paid for coal goes nominally to the railroad and what to its coal department or controlled coal company.

CECIL JOHN RHODES.

The death of Cecil Rhodes, which took place at Cape Town, March 26, closes a career which was intimately associated with the development of the mining industry in South Africa. He was not a mining man distinctly—rather a politician and diplomat—but he was associated with great mining enterprises and with the development of a mining country.

Cecil John Rhodes was born at Bishop-Stortford, in Hertfordshire, England, July 5, 1853, the fourth son of a country parson, and was so delicate in youth that it became necessary to send him to a more temperate climate, and he joined his elder brother, Herbert, in Natal, in 1871. The next year he returned to matriculate at Oxford, but his health again failed, and he went once more to South Africa, this time settling down with his brother at Kimberley. Both had claims in the newly discovered diamond mines, and both prospered. But Herbert left Cecil to manage their property, and it was the latter who extended it in every direction, and arranged for its development. In the intervals of diamond working he paid frequent visits to England, becoming a student of the Inner Temple, in London, in 1876, and taking the degrees of B.A. and M.A. at Oxford in 1881. Meanwhile he had decided, with that grasp of the future possibilities which always characterized him, that the economical working of the diamond mines at Kimberley was impossible with divided ownership, and had begun to arrange the consolidations which culminated in the formation of the De Beers Consolidated Mines, which now practically controls the diamond supply of the world.

Mr. Rhodes had always had political aspirations and seems, at an early period of his residence in South Africa, to have outlined the project of a consolidated South Africa, with which his name has been so closely associated. As early as 1880, eight years before the De Beers organization was completed, he had been elected a member of the Cape House of Assembly for the district of Barkley West, near Kimberley. He made his first speech in the House when he was a little over 29 years of age, and three months after the defeat of the British forces on Majuba Hill. At the close of the Basuto war, Mr. Rhodes was appointed a member of the commission of the Cape Parliament which proceeded to Basutoland to decide what compensation was to be paid to those natives who had remained loyal to the Cape during the revolt. He quickly gained a prominent position in public affairs, and in 1883, after the Cape Government had refused to take the responsibility, he induced the Imperial Government to declare a protectorate over Griqualand West, and soon afterwards he was mainly instrumental in preventing the absorption of Bechuanaland by the Boers, who had already secured large slices of Zululand and Stellaland.

When gold was discovered on the Witwatersrand, he at once secured interests in that district. He had obtained by hard work the extension of the Cape Government railroad lines to Kimberley, and, always looking to the extension of settlement and authority to the northward, he had organized the British South Africa Company, which was authorized to exercise political as well as commercial control over Mashonaland and Matabeleland, covering the extensive region between the Transvaal and the Zambesi River, which is now known as Rhodesia.

His political career in the Cape Colony had been successful, and he finally became Premier of the Colony, supporting his administration in Parliament by an alliance with the Afrikaner Bond. Under his administration the railroad system was extended to Johannesburg after a long contest with President Kruger, who at first opposed the building of any railroads in the South African Republic, but finally consented to their construction by the Netherlands Railway Company.

In the settlement of the railroad disputes with Mr. Kruger, he had to deal with a very difficult situation, and met it with singular ability. His political methods are illustrated by his early connection with the Afrikaner Bond, and the fact that at a later date, when it suited his purposes to change, he was the

object of the most intense hatred of the Dutch party in South Africa. He was attached to no party steadily, but used all as he found opportunity.

The settlement of the territory controlled by the Chartered Company—as the British South Africa Company was generally called—proceeded somewhat slowly until 1893, when the trouble arose with the Matabeles which resulted in war. Mr. Rhodes went to Fort Salisbury to superintend operations, and in 1894 Lobengula having died of fever, his people made complete submission. Upon his return to Cape Town, Mr. Rhodes was received with great rejoicing, and in November of the same year he visited London, when he made several speeches in favor of a United South Africa, and attracted a great deal of attention. In the spring of the following year he was made a member of the Privy Council, and it was at this period that he attained the summit of his power and influence.

At this point he did not very long remain. His political eclipse was due to the Jameson raid, the story of which has so often been told. Although Mr. Rhodes claimed that Dr. Jameson acted without orders, there is now no doubt that he sympathized with and aided the Reform Committee at Johannesburg, which Jameson's force was to aid. He helped



CECIL JOHN RHODES.

in the collection of arms and other details, and it was undoubtedly a very great disappointment to him when the movement to overthrow the government of the South African Republic—for such it really was—collapsed with the capture of Jameson's men and the hurried disbanding of the Reform Committee. It is altogether probable, indeed, that Dr. Jameson did actually start without orders, and that it was his premature action which caused the failure of the enterprise.

The immediate result was Mr. Rhodes' resignation as Prime Minister of Cape Colony, and his severe censure by Parliament. He never afterward held political position, though he continued to exercise great political influence.

After his retirement he devoted most of his time, which was spent partly in South Africa and partly in England, to his railroad projects. He succeeded in hurrying the completion of the railroad into Rhodesia; but this was only the first section of the "Cape-to-Cairo" line, which he never ceased to advocate as necessary to hold and consolidate British power and influence in Africa; and the completion of which in the future has been made possible largely through his exertions. While not in office, he used his great influence towards what he believed would result in the consolidation of South Africa under British rule, and the outbreak of war with the Boers was due in no small degree to his councils and the support which he received from a large party in Great Britain. This support was entirely on African questions, for he never took any prominent part in British domestic politics, and what he did was rather eccentric. Thus, years ago he contributed £10,000 to Mr. Parnell's

electioneering fund, making it a proviso that the second Home Rule Bill should retain a certain number of Irish members at Westminster, his belief being that this might prove the beginning of Home Rule all round, and in 1891, he gave £5,000 to Mr. Schnadhorst for the Liberal fund, on the understanding that there should be no "scuttling" out of Egypt. Some time ago there was an effort to prove that Mr. Gladstone and other leaders had been cognizant of this arrangement, but the publication of the correspondence showed that Mr. Schnadhorst had acted upon his own responsibility.

For nearly a year past Mr. Rhodes has been in poor health. When the war with the Transvaal broke out he went to Kimberley and was present there during the siege. His contribution to the defence was a corps of 400 men, which he raised and equipped. It is said that he never entirely recovered from the hardships and confinement incident to the siege. When he was last in London, early in the winter, his appearance showed ill health, and since his return to South Africa he had failed very rapidly. Up to the last, however, he kept a firm grip on all those vast South African interests created and controlled by him. Except that he was more irritable and more dictatorial, there was no outward change in his method of handling business. His condition was shown chiefly by his withdrawal from the social side of life entirely, and his refusal to see anyone except on business.

Cecil Rhodes was a man of very great ability, but he was controlled rather by ambition than principle. The object to be attained was the point, and he was not particular in the choice of means. This was shown at different times very plainly; for while he was perhaps not more unscrupulous than some other public men, he was too strong a man and too much absorbed in his aims to seek or care for much concealment. It was part of his character that, while he must have become enormously wealthy through his Witwatersrand investments, and through his connection with the De Beers Company, he never cared for money in itself, but seemed to value it only for the assistance it gave him in working out his plans. Few men knew how much he had; but it is enough to say that only a short time ago he exchanged his rights as a life-governor of the De Beers Company for stock which constituted a great fortune by itself. He lost money over the war, but what inroads that made must have been trifling compared with the many millions he possessed. He never lost his open-handed, somewhat reckless methods of handling money. Not long ago, it is said, he walked into the office of a confidential subordinate and threw down a bundle of notes, bonds, etc., said, "Invest these for me," and went out without waiting to have them looked at. Inspection revealed the fact that they amounted to more than a million pounds sterling. How they were invested Mr. Rhodes did not know, or care. His share in the British South Africa Company must also be worth a very large amount.

In the last named company, in the management of which he had for a long time practically a free hand, his methods were somewhat arbitrary, as his disposition was, and it is probable that they will have to be materially modified if the settlement of the country is to make progress. Perhaps his management there shows what he might have done elsewhere, had circumstances permitted. But under what must have been the heaviest disappointments—such as the failure of the Reform Committee plot and the Boer successes early in the war—he never showed any appearance of discouragement.

Whatever his faults, it cannot be denied that Cecil Rhodes was one of the strong men of our time, and that he has left his mark upon its history for good or evil.

PIG IRON IMPORTS INTO GREAT BRITAIN.—Imports of pig iron into Great Britain for the two months ending February 28 were 36,530 tons, of which 2,673 tons were from the United States. In the corresponding period of 1901 the imports were 32,299 tons, of which 21,713 tons were from the United States.

THE SADDLE REEFS OF BENDIGO.

By T. A. RICKARD, DENVER.

Half a century has elapsed since the beginning of gold mining in Victoria, and the recent opening of a jubilee exhibition at Bendigo draws attention to the part which that district has taken in the history of the Australian mining industry. The occasion prompts the contribution of a short account of the chief characteristics of a mining center which the writer has learned to view with an interest in which purely geological questions are pleasantly associated with the warmer regard arising from old friendships.

The Bendigo gold-field has produced a grand total of 17,110,013 ounces of gold, valued at \$342,000,000, a sum which approximates the yield of the Comstock. Bendigo has long been celebrated by reason of its deep mines, seven of which are now below 3,000 feet, and also on account of the peculiar character of its lodes, which are saddle reefs. To these introductory facts may be added the statement that Bendigo itself is a beautiful, clean city, quite unlike the ordinary mining town; it is situated amid a fertile tract of country and, according to a very recent census, it possesses a population of 46,463 people.

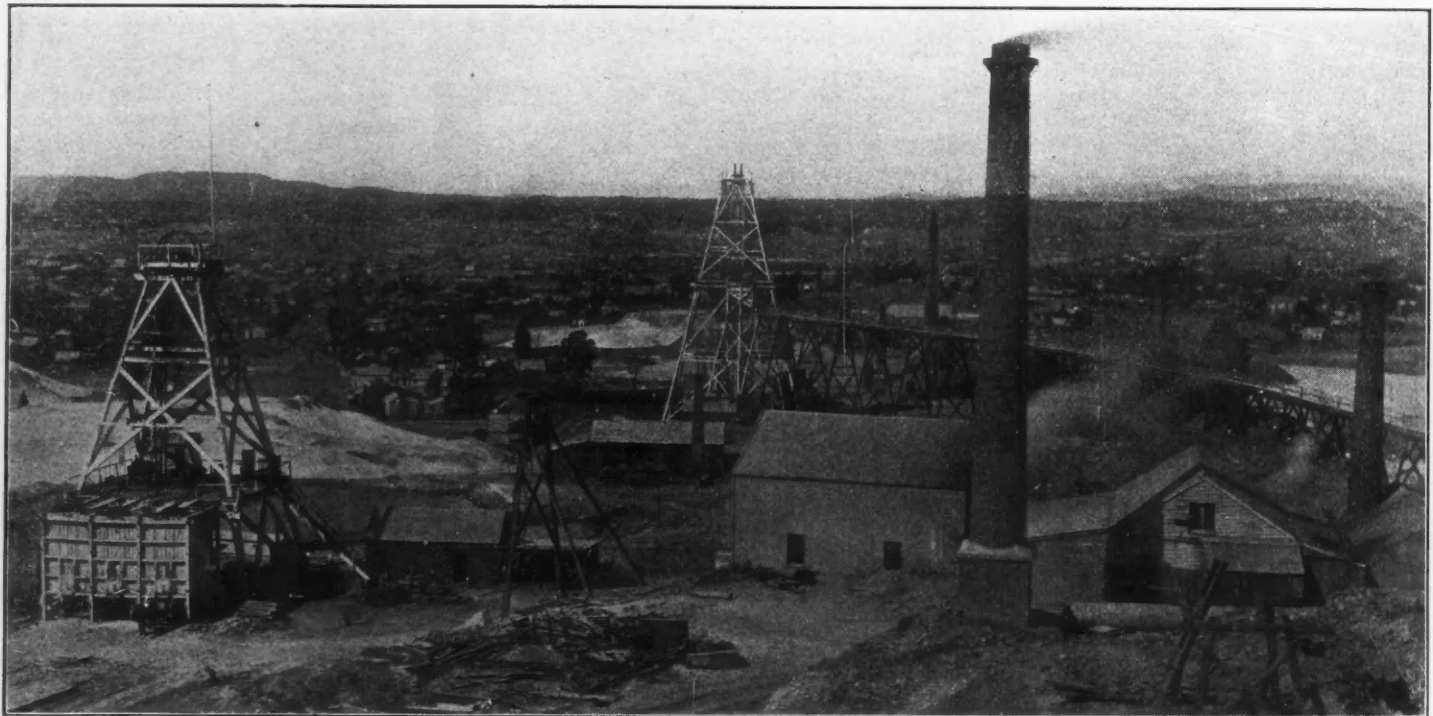
This region was a sheep-run previous to the dis-

covery of gold; in October, 1863, the town became the Borough of Sandhurst, and as Sandhurst it remained until 1891 when it was renamed Bendigo. In that second christening the writer played a part of which, though unimportant, is none the less interesting. An agitation had been started, in 1899, to remove the designation borrowed from a British military depot and to restore the old name rendered famous by the richness of the gold-field. In 1890, at a time when this purpose seemed to be languishing for a want of active interest, the writer visited the district and contributed several descriptive articles to a Melbourne paper, *The Evening Standard*, and in the course of these contributions he drew attention to the fact that Sandhurst as a name was entirely unknown in the northern hemisphere and had served simply to blot out the great reputation of Bendigo as a gold-mining center. This unsolicited testimony of a visitor served as a spur to the renewal of agitation in favor of the change of name, which was finally carried out, as related, in 1891.

Mining began here, as elsewhere, by simple digging at grass-roots. The shallow alluvium was immensely rich and yielded a great number of nuggets of large size, that is, ranging between 200 and 300 ozs. apiece. This, however, was but a passing

miners from all over Australia. As work progressed it was recognized that they occurred in a series, in almost vertical succession, and, while every saddle was not rich enough to be profitably worked, it was proved that those which were profitable maintained their richness over a long tract of country, so that a succession of mines could obtain good results from the extension of any one rich saddle formation. In the meanwhile the gold-field underwent no proper geological investigation and the important problems of rock-structure were left to the excellent, but untechnical, mine-managers, most of whom were Cornishmen. This led to the confused ideas of local geology which persisted until about ten years ago.

In April, 1890, when the writer went to Bendigo for the first time, the gold-bearing lodes were recognized as arches of quartz. This was indicated sufficiently by the name "saddle reef," but from this initial fact onward the true structure of this interesting type of ore deposit was quite misunderstood. It was described to me as a saddle of quartz, the eastern side of which dipped with the country while the corresponding western "leg" went "across the formation." The first time I went underground, to the 2,200-ft. level of the New Chum & Victoria Mine, and saw the arch of white quartz penetrat-



GENERAL VIEW OF BENDIGO DISTRICT, QUEENSLAND.

covery of gold, in 1851. In October, of that year, a shepherd in the service of the owner of the Ravenswood run found some specks of gold in the dirt near his hut. The shepherd's name is not known but he had been nicknamed "Bendigo," after a pugilist at that time quite celebrated in England. As gold had already been discovered earlier in the same year at Ballarat, Clunes, and other localities at no great distance from Bendigo, a rush set in as soon as the good news got abroad and the quiet sheep-run with its grassy flats and groves of eucalyptus was suddenly invaded by an army of diggers who changed the scene with the ruthlessness of a great destroyer. The peaceful landscape was denuded of its beauty and became a bare tract on which a thriving city was slowly upbuilt. Then, in process of time, man tried to repair the injury he had done to the fair face of nature and it is a striking testimony to the good sense of this community that they have changed the old heaps of tailings into artificial parks of rare beauty, and that they have planted avenues of trees having a total aggregate length of over 200 miles, so that at a distance the city looks again as if placed amid the foliage of a virgin forest.

Until 1863 the town and district were both known

phase of mining, for in 1855, the realization of the value of the outcrops of quartz led to the commencement of work in the solid rock. The first locality where "reef-mining" began was Victoria Hill where there were several bodies of quartz marking the outcrop of what is now known as the New Chum "line of reef." In 1890, Mr. Lansell gave me a photograph of an old drawing of one of these big masses of quartz which was reproduced in Vol. XXII. of the *Transactions* of the American Institute of Mining Engineers. It suggests the striking appearance of these natural monuments, the true character of which it took many years to decipher. Some of them exhibited gold and were broken down and crushed under "dollies," a dolly being a rudimentary stamp lifted by a spring-pole. Not much mining was required to prove these bodies of quartz to be short-lived, even those which appeared to be fairly permanent did not continue far in depth, but, by way of compensation, there were discovered, by cross-cutting underground, other lodes which made no appearance at the surface. By and by it was found that the quartz bodies occurred in arching masses, like saddles, they became known as "saddle reefs" and were a source of curious interest to

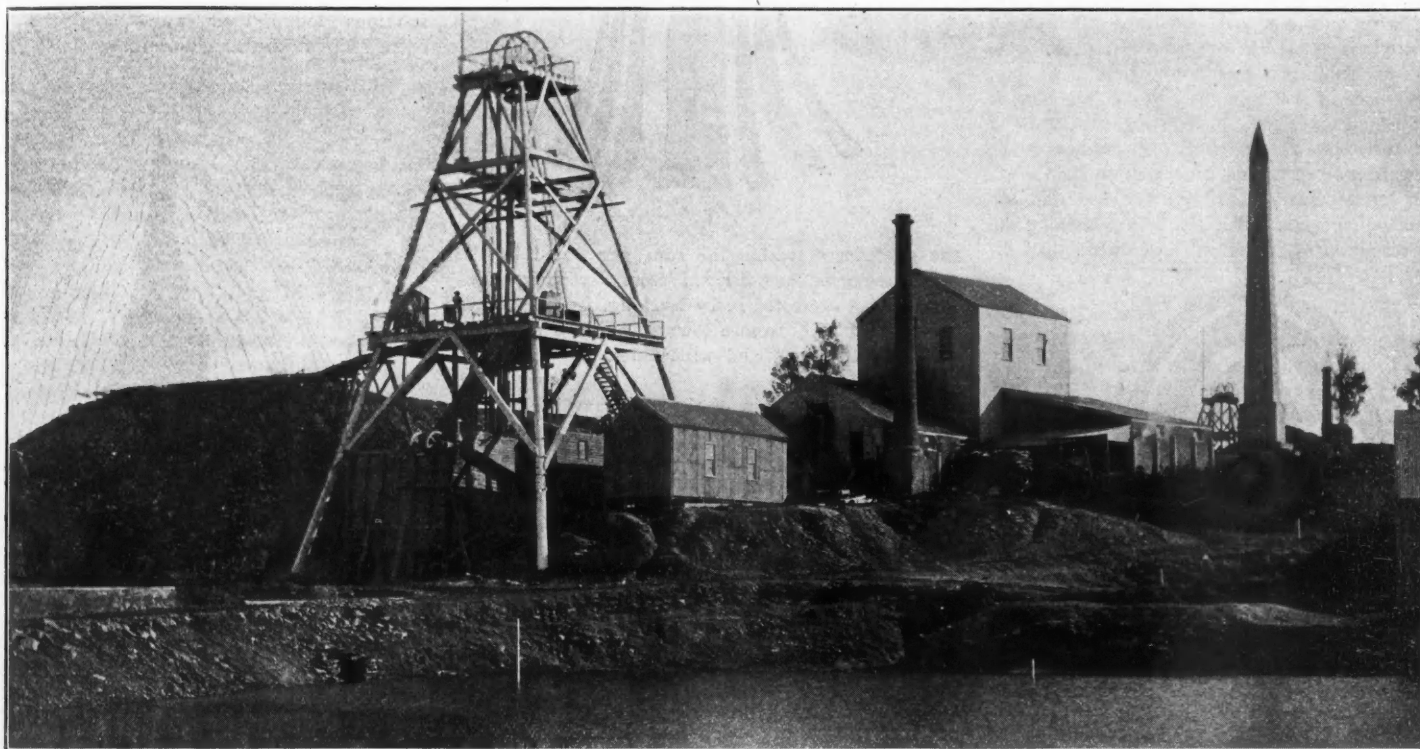
ing the dark rock with an apparent disregard of the evident cleavage-lines of the enclosing country, I came instinctively to the idea that it was a true anticlinal fold in the Silurian slates and sandstones. Yet, I must confess that in trying to follow up this idea I was, at first, unable to disentangle the cleavage from the bedding so that my correct conception of the geological structure surrendered for a time to the statements of the mine-managers who insisted that the west leg of the saddles ran counter to the formation, that is, it did not follow the structural lines of the country. It so happened that my first investigations were made in a part of the district where the true structure of the rock is most obscured by a well-developed cleavage; this cleavage is marked by lines dipping eastward at a high angle so as to coincide with the bedding plane on the east side of the saddle while on the western side the cleavage is strong enough to obliterate the bedding planes. When my study of the region gradually took me to mines outside this central area, I visited the Johnson's Reef Mine, and there, at the 1065-ft level, I came across evidence which put me on the right track again. This evidence was the finding of very distinct ripple marks on the footwall of the east leg. Such in-

dubitable signs of sedimentation finally disentangled for me the deceptive harmonies of bedding and cleavage. Later on, at the other end of the district, in the South New Chum Mine, I found the cast of ripple marks under the west leg of a saddle reef, at 550 feet. From this time onward it became easy to decipher the structure of the various lodes, and I made numerous underground sketches. It is a curious fact that the true anatomy of the gold-field should have been unknown so long in spite of the numerous detailed dissections afforded by a tremendous extent of underground workings. This surprise will not be lessened when it is stated that in December, 1888, Mr. E. J. Dunn had published a brief note in one of the government reports in which he clearly showed that he had correctly diagnosed the case. This contribution of Mr. Dunn's was unknown to the mine-managers in the district and I was not aware of it until he himself drew my attention to it in November, 1890, so that it is a fact that Mr. Dunn and I came independently to the same conclusion.*

formation and previous to actual rupture there must have been a shifting of the rocks along the bedding planes, with the production of a certain amount of clay owing to the rubbing of the faces against each other. This is indicated by the partings and selvages which are called "backs" at Bendigo; these are sometimes accompanied by the quartz-seams to which the term "leader" is fitly applied. In the process of re-adjustment, caused by lateral stresses, the beds must have been shifted, for, had they proved quite obdurate they would have been broken to a much greater degree than they exhibit. During this process, so slow that you and I could have been living on the surface overhead without being aware of it, there was a tendency to loosen the rocks along the tops of the arches and to squeeze the beds along the sides of the folds. This is illustrated by Fig. 2. It is probable that this went far enough to permit of the patient percolation of underground waters along the anticlinal crests, so that eventually ore-deposits were formed by the precipitation of quartz, iron pyrite and gold.

are composed of a lava termed "limburgite"* which is remarkable as containing a very low percentage of silica, and a correspondingly high amount of iron, rendering the rock fusible at a comparatively low temperature. These dikes are often extremely narrow, but extraordinarily persistent. In the celebrated "180" Mine I traced a dike, averaging less than one foot in thickness, from the surface to a depth of 2,600 feet. Since then it has been cut in the deeper levels and in the accompanying drawing the behavior of it is illustrated as observed through a vertical depth of 1,000 feet, that is, between the 2,200 and the 3,200-ft. levels. See Fig. 5.

The evidence afforded by an occurrence of this kind is good food for reflection. It is very clear that the old idea of a dike being formed of red-hot molten matter will not hold good in face of such facts as these. This lava has been followed for three-fifths of a mile in vertical descent and it continues downward to a depth which is probably much greater. A thickness of only one foot of such material could not have owed its liquidity or mobility



THE 180 MINE, BENDIGO DISTRICT, QUEENSLAND.

The saddle-reef is one of the most interesting types of ore deposit. It is essentially a bedded formation, conforming to the anticlinal arches of folds which have been produced in the sedimentary rocks. The latter, in this case, are slates and sandstones, of Lower Silurian age, which have been hardened and otherwise changed as the result of regional metamorphism, one of the causes of which is indicated by the intrusive granite to be seen to the west of Bendigo. These beds of slate and sandstone have undergone acute folding as the result of a lateral pressure. During this process the rock along the crest of the arches was loosened and that along the sides was tightened. The conditions approximate the diagram in Fig. 2 much nearer than the simpler state of affairs represented in Fig. 1. The slates and sandstones first underwent deformation and when the ultimate strength of the material composing them had been exceeded they were ruptured. Deformation is indicated by the flattening of the graptolites and other fossil remains to be found in these rocks and it is also evinced by the fact that the longer axis of most of the crystalline minerals is arranged along a line parallel to the present cleavage of the rocks; that is, at an angle strongly opposed to their original position, which was in conformity to the bedding. Subsequent to their de-

In some cases the process of folding went so far as to break a series of beds, and amid the shattered rock, due to this irregular fracturing of layers of varying hardness, there has been deposited quartz, which extends upward from the arch of the saddle in the form of a neck or chimney of considerable extent. This is illustrated in Fig. 4, while the normal saddle is shown in Fig. 3.

Since the period when the saddle-reefs were formed two geological events have occurred both of which have left the traces of their effects. I refer to the local shattering of the quartz and the intrusion of dikes of eruptive rocks. The two agencies responsible for these occurrences may have been separate or they may have been the manifestation of one and the same volcanic activity. The reefs often exhibit the effects of movement, subsequent to their consolidation, in the form of crushed quartz, striations, and slickensides. Occasionally, as in the Great Entended Hustler's Mine, I have seen crushed quartz so compacted under pressure as to exhibit faces of ivory smoothness, polished and grooved, and yet ready to crumble into sand as soon as it was roughly handled. The necks of quartz, above the anticlinal crests, are found to be frequently so shattered as to require careful timbering. Very often the breaks in the reefs coincide with the penetration of small dikes. These dikes are an interesting feature of Bendigo geology. They are of Tertiary age and

entirely to a state of fusion by heat, because it is not conceivable that the heat could have been retained long enough to permit of a slow tortuous passage through an irregular line of fracture traversing so great a thickness of rocks. Dikes having such a basic composition are peculiarly liable to quick chemical decomposition, therefore it is no wonder that they cannot be seen as they were when first consolidated after being injected through the slates and sandstones. At Bendigo, however, they show a banded structure due to the fact that the edges are less crystalline than the central core, a relation which suggests that the outer portions were cooled rapidly to a glassy condition while the body of the dike retained its heat long enough to permit of crystalline growth. Of course, material of this kind is a very poor conductor of heat and the formation, by cooling, of a crust along the edges of the dike would prevent the too rapid dispersion of heat into the enclosing rocks. A close parallel to this is furnished by the behavior of slag as observed any day at a smelter, the liquid contents of a slag-pot retaining its heat by reason of the protection afforded by the instant formation of a crust which retards the escape of heat into the surrounding cold air. When it is emptied such a slag-pot yields an interior mass of viscous, if not still liquid, slag and an exterior shell of cold, brittle, black clinker which

*"Special Report on the Bendigo Gold-fields," by E. J. Dunn, 1893. Geological Survey of Victoria.
"The Bendigo Gold-field," by T. A. Rickard, 1891. Vol. XX. Transactions American Institute of Mining Engineers.

*Limburgite is a form of basalt. See *Transactions, American Institute of Mining Engineers*. Vol. XXII, page 770.

tumbles over the dump with the tinkling of broken porcelain.

Underground, when dikes are formed, something analogous to this may occur, but instead of air there is water.

That volcanic matter is a bad conductor of heat is strikingly illustrated by an experience related by the great mountaineer, Edward Whymper. When making his ascent of Cotopaxi it was found that ice occurred amid the loose ashes covering the slopes of the volcano near its summit. In digging out a platform for their shelter-tent Whymper and his companions (the two Carrels) found the temperature on the outside of the cut to be 50° F. and on the inside 110° F. In the middle of the cut it was 72° F.* Thus ice and summer heat were separated by only a few feet of scoria.

While such suggestions of the non-conductivity of lava are not to be disregarded, it is difficult to imagine how lava can remain liquid by reason of heat alone when injected through comparatively cool rocks in such thread-like bodies and for such great distances. When we go to existing volcanoes and observe, with our own eyes, or learn of, through trustworthy witnesses, the extrusion of lava streams, we find that mobility is due, not to heat alone, but to the presence of water in the form of globules of superheated steam which, penetrating the mass of the lava, serve, like the ball-rolls of a mechanism, to lessen the friction of the moving mass so that it exhibits an extraordinary mobility. We find that the heat is more important indirectly, by maintaining the gaseous condition of the imprisoned water, than di-



FIG. 1.—TYPE OF SADDLE REEF.

rectly by raising the temperature of the lava to the point of fusion.

Therefore it is reasonable to suppose that the lava which forms the narrow and persistent dikes of Bendigo was enabled to penetrate so far because of the expansive force of imprisoned steam.

To the miner it is a matter of interest that at those places where the reefs are crossed by dikes, enrichments are frequent. I have a handsome specimen exhibiting a thread of lava traversing quartz which carries visible particles of gold next to the lava. It is not to be supposed that the latter brought the previous metal up with it, but, from analogy with other gold-producing regions, it is inferred that the fractures coincident with the intrusion of the lava permitted a passage for the thermal waters which had dissolved the gold elsewhere and precipitated it here.

The question, "Where did the gold come from?" remains as unsolved as the query which Pilate sent reverberating down the aisles of time. Ten years ago I emphasized the fact that the occurrence of gold as an iodide in sea-water rendered it probable that the ocean sediments would contain some of it and that therefore the gold of Bendigo might have been derived from the sands and silt which were laid down on the floor of the Silurian seas and, by the process of time and geologic changes, have been hardened into sandstone and slate. This did not mean, as an unfriendly critic assumed, that the gold in the reefs now being mined came from the immediately enclosing rock but that it may have been derived from such part of the great thickness of slates and sandstones as was within the scope of

*Page 149 of "Travels Among the Great Andes of the Equator," by Edward Whymper. Second Edition. 1892.

that circulation of underground waters to which the deposit of gold-bearing quartz is ascribed. In this connection it is notable that two such authorities as Professors Chamberlin and Van Hise have come to the conclusion that a large part of the material composing the zinc-lead ores of the Upper Mississippi Valley was at one time disseminated through the sedimentary rocks of that region and derived from them.* In the light of recent theories explanatory of the origin of ores it is probable that



FIG. 2.—TYPE OF SADDLE REEF.

the gold found within the zone penetrated by the mine workings was derived from ascending solutions which extracted it, by leaching, from a deeper horizon, probably from a lower portion of the great thickness of slates and sandstones, possibly from some other rock.

Whatever the origin of the gold may be, its distribution, as now observed, is traceable to structural conditions. Of these, the folding of the slates and sandstones, with the formation of anticlinal arches, is the principal. These anticlinal arches have a pitch, that is, they are not horizontal, like a bridge in longitudinal section, but slope north or south.† At the Great Extended Hustler's Mine the pitch, as observed by me, was 1 in 5, which is greater than usual. Thus by their pitch the saddles connect with a deeper horizon. The alternation of pervious and impervious strata, as exhibited by the succession of sandstones and slates, is another important factor in determining the distribution of ore, as has been pointed out by Professor Van

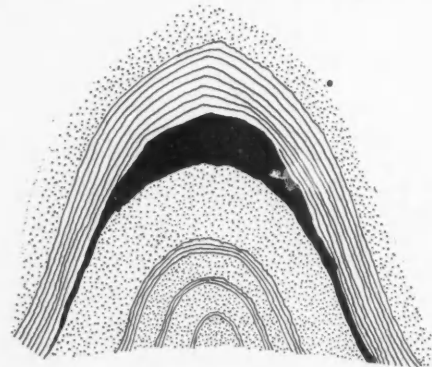


FIG. 3.—NORMAL SADDLE.

Hise, in his very suggestive discussion of my description of the district. The ore is usually capped by a slate bed and underlain by sandstone. When, however, the overlying slate is

*Transactions, American Institute of Mining Engineers. Vol. XXX, page 144.

†Professor Van Hise, in his celebrated paper, "Some Principles Controlling the Deposition of Ores," remarks (page 152, Vol. XXX, Transactions American Institute of Mining Engineers) that I do not mention the pitch of the anticlinals. This is an oversight. See pages 486, 488, 492, 508 and 512. Vol. XX, Transactions, American Institute of Mining Engineers.

ruptured, as was the case notably in the Lazarus Mine, at 2,000 feet, then the quartz extends through the impervious stratum and forms a neck of ore which is usually rich. See Fig. 4.

The ore-bodies valuable to man are essentially concentrations brought about by local conditions, chiefly structural. At Bendigo, the formation of saddle-reefs is traceable to the loosening of the rock along the anticlinal arches and the retardation in the upward passage of circulating solutions by an overlying, relatively impervious, layer of rock. It is a question whether the principal line of passage of the mineralizing waters coincided with the pitching arches of the saddles or whether these solutions came up along a more vertical course nearly coincident with that of the dikes. Probably both. The rich ores exploited to-day by man represent the results of more than one single period of precipitation and deposition. It is probable that at an early period the underground waters made use of the passages along the anticlinal crests, but the coincidence between enrichment and dike-crossing suggests that there was also a later period when the benefitting solutions found their way along the fractures opened up at the time when the slates and sand-

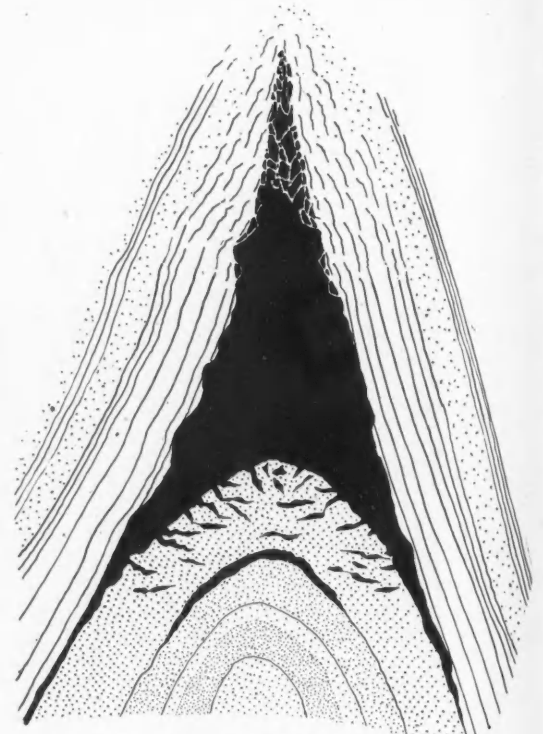


FIG. 4.—SADDLE IN CHIMNEY FORM.

stones were ruptured by the same force which also injected the lava into these rocks.

Since the lodes of Bendigo were first recognized as saddle-reefs it has been discovered that this type of gold-vein exists in other districts, notably, Broken Hill* and Hargreaves† in New South Wales, and also in Nova Scotia.‡ Of these the first is of great economic interest on account of the size and richness of the Broken Hill ore deposit. In this case the rocks are sedimentaries so altered as to have become crystalline schists, therefore the evidences of sedimentation are not as simple as they are at Bendigo. The lode occupies the axis of a very acute fold and resembles the necks of quartz, typified under the occurrence shown in Fig. 4. I append a cross section of the Broken Hill lode, as it appeared on the company's plans. See Fig. 6.

Bendigo has been, for twenty years, the pioneer in deep gold mining. It is destined to lose this distinction on account of the great energy which is being put into deep mining on the Rand. Of all

*"Geology of the Broken Hill Lode," by J. B. Jacquet. Memoirs of the Geological Survey of New South Wales. No. 5. 1894.

†"Saddle Reefs at Hargreaves," by J. Alex. Watt. Records of the Geological Survey of New South Wales. Vol. V, part iv. 1898.

‡"The Gold Measures of Nova Scotia," by E. R. Faribault. Published by the Mining Society of Nova Scotia. 1899.

metal mines the copper mines of the Lake Superior district, headed by the several shafts of the Tamarack, are the deepest at this time of writing. These have reached a depth of one mile from the surface. It will be remembered that the workings on the Comstock reached a maximum depth of 3,350 feet. Among gold mines, Bendigo can still, for the moment, claim the record, for the Victoria Quartz Mine is 3,750 feet deep, and the deepest shaft on the Rand, namely the Jupiter Catlin, is 3,740 feet deep, according to the latest intelligence. Moreover, the latter has not yet cut the reef and is therefore outside the category of "mines" while the Victoria Quartz is producing gold and paying dividends.

There are seven mines at Bendigo which have reached a greater depth than 3,000 feet. Of these the most interesting is the 180 Mine, which, for a great many years, held the record of being the deepest gold mine in the world. It is 3,350 feet deep, this being also the maximum depth of the Union Consolidated and the Mexican mines on the Comstock lode. Mr. George Lansell, who, on account of his energy and public spirit, is known as the "Quartz King," of Bendigo, owns the 180 Mine and several other important properties in the same district. The accompanying illustration of the 180 Mine, with its well-known "Cleopatra" smokestack, will be of interest.

The name of this property is derived from the fact that it extends for 180 yards along the supposed line of the New Chum Reef.* It is noteworthy that a claim having a maximum length of 540 feet, and covering only 14 acres, should possess a shaft more than six times as deep as the length of the claim. This is possible on account of the character of the ore deposits, which occur in nearly vertical succession. At the 180 Mine the anticlinal axis, called the "New Chum line of reef," has a strike of 21° west of north and an average dip of 85° eastward; the result of this is that while the "center country" the anticlinal axis, is 65 feet west of the shaft on the 560-ft. level, it is 70 feet east of the shaft at the 2,500-ft. level. The pitch of the arch is about 1 in 6, or 9° 30', northward. In the workings of this mine there have been uncovered seven distinct saddles, of which three have proved rich and two others have been barely profitable. These reefs were cut at the 560, 1,560, 2,000, 2,200, 2,500, 3,100 and 3200-ft. levels. The longest west leg was worked from the 1,600 to the 1,870-ft. level, a depth of 270 feet. The east leg of the 2,500-ft. saddle is the longest worked in the mine, but it went down only 40 feet. The cap of the 560-ft. saddle was the best portion of that particular reef. The east leg was very short lived and died out along a parting or wall. As a rule the west legs are the strongest in this mine, as elsewhere on the New Chum line. No large body of rich ore has been encountered below 1,870 feet. The great ore-body of the 180 Mine was found between 1,560 and 1,870 feet below the surface. Barren quartz is rarely met with, although, as has been indicated, only a comparatively small proportion of the total number of ore-bodies have proved rich enough for successful exploitation.

During 1900 the Bendigo gold-field produced 205,284 ounces of gold and paid out £162,709, or about \$800,000 in dividends, as compared with 1872 when the output was 346,992 ounces of gold and £683,140, or about \$3,400,000, in dividends. The biggest annual yield was in 1853 when the gold-field produced 661,749 ounces, equivalent to about \$13,250,000. During the last 15 years the results have not been as profitable as in the earlier decades on account of the exhaustion of the big ore-bodies and the expenses incidental to deep explorations which have not all been successful. Nevertheless, even under these less favorable conditions the mining operations of the district show a balance of profit year after year. One single year, 1889, is an exception, for during that period the calls, or assessments, exceeded the dividends by the sum of £19,016. Since the mines, all save the three or four properties

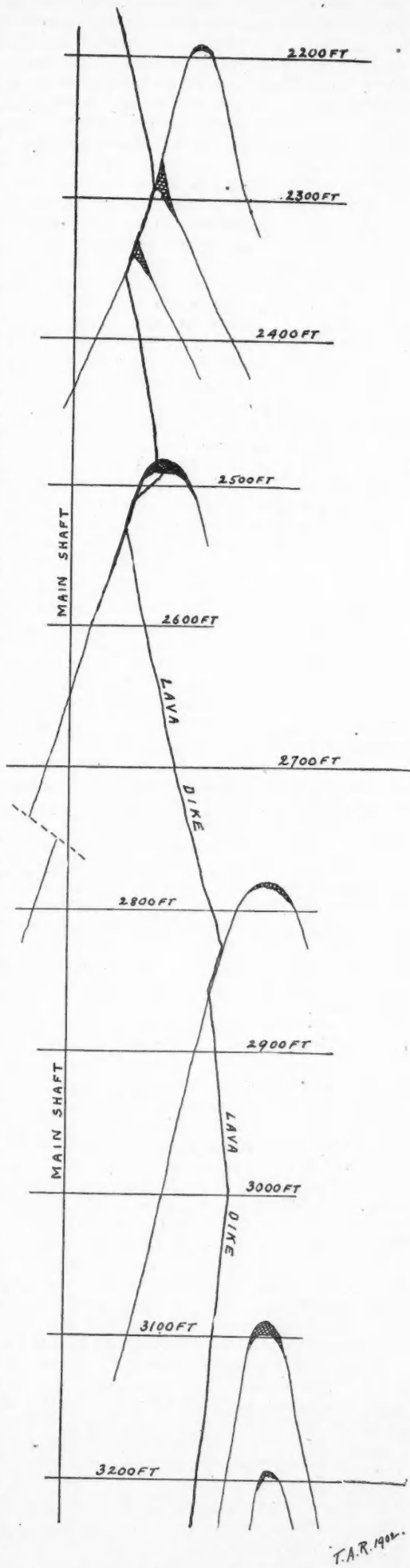


FIG. 5.—LOWER WORKINGS IN 180 MINE, BENDIGO.

owned by Mr. Lansell individually, publish their results, whether as profit or loss, it is possible to know with considerable accuracy the general outcome of mining in the district. As to Mr. Lansell's private holdings, it need only be said that they have made him a very rich man. Therefore, the story of Bendigo is one of a balance on the right side, year by year, for a period of half a century. This is a very notable fact. There are many gold-mining districts which, if careful inquiry be made, would show an aggregate of loss in their operations in spite of a large annual production, that is, the dividends paid by three or four successful properties would represent a smaller total than the aggregate of the sums expended upon mines which have not reached the productive stage or have passed it. Furthermore, it is a safe generalization to state that, taking the world over, the total annual production of gold has a value which is less than the total of the money

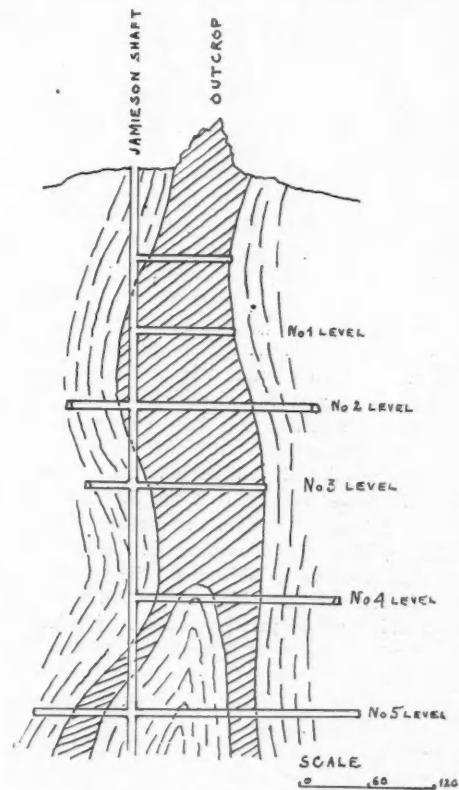


FIG. 6.—BROKEN HILL LODGE.

expended to obtain it by mining and milling. Therefore the record of Bendigo is a notable one, for in this district statistics are available since 1871, which excludes the bonanza period of the first twenty years, and these statistics show that the production, up to the end of 1900, has amounted to 6,359,916 ounces of gold out of which there has been paid in dividends the sum of £7,878,865, equivalent to nearly £1 5s., or over \$6, per ounce of gold produced. But, during the same period, the calls or assessments amounted to £4,441,838, so that the actual profit made by all mining operations, unsuccessful as well as successful, amounted to £3,437,027, or about \$17,000,000. This is at the rate of about 10 shillings, or \$2.50 per ounce of gold, that is, roughly, about 12 per cent of the gross yield. Under these conditions mining is indeed a first class investment.

PRODUCTION OF IRON AND STEEL IN SWEDEN.—Professor Richard Ackerman reports the production of pig iron and steel ingots in Sweden during 1901, as follows, these figures not being official, but practically complete: Pig iron, made with charcoal, 513,300 metric tons; blooms produced from pig iron in charcoal hearths, 164,700 tons; bessemer ingots, 77,300 tons; open-hearth ingots, 181,100 tons.

The exports during 1901 have been: Iron ores, 1,761,000 metric tons; pig iron, 84,600 tons; blooms, 18,200 tons; ingots, steel, 5,900 tons; bar iron, and steel, 142,100 tons.

*It is actually 514.8 feet in length along the anticlinal axis.

THE MINERAL PRODUCTION OF NOVA SCOTIA.

We have received the report of Mr. Edwin Gilpin, Jr., Inspector of Mines of Nova Scotia, for the fiscal year ending September 30, 1901. The report gives the output as below, in comparison with that for 1900:

	1900.	1901.	Changes.
Gold	30,399	30,537	I. 138
Iron Ore.....Tons.	15,507	419,567	I. 404,060
Manganese Ore.....	8	10	I. 2
Coal raised.....	3,238,245	3,625,365	I. 387,120
Coke made.....	62,000	120,000	I. 58,000
Gypsum.....	122,281	135,637	I. 13,356
Grindstones, etc.....	56,500	315	D. 56,185
Limestone.....	50,000	95,794	I. 45,794
Barytes.....	783	600	D. 183
Tripoli and Silica.....	1,100	800	D. 300
Copper Ore.....	600	...	D. 600
Pig iron.....	...	90,034	I. 90,034

The iron ore includes ore imported and used in Nova Scotia, as well as that mined in the Province.

During the past year surveys have been made in a number of the gold mining districts. Much difficulty has been experienced in getting the necessary surveys for the issue of coal and other leases. The number of available Crown land surveyors is comparatively limited. They are largely employed in surveying work which pays them better than Government work at the rates allowed.

The collection of minerals referred to as forwarded to the Paris Exposition was transferred with the other Canadian minerals exhibits to the Glasgow Exhibition. At the close of this Exhibition, at the request of the Dominion Government, the Nova Scotia minerals, with the exception of some gold ores, will be placed in the Canadian Department of the Imperial Institute, London.

Work has been continued in the Museum during the past year, and the classification and arrangement of the materials has been continued. During the coming summer a full and complete set of Nova Scotia minerals will be collected and installed, as it was found better to let the collection sent to Paris and Glasgow remain in London. When this is accomplished the Museum will furnish a good and representative exhibition of the natural products of the Province, which cannot fail to be of interest and value to parties desirous of information about our natural resources.

The Science Library has now been installed and arranged in an appropriate room with facilities for reading and consultation. It combines the libraries of the Nova Scotia Institute, the Nova Scotia Mining Society, and the technical works of the Legislative Library.

In addition to this, the Legislative grant has enabled the department to provide it with a number of books of reference. Judging from the progress made, in a few years this library will become one of the most useful science reference libraries in Canada. Mr. Piers has prepared a report on the Museum and Library, which will be printed. The Library is already utilized to a considerable extent by those engaged in the study of our resources, natural history, etc.

Much interest was taken in the arbitration between the Dominion Coal Company and some of its employees. This arbitration was held under the Miners' Arbitration Act.

Difficulties between the Nova Scotia Steel and Coal Company were reported to have been settled under the provisions of a Dominion act bearing on arbitration. It is sincerely to be hoped that in future arbitration will always be resorted to when differences arise between masters and men.

Coal.—The returns of coal sold during the year 1901 show, when compared with those of the year 1900, as follows:

	1900.	1901.	Changes.
Nova Scotia	863,900	998,814	I. 134,914
New Brunswick.....	406,519	349,994	D. 56,525
P. E. Island.....	68,103	53,773	D. 14,330
Newfoundland.....	99,307	105,620	I. 6,313
Quebec.....	934,229	1,017,046	I. 82,817
United States.....	624,273	590,086	D. 34,187
Other Countries.....	1,215	4,002	I. 2,787
Totals.....	2,997,546	3,119,335	I. 121,789

The production was 3,625,365 tons compared with 3,238,245 tons in the year 1900.

The sales show no marked changes. The Nova Scotia sales are increased by the operations of the Dominion Iron and Steel Company. The sales to Quebec show a slight increase, and those to the United States have fallen off a little. A small shipment has been made to Europe, and statements are made that there is a good opening for Nova Scotia coal in Northern Europe and at some points in the Mediterranean.

Gold.—Prominent among the improvements made in the gold mines during the year is the new cyanide plant at Caribou, the object of which was to treat the old tailing beds of the districts. The success or otherwise of this scheme will no doubt be observed with interest by the miners of the Province.

A distinct hardship was occasioned throughout most of the various districts by the exceptionally dry summer, and this was felt more particularly by the mill-men, who in several instances had to shut down for several weeks at a time. Rapid strides have been made during the past few years in the mill practice through the Province, and the methods and appliances now used, particularly in some of the larger plants, will compare equally with those employed elsewhere throughout the mining world. The benefits derived from the labors of Mr. Faribault, of the Canadian Geological Survey, become more marked each year, and the maps of this department may be found in the hands of the miners in nearly every district.

Lead.—At the Cheticamp Mining Company's property at Cheticamp, the following work has been performed: The main slope has been driven a distance of 112 feet from the line of the outcrop, 9 feet in width and 18 feet in height, the cubic contents of which contain upwards of 2,000 tons of rock; for the first 60 feet nearly all of the material removed was barren or void of metallic sulphides, which it was found necessary to mine in order to open up or attack the deposit properly. The remaining 50 feet has carried sulphides of good quality. In addition to the above work the company has constructed a skip-way from the bottom of the slope to the crusher of the mill, a distance of 300 feet, installed a boiler, hoist, forge, Wilfley table, and made numerous changes to the milling plant in order to improve its efficiency. The profitable concentration of this ore has presented some difficulties which, it is believed, have been overcome, and arrangements have been made for the installation of compressed air, and improved milling and concentrating plants, so that an average daily yield of over 50 tons may be maintained.

Copper.—During the past season some additional work was done on the Coxheath property near Sydney. Mining operations have been confined during the past year to surface explorations and the sinking of pits; some of the older pits have been sunk to a depth of 20 to 35 feet, more definitely proving the dip and strike of the western extension of the Coxheath veins and the composition of the gangue rock. From one pit on lease 95 (Coxheath) several hundred pounds of the low grade ore was shipped to Denver, Colorado, for a concentration test on a Wilfley table, with the following result: Assay of ore before concentration, 3 per cent copper. Concentrates—Copper, 9.90 per cent; iron, 27.30 per cent; silica, 35 per cent; tailings, copper, 1 per cent. In actual practice, with improved slime saving apparatus, the loss in the tailings can be reduced to considerably less than 1 per cent.

Mr. W. N. Young continued working in the district between Mira and Gabarus, and is reported to be testing a number of properties which will, it is expected, be available for working. A little work was done by the Copper Crown Mining Company at intervals during the summer.

At Cape D'or, Cumberland County, the Colonial Copper Company has made extensive developments on zones in the trap rock carrying metallic copper. The quantity of available rock, and its percentage of contents are reported as encouraging. At Horsehoe Cove No. 1 shaft is sunk 330 feet and is 12 by 6 feet. It is intended for a double cage 4 feet 6

inches each, and 3 feet for manway. It is timbered deal 3 feet thick down to the bottom; this shaft when down to the lode will be 350 feet. One thousand feet south of No. 1 shaft No. 2 shaft is sunk 60 feet, and timbered 56 feet from top. One mile from No. 1 shaft they are driving a slope down; it is now sunk to the depth of 120 feet, an angle of 45°. There is good steam power on No. 1 shaft and steam machinery on the way for the others. They have built cottages for their workmen.

Barytes.—Messrs. Henderson & Potts continued mining at Cape Rouge, Inverness County, and extracted about 600 tons of high grade ore.

COMPOSITION OF TURQUOISE.

In addition to what has previously appeared on the composition of turquoise, Prof. S. L. Penfield has recently published the result of an extended investigation as to the composition of turquoise based upon specially fine material from Lincoln County, Nev., and a comparison with previous analyses from various points. The constitution of turquoise appears very uniform, and in this fact Prof. Penfield finds a strong argument against the view, advocated by Prof. Clarke of Washington, that it is an admixture of a copper and an aluminum phosphate, and in favor of its character as a true species, in which the coloring copper is a definite ingredient. The theory of admixture, he finds it impossible to sustain in the light of careful study of the ratios involved; and presents another view which both agrees with all the facts as found, and presents a very simple chemical theory. This view is that the hydrogen in turquoise is present in the form of hydroxyl, and not as water of crystallization; the fact being that no water is expelled at low heat, as the latter condition would require.

Combining the aluminum and the iron each with two hydroxyls to form the univalent groups (Al (OH)₂) and (Fe (OH)₂), respectively, and the copper with one hydroxyl to form the univalent group (Cu (OH)) the ratio is then determined between the phosphorus and the sum of these three groups plus the excess of hydrogen. After the figures are tabulated, the three radicals and the hydrogen are added together and dealt with as a general univalent radical R; the ratio of R to P (as unity) in the seven analyses is then found to vary between 2.73 and 3.17, and to average 3.02. "The ratio 1:3 is that of phosphorus to hydrogen in orthophosphoric acid, H₃PO₄. Turquoise may therefore be regarded as a derivative of orthophosphoric acid in which the hydrogen atoms are to a large extent replaced by the univalent radicals (Al (OH)₂), (Fe (OH)₂), and (Cu (OH))." Between the radicals themselves, or between their sum and the hydrogen—that is, as to the extent or the proportions of the replacement of the hydrogen—no fixed ratio appears.

JADE NEPHRITE.—Scarcely a week passes without some interesting discovery being chronicled from some of the members of the Jesup North Pacific Exploring Expedition. The explorers belong to all classes of scientific investigators. Among the mineralogical discoveries of interest were a number of celts, apparently of Jade (nephrite) from prehistoric village and burial sites in British Columbia, near Lytton, at the junction of the Frazer and Thompson rivers. The celts are small, from one to four inches in length, and very delicate and thin. All stages of their manufacture are shown, from river boulders grooved and cut with thin slabs of siliceous sandstone, to pieces cut off, celts partly finished, and those completely polished. The material is translucent, pale green, and closely resembles nephrite; though without analysis, it is not yet fully determined. Its occurrence in boulders indicates that its source is farther up-stream. Mr. Smith states that the coast tribes now use celts of a similar form, mounted as adzes, to smooth boards that have been split out with wedges; and many such wedges, made of elkhorn, were found with these ancient celts.

WASHINGTON COAL MINES IN 1901.

The coal mined during the year as reported by State Inspector C. F. Owen, was 2,504,190 short tons, an increase of 86,156 tons over the output of the previous year. The coke produced was 49,197 tons, an increase of 13,275 tons over output of 1900.

The use of oil as fuel has displaced coal in the California market to a considerable extent in the past year. But for this, the increase over 1900, would undoubtedly have been greater; and it can reasonably be expected that a larger increase will be made in the current year.

Nearly all the coal mines in the State have extended their workings and increased their capacity for the present year's output. The Northwestern Improvement Company, of Roslyn, Kittitas County, has installed two electric motor haulages, one on the 4th level west, No. 2 mine, and one at No. 4 mine; and has opened No. 2 mine west in the dip. The company is developing property at Blossburg, on Carbon River, above Carbonado, where it has driven 1,200 feet of cross-out tunnels, intersecting four good veins of coal. This is a rich, bituminous, coking coal, characteristic of the Wilkeson-Carbonado field. The company is erecting a bunker, installing washers, and will be in shape for a good output as soon as the washing plant is ready for operation.

The Western American Company, at Fairfax, has erected 35 coke ovens the past year, and is extending its workings.

The Carbon Hill Coal Company, Carbonado, has opened a 7-ft. vein of good coking coal with sand rock, top and bottom. This company is installing a battery of 75 coke ovens.

The Wilkeson Coal & Coke Company, Wilkeson, is adding 50 ovens, which will give a battery of 100 ovens. The company has extended the working on the eastern dip, and is prepared for an increase of output for the present year.

The Pacific Coast Company is opening the old mine at Franklin. The railroad grade has been changed to the high line, bringing it up to the old opening, where a 3,000-ton bunker has been erected and a new washing plant installed. A slope has been sunk 1,000 feet on vein No. 1; this vein has two benches of coal of about 5 feet each, on hanging and foot walls, with about 20 feet of vein matter between. It is advancing a gangway on each of the benches, both to the north and south. A cross-cut tunnel is being driven from foot of slope, 300 feet to vein No. 12; from that point a hole will be drilled about 120 feet tapping the flooded workings of the old Franklin (or the McKey) which will drain them to this point, the water to be pumped to surface. After the old mine is drained to this level, the slope will be extended 400 feet, which with another boring will drain the old mine, and it will then be opened. A shaft is being sunk and is down 600 feet, which will connect with the slope at a lower level. A 12-ft. Capell fan has been installed to furnish ventilation. No. 7, Bruce Mine, will be worked out and abandoned in about six months. The Lawson slope has been extended to the 4th level, a new Capell fan installed, and other outside improvements made.

The Black Diamond Coal Company has installed a Capell fan at the Morgan slope, and enlarged the bunkers.

The Seattle & San Francisco Railway and Navigation Company, at the Leary Mine, has sunk on No. 5 vein, and put in a washing plant.

The Seattle Electric Company, which owns the old Renton Mine, has made extensive improvements—driven a double track tunnel to the old workings; opened the overlying vein of coal, installed an electric haulage, put up new bunkers and washing plant. It has also put in a new battery of boilers and an engine, and is installing a new fan.

The Issaquah Coal Company, Issaquah, has built new bunkers and installed a new washer; sunk slope on No. 4 vein to the 1,200 foot level, and is in shape for a good output the present year.

The Olympia Mining Company, of Seattle, is developing coal measures on Carbon River, south-east of Fairfax. Considerable prospecting has been done, and some development around Centralia, and also in Whatcom County.

The Skagit Coal and Coke Company, Cokedale, has completed a double compartment shaft, 530 feet, and is opening the measures at this level in order to make an increase of output this year.

The South Prairie Coal Company expects to sink a new slope the coming summer.

The Occidental Coal Company, Cumberland, has opened 6 new coal veins. The year was spent in development work, no report on output is made, as only a small amount of coal was produced from gangways.

The accompanying table shows the output of coal from each mine operated during the year:

Coal Output of Washington.

Name of Company.	Location of Mine.	Tons Mined.	County.	Day's Operation.	Employees Underground.	Employees on Surface.	Total Employees.	Tons Coke Made.
N. W. Improvement Co.	Roslyn	323,395	Pierce	302	1,465	141	1,606	.....
Carbon Hill Coal Co.	Carbonado	125,028	Pierce	293	340	145	485	.....
Wilkeson Coal & Coke Co.	Wilkeson	77,255	Pierce	290	173	65	238	29,400
South Prairie Coal Co.	Burnett	1,005,027	Kittitas	245	156	43	199	.....
Western American Co.	Fairfax	39,513	Pierce	313	100	50	150	13,991
Gale Creek Co.	Wilkeson	18,900	Pierce	298	48	16	64	.....
Pacific Coast Co.	New Castle	130,957	King	228	185	42	227	.....
"	Franklin No. 7	88,217	"	300	130	21	151	.....
"	Franklin No. 1	4,494	"	300	51	15	66	.....
"	Franklin Gem.	36,460	"	242	54	6	60	.....
"	Lawson	97,329	"	300	159	20	179	.....
Black Diamond Coal Mfg. Co.	Black Diamond	227,000	"	313	325	75	400	.....
Cedar Mountain Coal Co.	Cedar Mountain	13,500	"	200	30	10	40	.....
Issaquah Coal Co.	Issaquah	121,829	"	224	216	98	314	.....
Seattle Electric Co.	Renton	72,865	"	241	265	20	285	.....
Fred Nolte Co.	Cumberland	9,000	"	250	12	5	17	.....
Seattle & San Francisco Ry. & Nav Co.	Leary	63,578	"	250	150	75	225	.....
Blue Canon Coal Co.	Blue Canyon	48,200	Whatcom.	300	28	6	34	.....
Skagit Coal & Coke Co.	Cokedale	12,643	Skagit	302	58	28	86	5,306
Totals		2,504,190			3,945	881	4,826	49,197

The average coal mined per man at work was 519 tons. The output by counties was as follows: Kittitas, 1,005,027 tons; King, 865,229 tons; Pierce, 575,091 tons; Whatcom, 48,200 tons; Skagit, 12,643 tons.

SAPPHIRES IN NORTH CAROLINA.

One of the most valuable of the recent contributions to the literature of the sapphire is that of Dr. Joseph Hyde Pratt, mineralogist of North Carolina, published as Bulletin 180, Series 9, of the United States Geological Survey. On page 9 of the paper he discusses two or three localities where it occurs in gneisses and schists. In Cowee township, Macon County, it is found in seams or layers in a hornblende (amphibole) gneiss, which is itself derived from the alteration of an igneous rock (gabbro), the augite having been changed into hornblende, and the rock much sheared by pressure. The corundum shows plainly that it was an original constituent and not an alteration product. The other occurrence is even more interesting, as it shows the presence of corundum in gneisses and quartz-schists derived from sedimentary beds. These rocks extend along the crest of the Blue Ridge from Rabun County, Georgia, to Clay County, North Carolina, and carry bands or zones of corundiferous schist, conforming to and belonging with the rest. All these schists, Dr. Pratt regards as very ancient sandstones and shales, greatly elevated, eroded, and metamorphosed; in the course of which changes the aluminous shales yielded first bauxite, and then the excess of alumina crystallized as corundum.

PIG IRON PRODUCTION IN GERMANY.—

The output of the German blast furnaces in January is reported by the German Iron and Steel Union as below, in metric tons:

	1901.	1902.	Changes.
Foundry iron	132,008	140,317	I. 8,309
Forge irons	132,446	108,338	D. 24,108
Bessemer pig	40,761	36,212	D. 4,549
Thomas (basic) pig	389,997	371,821	D. 18,176
Total	695,212	656,688	D. 38,524

The increase in foundry iron, when there was a marked falling off in all other kinds, was the marked feature of this statement.

THE BOULDER OIL FIELDS.

BY OUR SPECIAL CORRESPONDENT.

The new Boulder oil-fields are located in portions of Larimer, Boulder and Jefferson counties, Colo., directly east of the foot hills. They include in their southern areas an extended portion of the territory mapped and described in the *Monograph*, No. XXVII, edited by Emmons, Cross and Eldridge, and issued by the United States Geological Survey in 1896, under the title, "Geology of the Denver Basin."

It is interesting to note that while this report makes no special reference to oil, the geologic conditions are not only accurately mapped, but minutely described. Thus, by five years the Survey has anticipated the needs of the community now so materially affected by these discoveries.

It is well to note also that, though the areas de-

scribed are bounded on the north by a line drawn east and west from a point just north of Boulder City, those of the present speculative excitement and consequent activity have much wider boundaries, both to the north and south.

That is, the present Boulder Oil Basin includes all the region from the foot hills on the west to an indefinite distance out on the plains, and between Fort Collins, Larimer County, on the north, to Clear Creek and Denver, on the south.

Though these are the general limits of these special fields yet the discovery of oil at Boulder in paying quantities and quality, and the apparent similarity of the geologic formations north and south, has encouraged the belief that like productive areas may reach from Wyoming to Pueblo, or even farther. Though it is yet too early to predict the final commercial significance of these discoveries, the following facts may be of interest:

At present there are only two wells in the Boulder district which have reached the oil bearing stratum. These are known as the Arnold and McKensie wells, and are located north of the City of Boulder. The depth of these wells is about twenty-seven hundred feet, and the oil seems to be in the Pierre formation or the overlying Fox Hills.

A peculiar and suggestive feature of this immediate district is the proximity to Boulder of an eruptive dike of basalt, locally known as the Valmont dike.

If the theory holds that these natural oils owe their origin to the destructive and decomposing effects of heat on previously deposited masses or layers of marine vegetable and animal life, with a consequent distillation of the liquid product, and the permeation of adjacent porous strata, then the proximity of eruptive masses of more recent origin deserves consideration.

In the Boulder District these basalt formations may safely be regarded as extending from the Table Mountains at the mouth of Clear Creek, on the south to the Valmont dike, though the main surface exposures are at Clear Creek, Ralston Creek and Valmont only. Should the conclusion be just, then the most promising oil productive areas may be judged as lying to the east of a line drawn between these two extremes, and to a limited district north and south of them.

There is always the possibility, however, of the

existence, at one or many points east of the whole line of foot hills, similar volcanic dikes or buttes which have either not reached the surface or have been covered by more recent depositions.

While to conclude that because oil has been discovered at Boulder, it is sure to be found only when in the same formation is to take an altogether too confident a position, yet there seems to be enough of promise in existing conditions to justify continued explorations at intervals along the whole eastern slopes of the Colorado foot hills, when the Cretaceous formations indicate a similarity of sequence and dip.

Though the existence near Boulder of an oil bearing stratum at a depth of 2,700 feet cannot be questioned, there still remains much to be decided, and there are many collateral questions that suggest conservative and careful procedure. The quality of the oil is undoubtedly of a high order, fully equal in value to the best Pennsylvania product. As an offset to this, however, it should be noted that Colorado refiners take no account of such by-products as paraffin scale, cosmoline, cylinder and spindle oils, or carbon, the isolation and sale of which adds so much to the revenues of eastern refiners.

A second consideration relates to home competition. Though the Boulder oil contains a much larger per cent of illuminant than that from the Florence wells, the proximity of the present refineries to the latter offsets many of the advantages of quality.

By far the most important and still undecided commercial question is that of the actual productive capacity of the present Boulder wells and the possibility of their stability. At present the larger of the two wells is yielding probably not more than 40 barrels a day, while the other, though located nearby, cannot be counted on for more than half as much, and all this must be pumped from a decided depth.

Counting the cost of installing a plant and sinking and tubing a well at at least \$10,000, add to this the loss by wear and tear, and the freight to Florence, and offset this by a price not to exceed \$1 a barrel at the well, and there is a fair basis on which to found a safe commercial estimate of net returns.

As an offset to these doubts as to quantity, suggested by present production, is always the reasonable chance that some or many of the new wells now being sunk will encounter more saturated areas, or possibly penetrate cavities, or even lakes, from which phenomenal returns may be obtained.

So far as relates to the present excitement, it can be safely affirmed that notwithstanding occasional speculative exaggerations, the promoters of the best of the Boulder enterprises are citizens of such established reputations for honest, conservative, and business acumen as to insure an economical use and strict accounting of receipts and expenditures.

Whatever may be the outcome of many of these individual enterprises, the effect on allied and dependent industries has been most pronounced. Chief among these is the demand for skilled labor and for such structural material as lumber for sheds and derricks, and iron and steel for tanks and general equipment.

Many new wells are now in progress from Fort Collins, on the north, to Colorado Springs, on the south, and there is every promise of continued interest for many months to come, and already the commercial centers are feeling the beneficial results of these new enterprises.

PYRITE.—Iron pyrites has always been a waste and most unwelcome by-product in coal mining. But when pyrites crystallizes in small, brilliant capsules, and in thin sheets so that it can be cut out in regular forms, it is used in jewelry as a coating of crystals, forming a sparkling surface of even height. These coatings occur lining cavities or partings in coal-slate, and are used just as they are, the only cutting being that needed to shape the pieces and smooth off the back. An exhibit of this material was made at the Paris Exposition of 1900, with a view of bringing it into notice abroad, by a firm that claims to control the output.

CALIFORNIA STATE MINERS' ASSOCIATION.

By Our Special Correspondent.

At a meeting of the Executive Committee representing 19,000 members of the California Miners' Association, held in San Francisco on March 19, the following resolutions were adopted and telegraphed to Washington:

"Resolved:—That we most earnestly urge upon our Senators and Representatives in Congress to use their utmost efforts to secure the enactment of the so-called 'Mineral Lands Bill,' now pending in Congress, to the end that there may be a prompt, effectual and final classification and segregation of the mineral lands within railroad grants in California, and that such mineral lands may be again thrown open to exploration and purchase as part of the public domain. No effort should be spared to procure the enactment of this legislation at this session of Congress.

"Resolved:—That the mining industry of this country, with its enormous output of raw material, its tremendous significance of the industrial prosperity of the nation, and its vast possibilities of future development, warrants and demands the governmental protection and aid that can be adequately extended only through a cabinet department of the Executive branch of the Government.

"Resolved:—That we heartily endorse the bill now pending in Congress to create a cabinet department of mines and mining, and in behalf of the miners of California, we demand the passage of the bill."

With regard to the invitation from the St. Louis Fair for the miners of the State to send on and maintain an exhibit, it was resolved that the duty of getting such an exhibit rested with the State Mining Bureau. It was estimated that \$10,000 would be necessary, and that an appropriation would have to be obtained from the State Legislature. As, however, the legislature will not meet until after the Fair opens, it was decided that the Association would lend its aid between now and then in securing specimens. The secretary was instructed to send letters to boards of supervisors in different counties, asking them to appoint some persons to make the collections of specimens and send them through the Wells, Fargo & Company express to the Mining Bureau, where they will be held until an appropriation can be secured.

MINING LAW FOR THE PHILIPPINES.

A Washington despatch of March 24 says that the Senate committee on the Philippine Islands has adopted for incorporation in the Philippine Government bill the mineral land laws of the Philippines recommended by the sub-committee, of which Senator McComas is chairman.

The bill throws all valuable mineral deposits in the Philippines open to exploration and purchase by citizens of the United States, natives of the Philippines, and Spaniards in the Philippines who have declared their intentions of becoming citizens of the islands. Claims for lode mining are limited for each individual to 1,000 feet square; for placer mining (including petroleum and building stone) to 20 acres; and for coal lands to 160 acres. Saline lands are to be sold at public auction for not less than \$1.20 an acre.

Provision is made for proper inspection and registration of claims upon proof and payment of the fees prescribed and the publication of notice in two newspapers of the islands. A prescribed amount of work or improvement must be put upon the claims each year in order to hold them. The committee has approved the plan of square claims.

SODALITE.—Sodalite, one of the deepest blue violet minerals known, and at times mistaken for lapis lazuli, is found at Litchfield, Maine. It is now known to occur in some abundance in Dunganon township, Hastings County, Ontario. It was exhibited in the Canadian section at the Paris Exhibition of 1900, as a new and promising ornamental stone, admirably adapted for mosaic-work, inlaying, and similar choice uses.

MINING DEVELOPMENTS IN LINCOLN COUNTY, NEVADA.

SPECIAL CORRESPONDENCE.

Probably no other county in Nevada, except it be Nye, gives more promise of future development than Lincoln County. With the two railroads, grading and surveying through the entire length of the county, prospectors have flocked to the heretofore unexplored sections. At present but a few sections are in active operation, but with the advent of transportation facilities the isolated region will be brought forward to the producing stage.

A recent trip was made by the writer in company with a prominent Los Angeles mining man over the entire survey of the proposed routes of the Oregon Short Line and the Salt Lake & Los Angeles Railroad.

Leaving Calientes the terminus of the Short Line road, Pioche, Nevada, was first visited—formerly one of the largest producing camps of the State. At present most of the large properties (which are lead-silver) are idle, owing to litigation, lack of money to build, expensive pumping plants, and also on account of poor transportation facilities.

At Bristol, 25 miles from Pioche, work has been going on preparatory to opening up the immense copper property there. The company also owns a smelter at Pioche, where extreme improvements are being carried on. Work was suddenly stopped a short time ago, but, as stated by the company, the plant will start up again in about sixty days.

Outside the American Group very little outside assessment work on the unpatented properties has been done. The American property, owned by E. F. Frudenthal, has shipped considerable ore.

At Fay, Nevada, the Horseshoe Gold Mining Company, under the management of Ernest Gayford, is treating about 2,500 tons a month in its cyanide plant; the values range very high. The Mountain View and the Newport & Nevada mining companies have both been doing extensive development work, the former having made several shipments of good gold rock. Throughout the Groom, Silver Park, Pahranaagat, Patterson, Silver King and Tem Piute districts are immense properties, all silver-lead, from which millions have been taken, but which are now lying idle.

At De La Mar, about 30 miles from the terminus of the railroad, there is an active mining camp, whose values are principally gold. At the De La Mar Mine, about 8,000 tons a month are treated at the mill, and besides this shipments have been made of rock running as high as \$1,000 to the ton. The April Fool Mine is also working steadily, although not treating as much as the De La Mar Company. Considerable ore was shipped last year from the Magnolia Mining Company.

Passing south over the survey of the railroads, the journey led through the Meadow Valley wash, a distance of 84 miles to Moafa, an Indian reservation, or the Muddy, as it is commonly called. Probably throughout the length of this deep canyon is the greatest lime formation in this section of the country. As yet little in the way of mineral has been found. What has been found is contained in small veins and the ranchers have hardly taken the trouble to locate them. Fair accommodations can be had en route of the person traveling not too particular. Not far from Moafa is located the Key West Mining Company, consisting of 8 claims, rich in copper. Considerable work has been done here, and the company is planning to build a smelter on the ground. C. L. Bradley is manager, and keeps a large force of men steadily at work.

South of Moafa, about 3 miles, is a large sulphur deposit, which, were it near transportation, could be worked to advantage; further south still, at St. Thomas, are immense salt beds, and at Riverville, near the Arizona line, can be found large deposits of mica. From Moafa the survey will follow the old California wash, going through Las Vegas Ranch.

Around here within a radius of 40 miles are located sulphur, mica, turquoise, copper, lead, silver and gold mines in abundance, but with little more

than assessment work done upon them. At Eldorado Canyon, 45 miles south of the survey line, the Southwestern Mining Company has just installed a new 30-stamp mill. This mine has been a steady producer. The company has a cyanide plant in connection with the mill. J. W. Wharton is in charge of the company.

From Las Vegas to Good Springs, an uninteresting country composed principally of cactus, sage and dry lakes is traversed, but at Good Springs is found the coming mining section of Lincoln County. Here have been opened up properties which have paid from the grass roots. Water is scarce here, and has to be hauled to all the properties, both around Good Springs and at Sandy, 14 miles from Good Springs. The principal values here are lead, silver and gold, although some good copper properties have been opened up. Upwards of 20 companies have shipped during the last year, and this year bids fair to surpass 1901, as an extension of the Eastern California Railroad has materially reduced the hauling, so that from Good Springs to the terminus they have a down hill haul all the way.

The principal shippers have been the 99 Copper, Ruth, Mt. Topeka, Keystone, Chariot, Potosi, Green Mountain, May Group, Galena, Columbia (copper), Double Up (copper), Palace and Porter, Boss (copper), Copper Prince (copper), Copper Queen (copper), Singer, Tam O' Shanter, Bonanza, Fitzhugh Lee, Rose & Lucky, and Copper Glance.

A. G. Campbell, of Los Angeles, is more heavily interested here than anyone else, but outside of Mr. Campbell, the majority of the mines are owned and worked by individuals. This is an "ideal" poor man's camp, as at the greatest depth, 750 feet, no water has as yet been encountered.

South of Good Springs, about 15 miles from the Colorado River, lies the Searchlight district, in which considerable work has been done in the past few years, notably by the Quartette Mining Company, in charge of Ben McCready. This company has a 20-stamp mill in active operation on the Colorado River, and is now engaged in connecting the mine and mill, a distance of 15 miles, by a narrow gauge railway. The Southern Nevada Mining Company, under the management of Frank C. Perew, has a fine stamp mill in active operation.

The New Era Mining Company, under H. A. Perkins, is taking out ore preparatory to shipping. Among the prominent shippers are the Searchlight Mining Company, Knob Hill and Flynn Group, all gold and silver, with a little lead.

These districts mentioned above are all within 40 or 50 miles of the railroad survey, although through the greatest extent there seems to be nothing as yet discovered of value, but when prospected by thorough miners, it may be that much of interest will be developed, more possibly in silver, lead and copper than gold. We were both surprised at the extent of grading done by both roads for a distance of 84 miles from Calientes to the Muddy; probably half the grading has been done by both roads.

Besides the districts mentioned the distance for hauling will be much shortened from the rich copper properties around St. George, Utah, and south of these in Grand Gulch, Arizona.

Another road is also contemplated to run from Ilex on the Santa Fe, along the Colorado River, through Searchlight and El Dorado districts, Nevada, and through southern Utah. Survey parties are at present working along the line.

CHEMICAL MANUFACTURES IN ITALY.—

A company has just been formed at Milan for the electrolytic manufacture of caustic soda and calcium chloride. These two products have up to the present been imported into Italy. The works of the new company will be situated at Varallo, where some 600 horse-power will be obtained from the River Sesia. The company expects with 350 working days of 24 hours to produce some 2,359 tons of calcium chloride solution, and 2,880 tons of caustic soda solution. This will require about 1,806 tons of sodium chloride and 1,216 tons of lime.

HISTORICAL SKETCH OF GOLD MINING IN MINAS GERAES, BRAZIL.

By ALCIDES MEDRADO.

The history of Minas, in common with that of the rest of the world, commences with a romantic period, full of uncertainties and fables. It is not the writer's intention to treat of this remote period, but only of that time covered by our own civil records.

After the first invaders, legendary figures, pioneers who penetrated the wilderness laying the foundations on which were erected the later settlements, came the second series of pioneers, to whose activity we owe the definite conquest of the territory, and the foundations of the towns of Carmo (now Marianna), Villa Rica (now Ouro Preto), Sabara, and others (1869-1898).

The first discovery of gold was made by Carlos Pedrosa da Silveira, in the year 1695. In the following year this Paulista discovered the Carmo River with its abundant alluvial deposits, which even today are considered the richest in the State.

If we consider the number of the population attracted to the workings, no other argument is needed to demonstrate the wealth of the superficial gold deposits in Minas Geraes. In the work of Antonil, published in 1711, is preserved the most valuable record of the first decade of the State's existence. The brooks of Ouro Preto, Carmo and Bento Rodriguez, which at this period were washed for the precious metal, actually justified the hyperbole of Claudio Manoel, "running over sands of gold." The same author gives details of the wealth accumulated by many of the invaders, from which some idea of the richness of the deposits may be formed.

It is said that in these times no river was considered worth working, unless a panful of sand gave one-quarter ounce (Portuguese) of gold, worth about \$3.50. Nuggets were common. The architectural achievements, the splendid houses and churches yet remaining, tell of the splendor and luxury of these bygone times.

The seemingly extravagant statements made about the early production on the River das Velhas rest on no less an authority than that of the late Sr. Xavier da Veiga, Director of the State Archives, a man noted for the severity and high degree of accuracy with which he examined all figures passing through his hands. According to Sr. de Veiga, between 1700 and 1713, the annual tax, including confiscated contraband, amounted to \$197,500. This shows a production of over \$975,000. Between 1715 and 1725 the annual tax had risen to \$225,000, showing a production of \$1,170,000 per annum. For the decade 1725 to 1735 there are no figures available, owing to the removal of books to Rio de Janeiro, but the production, judging from that of the preceding and succeeding periods could not have been less than \$1,400,000. From 1735 to 1751 the annual output reached \$1,550,000, and from 1751 to 1777, \$1,785,000. From these official data follows the conclusion that in less than seventy years the tax realized over \$40,000,000, showing the production of over \$200,000,000.

The history of Colonial gold production resolves itself into that of tax and contraband. The quantity of contraband gold is unknown, but it is known to have reached enormous proportions.

The great difficulty with which the earlier explorers had to contend was the loss from time to time of the run of the deposits which they worked. When they came to a fault, they were unable to locate the continuation of the auriferous beds. For this reason the deposits of the River Marianna, one of the richest in the State, remained practically untouched.

The suppression of the slave trade dealt the final blow to the industry. The case in Brazil, in early times, was much the same as in ancient Greece. Not the slightest improvement or advance was made as years went by. The ruins of an abandoned working in Minas Geraes resemble exactly those of the old world, in Spain, for example, which was to Rome and Carthage what California is to us to-day.

General economic causes decided the abandonment of mining for agriculture. Coffee replaced gold in the statistical returns. The profits were greater, and re-

turns more secure. The great advantage which presented itself to the colonist was the ease with which one man could earn a subsistence, and the more agreeable character of work in the open air. Many rich workings were deserted in favor of coffee growing in the course of a few years. The lack of intelligent exploitation of properties, discredited without reason many rich deposits. A brief inspection of the auriferous belt will satisfy any competent engineer that scarcely one of the thousands of deposits then worked should have been abandoned. It is absurd to suppose that so rich a country can have been exhausted. In Minas Geraes, as in other gold fields, the alluvial gold has been in great part removed, but there still remains the huge mountain veins absolutely untouched. Even now for thirty miles along the banks of the River Carmo one may see, every wet season, thousands of "faiscadores," who gain by their pans a living for their families. The floods continually renew the deposits, and without doubt it is the Ouro Preto hills which furnish the gold so carried down. The famous River Benton Rodrigues, thanks to the surrounding hills, furnishes an equal subsistence to the folk along its banks, and the same is true of other streams, through all the central region of the State. It is possible and more than probable that a new era is dawning for this ancient industry. Obstacles in the direction of transport and labor are gradually being removed, and the modern spirit of association bids fair to cope with difficulties too great for the old workers. Experts who have visited Ouro Preto declare that it is one of the richest gold fields on earth. Not one mine here existing is yet worked out or near it.

The following figures are extracted from official documents in the archives of the city of Ouro Preto, relative to past production of gold:

Gold-tax paid in the Villa Rica (Ouro Preto) district in the period of 1735-1751 (16 years) ..	\$3,481,125
Showing a production of	17,405,625
Gold-tax paid in the Marianna district during same period	3,887,250
Showing a production of	19,436,250
Goldtax paid by Minas Geraes during period of 1700-1820	53,529,750
Showing a production of	267,656,500

These amounts were divided among the various districts in the following proportions:

Ouro Preto	22%
Marianna	25%
Sabara	23%
Other districts	30%

These statements include only gold which paid the "Quinto," or Royal tax. The amount of contraband bullion exported is known to have been large, but it is impossible to estimate it with any approach to accuracy.

FRENCH SEA FLINT PEBBLES.—These pebbles are gathered on the beaches between Havre and St. Valery-sur-Somme, a distance of a little over 100 miles. Those which are nearly spherical in shape are carefully selected and are used in the Alsing system of cylinder grinding, which is becoming so generally employed for pulverizing cement pharmaceutical and chemical products, etc. The others are bought by the potteries for making ordinary porcelain ware, after being calcined, ground into a fine powder, and mixed with china clay. The yearly exports from France are about 13,500 tons, of which nearly one-half goes to the United States. The value of the selected pebbles varies from 35s. to 42s. (\$8.52 to \$10.21) per ton, in bags or barrels, f. o. b. at shipping port, while the pottery pebbles range from 5s. 3d. to 12s. (\$1.27 to \$2.92 per ton, f. o. b. in bulk. Ocean freight from Havre or Dieppe to New York averages 10 fr. (\$1.93) per metric ton. Competition is keen with the Danish and other pebbles that are used for the same purposes.

PIG IRON IMPORTS OF GREAT BRITAIN.

—Imports of pig iron into Great Britain in January were 24,833 tons, of which 2,144 tons were from the United States. In January, 1901, the total was 20,715 tons, of which 12,907 tons were from the United States.

THE CALIFORNIA STATE MINING BUREAU AND "WILD-CAT" COMPANIES.

By Our Special Correspondent.

For the purpose of protecting the investing public from certain "wildcat" stock mining schemes, the California State Mineralogist, Lewis E. Aubury, has for some time been carrying on investigations pertaining to those brought to his notice by Eastern and foreign investors, and also to those mining companies which have distorted or misquoted the reports of the State Mineralogist, or used the names of field assistants to fortify their reports.

For the information of the public Mr. Aubury states officially that no field assistant of the State Mining Bureau has the authority to sign himself as such in any private report, and only those reports having the official stamp of the Bureau should be accepted as genuine. One of these reports purporting to be made by an assistant of the Bureau has been issued in a prospectus sent out by the Sunset Mining Company, Mrs. K. E. Allington, of Rochester, N. Y., president, and G. W. Rumble, of San Francisco, general manager. The literature issued by this company, which is capitalized at \$10,000,000, promises guaranteed dividends of large amounts. To verify the statements made in the prospectus of the company, the State Mineralogist sent a representative to Oroville, in Butte County, to report on the various properties claimed to be owned by the company.

On the Amo Mine, which was represented as an active hydraulic mine, it was found the same had not been in operation for a year past, and then only to a limited extent. It was represented that this property was operating under special United States Government franchise, and was most successfully working. The values found in this claim were reported as not being sufficient to pay operating expenses, much less enormous dividends.

It was also represented that the company was operating a dredge near Oroville. It was found that some land was owned by the company on the river, but no dredge was to be found. It was intimidated by responsible parties resident in that section that the manager, G. W. Rumble, had photographs taken of the *Continental* and another dredge belonging to other companies, and had represented the same as a dredge operated by the Sunset Company.

Of the numerous claims which this company reports as being in active operation, only one claim was found to be in operation, the Old Glory, about 4 miles from Oroville. A deed has passed to the Sunset Mining Company for this property, but the owner of the claim holds a mortgage to secure payment of purchase price. Some locations have been made by Rumble, but no development work has been performed upon them. While a number of men are employed upon the Old Glory, no evidence can be found that the property is fabulously rich.

Exception is also taken by the State Mineralogist to misleading statements which have been made in a prospectus issued by the Minaret Mining, Milling and Smelting Company, Consolidated, of Arizona, with offices in the Flood Building, San Francisco. This company has a number of mining locations in the North Fork Mining District, Madera County. Statements are credited to the field assistants and from State Mining Bureau reports which are grossly incorrect.

POSSIBILITIES FOR AMERICAN COAL IN SMYRNA.

CONSULAR REPORT.

There are practically no coal mines in Turkey, and 99 per cent of all the coal used is imported from England. Reports from the larger markets of Europe show that American coal is gaining ground in competition with the English product; there is no reason why this should not be the case in Turkey. Important arrivals of American coal are noted in France, Italy and Russia, whereas none has appeared in Turkey. Possibly, the principal obstacle in the way of introducing American coal into this country has been the affiliation of native coal merchants with English exporters. This

can be readily overcome by applying to merchants who have not hitherto been identified with the coal trade and who can be easily induced to arrange for sample shipments.

The use of coal in Turkey is steadily increasing, through the construction of railways from Smyrna, Constantinople, Mersine, etc., into the interior of Asiatic Turkey, and from Constantinople, Salonica, and Dedagatch into European Turkey. New shipping lines are giving more attention to Turkish ports and are generally in need of coal upon arrival at Smyrna and other ports of the Levant. Coal is also used for industrial purposes in limited amounts. The coal contracts of the Ottoman Gas Company expire next June, and that company would be glad to experiment with a sample of American coal. In general, Cardiff and Newcastle coal is preferred in Smyrna, but pure Cardiff is rarely found. The kinds more often brought are Nantyglo and Griffen, from Newport mines. The best quality of Nantyglo corresponds to Cardiff coal; Griffen coal, a lower grade, is especially used by locomotives. According to specifications of the railway companies, the coal must be of fresh extraction and contain only traces of sulphur. Fifty per cent of each cargo must consist of large lumps, and the amount of dust must not exceed 15 per cent.

The annual consumption of coal in Smyrna and vicinity is about 150,000 tons, of which 80,000 tons are taken by steamers, 30,000 tons by railways, and 40,000 tons by the Ottoman Gas Company and other industries. The actual price c. i. f. Smyrna for Nantyglo coal, which is largely mixed with Griffen and sold under the name of Cardiff, is 22s. to 23s. (\$5.34 to \$5.58) per ton. The present favorable freight rates make it possible for American coal producers to lay their coal c. i. f. Smyrna at from 2s. to 3s. (48 to 73 cents) under the cost of English coal, and this is sufficient reduction to induce local consumers to give it a trial. Cargoes can be unloaded directly on wharf or by lighter. Return cargoes can frequently be picked up. If samples or analyses, with quotations, are addressed to Rufus W. Lane, U. S. Consul, at Smyrna, they will be delivered to local consumers.

PETROLEUM IN JAPAN.—The production of petroleum in the Province of Echigo, situated on the western coast of Japan has been steadily increasing annually for several years. The recent remarkable increase in its yield is especially due to the development of the oil fields in Nagamine and Kamada. Other fields, as the environs of Nagaoka or of Niytsu, are by no means discouraging, though the rate of progress seems slow in comparison. About 99 per cent of the total production of petroleum in Japan comes from this one province—Echigo.

AN AUTOMOBILE IN THE ANDES.—An automobile made in Paris, which serves a mine in Peru 11,166 feet above sea level, had to be subdivided into parts not weighing more than about 66 pounds each so that they could be carried on mules' backs. Three times a week the vehicle makes a run of 12 miles between the mine and Tarica, on gradients frequently attaining 1 in 8, states the *Auto-Velo*; and at first some difficulty was experienced through water boiling at 185° F., on account of the altitude.

GAS LIGHTING IN GREAT BRITAIN.—The *London Engineer* says: "An interesting comparison is afforded by the capital employed in the gas and electric lighting industries of the United Kingdom. The latter, at the end of 1900-1, had a capital of £27,934,239, compared with £102,924,220, or, deducting what has been added by conversion of stocks, £86,148,000 for gas lighting. At 3½ watts per hour for 1 candle, the electric light output was equal to 56,046 million candle-hours; while the gas output, calculated on a yield of 15 candles per foot by incandescent burners used under ordinary pressures, was equal to 2,106,277 million candle-hours.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DISCOVERY OF MINERALS AND LOCATION OF CLAIM.—An actual mineral discovery is essential to the valid location of a mining claim, and a location of a mining claim based on a discovery of mineral within the limits of another existing and valid location is void. Any rights acquired by a discovery of mineral on a mining claim subsequent to the construction of a ditch across the claim by a third person are subject to the easement of the ditch, and to the rights of the owner as a prior appropriator.—*Tuolumne Consolidated Mining Company v. Maier* (66 *Pacific Reporter*, 863); Supreme Court of California.

RIGHT TO INJUNCTION PENDING AN APPEAL ON MINING CLAIMS.—On the hearing of an order to show cause why an injunction should not issue to restrain certain parties from operating a mine pending a suit for an interest in same, the record of the prior action wherein it appeared that an injunction had been denied on the same facts as were involved in the present suit is admissible as barring a second application for an injunction on the same facts, where the court was doubtful as to the good faith of the application and of the merits and of the laches of the complainant.—*Wetzster v. Boston & Montana Consolidated Copper and Silver Mining Company* (66 *Pacific Reporter*, 943); Supreme Court of Montana.

ASSIGNMENT OF INTEREST IN A MINING CLAIM.—Where a contract for the sale of an interest in a mine provided that a balance of the purchase price was to be paid only out of the net proceeds of the working of the interest conveyed, and in no event was to become personal claim against the purchaser, but subsequently the seller agreed to permit such purchaser to sell his interest, provided the purchaser would become personally liable for the balance due, there was a sufficient consideration for such subsequent agreement, and the seller was entitled to recover. The purchaser by selling his interest rendered it impossible for the vendor to recover the balance due from the net proceed of such interest, and at once became personally liable for such balance.—*Carter v. Rhodes* (66 *Pacific Reporter*, 985); Supreme Court of California.

RIGHT UNDER MINING LEASE TO REMOVE IMPROVEMENTS.—The homestead of a husband and wife was supposed to contain gold, and they contracted with another party that the latter should have possession for a certain period, and that, if such party should put up improvements and pay a certain sum, the owners would convey an interest. The agreement was reduced to writing, and the others commenced work, and put up the improvements, which were removable without injury to the land or to the mine. The owners refused afterward to sign the agreement, and ousted the one who had made the improvements. It was held that the latter had a right to remove the improvements and to possession of the property during such removal.—*Goodwin v. Perkins* (66 *Pacific Reporter*, 793); Supreme Court of California.

ABSTRACTS OF OFFICIAL REPORTS.

Lehigh Coal and Navigation Company.

This company owns a large estate in the anthracite region of Pennsylvania. It owns the Lehigh Canal and several short railroad lines connecting its properties. It also owns the Lehigh & Susquehanna Railroad, but does not operate that road, leasing it to the Central Railroad Company of New Jersey.

The income account for the year 1901 shows receipts as follows: Lehigh coal lands, \$201,096; railroads, \$74,503; miscellaneous, \$225,822; rental of Lehigh & Susquehanna Railroad, \$2,082,585; total, \$2,584,006. From this is to be deducted \$9,077 loss on canals, making the earnings, \$2,574,929. The

charges were: General expenses, \$85,425; rentals and taxes, \$388,385; interest, \$851,555; sinking fund of 5 cents per ton on coal mined, \$87,078; depreciation, \$100,000; total, \$1,512,443; leaving a net balance of \$1,062,486. From this dividends amounting to \$860,799, or 6 per cent on the stock, were paid, leaving a balance of \$201,687 to profit and loss.

The total earnings of the Lehigh & Susquehanna Railroad, as reported by the lessee, were \$6,247,755, of which \$3,943,926 were from coal traffic. The coal traffic of the road and the Lehigh Canal is reported as follows:

	1900.	1901.
Received from		
Wyoming Region.....	3,326,197	4,015,565
Upper Lehigh Region.....	268,847	297,049
Beaver Meadow Region.....	555,088	747,175
Mauch Chunk Region.....	1,809,223	1,630,429
Lehigh Valley Railroad.....	7,694	6,947
Schuylkill Region.....	187,786	239,895
Total.....	6,154,835	6,937,060
Delivered.		
East of Mauch Chunk by rail.....	5,105,958	5,867,394
East of Mauch Chunk by canal.....	287,969	269,973
On line above Mauch Chunk.....	184,851	193,441
To connecting lines above Mauch Chunk.....	576,057	606,252
Total.....	6,154,835	6,937,060

The increase in tonnage last year over 1900 was 782,225 tons, or 12.7 per cent.

The coal mined from lands owned and controlled by the Lehigh Coal and Navigation Company, with the average cost, etc., is reported as follows, in tons:

	1900.	1901.	Changes.
Coal shipped.....	1,951,527	1,741,548	D. 209,979
Coal use by Co.....	147,363	163,947	I. 16,584
Total mined.....	2,098,890	1,905,495	D. 193,395
Per cent used by Co.....	7.0	8.6	I. 1.6
Days worked.....	213.55	211.75	D. 1.80
Average mined per day.....	7,955	7,923	D. 32
Av. cost of coal per ton.....	\$1.257	\$1.553	I. \$0.296

The proportion of large sizes—chestnut and over—and of the small or steam sizes produced at the company's collieries during the year was as follows:

	1900.	1901.	Changes.
Large sizes, per cent.....	49.20	50.16	I. 0.96
Pea coal.....	14.13	13.34	D. 0.79
No. 1 buckwheat.....	16.34	14.69	D. 1.65
Rice.....	20.33	21.81	I. 1.48
Total steam sizes.....	50.80	49.84	D. 0.96
Total.....	100.00	100.00	.....

This proportion of small sizes is usually high in anthracite mining operations, and is due in the case of this company largely to the extreme care taken in saving this fine coal in the course of preparation.

The report says: "The cost of mining at the collieries owned by the company, based on the production of all sizes, exclusive of the coal used by the company in its mining operations, and including in addition to the regular mining expenses all charges for extraordinary improvements, consisting of one new breaker partially completed, work on two new shafts, expenses in extinguishing fires, water storage reservoirs, dredging coal dirt dams, etc., was \$1.733 per ton. The increase in the cost of coal this year over last is entirely accounted for by increased wages paid, increased cost of mining supplies, and extraordinary expenses incurred by floods which drowned out the mines during the months of August and December.

"Nine collieries were in operation during the year. One colliery, No. 12, was idle for several months owing to an accumulation of water in the upper and abandoned levels which made it unsafe for workmen to enter the lower levels, and as a matter of precaution all work was stopped until the water could be drawn off. This is now being done. At colliery No. 9 the shafts which were begun last year for the purpose of opening a new lift in the Mammoth Vein have been sunk to the required depth, and the tunnels are now nearly completed for making connection with this vein, so that, during the coming year, mining should be begun and the capacity of the colliery largely increased. The construction of a large and complete breaker to take the coal from No. 6 colliery was started during the year and nearly finished. As soon as it is in working order, the coal which now goes from this mine to No. 5 breaker will be prepared at the new building. During the coming year a new breaker will be built to prepare the coal from No. 5 colliery, the present breaker being very old.

"The operations of the collieries were seriously interfered with during the past year, first by a lack of water, and afterwards from floods due to heavy rains. In the first two months of the year an unusual drought prevailed, making it very difficult to procure sufficient water to operate the mines and prepare the coal. In the latter part of August a heavy rain-storm occurred, which was exceptionally severe in the Panther Creek Valley, the precipitation being between 5 and 6 inches in less than 24 hours, much greater than in other parts of the coal regions. A number of our collieries were filled with water in their lower levels to such an extent that mining was suspended for periods running from two weeks to two months, the result being that the tonnage, as before reported, was less than produced during the previous year and the expenses of production materially increased. About the middle of December, the district was visited by another severe storm, but fortunately the precipitation in the immediate vicinity of our mines was not as heavy as in August; the interference with the mining was considerable, however, and the cost of coal further increased. The profit shown from our mining operations was made almost entirely in the first six months of the year, owing to the causes stated above. If the conditions had been as usual, the profits in the last six months should have been nearly double those of the first half of the year."

Old Dominion Copper Mining and Smelting Company, Arizona.

The report of this company covers the year ending December 31, 1901. The superintendent says that during the year development on the Globe Mine was 10,313 feet; in addition 580 feet of drilling with the diamond drill was done. The ore taken out was 82,005 tons, besides 935 tons sulphide ore. The smelter was in operation 361 days and smelted 81,015 tons of ore, from which was produced 9,248,093 pounds pig copper, and 1,737,331 pounds of matte. The pig copper was all shipped, but the matte was placed with that previously produced, making a total on hand December 31, 1901, of 3,797,837 pounds of matte, containing about 2,650,000 pounds fine copper. The flue dust made during the year not treated was 2,850 tons. This being placed with the flue dust previously made, gives a total of 5,924 tons on hand December 31, 1901.

Experimenting with fuel oil for boiler fuel at the smelter resulted in showing a saving over coal and the adoption for the entire plant thereof. This required the installation of oil storage tanks, pipe lines, and pumps, about three-fourths of the total installation expense having been charged out in the year 1901.

On the Continental Mine 398 feet of development work was done, and 209 tons of ore taken out.

The statement of assets and liabilities shows cash, supplies, accounts receivable, copper on hand, etc., amounting to \$1,231,230. Accounts payable amounted to \$894,023, leaving a balance of assets of \$337,207. The income account is stated as follows:

	Total.	Per lb. Copper.
Gross value of copper, gold and silver produced.....	\$1,276,980	12.66
Mining, smelting and electrolytic refining.....	\$993,801	10.01
Freight, selling, general expenses, etc..	169,349	1.52
Development and improvements.....	72,180	0.72
Total expenses.....	\$1,235,321	12.25
Surplus for the year.....	\$41,659	0.41

The balance on hand January 1, 1901, was \$401,923. From this is deducted \$106,375 for depreciation in price of copper at works, in matte, etc., 2,300,000 pounds, leaving a balance of \$295,548. Adding the net returns for the year, as above, gives a total surplus forward to current year of \$337,207. The report gives the cost per ton of ore mined at \$5.845; per ton, smelted, \$4.798. The average yield of fine copper from ore smelted was 6.23 per cent.

The directors' report says: "The result of the operations for the year 1901 for the first time enables the

management to place before the stockholders an intelligent and safe basis for determining what the costs of mining and producing copper are at Globe. Prior to this time the various vicissitudes of a new mining property were encountered, much development work had to be done and this, together with various unforeseen difficulties and expenses, made up a total cost which the management knew was abnormally high, and which could not form any basis for obtaining a fair average cost.

"As stated, in the last report, the great problem to be solved was the finding of sulphuretted ores in the mines which could be used to furnish a more economical smelting mixture. The richer oxidized ores are not at all refractory in the sense of being difficult to smelt, but on the contrary, owing to the ease with which they can be smelted into metallic copper, they occasion an undue loss of the metal in the slag. By the use of a sulphuretted ore this loss can be to a great extent obviated by changing the process of smelting. During the present year we have succeeded in finding in the bottom of the mine some limited ore bodies containing rich sulphide ores, but we have not yet been fortunate enough to discover any ore bodies of this nature sufficient to furnish us with the requisite amount of sulphides to warrant us in changing our methods of smelting. With this end in view we purchased, as stated in our last report, the Continental Group of mines, but while the mines have developed a certain amount of ore, they cannot help more than in a certain degree to supply our needs.

"Operations at the mine are shown in the report of Mr. F. W. Hoar, the acting superintendent, who took charge upon the resignation of Mr. S. A. Parnall. It will be seen from this report that the condition of the mine as far as oxidized ores go is very satisfactory, and that we have in the lower levels, as already mentioned, proven the existence of sulphide ore bodies which await further development before their extent can be determined. We have always had at the mine to contend with a large amount of water which seems to come at irregular periods. This has been the case since the opening of the mine 20 years ago, and during the latter part of the year 1901 we were practically shut off from extensive developments in the lower levels on this account. Since Mr. Hoar's report was written, however, the water has subsided to a large extent and we are again prosecuting development work in the lower levels with very favorable results.

"At the smelter everything has progressed smoothly during the year. The time lost during the whole year was less than five days. While we have a smelting plant much in excess of our present production, the management has deemed it best only to smelt a quantity of ore which could be produced from the mines without exhausting unduly the reserves. In the present condition of the copper market this policy has been a fortunate one for the company, as, if we had rushed production unduly, besides having exhausted our ore reserves we should have piled up a large quantity of copper which could not be sold at present without making a loss.

"Had it not been for the sudden drop in the price of copper and had the company been able to sell its total production at the price ruling early in the year, the financial report would have been a highly satisfactory one. When it was found that our copper was not being disposed of as rapidly as produced, the officers of the company, upon consultation with the United Metals Selling Company, the successors of Lewisohn Brothers, who had been the selling agents of the Old Dominion Copper Mining and Smelting Company from the beginning, found that owing to a very great shrinkage in the foreign demand all of the copper made in this country could not be disposed of without a serious fall in the price, which it was deemed inadvisable to bring about, as it was supposed the falling off in demand was only temporary. As various copper-producing companies who sold their copper through other sources than the United Metals Selling Company had expressed the same ideas and the same feeling, the officers of the selling company felt that it would

be very unwise for them to initiate a general breakdown in prices, in which the officers of this company thoroughly concurred. When it was found later in the year that the outside companies were systematically and secretly cutting prices and underselling the market under the protection of our maintaining the price, instructions were given to our selling agents to dispose of a sufficient quantity of our copper at cut prices to pay all our operating expenses for the year. The result has been that we have obtained for the copper produced during the year an average of 12½ cents per pound. It should be borne in mind, however, that had we initiated this policy early in the year the result would have been that we should have obtained a still lower average for our product, as we should then have lost the benefit of all the copper that we disposed of at high prices.

"At present prices for labor, supplies, freights, etc., and setting aside a fair amount for development work, copper cannot be produced, refined and sold by our company for less than 12 cents per pound, which is just about the price which it will bring in the market at present. Although at this price no profit can be made, the management considers it unwise to close down the property, as it would deteriorate very rapidly owing to the large quantity of water which would accumulate in the mine. As soon as the sulphide ore bodies are developed to a sufficient extent to warrant the installation of a converting plant it will be at once erected, and the cost of production will be considerably reduced. At present, however, it is not thought wise to proceed with this plant, as it can be erected in a comparatively short time."

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.

Coal Statistics. Seventh Yearly Edition, 1902. Compiled by Alder & Ruley. Philadelphia; Alder & Ruley. Pages, 196; with maps. Price, 50 cents.

Tenth Annual Report of the Bureau of Industrial Statistics of Maryland, 1901. Thomas A. Smith, Chief of Bureau. Baltimore; State Printers. Pages, 256; with map.

Iowa Engineering Society. Proceedings for 1901. Cedar Rapids, Iowa; published by the Society. Pages, 116; illustrated. Price, 50 cents.

The Need of Technical Training for Southern White Boys. Baltimore; the *Manufacturers' Record*. Pamphlet, pages 24.

New South Wales Geological Survey. Report on the Yalwal Gold-field. By E. C. Andrews. Sydney, N. S. W.; Government Printers. Pages, 48; illustrated.

New Zealand Mines Department. Papers and Reports Relating to Minerals and Mining. Wellington, N. Z.; Government Printer. Pages, 376; illustrated.

Tasmania. Statistics of the Colony for the Year 1900. Compiled by the Government Statistician. Hobart, Tasmania; Government Printer. Pages, 456.

BOOKS REVIEWED.

The Copper Handbook, Volume II., 1901. Compiled by Horace J. Stevens. Pages, 416. Price, in paper, \$1; cloth, \$1.75.

Mr. Horace J. Stevens, who is deputy commissioner of mineral statistics of Michigan, commenced a year ago the publication of this work, which is intended to be a compendium of information with regard to copper, copper mining and copper companies. The first volume was confined chiefly to the mines of the Lake Superior region, with which Mr. Stevens was especially familiar. In the present volume he has expanded his range considerably, taking in all the copper mines of North America, and adding also some information with regard to the

prominent foreign mines. There are ten chapters in the book, the first relating to the history of copper, while the second and third contain some notes on the chemistry, mineralogy and metallurgy of the metal. These are followed by a brief glossary of mining terms, which seems to be somewhat superfluous, although Mr. Stevens tells us that it has been inserted at the request of a number of readers of the first edition. The fifth chapter describes in a very condensed form the copper deposits of the world. This would be a difficult matter to do in the 16 pages given up to this subject, but it seems to us that a better arrangement of the matter might have been made. Thus, in under the heading of Canada we find over a page given up to the deposits of Quebec and Nova Scotia, which are comparatively unimportant from a producing point of view, while the mines of British Columbia, from which a great deal is expected in the future, are dismissed with a brief paragraph which gives one very little idea of the actual conditions there. Chapter 6 is of a similar character to the preceding one, but is devoted especially to the copper deposits of the United States.

Chapter 7 gives a list of the leading foreign mines accompanied by brief descriptions. This we think would have been improved by giving wherever possible the names and addresses of the leading officers of each company. Chapter 8 gives a similar list of the Lake Superior copper mines and this is the best and most complete portion of the book. It is especially valuable for its inclusion of all the old companies, particulars concerning which are generally difficult to find.

Chapter 9 gives a list of American copper mines, outside of the Lake Superior District and seems to have been compiled with considerable care, although one or two companies are included which might perhaps have been left out to advantage; still the arrangement is generally good and the information seems to have been prepared and edited with care.

Chapter 10 covers the statistics of copper, including production, prices, export and import movements of various countries, and also the dividends and assessments of American mines and the fluctuation of the leading copper shares during 1901.

This summary will give an idea of what the book contains; it is a great improvement on the first edition, and we have no doubt that experience will enable the author to make still further improvements in future volumes.

Sulphur, Oil and Quicksilver in Trans-Pecos Texas. Bulletin No. 2, University of Texas Mineral Survey. Austin, Texas; Published by the University. Pages, 44, with maps and illustrations.

This book contains a summary of the work done by the new Geological Survey of Texas up to date in the extensive and hitherto little known section of Texas west of the Pecos River. The results given show that the Survey has really accomplished a great deal, especially when the limited means at its command are considered. The present *Bulletin* deals specifically with the results of the examination of certain public lands in the counties of Brewster, El Paso, Jeff Davis, Pecos, Presidio and Reeves. It contains two reports on the sulphur deposits of El Paso County, showing that they are well worth attention and that they could supply large quantities of sulphur to commerce. There is also a description of the deposits of quicksilver ores in Brewster County, showing the extent of the field, the value of the product and the possibilities of further development. There is also an account of the operations of the Survey from its organization in May, 1901, to the close of the year, showing that more than 3,000,000 acres of public land in the Trans-Pecos region have been examined.

The quicksilver region of Brewster County is an interesting one and promises well, the principal company operating there—the Marfa & Mariposa Company—having been a large producer in 1901, while other companies are also prosecuting work. The ex-

plorations for oil and asphalt in Pecos County are also of much interest.

We may add that the Survey now has in hand the preparation of a *Bulletin* on the Fuels and Asphalt Rocks of Texas, to contain complete analyses of all of the coals, lignites and asphalt rocks, together with tests of the fuel value of the different oils. It is also engaged on the mapping of the mineral region of Brewster County, having in this important work the co-operation of the United States Geological Survey. The area to be mapped, on a scale of 4 miles to the inch and with lines showing differences of elevation of 50 feet, is about 600 square miles, and includes the quicksilver and coal districts of the southern and southwestern parts of Brewster County. The map will be ready some time this Fall. It will refer not only to that portion of Brewster County, but also to the adjoining portion of Presidio County, and will accompany the report on the mineral resources of that particular region.

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.

Use for Carbon Dioxide from Lime Kilns.

SIR: In your issue of March 15 a correspondent asks for uses of carbonic acid gas, the waste product of a lime-kiln. It may be a matter of interest to state that this utilization of CO₂ helps make profitable a well-rounded operation in Oldbury, England, the only surviving chemical works using the Le Blanc soda process.

The salt cake is burned in furnaces, the soda leached out, the chlorine recovered and the sludge of partially decomposed carbonaceous matter containing a large percentage of sulphite of lime is treated in closed agitators with carbonic acid gas obtained from burning lime rock in a closed kiln. The H₂S driven off in this operation of precipitating the carbonate of lime is burned in a Klaus kiln, air in proper proportion enters with the gas and flowers of sulphur is the final product of this part of the operation.

The carbonate of lime sludge together with all impurities is mixed with clay, dried and manufactured into portland cement of a high quality.

This Oldbury Chemical Works is the only one I have ever heard of which wastes nothing but water, and it uses that several times before discharging.

Other uses for carbonic acid gas obtained from burning lime are for charging soda waters, carbonated liquids and cheap champagnes, although natural carbonic acid gas from wells and springs near Saratoga, N. Y., is occupying this field at present.

HENRY A. MATHER.

New York, March 22, 1902.

[The use of carbonic acid gas from lime-kilns is also practiced in the Hargreaves-Bird works at Middleswich, England.—EDITOR E. & M. J.]

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

Books referred to in this column can be obtained from the Book Department of the ENGINEERING AND MINING JOURNAL.

Pyritic Smelting.—Will you let me know through the columns of your paper to what extent pyritic smelting has been a practical success on sulphide ores of the United States and British Columbia. It has been claimed by some parties that the fuel consumption has been reduced to 8 per cent. Please let me know if this is true as far as your experience goes.—R. L. W.

Answer.—Pyritic smelting has been a success when used under proper conditions and with suitable ores. A full discussion of the question would take too much space in this column. We can, however, refer you to an excellent summary of the subject contained in two articles on the "Province of Pyritic Smelting," written by Herbert Lang, and published in the *ENGINEERING AND MINING JOURNAL*, May 11 and May 18, 1901.

Infusorial Earth.—I have quite a large deposit of infusorial earth, and I see by your *JOURNAL* it is quoted (ground) in New York \$20 per long ton for American; for French \$37.50, and for German \$40. I learn it is used for making dynamite. Please tell me if it is used for other purposes and what they are; and again what constitutes a good quality? Why do French and German bring a better price than American?—E. Q. G.

Answer.—Infusorial or diatomaceous earth is used as an abrasive; also in the manufacture of non-conducting material and refractory brick, and in making water glass. The essential point is that it should be as nearly pure silica as possible and free from all foreign material. The higher price asked for German and French material is chiefly because greater care is taken in preparing it and freeing it from all mixture of other materials.

Discriminating Between Wrought Iron and Soft Steel.—Is there a satisfactory method for discriminating between wrought iron and soft steel other than the fibrous structure of the former and crystalline of the latter? Would a solution of the iron made by dissolving with iodine in iodide potassium and determining the slag which is always present in iron and absent in steel be conclusive? Can you give any other methods for distinguishing the one from the other?—G. C. C.

Answer.—In reply we may say that there are methods of discriminating between iron and soft steel other than that of the physical structure. In the premises you are a little at fault, as soft steel in its initial condition is rarely crystallized. The physical properties of wrought iron and soft steel are so similar that one cannot determine by physical test the kind of metal under test.

The usual test to determine between wrought iron and steel is the solution of the iron in iodine and iodide of potassium (or other solvent), determining the slag which remains as a residue in the case of iron; in the case of steel, of course, there being no slag present, it is not found. This is the method generally used. With regard to other methods of distinguishing between wrought iron and soft steel, sometimes the manganese content will be sufficient. All bessemer and open-hearth steels contain manganese, while wrought iron may be made without manganese. This, however, will apply only in special cases, as is evident.

Howe's "Metallurgy of Steel" may be consulted on this point with advantage.

Barytes.—Can you tell where barium sulphate is found in the United States and in what quantity? Also state in what size veins and what other metals are associated with it; also how pure it is generally found? I have a vein of barium sulphate and should like general information on this subject.—J. C. S.

Answer.—Barytes or barium sulphate is mined in the United States, in Missouri, North Carolina, Tennessee and Virginia. The total output in 1900 was 41,466 short tons; in 1901 it was about the same. The mineral occurs sometimes in veins, sometimes in masses or beds. It is very commonly associated with mineral ores, chiefly of lead, but sometimes with copper, silver, manganese, etc. In addition to the States where it is mined, as above, barytes is found in Connecticut, New York, Pennsylvania, New Mexico,

Colorado and California. The veins or beds vary very much in size, and no general statement can be given on that point. In the localities where it is mined the chief impurities are the quartz rock and earthy gangue associated with the mineral. It is generally freed from these by grinding and floating.

See *The Mineral Industry*, Volume IX., for statistics, uses and other information.

A NEW SAFETY EXPLOSIVE.

The introduction into mining operations of a safe explosive, which will not explode by accident or prematurely, and which will detonate without flame is a matter of no inconsiderable importance. Anything which will reduce the number of accidents due to the careless handling of high explosives, and particularly an explosive which defies fire and shock under ordinary conditions naturally arouses interest among mining men.

An interesting series of tests of a recently invented high explosive was made on Saturday, March 22, at Sand's Point, Long Island, the summer residence of the inventor, Mr. Fred L. M. Masury.

This explosive, to which the term "masurite" has been given, is manufactured by the Safety Explosive Company, of New York city. The tests were made in the presence of about 25 guests, and showed to the satisfaction of all present that the explosive was everything that it was claimed to be; namely, that it is absolutely safe from explosion or fire, except when fired by an electrically exploded cap.

The party invited to witness the explosion left Long Island City at noon, reaching Sands Point about an hour later. About four hours were occupied in making the 40 tests to which the explosive was subjected.

The experiments began with a series of concussion tests, which consisted first in placing 1 ounce of masurite on an iron anvil and striking it several sharp blows with a hand hammer. After this 4 ounces were placed on the hammer and struck a heavy blow with a 16-pound sledge. These two experiments were repeated, using a stone instead of an anvil. A 10-ounce cartridge was then placed on the anvil and a 50-pound weight was allowed to fall a distance of 25 feet. Cans containing 12½ pounds of masurite was then placed about 125 feet distant, and repeatedly fired into with a rifle, using alternately mushroom and steel-jacketed bullets. In one of these tests the masurite was first set on fire by means of burning charcoal before the shots were fired into it.

The masurite was then subjected to a series of fire tests, the first of which consisted in running a red-hot iron ¼ inch in diameter, through a cartridge. A 1-inch rod heated almost to white heat was then placed in a 10-pound can of the masurite, the effect being merely to fuse the material immediately in contact with the iron rod and to set up a slow combustion, which extinguished itself a short time after removal of the hot iron. Some of the masurite, both in cartridge form and loose, was then thrown upon a forge fire. The material fused and burned slowly, but with no appearance of explosion. When thrown upon a piece of burning charcoal the masurite would continue to burn as long as the charcoal furnished carbon for combustion, and the same effect was shown when burned with wood. A bundle of 50 parlor matches was ignited by friction in a heap of masurite without combustion or explosion. Heaps of it were then covered with black powder and with smokeless powder, and these were ignited by fuse without causing explosion or combustion of the masurite. Quantities of masurite thrown upon a red-hot iron plate fused and burned in a manner somewhat similar to the action of sugar under similar conditions. A melting pot filled with masurite and covered with an inverted funnel was placed upon a forge fire, and the fumes made by the decomposition of the masurite, extinguished a match held over the top of the funnel.

The material was then subjected to a series of electrical tests, using a current of 115 volts without exploding. Friction tests consisted of grinding mas-

urite to powder between sand paper and emery paper under 25 pounds pressure.

After these unsuccessful efforts to explode the material, it was subjected to detonation tests, the first of which consisted of a single cartridge of masurite exploded by a double strength electric cap. The detonation was equivalent to that of about 40 per cent dynamite. Two cartridges were then placed end to end, and seven cartridges were placed end to end, the cap being attached to one in each case. All were exploded with a single fuse. The next test consisted in placing two cartridges 24 inches apart, and one exploded; the second was torn to pieces by the force of the explosion, but not detonated. The same result was shown with the cartridges 12 inches apart. One cartridge was then hung 18 inches above another, the lower one being exploded without affecting the upper one. An electric fuse exploded within 4 inches of a cartridge did not affect it. These experiments were intended to show that caps or other detonators exploded near a mass of masurite would not explode it unless in immediate contact, and that caps would be stored without danger in the same house with the masurite. A cartridge of masurite was then placed within 12 inches of a dynamite cartridge; the dynamite exploded, tearing the masurite to pieces, but without exploding it. This test was reversed, and the dynamite was exploded by the detonation of the masurite.

At 4:30 p. m. 10 ounces of the masurite which had been placed in a freezing mixture and reduced to a temperature of 6° below zero, Fahrenheit, were taken out and immediately exploded, the low temperature not having affected it in the least.

A concluding test consisted of placing six cartridges into each of two bore holes which had been made in a large boulder of granite. These were fired simultaneously, and the boulder was shattered to pieces. One of the remarkable features of the test was the entire absence of flame at the time of the explosions of the masurite, the only flames seen during the detonation tests being from the dynamite exploded in connection with the masurite. For this reason it is claimed that the masurite can be used with perfect safety in the most gaseous coal mines.

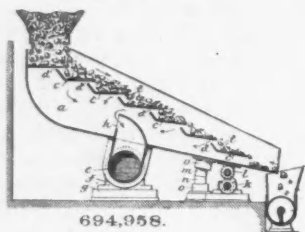
PATENTS RELATING TO MINING AND METALLURGY UNITED STATES.

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 March 11, 1902.

- 694,885. AIR-COMPRESSOR.—David O'Connell, Brooklyn, N. Y. The combination with two tanks, each having a valve connection with a pressure-receiver and the outer air, respectively, one of said tanks containing water, a pump operatively connected with said tanks, a valve controlling the connection between the pump and said tanks and adapted to be turned to cause the water to be withdrawn by said pump from each of the tanks in turn, and forced into the other, chambers communicating respectively with the upper end of each tank, a float in each chamber, a rock-shaft on which both of said floats are mounted and means actuating said rock-shaft for alternately shifting the said valve as the water rises in each of said tanks successively.
- 694,933. ELECTRODE FOR PURIFYING LIQUIDS IN ELECTROLYSIS.—William R. Chipman, New York, N. Y., assignor of one-half to Max Blumenthal, New York, N. Y., and Frederick G. Kune, Brooklyn, N. Y. An electrode for use in the purification of liquids by the electrolytic process consisting of a compound of metallic magnesium and aluminum from which oxyhydrates may be developed by electrolysis, one or more metals serving as a binder and one or more metals serving for hardening the compound, together with a suitable flux.
- 694,970. REVERBERATORY PUDDLING OR BOILING FURNACE.—William Kent, Covington, Ky. A reverberatory furnace having a hearth, an open flue connected thereto for escaping flames and for feeding a charge to the hearth, inclined to allow the ore to slide by gravity thereto, means for introducing the charge into the flue by gravity and a removable gate of less height than the flue to hold the charge in place on the floor of the flue, without interrupting the draft.

694,958. APPARATUS FOR COOLING CEMENT CLINKER OR OTHER GRANULAR MATERIALS.—Christian L. Galschiot, Copenhagen, Denmark. The combination of a pivoted incline provided with openings intermediate of its ends to permit a current of air to pass through the clinker whereby same is cooled while passing down the incline, and means for rocking said incline.

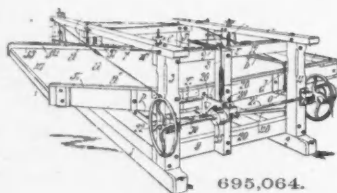


694,958.

694,794. BALL GRINDING MILL.—Povl T. Lindhard, Richmond Hill, N. Y. The combination of a rotary grinding-drum having a closed circumference, grinding-balls therein, the inlet and outlet heads of said drum being provided with inlet and discharge openings respectively, screens rotating with the drum and delivering toward the inlet-head, said screens communicating both with the inlet and discharge openings of the grinding drum.

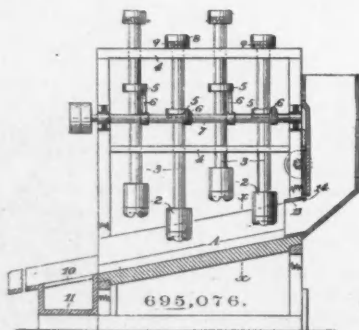
694,988. DEVICE FOR OPERATING BLAST-FURNACE SNORT-VALVES.—Robert S. Pollard, Pittsburg, Pa. In combination with a furnace, a main casing, an auxiliary casing mounted thereon, ports in said casings, a port for establishing communication between the said casings, shafts secured in said casings, valves mounted on said shafts, a sprocket-wheel mounted on each shaft, a chain connecting the said wheels, and a lever connected to one shaft.

695,033. PRODUCTION OF CHLORINE AND ALKALINE HYDRATES ELECTROLYTICALLY.—Edwin D. Chaplin, Winchester, and Henry G. Halloran, Boston, Mass., assignors to Henry Dakin, Boston, Mass. In the separation of chlorine and alkaline hydrates, subjecting a chloride solution as the electrolyte to the action of an electric current to separate the ions; maintaining them separated laterally by interposing an impervious, non-conducting barrier between anode and cathode; and utilizing the chloride solution to complete the electric circuit between anode and cathode while separating such solution by a pervious non-dialytic diaphragm from both the anode and cathode compartments.



695,064.

695,064. ORE-CONCENTRATOR.—Luther Look, Los Angeles, Cal., assignor to the New Standard Concentrator Co., Los Angeles, Cal., a corporation of California. The combination of a frame; a concentrating-table which slopes longitudinally downward from head to tail and discharges over the edge at the tail; a yoke; flexible means at the middle of the yoke connected with the frame at one end thereof for supporting the yoke; links at the ends of the yoke respectively, loosely connected with the yoke and with the opposite sides of the table at one end thereof; two table-supporting links at the other end of the frame, the same being respectively loosely connected with the frame and with the table at the opposite sides thereof; intermittent means for moving the table in one direction; resilient means for returning the table; and means for stopping the table at its return; said table also sloping transversely downward from the concussion side to the opposite side.



695,076.

695,076. CEMENT-GRAVEL CRUSHER AND SEPARATOR.—Charles H. Ohm, Shellville, Cal. A cement-gravel crusher, consisting of a trough or mortar, means for advancing the material through it, vertically rising and falling stamps located above the mortar, and stops by which the stamps are arrested and prevented from striking the bottom.

695,050. HOIST AND CONVEYOR.—Harry F. Hodges, U. S. Army. In a conveyor, the combination with a fixed guide of a belt or chain running parallel thereto, a carrier having its lower portion pivotally supported on said chain, contact devices carried by the upper and lower portions of said carrier and arranged to engage the rear and front faces of said guide respectively, and means for permitting the upper portion of said carrier to move away from the chain when desired.

695,126. PROCESS OF EXTRACTING METALS FROM SULPHIDE ORES.—James Swinburne and Edgar A. Ashcroft, London, England. The process consists in treating sulphide ores, suspended in a bath of fused chloride or chloride with chlorine.

695,177. METHOD OF TREATING IRON SCRAP.—Marcus L. Sly, Medina. A method of purifying iron scrap, which consists in placing in a cupola sheets or plates of iron interposed by fuel and finely-divided oxide of iron and oxide of aluminum, and then subjecting the mass to the action of the requisite heat.

695,180. APPARATUS FOR COOLING AND ABSORBING SULPHURIC ANHYDRIDE.—George C. Stone, Jersey City, N. J., assignor to the New Jersey Zinc Company, a corporation of New Jersey. A cooler and absorber for sulphuric anhydride, comprising a system of cooling-pipes consisting of lines of oppositely-extending inclined piping formed by return-bends into a continuous closed conduit, said system having a gas-inlet and a liquid-outlet at one end, and a gas-outlet and a liquid-inlet at the other, said pipes having dams anterior to the bends.

695,181. CONVEYER FOR ROLLING-MILLS.—James D. Swindell, Pittsburg, Pa. A conveyor for metal-rolling mills, comprising two series of endless chains or belts located one above the other, the chains or belts of the upper series being disposed over the chains or belts of the lower series, bearings for the respective series of chains, the bearings for the upper series of chains being disposed immediately over the bearings of the lower series at both ends of the conveyor.

695,182. PUDDLING-FURNACE.—James D. Swindell, Pittsburg, Pa. In a puddling-furnace, the combination with an outlet for the escape of burned gases and products of combustion, of a water-trap projecting into said outlet between the ends thereof to catch the refuse particles in the waste gases and products of combination.

695,256. MANUFACTURE OF STEEL.—William White, Jr., Pa. The method consists in charging molten metal into a converter, blowing air through the metal to remove the silicon, neutralizing the heat developed by the burning of the silicon, transferring the desiliconized metal to an open-hearth furnace and subjecting it to the usual or any desired treatment.

695,264. PROCESS OF MANUFACTURING STEEL.—Thomas Andrew, Richmond, and Thomas K. Bellis, London, England. The process consists in first opening, by the application of heat, the pores or grain of the steel to appreciably expose the carbon of the same; secondly, subjecting said steel, with its pores open and its carbon exposed, to a bath of hydrogen; and, thirdly, finally raising the temperature of the steel, by a second application of heat, and immediately chilling the same precipitously to fix the carbon.

695,278. APPLIANCE FOR PROTECTING OIL-WELLS FROM FIRES.—James M. Cochran, Gober, Tex. The combination with the oil-well pipe or casing, of a water-tank surrounding the upper portion thereof, a protective covering for the said tank, a reservoir, and suitable connections between the said reservoir and the tank and oil-well pipe or casing.

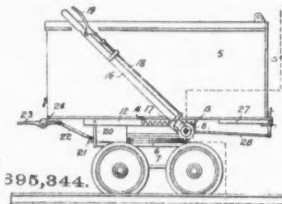
695,287. RAISING OR LOWERING APPARATUS FOR MINES OR THE LIKE.—David Davy, Sheffield, England. A continuously-running apparatus for raising and lowering, comprising pendulous cage-carrying slings, a pair of endless chains to which said slings are pivoted, pairs of upper and lower pulleys upon which said chains run, guides adapted to bring the cages and the lower ends of the slings to a mid-position between the ascending and descending chain members at the upper and lower landing-points, means of temporarily supporting the cages at the landing-points, and means of detachable connection between the slings and cages, said means of effecting connection consisting of hooks pivoted to the slings, the hooks of successive slings pointing in opposite directions and being adapted to be pivotally controlled by the guides so as to be thereby caused to enter into engagement with or become disengaged from the cages.

695,288. PUMPING-ENGINE.—James J. Delaney, Shamokin, Pa. In an engine, a cylinder, a piston held to reciprocate therein, tubes or channels located at each end of the cylinder and communicating therewith at the ends of the cylinder and at points located at a distance from the cylinder-heads greater than the thickness of the piston, a check-valve in each channel and opening toward the outer end thereof to permit the steam to pass from the working end of the cylinder to the dead end to form a cushion, the check-valve closing on increase of pressure, thereby preventing live steam passing through the pipe or channel to the other side of the piston on the opening of the inlet-port, and an adjustable stop for limiting the opening movement of the valve, to regulate the flow of steam from the working end of the cylinder to the dead end to increase or lessen the cushioning effect.

695,302. APPARATUS FOR THE ELECTROLYTIC DE-

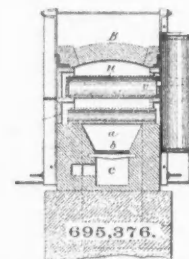
COMPOSITION OF ALKALINE SALTS.—James D. Gilmour, Glasgow, Scotland, assignor to the Gilmour Alkali Manufacturing Syndicate, Limited, Glasgow, Scotland, a corporation of Great Britain and Ireland. Apparatus for the electrolytic decomposition of alkali-metal salts, comprising upper and lower vessels, mercury in the vessels, means whereby the mercury may flow between the vessels and means adapted to cause the mercury to circulate from vessel to vessel by the variation in pressure of the caustic liquor.

695,306. SEPARATION OF THE CONSTITUENTS OF COMPLEX SULPHIDE ORES.—Max M. Hafl, New York, N. Y., assignor to the Ampere Electro-Chemical Company, Jersey City, N. J., a corporation of New Jersey. The process consists in heating mixed sulphides of zinc and lead with sulphate of an alkali metal, treating the resultant mass with a dissolving agent to dissolve the zinc sulphate and alkali-metal sulphate, while leaving the lead sulphate undissolved and adding barium hydrate to the mixed solution to precipitate zinc hydrate and barium sulphate.



395,344.

695,344. ORE-CAR.—Peter J. Smith, Idaho Springs, Colo. The combination with a truck, of a track pivotally mounted thereon, and a car-body slidable on the track.



695,376.

695,376. PRODUCTION OF ZINC-DUST.—George G. Conners and Arthur B. De Saules, South Bethlehem, Pa. The process of obtaining the maximum yield of zinc-dust or blue powder from a given retort charge, which consists in heating the charge to effect the distillation of the zinc, receiving the metallic-zinc vapors given off from the charge, in their substantial entirety from the muffle directly into a collecting-chamber, thereby maintaining their temperature throughout above the point of liquefaction of any substantial portion of the vapor until they have entered the collecting-chamber, and immediately condensing them in said chamber under such conditions of temperature and expansion as will precipitate them in substantially their entirety in the form of zinc-dust.

695,388. CHUCK FOR ROCK-DRILLS.—Robert H. Hamill, Salmo, Canada. A drill-chuck, comprising a head, bored to receive a drill shank and formed with a slot communicating with the bore, in combination with a chuck-key inserted in the said slot; a bridge crossing the slot and formed with dovetail groove, in its under side; a dovetailed key fitted into the said groove; and a wedge adapted to engage the dovetailed key and the chuck-key.

GREAT BRITAIN.

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

Week ending February 13, 1902.

- 1,099 of 1901. G. Thomson, Elizabeth, N. J. A compound plate, composed of steel and a copper metal alloy.
- 1,208 of 1901. F. Allard, Chateaulineau, Belgium. A combination of screens with square and oblong holes for eliminating slaty material from coal.
- 1,376 of 1901. D. Davies, Newport, Monmouth. An open hearth furnace, for making steel direct from fine iron ores.
- 1,842 of 1901. C. Enoch, Hamburg, Germany. Precipitating silico-fluoride of sodium from waste solutions of silico-fluoric acid by adding sodium chloride, without having to evaporate the solution.
- 4,147 of 1901. W. J. Foster, Darlaston, Stafford. Method of injecting heated carbon dust with the blast into blast furnaces.
- 4,375 of 1901. W. Pethybridge, London. Treating telluride of gold ores with ferric sulphate, thus precipitating the gold and recovering the tellurium in solution.
- 5,693 of 1901. D. McKechnie, Liverpool. Treating copper precipitate in a blast furnace, then in a reverberatory that has a division allowing the copper to pass to refinery furnace and leaves slag behind, and for method for catching the metals from the gases.
- 22,931 of 1901. Simon Carves Company, Manchester. Detailed improvements in coke ovens, where the gases are burnt to supply heat to the charge of coal.

PERSONALS.

Mr. P. H. Lynch is superintendent of the Century Mine at Park Valley, Utah.

Mr. C. A. Stephens is now superintendent of the Gold Road Mines, near Kingston, Ariz.

Governor Savage, of Nebraska, has been examining mining property in Gilpin County, Colo.

Mr. R. C. Vidler recently returned to Argentine, Colo., from a visit of several months in London.

Mr. J. A. Lusk, superintendent of the Tip Top Mine, Hailey, Ida., has been at Santa Cruz, Cal.

Mr. J. I. Long, manager of the Hidalgo Mining Company at Parral, Mex., has gone to California.

Mr. H. M. Crowther has left Salt Lake, Utah, for Idaho, to examine mining property for Boston men.

Mr. E. S. Feineman, of the Victor Mining Company, at Prescott, Ariz., has been visiting in Rochester, N. Y.

Mr. Henry Becker, a well known mine operator of Gilpin County, Colo., has been making a visit to New York City.

Mr. Edwin Haynes is general manager of the Chicago & Sonora Gold Placer Mining Company, Saqui Grande, Sonora, Mex.

Mr. W. E. Nevills, former superintendent Alabama Mine, Tuolumne County, Cal., has returned from Nome, Alaska, and gone to Tonopah, Nev.

Mr. T. Worth Bowen, of Salt Lake, Utah, has decided to locate permanently in Boston, Mass., at 502 Tremont Temple, as consulting mining engineer.

Mr. Leo Von Rosenberg, of New York City, has left San Francisco for Arizona, where he will examine some mines in the vicinity of Prescott.

Mr. L. W. Tatum, mining engineer of Chicago, Ill., passed through Denver last week on his return from a professional trip in Northern New Mexico.

Mr. Philip Argall, of Denver, Colo., recently returned from an extended trip to Mexico and left a couple of days later on a professional trip to California.

Dr. A. E. Heighway recently returned to Los Angeles, Cal., from an extended trip through the mining sections in the northern portion of California and in Oregon.

Mr. T. A. Hanna, of Iron Mountain, Mich., commissioner of mineral statistics of Michigan, recently inspected several copper mines in the Lake Superior District.

Mr. Todd C. Woodworth, engineer in charge of the experimental plant on the tailings from the Calumet & Hecla mills at Lake Linden, Mich., recently visited Boston, Mass.

Mr. James Healy, former foreman of the De La Mar and April Fool Companies, De La Mar, Nevada, is now with the Salt Lake & Tonopah Mining Company.

Mr. I. L. Parker, formerly of Rossland, B. C., has been appointed manager of the North Star Mine, in East Kootenay, B. C., to succeed Mr. F. Robbins, resigned.

Mr. E. McCormick, manager of the Aberdeen Consolidated Company's mines of New Mexico, has been making a tour of inspection through the mining districts of Colorado.

Mr. Theo. F. Van Wagenen, general manager of the Nevada Copper Company, Lovelock, Nev., recently resigned and accepted the management of a British mining company at Buluwayo, Rhodesia.

Mr. E. P. Arthur, Jr., a well known mining engineer, has been appointed superintendent of the Ormsby & McFarland lease on the north end of the Pharmacist and Burns claims, at Cripple Creek, Colo.

Mr. Edgar H. Berry has resigned from the position of draftsman in charge at the Equipment Department, Navy Yard, Brooklyn, N. Y., to enter the employ of the C. W. Hunt Company, West New Brighton, N. Y.

Mr. Eli T. Connors, a division superintendent of the Lehigh Valley Coal Company, has resigned to accept the position of general superintendent of the new Webster Coal and Coke Company, at Cresson, Pa. He will be succeeded by Mr. Frederick E. Zerby, Hazleton, Pa.

Mr. Emerson Gee, formerly manager of the Pride of the West Mining and Milling Company, of Washington Camp, Ariz., recently resigned his position with that company and is now manager of the California King Gold Mines Company at Picacho Mines, San Diego County, Cal.

Mr. W. C. Thomas, who has been with the Butte & Boston Copper Company since 1889, and has been superintendent of the Butte & Boston Smelter for some years, has resigned to take charge of the Highland Boy Smelter, Bingham, Utah. Mr. Arthur Day, who has acted as general foreman, succeeds Mr. Thomas as superintendent of the Butler & Boston Smelter.

Mr. William M. Brewer, whose name is familiar to the readers of the ENGINEERING AND MINING JOURNAL

as its representative in British Columbia for several years past, has associated himself with the North Western Smelting and Refining Company, a Montana corporation interested in mining development in British Columbia, Alaska, Washington, California and elsewhere. This company is building a large smelting and converter plant at Osborne Bay, Vancouver Island and intends to develop a large custom smelting business on the Pacific coast. Mr. Brewer will examine and report upon properties, purchase ores, etc. His duties will take him not only into the territories mentioned but probably also into Mexico and South America. He will continue to represent the ENGINEERING AND MINING JOURNAL and to contribute to its columns.

OBITUARY.

Col. James F. Woodman, a well known mining promoter, of Salt Lake City, died recently, aged 78 years. Mr. Woodman was born in England and came to America in the California gold excitement, arriving on the Pacific coast in 1850. He was engaged in gold mining there until 1865, when he removed to Salt Lake City, which continued to be his home until his death. He was the discoverer of the famous Emma Mine, near Salt Lake City, whose sale to an English syndicate involved Gen. Robert C. Schenck, American minister to London, in an international scandal. Mr. Woodman was also the discoverer of the Centennial-Eureka Mine in Utah, one of the most valuable mining properties in the West.

INDUSTRIAL NOTES.

The Dominion Iron and Steel Company, of Sydney, N. S., has part of its large open-hearth steel plant in operation.

The Stillwell-Bierce & Smith-Vaile Company, of Dayton, Ohio, has some large contracts for turbine and pumping outfits for shipment to F. Nell, of London, Eng.

The Liberty Manufacturing Company, of Pittsburg, Pa., is reported to have received a fair-sized contract for its specialties through Fraser & Chalmers, Limited, of London.

The Monterey Iron and Steel Foundry at Monterey, Mex., is reported to have shipped a narrow gauge engine to the Beaumont Lumber Company of Texas. This is said to be the first Mexican-built locomotive ever forwarded to the United States.

The aerial tramway that is to be built from the Ferris Haggarty Mine to the Boston & Wyoming Smelter at Encampment, Wyo., will be 15½ miles long. The A. Leschen & Sons Rope Company, of St. Louis, Mo., is to furnish the equipment.

The Bethlehem Steel Company, South Bethlehem, Pa., recently closed a contract with the Carnegie Steel Company calling for 12,000 tons of structural material, while the American Bridge Company recently placed an order for 35,000 tons of angles from 3 to 6 in.

P. K. Wood, pump manufacturer of Los Angeles, Cal., is in Batavia, Ill., installing a water plant, in which one of his high-grade pumps is to be utilized. This pump will raise 1,000 gals. a minute from a 2,000-ft. well, and will form a part of the water works of that city.

The Maryland Steel Company is building at Sparrow's Point, Md., 200 by-product coke ovens of the Otto-Hoffman type, which are expected to be finished by September. The coke made will be for the blast furnaces of the Maryland Steel Company at Sparrow's Point.

The Virginia Bridge and Iron Company has given the Knoxville Iron Company, of Knoxville, Tenn., a contract for the erection of steel buildings. It is expected that the plant will be in full operation by August. Cahall boilers and other modern machinery have been purchased.

The Brown Hoisting Machinery Company, of Cleveland, Ohio, is about to make a shipment to the Queensland Government of a 10-ton traveling crane equipment, which will be used for handling coal at the Brisbane docks. The equipment will be operated by a 125-h.p. motor built by the Elwell-Parker Electric Company, of Cleveland, Ohio.

The Bessemer Limestone Company, Youngstown, Ohio, has placed these orders for brick-making equipments: Dry pans and machinery, the Bonnet Company, Canton, Ohio; engines, Buckeye Engine Company, Salem, Ohio; boiler equipment, Erie City Iron Works, Erie, Pa.; hot air fans and engine, American Boiler Company, Detroit; kilns, T. H. Wilson, Pittsburg. Mr. Wilson will oversee the erection of the kilns.

The Chicago Pneumatic Tool Company, of Chicago, Ill., with offices so long located in the Monadnock Block, owing to its requirements for greater office room, has decided to remove to the Fisher Building, May 1. The new offices will be located on the tenth floor of the Fisher Building, corner of Dearborn and

Van Buren streets, Chicago, will occupy nearly the whole floor. The company states it will be glad to meet all old friends in the new quarters whenever they can make it convenient to call. The New York office will remain, as heretofore, at No. 95 Liberty street.

The General Concentrates Company, of New York City, is erecting a 70-ton dry concentrating plant at Lava, N. M., for the Grapevine Lead Company, and has just made a shipment of 4 carloads of machinery to that point. The plant will be equipped with a 9 in. by 15 in. Buchanan jaw crusher, 4 in. by 12 in. Sturtevant roll jaw crusher, a set of Hooper rolls and a set of Buchanan rolls for fine crushing, five Mashek octagonal revolving screens, and seven Hooper pneumatic concentrators. Power will be furnished by two Hornsby-Akroyd oil engines of 44 h.p. and 50 h.p., respectively.

The Jeanesville Iron Works Company, of Jeanesville, Pa., reports the following installations of its mining pumps have recently been made from the Denver office: Vindicator Mine, Cripple Creek, Colo., a compound condensing pump, capacity 500 gal., against 1,200-ft. lift; Golden Cycle Mine, Cripple Creek, a mine pump, 1,200 gal., 1,000-ft. lift; Iron-Silver Mining Company, Leadville, a pump, 500 gal., 900-ft. lift; Nisi Prius Mine, Leadville, a pump, 500 gal., 900-ft. lift; Gold King Mine, Cripple Creek, 500 gal. pump, 800-ft. lift; 6 electric station pumps for Old Mexico, and 1 electric pump for a coal mine in Colorado.

The Westinghouse Machine Company recently awarded contracts for the erection of its new foundry, to be erected at Trafford City, Pa., on the main line of the Pennsylvania Railroad. The foundry building will be 612 ft. long and 184 ft. wide, and will contain 3 cupolas with an annual capacity of 100,000,000 lbs. of castings. Adjoining the foundry will be a 3-story pattern shop 603 ft. long and 80 ft. wide. The two buildings will be on a 22-acre site and the floor space will cover about 5 acres. The steel required in the erection of the buildings, nearly 4,000 tons, will be furnished by the Cambria Steel Company. The contract for the erection of the buildings has been awarded to James Stewart & Co. The new foundry will concentrate the foundries now located in Pittsburg, Allegheny, Cleveland and East Pittsburg.

The capital stock of the Atlas engine works, of Indianapolis, Ind., which has been \$550,000—common stock, \$200,000, preferred stock, \$350,000—is now \$2,000,000, one-half of which is common and one-half preferred stock. The plant is to be increased to correspond with the increase of stock. The officers of the company will remain unchanged. They are: H. H. Hanna, president; Bement Lyman, treasurer; R. M. Coffin, secretary; H. H. Hanna, Jr., vice-president; M. R. Moore, superintendent; E. K. Marquis, assistant treasurer. The company was organized in 1878, when it took over the property of the Indianapolis Car and Machine Company, organized in 1872. The increase in business has made it necessary from time to time to add to the capacity of the plant. During the last year 6 new buildings, with a total floor space of 224,600 sq. ft., were erected. The average number of men employed throughout the year is now about 1,500.

TRADE CATALOGUES.

The Canton Pump Company, of Canton, Ohio, manufacturer of steam pumps and hydraulic machinery, issues a little 16-page pamphlet showing some of the standard designs of its pumping machinery. For mine use the company makes outside packed plunger pumps of compact design.

Advance sheet No. 15, issued by the Jeanesville Iron Works of Jeanesville, Pa., a 20-page pamphlet with a striking cover design, gives a lot of information about the design, capacity, weight and construction of Jeanesville mine pumps. The Trent Engineering and Machinery Company, of Salt Lake, Utah, is agent for these pumps.

The Atlantic Dynamite Company, of New Jersey, issues a neat 20-page pamphlet giving information about the proper methods of using giant powder, preparing charges, blasting, etc. The information is given concisely and particular stress is laid upon what not to do. The precautions necessary to insure safety in using dynamite are few, and this pamphlet emphasizes them.

A 32-page pamphlet on "Superheated Steam," issued by the Power Specialty Company, of New York City, discusses the economies of superheated steam and its various uses. The discussion contains concisely written and interesting information not ordinarily found in trade catalogues and gives facts about some carefully conducted tests. Incidentally, attention is called to the merits of the Foster superheater.

A pamphlet of 28 pages, issued by the Brazil foundry and machine shops, of Brazil, Ind., Crawford & Crimmin Company, proprietor, is entitled a "30th Annual Message." The Crawford & Crimmin Company succeeds the firm of Crawford & Crimmin, the incorporation being due, the pamphlet says, to a

STOREY COUNTY—COMSTOCK LODE.

Chollar Mining Company.—At the annual meeting in San Francisco, March 19, the following directors and officers were elected: H. B. Goodwin, president; Thomas Cole, vice-president; Herman Zadig, B. F. Shaw and George C. Sneider. Charles E. Elliott was re-elected secretary and H. M. Gorham, superintendent. An assessment of 5c. per share was levied.

NEW MEXICO.

GRANT COUNTY.

(From Our Special Correspondent.)

Faywood Lead Company.—This company, capitalized at \$100,000, has been organized under the laws of the State of Delaware, to operate a silver-lead mine near Faywood, a station on the Atchison, Topeka and Santa Fe road. The property is in the Cook's Peak District, and was formerly owned by J. N. Onstat, of Deming. The erection of a dry concentrating plant is contemplated, and a contract for that purpose has already been given the General Concentrating Company, of New York City.

OREGON.

MALHEUR COUNTY.

(From Our Special Correspondent.)

Mormon Basin District.—Three miles north of the Morning Star group is the Kidd and Tedrow Mines, now owned by Salt Lake and Baker City people, who bought this property last year. There are several mines, and at least 2 other stamp mills in this district, from 6 to 12 miles southwest of the Mormon Basin—the Red, White and Blue, Little Giant and Eagle, near Malheur City, and one 4 miles southwest of the Morning Star group. Eblin and Kytton are reported shipping good ore from their mine, not far from Bridgeport, some 10 miles northwest from the basin.

East of the Golden Eagle, 2 miles on the east slope of Pedro Mountain and extending about 2 miles up the mountain are several promising properties, among them the Bennett, the Bryan, the Reynolds, the Romeo and Juliet and the Lelia and Granite. The last 4 are mostly owned by Salt Lake men. Some of the others are owned by Baker City people. J. A. Platt is also interested. The Salt Lake men with Mr. Reynolds built a 3-stamp mill on South Dixie Creek last year, and also built a good wagon road from the Bryan, Lelia and Granite and Romeo and Juliet claims, to the mill. The Salt Lake men are running an 800 ft. tunnel on the Romeo and Juliet and on the Lelia.

This being a free gold district and the ores cheaply treated, it requires less capital to make a producing mine than in the base ore districts. There are 20 properties in this district now being worked at intervals. Five properties were sold last year and as many more are being negotiated for, but the surface cannot be properly examined before April, as a rule.

Atlantic.—This claim has a cross-cut tunnel about 35 ft. under cover just cutting the ledge sufficient to show 10 inches of good ore. The Atlantic is a westerly extension of the Morning Star claim.

California.—This group, on California Mountain, owned by W. E. King and associates, of Portland, Ore., consists of 3 claims. He has erected buildings and a new hoist, and has been stacking ore for 6 months past said to go from \$14 to \$57 in free gold, with concentrates running \$186 per ton. This property is about one mile southeast of the Morning Star group.

Golden Eagle.—This claim, north of the Morning Star, has a shaft 70 ft. deep and 100 ft. of tunnel, showing good values. J. D. Voss is owner. The ledge is on the contact between granite and slate.

May Flower.—This and the Rising Sun prospects adjoin the Morning Star group on the southwest. Next to the Rising Sun is the Eagle Head, with one tunnel in on the ledge over 100 ft.

PENNSYLVANIA.

ANTHRACITE COAL.

Representatives of the United Mine Workers at a convention at Shamokin adopted a number of resolutions, the more important being:

- To demand an 8-hour work-day.
- To demand recognition of mine committees for the adjustment of disputes.
- To oppose working with non-union men.
- To provide for the organization of all skilled mechanics in conformity with the decision of the American Federation of Labor Convention.
- To favor the arbitration of trade disputes.
- To favor colliery unions wherever practicable.
- To provide for the systematic examination of working cards.
- To oppose the contract system now in force at some collieries and to limit to two the number of laborers who may be employed by any one contractor.
- To request the Bureau of Mines and Mining to print not less than 25,000 copies of the mining laws for distribution among anthracite mine workers.
- To condemn the operators' system of blacklisting employees discharged by any one company.

The resolutions passed virtually amount to a demand for increased wages and direct recognition of the union. The National Civic Federation was invited to try to bring the operators and miners to an agreement. If the Civic Federation failed to effect a satisfactory adjustment prior to April 1, and if after that date negotiations are still pending, it was resolved that all anthracite mine workers, except those necessary to keep the mines in repair, will remain away from the mines, strippings, washers and breakers on Tuesdays, Thursdays and Saturdays of each week. Should a strike take place no settlement will be made in any separate district, and will not terminate until it has been officially declared ended by a convention representing the 3 anthracite districts.

The large producing companies were invited to send representatives to the convention, but none of them did so.

BITUMINOUS COAL.

Berwind-White Coal Mining Company.—Judge McPherson recently filed an opinion in the United States Circuit Court awarding \$86,586 damages to John C. Martin in his suit against this company for breach of a mining contract. Under the contract Martin leased to the company a seam of coal under a tract of land in Cambria County, with the right to mine, transport and sell, and the company agreed to mine and ship not less than 75,000 tons annually after the first year and to pay a royalty of 10c. for each ton of this quantity, whether mined or not, and for each ton mined and shipped in excess of such quantity. The contract was to run for 10 years from January 15, 1891. The coal company after running a few months reached a part of the seam in which the coal was so inferior as to be unmarketable and ceased to mine. Martin, with the company's consent, continued work, and after some months of work passed through this inferior section of the seam and came to marketable coal. The company refused to go on with the operation and did nothing more during the term of the lease.

Ella Coal Company.—This company, of Pittsburg, the new owner of the Pittsburg & Baltimore Coal Company properties south of Irwin, is making extensive improvements at Edna, the town where the shafts are situated. Twenty-five new houses are being erected, with as many more to follow. The most important work on hand is remodeling of the tipples so that 2,000 tons of coal may be loaded per day.

Oklahoma.—Harry McCreery has sold these coke works below Graceton to Joseph Horton, a Philadelphia iron and steel man. The consideration is \$140,000 and the sales includes 2,500 acres of surface, 520 acres of coal and other coal lands, acres of coal, tenant houses, ovens, etc. The Oklahoma Works were recently purchased by Mr. McCreery from the Farmers' Bank, John P. Elkin, A. P. Kirtland and others for \$35,000. The purchase of Mr. Horton includes the 24 ovens, washer, houses and land. Mr. Horton will spend about \$100,000 in improvements, increasing the number of ovens so as to make 300 tons of coke per day.

W. K. Niver Coal Company.—This company, of Baltimore, Md., recently purchased a tract of coal land near Berlin, Somerset County, from J. J. Hohlitzell, of Meyersdale, for \$24,531.

SLATE.

More than 1,000 men employed in the slate quarries in the Bangor District went on a strike March 20. They presented demands for a 9-hour day and the same wages they were receiving for 10 hours. The slaters asked for an increase of 10c. for each square. In the Pen Argyll District the same demand has been made, and the operators have until April 1 to reply. From present indications there will be a strike there also. Every quarry in the Bangor District closed.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Clara Belle.—The new shaft is approaching the ledge. It was started 80 ft. from the incline. Work has been stopped at the mill until it can be supplied with ore.

New York Mica Company.—Work continues and a shipment of mica is being prepared.

Wabash Mining Company.—The company recently purchased the Globe group of claims of Charles Harbach and Charles Haserodt, of Custer, the price being \$100,000 in 9 payments, the first having been made. The ground joins the original Wabash group. The shaft is over 200 ft. deep.

Willow Creek Company.—The annual meeting and election of officers is soon to occur and the matter of resuming work at the Lizzie Mine will be decided. The mine is a mile from Custer.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Alder Creek Company.—The last of the machinery for the 60-ton cyanide mill on Yellow Creek has ar-

rived and the plant will start the second week in April.

Bear Gulch Mining Company.—The annual election of officers occurs May 6. Work for the ensuing year will be laid out at the meeting.

Bee-Lode Mining Company.—The company's shaft is 100 ft. deep, and cross-cutting will begin at once.

Clover Leaf Mining Company.—The shaft is completed to the 500-ft. level and a drift is being run to the ledge. The stamp mill is being enlarged from 20 to 60 stamps, and 10 of the new stamps will be ready to run in a few days. The remaining 30 will be set up in a few weeks.

Columbus Consolidated Mining Company.—The Columbus Mine in Sawpit Gulch has been purchased of Harris Franklin, S. W. Allerton, Chris. Ruth, and William Lardner, by H. J. Mayham for a New York syndicate. In addition to the Columbus he bought the Dalton group of Gus Oberg, the Buckeye group of C. W. Carpenter, the Rossiter group of Rossiter Brothers, and a fraction of John Murray. The ground all lies immediately north of the Homestake, making 300 acres.

Deer Lick Mining Company.—A large body of \$12 cyaniding ore has been reported in a tunnel. The company has bonded 100 acres of ground lying to the north of the Deer Lick Group.

Hidden Fortune.—Thomas J. Steele has succeeded George M. Nix as manager. The Baltic tunnel is nearly 1,500 ft. long.

Spanish R.—Prospecting with a diamond drill has ceased and a drift is being driven from near the bottom of the shaft.

Spearfish.—W. H. Burrage, of Boston, Mass., and others have a bond on several hundred acres of mining ground at Ragged Top, taking in the Spearfish and Deadwood-Standard properties, with the cyanide plants. The bond runs for 90 days and 150 men have been hired to prospect.

Wasp No. 2.—The last semi-monthly clean-up at the 100-ton cyanide plant resulted in a \$7,250 bar.

UTAH.

(From Our Special Correspondent.)

Salt Lake Ore and Bullion Settlements.—For the week ending March 22 the ore and bullion settlements made by the banks are as follows: Ore, \$114,500; gold bullion, \$140,800; Germania bullion, \$169,800; auro-cyanides, \$11,300.

BEAVER COUNTY.

(From Our Special Correspondent.)

Frisco Shipments.—Shipments for the week ending March 22 are 12 cars from the Horn Silver.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—The following consignments were made in the week ending March 22: Yankee Consolidated, 12 cars; Lower Mammoth, 6 cars; Mammoth, 6 cars; Bullion-Beck, 4 cars; Star Consolidated, 1 car; Carisa, 9 cars; Swansea, 5 cars; South Swansea, 2 cars.

Fish Springs Shipments.—The Utah marketed for the week ending March 22 1 car ore.

Martha Washington.—Frank Morehouse has resigned as superintendent and P. H. Snell has been elected to fill the vacancy.

Swansea.—A fire at the 850-ft. station burned for 2 or 3 days, but advices state that it has been extinguished with little damage. The origin of the fire has not been ascertained.

Tesora.—It is stated that a strike of importance has been made in virgin ground.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—Ore shipments for the week ending March 22 are as follows: Ontario, 1,200,580 lbs.; Quincy, 1,242,930 lbs.; Daly-West, 1,369,310 lbs.; Anchor, 426,900 lbs.

Bonanza Consolidated.—A strike is reported of 18 in. of ore in the incline off the tunnel level.

D. & M.—Returns from samples are said to give 55.6 per cent lead, 12 oz. silver and \$10.74 in gold per ton. The old Weber Mill has been secured by this company, and it will be moved to the ground for handling the milling ores.

Daly-West vs. Quincy.—The retainers for the Daly-West, it is understood, in their contest with the Quincy are Prof. A. Palmer and A. F. Holden, with others to be added; while the Quincy has for its defense E. P. Jennings, W. H. Wilson and Col. Wall so far.

Daly-West.—Complaint has been filed at Coalville by W. M. Ferry alleging the wrongful extraction of ores from the Quincy property while he was leasing from October 16, 1895, to November 27, 1899.

Quincy.—A damage suit to the extent of \$2,000,000 has been filed at Coalville by this company against the

Daly-West for trespass. An injunction against the extraction of ores has been granted and has forced the Daly-West to cease taking out ore "within the limits of the disputed territory." It is claimed in the affidavit that the Daly-West is taking out \$5,000 worth of ore daily from the territory in dispute, which belongs to the Quincy by right of apex.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—The following cars were marketed during the week ending March 22: Ben Butler, concentrates 5 cars, ore 1 car; Rough Wrestler, ore 1 car; Tiewaukee, concentrates, 1 car.

Boston Consolidated.—It is understood the old Stewart Mill will be torn down and the site used for a tunnel to tap the property under the present workings.

Dalton & Lark.—It is understood the management has a plan for the erection of a concentrator and experiments are being made by J. D. Fleming.

Franklin Tunnel.—Three shifts are working to clear the tunnel for connection with the Silver Shield vein.

Highland Boy.—Shipments cast for the week ending March 22 are 3 cars of copper bullion. A shoot of ore is reported in a cross-cut from one of the upper workings into unexplored territory.

United States Mining Company.—Contract has been awarded to the Trenton Iron Company, of Trenton, N. J., for the construction of a bucket tramway from the mines to the railroad station in Bingham. The total length of the line is 17,600 ft.—over a mile longer than the tram of the Highland Boy. Construction is to begin at once and to be completed by July 1. Fred Lyon, of the company's staff, is to have general supervision. The capacity guaranteed is 50 tons an hour.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—The shipments for the week ending March 22 are: Ophir Hill, 18 cars of concentrates; Cygnet, 1 car of ore.

Mercur.—The affairs of the old Mercur Mining Company have now been practically wound up and the corporation is out of existence. The balance remaining in the treasury has been distributed. This balance of \$9,500 makes a total of \$1,491,500 in dividends paid by the old Mercur.

Midas.—Water tanks have been constructed at American Fork and will be sent to the mine. Manager Chandler claims there is nothing to interfere now with the property making a fine showing.

Sacramento.—Plans for the new mill have been accepted and the superintendent, G. W. Cockler, has gone to the property to begin work.

WASHINGTON COUNTY.

(From Our Special Correspondent.)

Dixie.—As soon as the new hoisting plant is installed the main shaft will be sunk to the lower levels.

VIRGINIA.

WISE COUNTY.

Judge H. C. McDowell, of the United States District Court, in the case of William Webber, John Haddow and others, organizers of the United Mine Workers, who were tried last week for contempt of court in interfering with receivers of the Virginia Iron, Coal and Coke Company in their operation of the Inman coal mines, in Wise County, and also for their disregard of an injunction restraining them from interfering with the operatives, found the defendants guilty and sentenced Webber and Haddow each to 6 months in jail, and the others to terms of from 1 to 2 months. Judge McDowell holds that the methods of the organizers in endeavoring to force operatives into the union by threats and intimidation were clearly illegal and that the defendants were guilty of a conspiracy.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

Princess Maud.—The vice president of the company has put a new superintendent in charge. A small force is preparing for work.

Roosevelt and Teddy.—These 2 claims, on Hard-scrabble Mountain, 1½ miles northeast of the Phil Sheridan Mine, are claimed to be on the same vein. A joint shaft, down 45 ft., will be sunk 20 ft. deeper and a drift run on the vein. The vein is 6 or 7 ft. wide.

WEST VIRGINIA.

A large tract of undeveloped coal lands, purchased recently at a cost of over \$2,000,000, is reported pooled by the Wabash Railroad interests and the West Virginia Central Railroad interests. The land lies in Gilmer, Braxton, and Lewis counties, and is along the proposed extension of the Little Kanawha Railroad. Half of this territory was purchased by Senator Elkins and the other half, it is said, by representatives of the Wabash interests, and the entire tract has been merged into one holding.

BARBOUR COUNTY.

Century Coal Company.—The directors of this company, which owns 10,000 acres of coal land, have decided to increase the capacity of their plant to 1,000,000 tons a year. The present output is 500,000 tons annually. The mines are located on the Baltimore & Ohio Railroad at Century, and at that place the company will erect 25 new dwellings for the miners. Benjamin Bissell has been chosen superintendent of the company, with headquarters at Baltimore. He succeeds Dr. Richard Gersell. Baltimore capital owns the mines, John K. Shaw being president and Major Alexander Shaw, Gen. John Gill, Nelson Perin, Simon Rosenberg and John K. Shaw directors.

FOREIGN MINING NEWS.

AFRICA.

RHODESIA.

The Chamber of Mines reports for January that at 8 operating mines there were 145 stamps at work. The total yield reported is: Mill, 13,970 oz.; tailings, 1,907 oz.; other sources, 78 oz.; total, 15,955 oz. crude. This is an increase of 5,258 oz., or 49.1 per cent. over January, 1901. The total yield this year was equal to 14,200 oz. fine gold, or \$293,514.

TRANSVAAL.

The total output of the Witwatersrand in February is reported as 81,405 oz. fine gold, or \$1,682,641. This makes for the two months ending February 28 a total of 151,745 oz., or \$3,136,569. Last year there was no production in January or February.

Bonanza, Limited.—Results for February, received by cablegram from Johannesburg, show 7,818 tons crushed. The gold saved was: From mill, 4,724 oz.; from cyanide and slimes works, 2,326 oz.; total, 7,050 oz. fine gold. The profit for the month was £20,500.

Crown Reef Gold Mining Company, Limited.—The working results for February were: Gold from mill, 3,559 oz.; from cyanide works, 1,760 oz.; from slimes works, 147 oz.; total, 5,466 oz. There were 9,638 tons milled. The total expenses were £12,871; the profits, £10,369; revenue per ton crushed was \$11.57; cost, \$6.41; profit, \$5.16.

Crown Deep, Limited.—This company reports the following results for February: Number of stamps working, 60; days working, 25½; tons crushed, 7,467. The yield in fine gold from mill was 1,933 oz.; sands and concentrates, 878 oz.; slimes, 226 oz.; total, 3,039 oz. The estimated profit for month was £3,000.

Goldenhuis Deep, Limited.—This company reports the following results for February: Number of stamps working, 120; days working, 27½; tons crushed, 15,100. The yield in fine gold from mill was 4,768 oz.; sands and concentrates, 1,865 oz.; slimes, 199 oz.; total, 6,833 oz. The estimated profit was £12,700.

Goldenhuis Estate and Gold Mining Company.—This company reports results for February as follows: Ore crushed (60 stamps), 7,659 tons. Obtained from mill, 1,856 oz.; from tailings by cyanide, 1,334 oz.; from slimes, 612 oz.; from by-products, 391 oz.; total, 4,193 oz. gold. The profit for the month was £7,150.

Glen Deep, Limited.—A cablegram has been received from the head office of the company at Johannesburg, intimating that the announcement of the actual restarting of the mill was premature, but that all preparations are being made for an early start.

Jumpers Deep, Limited.—This company reports the following results in February: Stamps working, 50; days working, 24; tons crushed, 6,504. The yield in fine gold from mill was 813 oz.; sands and concentrates, 737 oz.; slimes, 63 oz.; total, 1,614 oz. The estimated loss was £750, due to shortage of native labor, which necessitated the crushing of dump rock only; the plates have absorbed some gold, and only a portion of the tailings was treated.

Langlaagte Deep, Limited.—This company reports the following results for February: Stamps working, 60; days working, 26½; tons crushed, 8,336. The yield in fine gold from mill was 1,893 oz.; sands and concentrates, 1,261 oz.; slimes, 93 oz.; total, 3,248 oz. The estimated profit was £3,200.

Robinson Gold Mining Company, Limited.—This company reports results for February as follows: Sixty stamps working, crushed 7,312 tons. The yield from mill was 4,122 oz. fine gold; from tailings by cyanide, 1,968 oz.; total, 6,090 oz. The net profit was £17,000.

Rose Deep, Limited.—This company reports the following results for February: Stamps working, 70; days working, 27; tons crushed, 10,500. The yield in fine gold from mill was 2,712 oz.; sands and concentrates, 1,929 oz.; slimes, 210 oz.; total, 4,352 oz. The estimated profit was £6,600.

AUSTRALIA.

NEW SOUTH WALES.

The Mines Department reports the gold production of New South Wales in January at 46,235 oz. bullion, equal to 38,098 oz. fine gold. This compares with 17,655 oz. fine gold in January, 1901, showing an increase of 20,443 oz., or 115.8 per cent.

TASMANIA.

The total value of minerals exported in January was £118,286, against £90,684 in January, 1901; an increase of £18,602. The items of exports this year were: Blister copper, 802 tons; copper ore, 44 tons; gold, 3,892 oz.; gold ores, 25 tons; zinc ore, 104 tons; iron ore, 200 tons; silver ore, 961 tons; tin, 131 tons; tin ore, 2 tons; silver lead bullion, 207 tons.

VICTORIA.

The gold production of Victoria for the month of January is reported at 39,091 oz., against 51,145 oz. in January, 1901; a decrease of 12,054 oz., or 30.9 per cent, this year.

CANADA.

ONTARIO—RAINY RIVER DISTRICT.

(From Our Special Correspondent.)

Anglo-Canadian.—The lode on this property has been stripped for 1,000 ft., giving, it is said, an average value of from \$15 to \$20 per ton. The rich ore shoot on the surface appears to be between 500 and 600 ft. long. One shaft was sunk 30 ft. The vein is from 3 to 6 ft. wide.

Elizabeth.—This mine was thoroughly tested by the company's diamond drill, a Bullock, with a capacity of 600 ft. of 5/8-in core. About 2,000 ft. of drilling was done. The total lineal feet of underground work done since then is 650 ft. No. 2 shaft is down 250 ft., with levels at 60 ft. and 136 ft. The lode is from 4 to 7 ft. wide and carries values from \$5 to \$40 per ton. The average is said to be about \$16. The machinery comprises 2 boilers ½ duplex Rand compressor with capacity of 6 drills, Sturtevant fan and engine, double cylinder hoist. The compressor is running.

A new lode is reported discovered within 600 ft. of No. 2 shaft, but no test has been made of it. A timber dam, 60 by 16 ft., forming an artificial lake, brings the water within 200 ft. of the mill site.

MEXICO.

CHIHUAHUA.

(From Our Special Correspondent.)

Nuevo Austrial.—F. Gilpin, representing Colorado Springs capital, who last year purchased the La Pita Mine in the State of Jalisco, has closed for this mine in the Guanacevi District. Both properties were purchased from D. M. Shepard.

Restauradora.—This mine recently shipped 70 bars of silver. The total shipment contained, besides the silver, 233 oz. of gold. The consignment was to the Banco Nacional de Mexico.

San Pedros and San Jose.—These were among the first mines discovered in the 15th century, and have been producers in greater or less degree since that time. The properties were recently purchased by Wm. V. Pettit, of Philadelphia, Pa., from Bartolo Gutierrez, the cash payment being \$75,000, gold. The property joins the Adela, on which Mr. Pettit has recently encountered a 12 ft. vein of good ore. Machinery has been ordered for the construction of a 100-ton mill.

DURANGO.

Compania Minera de Penoles.—This Belgian concern, operating large copper mines in Mapimi, is to erect a new electric power station, which is to be equipped with machinery, etc., imported from the United States. Among the contracts recently placed is one for a 50-ton electric traveling crane, to be operated by a 105 h. p. motor, with Manning, Maxwell & Moore, of New York City. The crane will be built by the Shaw Electric Crane Company, of Muskegon, Mich.

(From Our Special Correspondent.)

Edward Parks has denounced 12 hectares of land to prospects for copper, lead, silver and gold, under the name of "Los Dos Amigos," in the Mapimi District.

Avino.—The new lixiviating equipment, purchased in the United States for the mines at Avino, is expected to arrive soon after the return of Charles Flynn, the manager. Mr. Flynn has been in London, Eng., for several months past.

NEW ZEALAND.

The Mines Department reports the exports of gold and silver for December and the year as below, in ounces:

	Gold.		Silver.	
	1900.	1901.	1900.	1901.
December	34,008	45,236	32,732	85,805
Year	371,993	455,559	326,457	562,598

The increase in gold was 83,566 oz., or 22.5 per cent; in silver, 236,141 oz., or 72.3 per cent. The gold exported in 1901 was equal to 412,921 oz. fine gold, or \$8,535,077.

MINING STOCKS.

(Complete quotations will be found on pages 467 and 468.)

New York. March 27.

Matters are again depressed by the unsettled condition of the copper share market. So far dividends have been cut in several instances, and it is possible that the postponement of the Amalgamated and Anaconda meetings means a further reduction in their annual rates. Both stocks sold this week at low prices, Amalgamated dropping to \$61 on Tuesday and Anaconda to \$28. This price for Anaconda is the lowest on record. Transactions in both Anaconda and Amalgamated were not very large, and were in the main to cover short interests, especially in Boston. On curb the copper stocks were not lively, though increased interest is shown in Greene Consolidated, of Mexico. This stock, after selling down to \$19, recovered to \$20 $\frac{1}{2}$. White Knob, of Idaho, is quiet, selling at \$22@22 $\frac{1}{4}$, and later down to \$21 $\frac{1}{4}$. British Columbia was weak, bringing only \$7 $\frac{1}{2}$ @\$8 $\frac{1}{2}$, while Montreal & Boston fluctuates between \$3 $\frac{1}{2}$ @\$3 $\frac{3}{4}$ on moderate dealings. Little is now doing in Union, of North Carolina, the quotation being pivoted at \$3 $\frac{1}{2}$.

Ontario Silver, Utah, fell to \$7.75 on sales, but later recovered to \$8. The fall in price is said to be due to the weakness in the silver market. On March 20 the company paid a 30c. dividend, amounting to \$45,000, and making a total up to date of \$14,782,000, which is a return on the capital stock of over 98 per cent. The stock is largely held in New York and Utah by people who bought for investment, so odd sales have little effect.

Standard Consolidated Gold, of California, made a sale at \$3.65. This stock is seldom offered, as the property yields dividends of 40c. per share or \$71,356. annually. Since the incorporation it has returned over twice its authorized capital stock of \$2,000,000. Further sales of Quicksilver common are reported at \$3 $\frac{1}{2}$ @\$4, and of the preferred at \$11.

The Colorado stocks are quiet, though many Eastern buying orders are reported to have been received by Western brokers. Elkton of Cripple Creek is unsteady at \$1.20, while Isabella has recovered to 28c. Mollie Gibson hangs around 13c., but few buyers are visible, as the company reported a profit last year of only \$5,246 after all expenses were met. The cash on hand on January 1, 1902, is given as \$54,599, which, if divided among the stockholders, would yield a little over 5c. per share. The price of Iron Silver of Leadville is up to 75c., yet the dealings are small, as holders anticipate continued dividend payments. The last was for 10c. per share in December, 1900.

The Comstocks are higher, though the assessments pending promise another reaction in prices. In the first quarter of the present year 17 companies levied assessments of 3 to 15c. per share, aggregating \$121,070. In the same time last year assessments were only \$97,112 by 11 companies.

The only sale at auction this week was \$50,000 first mortgage 5 per cent bonds of the Blue Ridge Mining Company at 24 $\frac{1}{2}$.

Boston. March 26.

(From Our Special Correspondent.)

Things are beginning to look a little brighter after a week of dullness in copper shares. Prices have mended but the market is what the traders make it. Speculation has been principally in the so-called Lawson group, consisting of Centennial, Arcadian, Trinity, Copper Range and Amalgamated. Apart from these Daly-West has risen \$5 to \$28, and the buying has been largely from Salt Lake City. The Dominion securities have also been in evidence, although speculation in them has tamed down materially. Dominion Coal has risen \$8.50 to \$122.50, while Dominion Iron & Steel has fallen \$3 to \$43.25.

Centennial after advancing from \$21.37 $\frac{1}{2}$ to \$25, received a chill on the announcement from Mr. Lawson that he is in no way interested in the affairs of the company. A consolidation of this and Arcadian was street gossip, which resulted in putting the price down from \$10.62 $\frac{1}{2}$ to \$9.12 $\frac{1}{4}$, after Mr. Lawson disclaimed knowledge of any such scheme. In this connection it is said that one of the principal holders of Arcadian in New York has succeeded in unloading about 10,000 shares in the advance from below \$5. Osceola touched \$58.50, but rallied to \$60 to-day, a net loss of \$1.50 during the week. Copper Range has advanced \$2.25 to \$48, and with any pronounced movement this stock is claimed to have merit.

Messrs. Toole & Fitzgerald claim to have more than enough Old Dominion proxies to oust the present management at the meeting next week.

The reduction in the Consolidated Mercur dividend from 50c. to 36c. per year had no effect on the stock, which holds just under \$2. Santa Fe mining, which was largely held by the late Leonard Lewisohn, broke to \$2.75 on light trading. American Zinc, Lead and Smelting recorded an advance from \$9.50 to \$12 on the improved price of zinc ore, but the market in this

stock is narrow. Trinity moved up \$1 to \$14.50. Reports are current that De La Mar and Lawson will jointly build a smelter and that ore from the Trinity and Bully Hill mines, making a nice fluxing ore, will result in a deal of some kind between these parties.

The Isle Royale Copper Company's report for the year ended December 31, 1901, shows a net loss of \$426,327. The directors state that the future of the mine depends primarily upon an increase in the amount of copper in the rock, which was but 11 $\frac{1}{4}$ pounds ingot per ton of rock stamped during 1901.

The reorganization committee of the Cochiti Gold Mining Company is Arthur W. Hale, J. T. Meader and D. M. Belcher, and they ask for deposits of stock until April 26.

Colorado Springs. March 20.

(From Our Special Correspondent.)

The market showed a pronounced improvement over a week ago. As it is, however, the improvement took place only during the last two days, the balance of the week being far from satisfactory. Several slumps were recorded the latter part of last week and the first of this, being principally in Elkton, Doctor-Jack Pot, Portland, Sunset-Eclipse and Calera. Little Puck was subjected to a bear raid in order to carry out the purposes of a certain coterie which is endeavoring to secure a control at as low a figure as possible.

The tide turned yesterday and higher prices of the last two days have stimulated trading so that the market closed this week with a general expansion of values and swelling of the volume of business. A consideration is that there is more home money going into Cripple Creek stocks at this time than there has been for perhaps 6 months past. This merely means that the small local investors are getting in early in the game, in anticipation of any advance which may occur in the next few months. There is not much outside money coming in as yet.

Elkton sold a week ago at \$1.19 $\frac{1}{2}$ @\$1.19 $\frac{1}{2}$, slumping violently on Saturday to \$1.15 and \$1.14. The break was occasioned by a professional turn, which was successful in shaking out some stock. On Monday the pressure was released and these shares sold rapidly from \$1.14@1.19 $\frac{1}{2}$, closing with sales \$1.19@1.18 $\frac{1}{4}$. The regular quarterly dividend of 4c. a share, amounting to \$100,000, was distributed to-day.

All eyes have been on Doctor-Jack Pot for the past two or three weeks in anticipation of the opening of the rich Doctor-Chief ore shoot in the 700-ft. level. This mine has been practically out of ore for three months and to-day it was unofficially announced on good authority that the ore had been recovered at a point 85 ft. beyond where it was expected it would be encountered according to the showing in the 600-ft. level. The stock advanced from 42 $\frac{1}{2}$ c., the low point of the week, registered last Monday, to 49 $\frac{1}{2}$ c., the high point, to-day. The stock weakened somewhat at the close, selling at 48 $\frac{3}{4}$ c.

The passing of the annual meeting of the Butterfly-Terrible Company in Denver this week did not strengthen these shares, which closed weak around 14 to-day. El Paso held steady from 53 to 54 $\frac{1}{2}$ c., during the week, with little interest being manifested. Lexington sold up during the week from 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ c., closing off at 8 $\frac{1}{4}$ c. The strength of these shares is accounted for by the fact that a number of lessees are making steady shipments from their several blocks of the company's ground on Gold Hill. Moon Anchor proved a disappointment and weakened to 15c., selling, however, during the week up to 19c. Calera slumped from 24 to 18c., and showed signs of manipulation from the inside. The close was made at 19 $\frac{1}{2}$ c. bid to-day. This is a Mexican mine, controlled in Denver. Sunset-Eclipse fell off from 11 $\frac{1}{4}$ to 9 $\frac{1}{4}$ c. during the week, recovering to 9 $\frac{1}{4}$ c. to-day. Portland stock sold from \$2.50 to \$2.37 during the week, strengthening considerably at the close.

Salt Lake City. March 22.

(From Our Special Correspondent.)

The general trend of the market for the week has been upward. With on or two exceptions all stocks have gained steadily, although the last half of the week did not show such gains as the first half. The most active on the board were Ajax, Carisa, Consolidated Mercur, Daly-West, May Day, Uncle Sam, Yankee Consolidated and California. Daly-West was re-enforced by the orders from friends in the East, and the price moved from \$19.20 to \$28.10 at the close, selling 6,031 shares. The shorts are less forward and are hammering fewer properties. The Yankee Consolidated's high point was Wednesday, \$2.70 $\frac{1}{2}$. May Day has been held steady at 36@39c. for the most sales. California moved up and down 12 points and Consolidated Mercur moved to \$1.91 $\frac{1}{2}$ from \$1.77 at the opening of the week.

San Francisco. March 22.

(From Our Special Correspondent.)

The market has been steady this week on moderate trading. There was some inquiry for the shares of those Comstock companies which are interested in the Brunswick Lode. Prices showed very little change.

Some prices noted are: Consolidated California & Virginia, \$1.25@1.30; Mexican, 32@33c.; Hale & Norcross, 28c.; Best & Belcher, 27c.; Yellow Jacket, 17c.; Sierra Nevada, 14c.; Potosi, 13c.; Chollar, 9@11c.

On the Producers' Oil Exchange business has been somewhat better, though buying orders were generally for small lots. The tone has been firm. Thirty-three sold for \$7.75; Peerless, \$6.50@6.75; Home, \$3.85; Sterling, \$1.20@1.25; Reed Crude, 34@35c.; Occidental, 19@20c.; Junction, 18c.; Lion, 7@8c. Lion, Reed Crude and Peerless were largely dealt in.

London. March 14.

(From Our Special Correspondent.)

The South African mining market has been very depressed all week, and prices have fallen back. The reverse of Lord Methuen's force has had a worse effect on the market than has been experienced since the early days of the war, and a feeling of pessimism with regard to the immediate future has prevailed.

The Whitaker Wright group has once more been before the public this week. This time the news is very favorable, for it is to the effect that the London & Globe's interest with "tube" railway from Baker street to Waterloo has been disposed of to Mr. Yerkes for a sum of £360,000. Of this sum, some £200,000 has to be paid to secured creditors, while the remainder is free for distribution among shareholders. The scheme of reconstruction of the Standard Exploration Company, to which I referred last week, has been carried by a narrow majority of votes, and there is a good deal of dissatisfaction among the minority. Their opinion is that none of the properties are of any value, and that it is foolish to throw money away on them. On the other hand, it is urged that though the properties were failures under Whitaker Wright management, it does not follow that they may not be made to pay eventually. It is likely that a great many shareholders will not respond to the assessment, and that much less capital will be raised by the reconstruction than was reckoned on. A week or two ago I mentioned that the directors of the Kootenay Mining

DIVIDENDS.

Name of Company.	Latest Dividend		Total	Total to Date.
	Date.	Per Share.		
Am. I. & S. pf.	Apr. 1	.62 $\frac{1}{2}$	37,500	375,000
Arizona Copper, pf.	Apr. 1	17.50	55,834	...
Am. Sm. & Ref. pf.	Apr. 8	1.75	875,000	7,141,553
Bald Butte, Mont.	Apr. 10	.06	15,000	1,177,148
Bartolome de Medina, Mex.	Mar. 31	.65 $\frac{1}{4}$	1,305	47,610
Bunker Hill & Sull.	Apr. 4	.07	21,000	1,369,000
Central Coal & Coke, com.	Apr. 15	1.00	15,000	90,000
Central Coal & Coke, pf.	Apr. 15	1.25	18,750	656,250
Central Lead, Mo.	Apr. 15	.50	5,000	285,000
Colo. City, Mg. & Leas, Colo.	Mar. 10	2.50	65,000	65,000
Colo. Fuel & Iron com.	Apr. 15	1.75	402,500	1,642,500
Con. Mercur, Utah.	Apr. 7	.03	30,000	240,000
Consolidated, Colo.	Mar. 25	.01	19,000	380,000
Daly West, Utah.	Apr. 10	.40	60,000	1,487,500
Doe Run Lead, Mo.	Apr. 15	1.50	15,000	507,072
Dominion I. & S., pf.	Apr. 7	3.50	175,000	350,000
Federal Chem., pf.	Apr. 1	1.50	22,500	45,000
Gen'l Chem., pf.	Apr. 1	1.50	141,240	1,556,343
Gwin, Cal.	Mar. 18	.20	20,000	306,500
Guadalupe, Mex.	Mar. 20	1.30	13,000	3,412,650
Houston Oil, pf., Tex.	Mar. 15	3.00	225,000	225,000
Iowa, Colo.	Apr. 15	.01	16,667	236,835
La Fortuna, Ariz.	Apr. 9	.05	32,500	1,738,825
Mong. River C. & C. pf.	Apr. 15	1.75	347,165	1,738,825
Napa Quicksilver, Cal.	Apr. 1	1.10	10,000	1,100,000
Natividad, Mex.	Mar. 25	1.73	4,152	123,276
New Idria Quicksilver, Cal.	Apr. 1	.20	20,000	350,000
Pacific Coast Borax.	Mar. 29	1.00	19,000	1,046,500
Penn. Salt.	Apr. 15	3.00	150,000	13,000,000
Penoles, Mex.	Mar. 31	21.63	54,063	1,514,988
Providence, Mex.	Mar. 18	.87	5,190	115,890
Quincy, Utah.	Apr. 15	1.00	125,000	1,225,000
Republic I. & S. pf.	Apr. 1	1.75	355,371	8,909,080
Rocco-Homestake, Nev.	Apr. 10	.01 $\frac{1}{2}$	4,500	72,000
San Carlos, Minillas, Mex.	Mar. 20	4.33	10,813	245,142
San Francisco, Mex.	Mar. 31	.87	5,190	249,830
Silver King, Utah.	Apr. 10	.66 $\frac{1}{2}$	100,000	5,150,000
Sloss-Sheffield St. & I. pf.	Apr. 1	1.75	117,250	1,042,250
Sta. Maria de Guad.	Apr. 10	4.35	10,875	325,625
United Zinc pf.	Apr. 15	.50	7,499	75,667
U. S. Red & Ref., pf.	Apr. 1	1.50	58,850	117,700
U. S. Red & Ref., com.	Apr. 1	1.00	60,000	60,000
Va-Car. Chem., pf.	Apr. 15	2.00	240,000	5,580,000
Westmoreland Coal.	Apr. 15	1.50	375,000	7,125,000
Wolverine, Mich.	Apr. 1	2.00	120,000	871,000
Yankee Con., Utah.	Apr. 1	.05	25,000	75,000

ASSESSMENTS.

Name of Company.	Loca- tion. No.	Deltaq.	Sale.	Amt.
Ajax	Utah 3	Mar. 20	Apr. 5	.05
Belcher	Nev. 4	Apr. 4	Apr. 29	.05
Ben Butler	Utah 8	Mar. 31	Apr. 19	.05
Brunswick Con.	Cal. 3	Apr. 3	Apr. 19	.03
Canton Placer.	Cal. 2	Apr. 23	Apr. 23	.01
Central	Cal. 1	Apr. 1	Apr. 1	.03
Central Point	Nev. 1	Apr. 9	Apr. 9	.05
Eureka Con. Drift.	Cal. 34	Mar. 31	Apr. 31	.00 $\frac{1}{2}$
Int'l Copper.	Utah 1	Apr. 5	Apr. 30	.00 $\frac{1}{2}$
Larkin	Cal. 1	Apr. 12	Apr. 12	.02
Little Standard Oil.	Cal. 3	Apr. 12	May 12	.10
Martha Washington.	Utah 2	Mar. 25	Apr. 15	.01
Mexican	Nev. 70	Mar. 25	Apr. 15	.10
Overman	Nev. 1	Apr. 4	Apr. 29	.10
Potosi	Nev. 62	Apr. 16	May 7	.05
Savage	Nev. 1	Apr. 12	May 6	.10
Sierra Nevada	Nev. 1	Mar. 25	Apr. 15	.10
Silver King	Ariz. 23	Mar. 11	Apr. 8	.03
Spence Mineral.	Cal. 1	Mar. 31	Apr. 1	.10
Tanana	Cal. 5	Apr. 7	Apr. 29	.01
Tetro	Utah 82	Apr. 1	Apr. 26	.01
Willetta	Cal. 4	Mar. 5	Apr. 7	.01
Yuba Con.	Cal. 6	Mar. 24	Apr. 14	.03

and the Rossland Great Western companies had intimated their willingness to resign owing to the shareholders expressing a wish that all the old Whitaker Wright nominees should withdraw from management. It now appears that the shareholders who carried on the agitation against the board are not anywhere near so numerous as was supposed, so the directors have reconsidered their decision to retire. There will probably be renewed bickerings over the subject, and in the meantime the position at the mines will not improve. The £5 shares of the Kootenay Company are quoted at less than 10s., and the Rossland Great Westerns are not much higher.

The demand for shares in the Great Boulder Perseverance is one of the features of the West Australian market. This is one of the Hannan's District mines that has never had a slump, and under the direction of Mr. Frank Gardner has been placed on a sound footing. The sulphide problem caused much difficulty and large sums of money were spent on the plant. But as the mine is of great richness it has survived these troubles.

After having gone through a period of weakness recently the shares of the Rio Tinto Company have strengthened slightly on the dividend announcement for 1901. The rate of distribution on the ordinary shares is 72½ per cent for the year, as compared with 85 per cent in the year previous, and 80 per cent in 1899. The amount placed to reserve is rather less this year, being £40,000, instead of £60,000. The total reserve now stands at £400,000. The market expected a lower rate of dividend, so was agreeably surprised when the figures were published. As speculators are utterly at sea with regard to the doings and intentions of the Amalgamated Copper Company, there is very little safe ground for speculation in any of the English copper shares. What speculation there is comes from France.

COAL TRADE REVIEW.

New York. March 28.

ANTHRACITE.

The probability of a general strike at the anthracite mines is the matter of most interest this week. The resolutions passed at the Shamokin convention by representatives of the United Mine Workers were of a character that the great producing companies would not care to grant. In fact, if the convention had decided that the officials of the mine workers should make a determined stand for the demands, a strike would have been inevitable. As it is, the published statements of Mr. Mitchell show a conciliatory attitude and lead to the suspicion that the convention's resolutions asked a great deal more than the most sanguine delegate present really expected to get. The National Civic Federation, at Mr. Mitchell's request, is now acting as intermediary between the operators and the miners and everything indicates that the danger of a general strike is not great. In fact, some people in the trade hint that there are political motives back of the passage of the resolutions at Shamokin and the calling in of the Civic Federation. Be this as it may, a long drawn strike would seriously affect miners, operators and the public, and a peaceful settlement of points in dispute is to be desired on all accounts.

Trade in all territories, pending the settlement of the threatened labor disturbances, is not especially active. Some consumers, particularly those along the seaboard using steam sizes, have been ordering in excess of present needs in fear of a strike. Most large dealers, however, are not buying more coal than is necessary, feeling that as soon as the labor outlook clears the companies will give notice of a reduction of prices to spring buyers.

In the Northwest with the opening of Lake navigation probably but 2 weeks away the demand for coal continues fairly active. The supplies on dock at the opening of navigation will be small. In Chicago territory trade is quiet. There will be a considerable tonnage on the docks when navigation opens. Arrivals of all-rail coal are light, but owing to the reduced demand there is no shortage. Along the lower lakes and in Canadian territory the market is pretty firm. Little coal is arriving, but enough for all needs. In the line trade farther East and along the Atlantic seaboard trade is rather quiet. The uncertainty over the labor situation is the only disturbing factor. If, as is anticipated, a reduction of 50c. per ton is made, as soon as it is certain that there will be no strike, there will no doubt be a repetition of the lively ordering of last spring. A year's experience has shown dealers that they have nothing to gain by delaying orders and that the anthracite trade is no longer what it was before Mr. Morgan's strong hands took control.

BITUMINOUS.

There continues to be a heavy demand in the Atlantic seaboard bituminous trade, while the available

supply is short. The railroads show little or no improvement in car supply, but promise an improvement before long. Transportation from the mines to tidewater has improved, however, and the railroads are giving better service than in several months. Cars are no longer 2 or 3 weeks in getting through. But for coal coming through quickly, prices at tidewater would undoubtedly be higher. As to improved car supply at the mines, the indications are that the railroads lack locomotives as well as cars to handle all the tonnage they might have. Producers are closing contracts right along for the coming year, but as a rule are acting cautiously, not caring to contract for as large amounts as last year from a fear that they may not be able to fill them with car supply so uncertain. In many cases customers of some years' standing find it impossible to close as large contracts as they desire.

In the far East coal is scarce, and, except for fairly liberal shipments from Norfolk and Newport News, the situation would be much worse, as stocks generally are low. Along Long Island Sound consumers are putting in any grade of coal they can secure, whether they have been using the better grades or not. Trade at New York Harbor points is a little better off on account of the fall in prices from coal coming through to tidewater quickly. The all-rail trade is in a bad way, nearly all consumers are short of coal and tracers are put on nearly every car shipped from the mines.

Transportation from the mines to tidewater is now so good that some coal is coming through in 3 or 4 days. Car supply at the collieries continues variable, ranging from 25 to 50 per cent. In the coastwise vessel market vessels are in good supply, but in light demand. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 75c.; Boston, Salem and Portland, 85c.; Portsmouth, 90c. Clearfield coal is selling at about \$2.65@2.70, f. o. b. New York Harbor shipping ports.

Birmingham. March 24.

(From Our Special Correspondent.)

There is no change in the coal demand in this State and the mines are in full operation. There is a larger production right now than ever before in the State, and further development is being pushed. The railroads are still a little slow in furnishing all the cars with which to handle the product that is desired. The weather has become somewhat warmer, signs of spring being noticeable, but the demand for coal has not ceased. Prices are stationary.

The Ensley Southern Railroad, a branch of the Southern Railway, extending from Ensley to Parrish, Ala., a distance of 35 miles, is about completed, and preparations are being made to open a number of new coal mines along the road.

Chicago. March 25.

(From Our Special Correspondent.)

For the first time in many months, wholesalers say there is a plentiful supply of anthracite and bituminous coal of all grades, in and about Chicago. This is attributed to a combination of better railroad conditions and to the mild weather succeeding the brief cold spell of a week ago, causing increased receipts and decreased demand. Some dealers even say that there is too much of certain grades of bituminous, Hocking, for example, which has been scarce for months, but prices show no effect of the plentifulness. Hocking remains at \$3.25 and other grades at the prices quoted last week: Indiana block, \$2.75; Indiana semi-block, \$2.50; Clinton lump, \$2.25; West Virginia splint, \$3.50; Youghiogheny lump, \$3.40; blacksmith's coal, \$3.50; smokeless egg, \$4; smokeless mine run, \$3.50; smokeless lump, \$3.90; Illinois mine run, \$1.75@2. Reports that navigation will begin at an unusually early date, on the great lakes, are taken with a large grain of salt by the coal trade, which is still counting upon about May 1 as the time when lake traffic will begin. Vessel-men profess to believe that there will be little business done on the lakes before April 15. The opening of lake navigation alone will apparently relieve the scarcity of coal in the northwest.

Anthracite remains firm at \$6, with no prospect of an immediate change and the usual lessening of demand due to spring weather, beginning to make itself felt.

Pittsburg. March 26.

(From Our Special Correspondent.)

Coal.—Every mine in the Pittsburg District, both river and rail, is in full operation this week and indications point to a steady run. Trade is improving and the car supply is better. No change in prices has been made, but it is likely that a meeting of the leading producers will be held this week and prices arranged for the season. It is believed that an advance will be ordered, but no definite information on the subject has been given out. There are many reports to the effect that prices are to be increased but all

lack confirmation. The Monongahela River Consolidate Coal and Coke Company had an unusually successful run on the last rise and all the coal loaded got out. Many empty coal boats and barges were returned and there are a sufficient number in the pools to warrant a steady operation of all the river coal mines for several months.

Connellsville Coke.—There was a better movement of coke last week than for several months, the railroads putting more cars in the coke regions. The production shows a slight improvement over former weeks in this month. Prices so far remain unchanged although an advance is expected for delivery after July 1. Furnace coke is still quoted at \$2.25 and foundry at \$2.75@3. The last issue of the *Courier* gives the production for the previous week at 215,067 tons. The shipments for the week aggregated 10,658 cars, distributed as follows: To Pittsburg and river points, 2,758 cars; to points west of Pittsburg, 6,072 cars; to points east of Connellsville, 1,828 cars. This was an increase of 1,420 cars compared with the shipments of the previous week.

San Francisco. March 22.

(From Our Special Correspondent.)

There have been several arrivals of cargoes from Australia, and prices are lower. Ocean rates are very low, charters having been taken under 10s. (\$2.40) per ton from New Castle, N. S. W., to San Francisco.

Yard prices of coast coals to dealers are quoted as follows: Coos Bay, \$5.50; Seattle, \$6.50; Roslyn, \$7.50; Wellington, \$9. Prices for Rocky Mountain coals are: Castle Gate, Clear Creek or Rock Springs, \$8.50; Colorado anthracite, \$14.

Cargo lots of Eastern and British coals are quoted as follows: Pennsylvania anthracite, \$14; Cumberland, \$12; Welsh anthracite, \$12; cannel, \$9; Welsh steam coal, \$7.50@8.

Foreign Coal Trade.

March 27.

Export trade here continues quiet. No more anthracite is going to Germany at present, and it is said that the former shipments have not been well received, the German stoves, etc., not being well adapted to the coal.

Coal exports from Great Britain for the two months ending February-28 are reported as follows in long tons:

	1901.	1902.	Changes.
Coal	5,716,493	5,937,729	I. 221,236
Coke	108,316	96,313	D. 12,003
Briquettes	153,399	165,095	I. 11,696
Total	5,978,208	6,199,137	I. 220,929

In addition there were 2,300,375 tons of coal sent abroad for the use of steamers engaged in foreign trade, against 1,952,692 tons in the corresponding period last year.

Imports and exports of coal in Germany for the month of January were reported as follows, in metric tons:

	Imports		Exports.	
	1901.	1902.	1901.	1902.
Coal	346,469	348,680	1,196,153	1,186,077
Brown coal	643,081	492,330	2,659	1,243
Coke	37,010	32,224	197,730	154,740
Total	1,026,560	873,234	1,396,452	1,342,060

Imports of coal and coke were chiefly from Great Britain; those of brown coal were all from Austria.

Messrs. Jackson Brothers, of Valparaiso, report as below the imports of coal into Chile for the six months from July 1 to December 31, in long tons:

	1900.		1901.		Changes.
	1900.	1901.	1901.	1902.	
Steam Coal:					
English	127,720	220,571	I. 92,851		
Australian	233,887	181,706	D. 52,181		
American	21,300	12,750	D. 8,550		
Total	382,907	415,027	I. 32,120		
Smelting Coal:					
English	11,958	18,789	I. 6,831		
Australian	34,030	32,842	D. 1,188		
Total	45,988	51,631	I. 5,643		
Total	428,895	466,658	I. 37,763		

The proportion of American coal, it will be seen, was very small.

Under date of February 18, 1902, United States Consul Freeman, of Copenhagen, informs the State Department of the arrival at that place of a vessel with the first cargo of American coal ever shipped to Denmark—the *Freya*, with 6,000 tons, consigned to the Copenhagen Gas Company. The Dominion Coal Company, of Canada, is also making efforts to enter Scandinavian markets, and the consul says that its local agents have just closed a contract for the delivery next month of a cargo to the city gas works. Swedish State railways have made a trial of Canadian steam coal, and an effort will be made to secure a similar test by the railroads of Denmark. The consul adds that the principal obstacle in the way of selling trans-Atlantic coal in Denmark has been high prices. The local

agents for United States coal are Messrs. M. & G. Melchoir.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of March 14 that the tone of the Welsh coal market is steady and prices remain very firm for all descriptions of coal. Quotations are: Best Welsh steam coal, \$3.60@3.72; seconds, \$3.60; thirds, \$3.48; dry coals, \$3.24; best Monmouthshire, \$3.30@3.42; seconds, \$3.18; best small steam coal, \$2.22; seconds, \$1.92; other sorts, \$1.68.

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

The freight market is quiet, with but little business doing at recent rates. Some rates quoted from Cardiff are: Algiers, \$1.30; Marseilles, \$1.40; Genoa, \$1.44; Naples, \$1.38; Singapore, \$2.52; Las Palmas, \$1.56; St. Vincent, \$1.74; Rio Janeiro, \$3; Buenos Aires, \$2.76.

IRON TRADE REVIEW.

New York. March 27.

In all quarters business continues extremely active. Some further demand for foundry iron has appeared and considerable sales are reported from different quarters. On the other hand, it is said that there has been some reselling by parties who had contracted for more than they are likely to need. Quite possibly we may see more of this. Some contracts have been closed which run into the first quarter of 1903.

In finished material the chief call has been for structural material, bars and plates. Builders are finding some difficulty in placing orders for the work of the coming season. The advance in prices of bars is referred to elsewhere.

The tendency of the larger interests is still to keep prices steady, and several moves looking to increases in quotations have been unsuccessful.

There were imported at New York this week from Sydney, Cape Breton, 3,128 tons of pig iron and 1,050 tons steel billets.

Birmingham. March 24.

(From Our Special Correspondent.)

The demand for pig iron in Alabama is still very brisk. A report which was put in circulation via New York, to the effect that iron manufacturers would hold a meeting in Birmingham and decide on an advance of \$2 per ton on all grades, did not come true; no meeting took place, according to statements made by manufacturers. However, the demand is strong enough to admit of an advance from 50c. to \$1 on the ton. The production is holding up well, and preparations are being made to increase the volume of iron in the State, three furnaces being slated to go into operation next month, two belonging to the Sloss-Sheffield Steel and Iron Company, and one the property of the Republic Iron and Steel Company. Purchasers are still making the offer of \$1 premium on the ton in order to get the product on anything like immediate delivery for No. 2 foundry.

There are but few furnaces in this State now which are not in blast. The little Mary Pratt furnace, belonging to the Alabama Consolidated Coal and Iron Company, located in this city, will soon be dismantled. The machinery will be used at another furnace belonging to this company. The shipments of pig iron from this section are heavy. The railroads are now able to furnish more cars than heretofore.

The following prices are given, not including the premiums of \$1 and \$2 per ton for immediate delivery: No. 1 foundry, \$12.50; No. 2 foundry, \$12; No. 3 foundry, \$11.50; No. 4 foundry, \$11; gray forge, \$10.50@10.75; No. 1 soft, \$12.50; No. 2 soft, \$12.

There is no hesitation in the demand for finished iron and steel, and heavy shipments are to be noticed in this district. The steel plant at Ensley, belonging to the Tennessee Coal, Iron and Railroad Company, is working nicely and the production is better than usual. The rolling mills in this district have many orders still on hand, and all departments are now on double turn with more men than ever before. Mr. John D. Dwyer, formerly superintendent of the Birmingham rolling mills, is forming a company to construct large rolling mills in this district. He expects to be at actual work on the plant very soon. It will make structural iron and steel.

Buffalo. March 26.

(Special Report of Rogers, Brown & Co.)

The fact that so many furnaces have been obliged to entirely withdraw from the market on account of

the sold-up condition of their order books has caused an embarrassing situation to confront belated buyers who have not fully covered for their requirements. This inability to obtain the iron necessary for their work has resulted in considerable loss to many foundries, owing to their having been obliged to radically change their mixtures. Southern iron is practically all that is being offered in this vicinity at the present time for delivery during the balance of the year. There is no let-up in the heavy demands on furnaces for shipments on existing contracts. The following quotations, on the cash basis f. o. b. cars Buffalo, may be considered a fair average of prices being asked for the available tonnage: No. 1 strong foundry coke iron, Lake Superior ore, \$19; No. 2, \$18.50; Southern soft No. 1, \$18.75; No. 2, \$18.25; Lake Superior charcoal, \$20.50.

Chicago. March 25.

(From Our Special Correspondent.)

Sales of pig iron output for the last half of the year continue active, despite the fact that Southern iron has soared in price until it is claimed that sales are now being made for soft and foundry at \$19.50, though nominal quotations remain at \$16.15 for No. 1 and \$15.65 for No. 2. The eagerness of buyers will apparently cause Northern iron to advance also, for there is little in sight, at any price. To-day Northern No. 1 and No. 2 are quoted at the same prices as last week: \$18.50@19 and \$18@18.50, respectively. Men conversant with the trade look for continued crowding of the furnaces up to their limit and for little relief from the congested condition of the railroads, for many months. The opening of lake navigation, which will occur between April 1 and 15, will, it is said, not affect the condition of things to any extent. It can hardly affect the principal source of complaint among producers of pig iron, the inability to get coke. The situation in this respect is only slightly if at all improved; there is hardly any product of the Connellsville ovens coming westward; nearly all the coke being used is from West Virginia. For spot coke the price continues at \$5.50@8; for delivery in the last half of the year \$5@5.50 is being asked. There does not appear to be much trading in future coke, the general opinion being apparently that the price will come down rather than advance.

Pittsburg. March 26.

(From Our Special Correspondent.)

An advance of \$2 a ton has been ordered by the Western bar iron interests which will go into effect on April 1. This increases the price to 1.80c., Pittsburg, with freight added to point of delivery. As noted last week this rate was decided upon by the Eastern bar iron manufacturers and has just been met by the largest producers, the United States Steel Corporation and the Republic Iron and Steel Company. Some of the independent concerns have been selling at higher prices for several weeks. The tonnage in iron bars has been unusually heavy during the past month and several mills are sold up to July 1 at 1.70c. It is now probable that the price of steel bars will be advanced an additional \$2 a ton before the recent raise made becomes effective on April 1, in order to maintain the differential of 0.10c. with iron bars. A number of large lots of steel bars have been contracted for at the present quotations and some heavy orders are likely to be placed in anticipation of the probable advance. The chain interests of the country met here during the week and advanced prices \$3 a ton on account of the increased cost of steel bars. A still further advance will be ordered when an additional \$2 a ton is put on bars. It is reliably reported that the chain manufacturing concerns are forming a combination which will include 17 of the most important companies in the United States. The report, however, is denied by a representative of the leading interests and no official confirmation of the project was obtained.

The pig iron market is more active this week, particularly in foundry iron, and sales into the first quarter of next year at \$19, Pittsburg, are reported. Several thousand tons have been sold at that price for delivery this year and some sales for prompt shipment have been made at \$1 a ton higher. Bessemer pig iron has sold at \$17.50, Valley furnaces and gray forge is held at \$18, Pittsburg. All the furnaces are now turning out the full capacity, there being no curtailment of production on account of shortage of coke supply, transportation facilities having greatly improved. The blast furnace employees' organization has not yet made the expected demand decided upon last month for three turns instead of two turns without any reduction in pay. No official notice has been given to the furnacemen. It is believed the demand will be made on April 1 to go into effect on May 1. Furnace owners say it will be impossible to concede the terms proposed but do not anticipate any serious trouble in arriving at a settlement.

Meetings of the wire and cut nail interests are scheduled to be held to-morrow, the former in Chicago and the latter probably in New York. It is understood that an advance is to be ordered on wire and wire nails of \$1 a ton. Nails are to be increased from \$2.05 to \$2.10 in car-load lots. The cut nail manufacturers likely will advance prices from \$2 to \$2.05 a keg.

Pig Iron.—Sales of bessemer pig iron were made this week aggregating from 8,000 to 10,000 tons at prices ranging from \$17 to \$17.50, Valley furnaces, the latter price being for delivery this side of July 1. Basic iron is quoted at \$16.50@17, Valley furnaces. Gray forge has again advanced, one lot of 1,500 tons being sold at \$18, Pittsburg. The demand for foundry iron is increasing and sales have been made into the first quarter of 1903 at \$19, Pittsburg, for No. 2. Several thousand tons were sold, some bringing as high as \$20, Pittsburg, for prompt delivery.

Steel.—Several small lots of bessemer steel billets, amounting to about 500 tons, were sold at \$31, at mill. Steel bars are in heavy demand and while the new price of 1.60c. does not become official until April 1, but little has been sold at the old price. A further advance of \$2 a ton seems likely. Large premiums continue to be paid for structural material. There is no change in the price of plates and tank plate is still quoted at 1.60c.

Sheets.—The market for the heavier gauges is unusually strong and lighter gauges are a trifle weaker. No. 28 gauge is firmer this week and is quoted at 3.10@3.15c. Galvanized sheets are 70, 10 and 5 per cent off in car-load lots and 70 and 10 per cent off in less than car-load lots.

Ferro-manganese.—There is no change in prices, 80 per cent domestic still being quoted at \$52.50.

New York. March 28.

Pig Iron.—There is no change in conditions except that spot iron is increasingly hard to get. Prices below on Northern irons are for delivery in July and later. We quote for tidewater delivery: No. 1X foundry, \$19.25@19.50; No. 2X, \$18.25@18.75; No. 2 plain, \$18@18.50; gray forge, \$17@17.50. For Southern iron on dock, New York, No. 1 foundry, \$16.25@16.75; No. 2, \$15.75@16.50; No. 3, \$15.25@15.75; No. 4, \$14.75@15.25; No. 1 soft, \$16.50@16.75; No. 2, \$15.75@16.25.

Bar Iron and Steel.—The market is firm at the recent advance. We quote 1.70c. for common bars in large lots on dock; refined bars, 1.83c.; soft steel bars, 1.83c.

Plates.—Demand is strong and the market firm. Another Eastern concern is reported to have advanced prices \$2 per ton. We quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier, 1.78@1.80c.; flange, 1.88@1.90c.; marine, 1.98@2c.; universal, 1.78@1.80c.

Steel Rails.—The market is quiet with prices firm. Standard sections are still quoted at \$28 at Eastern mills; light rails at \$30@33, according to weight.

Structural Material.—Anything like prompt delivery commands a good premium. We hear of 2.50@2.75c. being paid for spot beams in small lots. We quote for large lots at tidewater as follows: Beams, 1.80@1.95c.; tees, 1.85c.; angles, 1.80c.

CHEMICALS AND MINERALS

New York. March 27.

Heavy Chemicals.—Contract deliveries continue to improve. Some new forward orders have been taken, but the quantity is not large. Business in domestic high-test alkali continues to be done at 80@85c. per 100 lbs. f. o. b. works for prompt shipment, and 75@77½c. for next year's delivery. Foreign alkali is quiet at 90@92½c. per 100 lbs. in New York. Domestic high-test caustic soda for shipment is in better demand at \$1.90 per 100 lbs. f. o. b. works, while prompt orders are taken at \$1.95 up, according to seller. More export inquiry is noted for bicarb. soda, and prices are \$1 per 100 lbs. f. o. b. works for ordinary, and \$3 up for the better grades. Sal soda for spring delivery meets with ready sale at 55c. per 100 lbs. f. o. b. works. Bleaching powder is quiet, selling on spot at \$1.70 up per 100 lbs., according to make and seller, while new contracts are being booked at \$1.75@1.80 Chlorate of potash shows little doing, crystals being quoted at \$8@8½ per 100 lbs., and powdered at \$8¼@8½. On new contracts domestic makers still ask \$7¼ per 100 lbs. f. o. b. works.

Acids.—Market shows freer movement on contracts, but it cannot be said that trade is active. Blue vitriol exhibits more interest in export circles. Ex-

ports from Great Britain in February were 4,160 long tons, against 3,517 tons in the same month last year; showing an increase of 643 tons. The value this year, however, has been lowered owing to the cut in the market price of the metal. In February, 1901, the copper sulphate averaged \$119.90 per ton, while in 1902 it was only \$99.75, showing a falling off of about \$20 per ton this year.

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

Acetic, com'l 28%.....\$1.80	Oxalic, com'l.....\$4.75@5.00
Blue Vitriol.....4.37½@4.50	Sulphuric, 50 deg., bulk
Muriatic, 18 deg.....1.50	.....14.00@16.00
Muriatic, 20 deg.....1.62½	Sulphuric, 60 deg.....1.00
Muriatic, 22 deg.....1.75	Sulphuric, 60 deg.,
Nitric, 50 deg.....4.00	bulk.....18.00@20.00
Nitric, 38 deg.....4.25	Sulphuric, 66 deg.....1.20
Nitric, 40 deg.....4.50	Sulphuric, 66 deg.,
Nitric, 42 deg.....4.87½	bulk.....21.00@23.00

Brimstone.—Trade is quiet, as the high prices have inaugurated a hand-to-mouth buying policy. Best un-mixed seconds on spot sold at \$23.25 per ton, while shipments are worth \$22.50@22.75. Best thirds hold at \$21½ per ton under seconds. The imports into Great Britain in the 2 months ending February 28 totalled 4,306 long tons, against 3,728 tons in the corresponding period last year. A charter has been booked from Sicily to St. Lawrence at 7s. 9d. (\$1.86).

Pyrites.—Sellers are alive to the high prices asked for brimstone and are hustling for new business. So far this year an appreciable number of orders have been taken for pyrites, especially for the Virginia and Spanish ore. Cargoes of 3,128 tons and 2,550 tons Spanish pyrites arrived at New York. Freight rates from Huelva, Spain to North of Hatteras for next month's sailing are quoted at 10s (\$2.40) and to Savannah at 9s (\$2.16). In the 2 months ending February 28 Great Britain imported 111,301 long tons iron and copper pyrites, against 129,403 tons last year, showing a decrease of 18,102 tons, or 14 per cent.

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 from 40 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—A cargo of 80 tons 6 cwt. arrived at New York this week from Sydney, Cape Breton. The market is firmer at \$2.95 per 100 lbs. for 2½@25 per cent gas liquor for early shipment.

Nitrate of Soda.—Spot scarce and higher at \$2.35@2.40 per 100 lbs. The bark E. M. Phelps, now due at Philadelphia, with 32,500 bags, is firmly held at \$2.25@2.27½. April arrivals at New York and Baltimore cannot be obtained under \$2.25. We quote May arrivals at \$2.20; June, \$2.05, and balance of year, \$2. The advance in prices is attributed to the delayed shipments in Chile in consequence of the strike at Iquique and Caleta Buena. Freight rates from the west coast of South America are at the lowest level. Charters have recently been taken at 17s. 6d.@20s., which compare with 24s.@26s. 3d. a year ago. Importers, however, anticipate no radical change in nitrate prices. The producers' combination in Chile has fixed the output for the year from April 1, 1902, to March 31, 1903. The production is regulated by the exports.

With regard to the purchase of nitrate land by Germany, noted in our last issue, it is reported that at a meeting in Darmstadt of influential agricultural societies it was mentioned that Dr. Biernatzki had telegraphed from Chile recommending the purchase of the nitrate concessions offered by Felsch & Martin. It was also stated that Mr. Brockhausen approved the purchase and that his association had \$85,000 (\$425,000) available for the purpose. Some opposition is shown, however, by certain interests, who ask why the Prussian Government should use public money, if such it be, for the benefit of the Agrarians.

Concerning the Chilean market, Messrs. Jackson Brothers, of Valparaiso, write us under date of February 22 as follows: Work was resumed in Iquique on February 13, but shipments are retarded due to the excessive traffic required to be done by the Nitrate railway to fulfil the contracts accumulated in consequence of the strikes. In Caleta Buena a general strike also broke out, but fortunately was nipped in the bud. Our market has been inactive in great part, due to the firmness shown by producers in maintaining prices. Transactions during the fortnight amount to about 550,000 qtls., sales of 95 per cent taking place at 6s. 7½d.@6s. 8d. for February-March, at 6s. 7½d.@6s. 8¼d. for March-April, at 6s. 8½d. for July-December, and 6s. 9d. for September, alongside terms. Refined quality for prompt delivery has been sold at 6s. 11d. alongside. The production during January amounted to 2,283,000 qtls., about 30,000 qtls. more than same month of 1901. We quote, 95 per cent, 6s. 9d. for February-March; 6s. 8d. for April, and 6s. 9d. for September-October. Refined 6s. 11d. for March, 6s. 11d. for April, all ordi-

nary terms sellers. The price of 6s. 9d., with an all round freight of 17s. 6d., stands in 8s. 4¼d. per cwt. net cost and freight without purchasing commission.

Phosphates.—Quiet as regards new business. At the mines work is active, and shipments on contracts taken some time ago are moving as quickly as the car supply will permit. Prices are generally firm.

Information is received from Belgium that the superphosphate manufacturers' combination, recently completed, has fixed spring prices at 36 centimes per unit, f. o. b. Belgium depots in car-load lots, with a reduction of 20 centimes per 100 kilos, to the syndicates and the trade; payment 30 days net. Belgium last year was the second best buyer of American phosphates, importing 55,785 tons Florida high grade rock, and over 14,000 tons Tennessee rock. Consequently the efforts of the Belgium superphosphate makers to maintain prices for their product will eventually benefit us, at least insofar as our export trade in phosphates is concerned.

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 (77@80%)....	\$7.50	6¼@7d	\$9.75@10.92
*Fla. land pb. (68@73%)....	3.00@3.25	4¼@5d	6.65@ 7.00
*Fla. Peace Riv. (58@63%)..	2.25@2.50	4¼@5d	5.70@ 6.00
†Tenn. (78@80%) export.....	3.50	.....	.....
†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.....	2.75@3.00	4¼@5d	5.67@ 6.30
‡So. Car. river rock.....	2.75@3.00	.....	.....
Algerian, rock (63@70%)....	.....	6@6¼d	8.04@ 8.70
Algerian, rock (58@63%)....	.....	5@5¼d	6.00@ 6.30
Tunis, Gafsa (58@63%).....	.....	5@5¼d	6.00@ 6.30

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

Liverpool. March 12.

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

The chemical market is quiet all round, but prices are steadily maintained.

The exports of bleaching powder and sodas for the month of February have been on a moderate scale, the particulars according to the Board of Trade returns being as follows:

Bleaching powder, shipments to United States 53,143 cwt.; other countries, 18,627 cwt.; total shipments, 71,770. Soda ash, 89,685 cwt.; caustic soda, 91,933; bicarbonate soda, 26,021; soda crystals, 11,280; sulphate, 52,540; other sorts, 23,569; total, 295,028 cwt.

Soda ash is without change and selling at the usual varying prices as to market. We quote spot range for tierces about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 68 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags 5s. per ton under price for tierces. Soda crystals are in fair request at £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export markets. Caustic soda is steady, but business is only moderate. We quote spot range: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Bleaching powder, while dull, is unchanged at nominally £6 15s.@£6 17s. 6d. per ton, net cash, for hardwood packages, with special terms for continental and a few other export quarters.

Chlorate of potash is neglected and offered at 3d.@3½d. per lb. net cash. Bicarb. soda is selling to a fair extent at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets. Sulphate of ammonia is in rather better request at £11 12s. 6d.@£11 15s. per ton, less 2½ per cent for good gray 24@25 per cent in double bags f. o. b. here. Nitrate of soda on spot is still held for £10 10s.@£10 15s. per ton, less 2½ per cent for double bags f. o. b. here, as to quality and quantity.

Messina, Sicily. Feb. 28.

(Special Report of Emil Fog & Sons.)

Brimstone.—There is no alteration in the position of the market. We noticed in January an important increase in exports to the United States, namely, 20,000 tons, against 6,500 tons last year; but this demand did not make any impression upon the market, and is quite insufficient to relieve the Anglo-Sulphur Company of their immense stocks. As yet there is no hope that they will consent to make reasonable concessions to consumers, although this would certainly prevent the decrease in consumption which already makes itself felt. Present prices leave such enormous profits to the syndicate that the demand of the trade for a reduction in prices is quite legitimate. But the board of directors in London remains insensible to these demands. For the present the chief con-

sumers, the sulphite manufacturers, despite the high prices, will continue to use exclusively Sicilian brimstone, but the time may come when they too will turn to pyrites. Should this happen it will be fatal to our brimstone, and a reduction in prices will then come too late. We quote, per ton: Best un-mixed seconds, 84s. 9d.; best thirds, 74s. 3d.; current thirds, 70s. 9d.; refined block sulphur, 100 per cent, 85s. 6d.; refined roll sulphur, in 3 cwt. casks, 95s.; sublimed flowers, pure, in bags, 102s. 9d.; sublimed flowers, current, in bags, 93s. 9d.

METAL MARKET.

New York. Mar. 27.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

Metal	February.		Year.	
	1901.	1902.	1901.	1902.
Gold Exports....	\$416,812	\$8,617,287	\$8,637,971	\$10,590,962
Imports.....	1,859,274	1,984,893	6,124,900	3,089,689
Excess. I.	\$1,442,462	E. \$6,932,394	E. \$2,513,071	E. \$7,501,282
Silver Exports....	\$4,579,249	\$3,924,183	\$9,389,488	\$8,433,396
Imports.....	2,189,489	2,005,593	5,378,907	4,113,274
Excess. E.	\$2,389,760	E. \$1,918,590	E. \$3,990,681	E. \$4,320,122

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 March 27, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$38,968	\$21,453	\$656,690	\$25,097	E. \$649,073
1902.....	13,839,695	898,541	9,400,999	329,256	E. 22,103,888
1901.....	9,279,935	778,885	9,127,969	1,025,669	E. 16,603,336
1900.....	2,925,984	1,665,704	9,823,450	1,082,884	E. 10,600,840

The gold exported this week went chiefly to South America, and the silver principally to London. There were also exported \$16,768 Mexican dollars, of which \$14,504 went to London. Imports of gold and silver were from Central and South America and the West Indies.

Financial Notes of the Week.

Business continues generally good, with few changes to be noted. Speculation is quiet, owing chiefly to current scarcity of money and high interest rates.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending March 22, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902
Loans and discounts....	\$739,331,000	\$916,779,100	\$912,953,100
Deposits.....	800,116,400	1,000,458,300	973,234,600
Circulation.....	19,290,700	31,525,100	31,434,500
Specie.....	146,245,800	188,488,300	176,832,400
Legal tenders.....	59,690,600	71,898,700	69,947,500
Total reserve.....	\$205,846,400	\$260,387,000	\$246,779,900
Legal requirements ..	200,029,100	250,114,575	243,308,650
Balance surplus....	\$5,817,300	\$10,272,425	\$3,471,250

Changes for the week, this year, were an increase of \$358,350 in surplus reserve, and decreases of \$7,777,000 in loans and discounts, \$11,135,400 in deposits, \$63,400 in circulation, \$2,358,500 in specie, and \$67,000 in legal tenders.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings at the corresponding date last year:

	—1901—		—1902—	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.	\$188,488,300	.....	\$176,832,400	.....
England.....	181,459,895	.....	187,766,140	.....
France.....	475,583,805	\$219,573,585	509,101,365	\$221,165,255
Germany.....	155,365,000	74,805,000	194,365,000	221,165,255
Spain.....	70,190,000	82,330,000	70,305,000	90,095,000
Netherlands ..	25,292,000	28,103,500	26,931,000	32,778,500
Belgium.....	14,735,000	7,370,000	15,620,000	7,810,000
Italy.....	79,240,000	9,336,500	89,375,000	10,640,000
Russia.....	367,780,000	34,835,000	359,430,000	37,890,000

The returns of the Associated Banks of New York are of date March 22 and the other March 20 as reported by the Commercial and Financial Chronicle

cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has held steady, and continues very dull without special feature.

The United States Assay Office in New York reports receipts of 42,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to March 13 are reported by Messrs. Pixley & Abell's circular as follows:

Table with columns for 1901, 1902, and Changes. Rows include India, China, The Straits, and Totals.

Arrivals for the week, this year, were £49,000 in bar silver from New York, £7,000 from Chile, £4,000 from the West Indies, and £3,000 from Australia; total, £63,000.

Indian exchange is a little easier. There is an abundance of money in the Indian markets, and the demand for council bills in London has fallen off considerably.

Gold exports from Australia from January 1 to February 15 were £1,063,783, against £1,059,932 for the corresponding period last year.

The foreign merchandise trade of Great Britain for the two months ending February 28 is valued by the Board of Trade returns as below:

Table with columns for 1901 and 1902. Rows include Imports, Exports, and Excess, imports.

The increase in imports was £6,120,984, or 7.1 per cent; the decrease in exports was £82,584, or 0.1 per cent; leaving an increase of £6,203,568, or 21.5 per cent in the balance of imports.

Table with columns for Cold, Imports, Exports, Imp., and Excess. Rows include 1902 and 1901 for Silver.

Of the silver imported this year, £1,364,391, or 82.8 per cent of the total, came from the United States.

Prices of Foreign Coins.

Table with columns for Bid and Asked. Rows include Mexican dollars, Peruvian soles, Victoria sovereigns, etc.

OTHER METALS.

Daily Prices of Metals in New York.

Table with columns for Mar., Sterling Exchange, N.Y., London, etc. Rows include Silver, Copper, and Spelter.

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's.

Copper.—In view of the approaching holidays the market has again ruled very quiet indeed. Consumers do not seem to be supplied very far ahead, but are only covering their immediate requirements.

The foreign market which closed last week at £52, improved in the course of this week, the closing quotations being cabled at £52 12s. 6d. for spot, £52 10s. for three months.

The London Exchange will be closed until next Tuesday.

Refined and manufactured sorts we quote: English tough, £55@£55 10s.; best selected, £55 10s. @£56;

Exports of copper from New York, Baltimore and Philadelphia in the week ending March 26 are reported by our special correspondents as follows:

Table with columns for 1901, 1902, and Changes. Rows include Matte and precipitate, Copper ore, Fine copper, and Totals.

Of the totals this year 85 tons of ore, 4,160 tons matte and 12,091 tons fine copper were from the United States; these figures comparing with 123 tons ore, 2,407 tons matte and 3,105 tons fine copper in 1901.

Exports of copper from Chilean ports, including shipments from both Chile and Bolivia, are reported by Messrs. Jackson Brothers, of Valparaiso, as below, in quintals, for the year ending December 31:

Table with columns for 1900 and 1901. Rows include Bar copper, Regulus, Ores, Total quintals, and Total long tons.

The increase last year, in terms of fine copper, was 5,205 tons, or 20.3 per cent. The destinations of the exports, expressed in quintals of fine copper, was as follows:

Table with columns for 1900, 1901, and Changes. Rows include Great Britain, France, Germany, Un. Kingdom for orders, Total Europe, United States, Peru, Australia, and Totals.

The exports to the United States last year were made up of 395 quintals bar copper, 91,911 quintals regulars and 4,349 quintals ore.

Tin.—On account of the arrival of a number of steamers, the market has assumed a more normal aspect, and the premium for spot tin has become smaller.

The foreign market, which closed last week at £117, opened on Monday at the same price, ruled steady throughout the week, and the closing quotations are cabled as £116 10s. @£116 12s. 6d. for spot, £114 7s. @£114 7s. 6d. for three months.

Imports of tin into Great Britain for the two months ending February 28 were as follows, in long tons:

Table with columns for 1901, 1902, and Changes. Rows include Straits, Australia, Other countries, Totals, Re-exports, and Balance.

The decrease was chiefly in Straits tin. Lead is steady without any special feature. The ruling quotations are 4@4.05c. St. Louis, 4.05@4.10c. New York.

The foreign market is steady, Spanish lead being quoted at £11 6s. 3d. @£11 8s. 9d., English lead at £11 8s. 9d. @£11 10s.

Imports of lead into Great Britain for the two months ending February 28 were as follows, in long tons:

Table with columns for 1901, 1902, and Changes. Rows include United States, Spain, Australia, Other countries, Totals, Exports, and Balance.

The lead credited to the United States is chiefly Mexican lead refined here in bond.

Spelter is again somewhat firmer. We quote the market at about 4.15@4.17 1/2c. St. Louis, 4.30@4.32 1/2c. New York.

The foreign market is steady, good ordinaries being quoted at £17 10s., specials at £17 15s.

Imports of spelter, or metallic zinc, into Great Britain for the two months ending February 28 were 12,901 long tons, against 8,281 tons for the corresponding period in 1901; an increase of 4,620 tons.

Antimony is unchanged. We quote Cookson's at 9 3/4@10c.; Hallett's at 8@8 1/2c.; Hungarian, Italian, Japanese and U. S. Star at 7 3/4c.

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 continues \$48 per flask for large lots, with a slightly higher figure for small orders. In San Francisco quotations are firm at \$47.50@48 for domestic orders, and \$44 for export.

Imports of quicksilver into Great Britain for the two months ending February 28 were 447,150 lbs., against 433,835 lbs. for the corresponding period in 1901. Exports were 354,861 lbs., against 193,806 lbs. last year.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Table with columns for Per lb. and various metal types like Aluminum, Ferro-Tungsten, Magnesium, etc.

Variation in prices depend chiefly on the size of the order.

Average Prices of Metals per lb., New York.

Table with columns for Tin, Lead, Spelter and months from 1902 to 1901.

Average Prices of Copper.

Table with columns for Electrolytic, Lake, Standard and months from 1902 to 1901.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Table with columns for 1902, 1901, 1900 and months from 1902 to 1901.

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices from March 20 to 26.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations for New York, listing companies and their prices from March 20 to 26.

PHILADELPHIA, PA. \$

Table of stock quotations for Philadelphia, PA, listing companies and their prices from March 20 to 26.

MEXICO.

Mar. 15.

Table of stock quotations for Mexico, listing companies and their prices as of March 15.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies and their prices from March 20 to 26.

Official Quotations Boston Stock Exchange. Total sales, 171,422 shares.

ST. LOUIS, MO.*

Mar. 17.

Table of stock quotations for St. Louis, MO, listing companies and their prices as of March 17.

*From our Special Correspondent.

SPOKANE, WASH.*

Mar. 21.

Table of stock quotations for Spokane, Wash., listing companies and their prices as of March 21.

Total sales 38,600 shares. *Reported by HUNTER & HARRIS.

SALT LAKE CITY.*

Mar. 22.

Table of stock quotations for Salt Lake City, listing companies and their prices as of March 22.

*By our Special Correspondent. Total number of shares sold, 434,081.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph), listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

MONTREAL, CANADA.

Mar. 24.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, Can. Gold Fields, etc., with columns for par value, high/low prices, and sales.

LONDON.

Mar. 15.

Table of stock quotations for London, listing companies like Alaska-Treadwell, Anaconda, Copiapo, etc., with columns for authorized capital, par value, last dividend, and quotations.

c.—Copper, d.—Diamonds, g.—Gold, l.—Lead, s.—Silver.

PARIS.

Mar. 6.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Anzin, Boleo, Brianc, Champ d'Or, etc., with columns for country, product, capital stock, par value, latest dividends, and prices.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario Olive, British Columbia, Cariboo M.C.K., etc., with columns for par value, high/low prices, and sales.