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\*Illustrated.

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REMEMBRANCE of an old speculation was revived in London the other day by the winding up of the Emma Mine. This Utah mine was floated by Baron Grant in 1871 for £1,000,000, and for a year dividends at the rate of 1½ per cent. per month were paid. Since then the mine and the successive companies owning it have had all sorts of vicissitudes, but no dividends, and at last it has been given up as a bad job. Very few people in the mining market remember the boom of 1871, but it was a great event at the time.

MUCH COMPLAINT is noted in our Australian exchanges as to the delay in organizing the Federal patent office. It is to be hoped that this will soon be done. The unification of patent practice in Australia and the transfer of the issue and control of patents from the six separate colonial governments to a single office for the whole Commonwealth, is a matter of importance to inventors and manufacturers everywhere. While the reorganization is necessarily a matter which involves much labor, its early completion is a matter of importance to many interests.

THE STOCKHOLDERS of the Old Dominion Copper Mining Company at the meeting last week voted a complete change in management, the Bigelow board being replaced by directors representing the opposing party. In this case the movement for a change was started far enough in advance of the meeting to give plenty of time for full discussion, and opportunity to bring in proxies from stockholders who fully understand matters. There was no chance for the adoption of the tactics which were used at the Osceola meeting and were temporarily successful there. Other meetings are to come soon, and it will be interesting to note the results—with the Tamarack, for instance.

IDAHO seems likely to have a boom this year. The Thunder Mountain District is drawing especial interest just now, and numerous prospectors are on their way to the region, although it is still early in the season for that mountain country. From all accounts so far received the new district seems to be worth attention, though the accounts given out are doubtless as full of exaggerations as is generally the case with a new country. Outside of this special boom, the State is attracting many people this spring, and matters promise well both for its mineral and agricultural resources. There is a prospect also that some railroad building will be done in the State this year, to the great benefit of several districts, the development of which is now delayed by lack of transportation.

THE REPORT of the Rio Tinto Company, an abstract of which is given on another page, shows that the great mine is giving no signs of exhaustion. Though there are workings at Rio Tinto over 2,000 years old, the quantity of pyrites taken out last year was the largest ever reported—nearly 2,000,000 tons; while the final returns in copper were fully equal to those of any previous year. In one respect the company makes a better showing than some American copper mines, whose reports have lately been noticed. While somewhat lower prices were accepted for copper early in the year than obtained here, the average return was much better. The metal was sold freely

throughout the year, and was not rushed on the market when prices fell. Though the dividends were somewhat smaller than in 1900, the company was still able to pay 7½ per cent on its common stock, besides full appropriations to depreciation and reserve funds; a result with which the stockholders should be very well satisfied.

THE WILL of Cecil Rhodes, which has been made public during the week, is not what most people had expected from their general knowledge of the man. The provision which most concerns the public and is most nearly in the nature of a charitable bequest, is one establishing a fund from the income of which a number of scholarships are to be supported. Each of these will be of an amount large enough to pay all the expenses of a student at Oxford University in England; and the students are to be drawn from Great Britain and the Colonies, from the United States and Germany. The applicants are to be judged, not by scholarship alone, but also by their physical condition and general character. As might be expected, Mr. Rhodes' intention is that his fund shall train, not scholars and specialists, but active men of affairs. It seems strange that with this object in view Oxford should be designated as the place of study, and all mention of scientific or technical schools omitted. The avowed object of including Americans among the beneficiaries of the trust is to promote a better understanding between England and the United States in future.

Mr. Rhodes selected as the place for his tomb an elevated spot in the Matoppo Hills in Matabeleland, and his body will be taken there as soon as arrangements are completed.

THE REPORT of the Exploration Company of London for 1901 shows that there has been a still further depreciation in the value of the investments held, while no profitable transactions have been carried through. A loss of £190,000 has been made, which, following on a net loss of £200,000 during 1900, has rendered it necessary for the shareholders and directors to consider the position of the company very carefully. The losses of the company have been chiefly due to the unfortunate investment in Paris Traction and Tramway shares, and the absence of profitable transactions is due partly to the fact that the holdings in Johannesburg land and South African mining shares are not realizable at a profit at present and partly to the dullness in the markets for the American and Mexican mining shares held by the company. The directors have re-valued their investments and have written them down by the amount of the balance of reserve fund, £364,000, so their value now stands at £940,000. The assets also include loans against security, ground property in London and other small items, bringing the total assets to £1,280,000, which is approximately equal to the nominal capital of the company. The bulk of the item "loans against security" consists of a loan to the Compagnie Generale de Traction, the investment in the shares of which caused the company its great losses, but the directors are of opinion that the loan will be repaid in full. As regards the other assets of the company, the holdings in mining shares in Johannesburg land property, the report does not itemize the investments, so it is impossible to judge of their prospective value, but as their values

have been written down it may be presumed that none of them is likely to rise in the near future and so yield a profit on selling out.

Some changes have taken place in the board of directors. Since the publication of the report for 1900 two chairmen, Mr. Harry Mosenthal and the Hon. Chandos Stanhope, have successively resigned, and Mr. R. T. Baylis now becomes chairman and sole managing director. Mr. J. H. Lukach has resigned his joint managing directorship, and has retired from the board, and Lord Farquhar and the Hon. Chandos Stanhope have resigned their positions as directors. Mr. Bayliss is well known in this country, especially in Montana, as a capable mining engineer and man of business, so it is to be hoped that, although at present the future looks far from promising, under his direction the company will once more regain the eminent position it used to occupy.



THE REPORT of the Mountain Copper Company, Limited, of California, for 1901, as issued in London, shows that a net profit of £380,000 was made during the year. Of this £125,000 is to be paid as dividend and £250,000 placed to reserve fund. For some time the directors have been aware that the mine is being exhausted, and they are desirous of reducing the capital accordingly. The scheme for doing so is now before shareholders. It provides for the formation of a new company with a capital of £250,000 in ordinary shares of £1 each, and £750,000 debentures bearing 6 per cent. interest, of £3 each, as compared with £1,250,000 in £5 shares as at present. The advantage of the scheme is that the debentures can be paid off gradually from the reserve fund and from profits, so that eventually the capital will have been reduced to £250,000. The life of the present deposit is still several years, and there is a good deal of poorer ore which would, with the plant now erected, pay to a certain extent. The policy would then be to buy copper and gold ores and use the furnaces as custom smelters. The scheme of reconstruction seems a good one, and we are informed that the shareholders will not hesitate to accept it.

We may add that the present proposal for reorganization is a judicious one, and that the policy now adopted is in accordance with that outlined in the JOURNAL a year or more ago, as that which the company ought to adopt.



#### THE NICKEL COMBINATION.

The announcement made in our columns last week of the organization of the International Nickel Company had been in part forestalled by current reports. The fact that negotiations were in progress for the formation of a combination to control the production of nickel had been matter of common report for some time, although nothing definite was known of the details of the plan, now made public.

The new combination, as described last week, controls mines and works which turn out about 60 per cent of the nickel supply of the world; and the properties which it controls give opportunities for a large expansion in output. It has valuable ore deposits both in the Sudbury District in Canada and in New Caledonia, though the latter have not been much developed as yet. It has also the best reduction works of their kind in existence, and the necessary control of patents and processes. If, as stated, the managers have arranged a full understanding with the Société le Nickel, the two companies together will have control of 90 per cent of the world's nickel supply, and will be practically masters of the market for that metal. The combination will doubtless seek to extend its Sudbury holdings, so as to keep any possible competitor out of the region.

The weak point in the new combination is in its excessive capitalization. This is fixed at \$12,000,000 common stock, \$12,000,000 preferred stock and \$10,000,000 bonds; a total of \$34,000,000. Assuming that the company controls 60 per cent of the total nickel output, on the basis of present production, to pay the charges on the bonds and preferred stock would require a clear profit of 12 to 13 cents a pound on all the metal produced, and this would leave nothing for the common stock. The nickel business is a small one when compared with that in the more important metals like copper, tin, lead or zinc, and its increase seems to depend largely on the establishment of prices low enough to encourage the greater use of the metal. It does not appear that the new company will be in a position to reduce these prices soon. It will doubtless be able to maintain them at about the present level, should it be considered expedient to do so; but that will not encourage consumption.

The apparent—though not official—connection of the new company with the United States Steel Corporation is natural enough, in view of the fact that the Steel Corporation is one of the larger consumers of the metal, and would find it well to control its supplies.



#### SILVER PRICES.

The price of silver, which, recovering somewhat from the depression of previous years, reached an average of 64.14 cents per fine ounce in New York in December, 1900, has fallen almost continuously since that date. In the month of March, just closed, the average price in New York was 54.23 cents; being 9.91 cents lower than that of fifteen months ago, and the lowest average recorded for any month since August, 1897, when it was 54.19 cents. From the low point of 1897 the price rose gradually, and continued to do so until the close of 1900 when the retrograde movement began. At the present time the market is heavy, and there seems to be no prospect of an improvement. The causes for the present low prices are somewhat complex, and it will be of interest to inquire into them.

The production of silver has not shown the decrease which was expected when the great fall took place in 1893. There has not been the closing of mines or the curtailment of production for which many persons then looked. On the contrary, the world's production of the metal has been well maintained, and has even increased. In 1893 the total output reported was 5,339,746 kilograms; in 1900 it was 5,681,363 kilograms, being 341,617 kilograms, or 6.4 per cent greater than seven years before; in 1901 there was but slight change from the preceding year, and the total was not far from 5,700,000 kilograms.

The causes of this increase have been so often referred to that it is not necessary to go into them here at any length. Briefly stated, they are, first, that a very large part of the silver produced is a by-product made in connection with other metals, chiefly lead and copper; and second, that there has been a great development in mining in Mexico and a lesser one in several of the South American countries, which are silver producers. Both these causes are likely to continue effective for some time to come.

During the period above referred to the quantity of the metal used in the arts and in manufactures has doubtless gradually increased. The statistics on this point are always based largely on conjecture, but it is certain that under the combined effect of comparatively low prices and increasing prosperity the demand for silver has grown, and that in 1900 and 1901 a very large quantity was absorbed in this way—probably the largest on record. The uncer-

tain elements, which affect the surplus not taken by manufacturers, and therefore the general price, are the demand for the East and that for coinage. In 1900 there was a considerable demand for the last-named purpose, the countries in the Latin Monetary Union having been buyers, while a still larger quantity was taken by the Indian Government. The closing of the Indian Mints had not had the expected effect, and the Government was forced to resume the coinage of rupees on a large scale to prevent serious embarrassment to trade. These purchases helped materially in disposing of the surplus silver, and so maintaining prices.

In the East the light demand from India, which resulted from depressed business following the famines of 1895 and succeeding years, was partially overcome in 1900, and the exports to that country in 1900 and 1901 were larger than those for any year since 1893. A considerable proportion of the silver was that bought for coinage, however, and it cannot be said that India has yet regained the normal purchasing rate which was shown before the depression of the famine years set in. In China there has been for the past year or more a general demoralization of business, which last year cut down the imports of silver to about one-fourth of those reported in 1900. This not only reduced the usual purchases in London, but it also caused Australian silver, which had in previous years gone to China, to be shipped to London, increasing the quantity pressing on the market.

At the present time there seems to be no immediate prospect of recovering from the depression. The demand for coinage from Russia and France has been satisfied, and no new requisitions of this kind seem probable. The Indian demand has shown some improvement recently, though not to an important amount. The requisitions for China are still small, and are likely to remain so, especially in view of the heavy payments which the Chinese Government will have to make to Europe on indemnity account. Changes in the handling of the tin trade are likely to diminish the quantities of silver sent to the Straits. Upon the whole, there seems to be little chance of an increase in the demand for the East.

The market is also depressed by the knowledge that large unsold stocks of silver are held in London and the strong suspicion that other large stocks exist in New York, or at any rate in this country. As long as such a surplus hangs over the market, with the possibility of a pressure to sell, there will be no recovery in prices.



#### NOTES ON PLATINUM AND ITS ASSOCIATED METALS.

By JAMES F. KEMP.

The price of platinum has steadily augmented within recent years until now its quotations exceed those of gold. Special interest therefore attaches to its occurrence in nature and above all as to its presence in the situations and associations which have not hitherto attracted all the attention that they have deserved. The properties of platinum are altogether exceptional and render it available for scientific and commercial processes for which there seems to be no suitable substitute. These special uses are likely to increase rather than decrease, and therefore, aside from the fact that manipulation and control of the markets may have in some degree caused the increased price, yet the latter is based in part on the actual demand for the metal.

The writer became interested in the subject while making investigations for the S. S. White Dental Manufacturing Company, and in association with Mr. Albert W. Johnston, to whom acknowledgments are due for the generous permission to use much of the following information.\*

\*A more extended treatment of the subject will be found in Bulletin 193 of the United States Geological Survey.



Almost all the platinum of commerce is obtained from placers and by hydraulic processes. The metal is generally described as occurring in the native state but this is only partially true. The richest nugget yet assayed and recorded yielded 86.50 per cent platinum. The greater number range between 85 and 70, and not a few go lower still. Much the most abundant of the other metals, which appear in the nuggets, is iron. When all the available assays are plotted it is found that iron gradually increases as the platinum percentage falls, until the latter reaches about 69. The highest iron percentage of which I know is 19.5 with 68.8 Pt in a specimen from the Urals. Iron then rapidly decreases with the increase of platinum and with values below 80 per cent Pt iridium tends to become very abundant. As a rule the other metals of the platinum group, viz., iridium, rhodium, and palladium are always present. Until the platinum falls below 60 per cent the iridium seldom reaches 5 per cent; rhodium seldom reaches 4 and palladium is less than 2. In the curves which I have plotted, however, there seems to be no law governing their relations. The above statements it should be further remarked are based upon analyses of what would be mineralogically described as platinum and do not include the other mineralogical species.

Besides the associated metals just referred to, the nuggets often contain osmium, ruthenium, copper and sometimes even gold, but the percentages are smaller.

In the way of mechanical admixture chromite is the commonest associated mineral, some nuggets showing a large proportion of it. Much more rarely olivine adheres to the platinum, as do also rarer silicates, such as biotite and pyroxene. Scales of iridosmine have been obtained by dissolving away the more soluble platinum.

Besides platinum the other minerals which contain the metals of this group are the following: Platiniridium, palladium, allopalladium, and iridosmine (sometimes called osmiridium). There are two compounds with non-metals, sperrylite ( $PtAs_2$ ), and laurite ( $RuS_2$ ). In laurite a little osmium replaces a part of the ruthenium.

Of these minerals only iridosmine and sperrylite are of any commercial importance. The former has been vigorously sought in recent years because of its osmium, which is much desired on account of its incandescent properties. Sperrylite as an associate of the nickel-copper ores at Sudbury, Ont., and in the Rambler copper mine, Wyoming, is of more than purely scientific interest.

In its usual associations platinum is found only with the basic, igneous rocks which are rich in the mineral olivine, or chrysolite. They constitute the group of the peridotites and are likewise the home of chromite, the commonest associate of platinum. The peridotites change readily under metamorphosing influences to serpentine, and it is therefore not surprising to find that the platinum is often traceable to this mother rock.

As stated above, the platinum of commerce is still almost exclusively obtained from placers and yet the actual gravels seldom rest upon peridotites. It is necessary to follow the streams to their upper portions, in order to locate the mother-rock, but then, so far as known, the peridotites or their relatives are always discovered. In the Tura River region of the western Urals, for example, the bed-rock of placers is Devonian limestone but the source of the platinum is in the peridotites up-stream.

In one of two instances in the Urals and in several cases investigated by the writer in the Tulameen River district of British Columbia, the platinum has been detected by assay in the peridotite or in its derived serpentine, but the amounts have proved to be so small, or else the metal has been so irregularly distributed, as not to present an economic proposition. The evidence in hand leads to the conclusion that the platinum is very sparsely disseminated.

Platinum is also found in other rocks. We have detected it in pyroxenites and even in crushed and

chloritized granite in the Tulameen region. It has likewise been reported elsewhere from syenites and gabbros. Mr. A. W. Johnston has determined it by assay in hornblende gneiss and Triassic shale from Pennsylvania. In the shale it may have been in the form of a fossil placer. The late Dr. F. A. Genth, of Philadelphia, detected it in a clay slate from Lancaster County, Pa., which contained pyrite, chalcopyrite and galena. He also found it in ilmenite in a micascist from the same place.\* In a most extraordinary deposit near Broken Hills, New South Wales, it has been found in kaolinized material, lying beneath an iron cap, and shading into less and less altered granite or gneiss in depth. It is supposed by Mr. J. B. Jaquet†, who has described the occurrences, that the vein phenomena were produced by an uprising hot spring. The region is one of metamorphosed Lower Silurian strata, in which are dikes and bosses of granite.

Platinum has been reported in several instances, and on good authority, as occurring in gold-bearing veins, and in such a way as to lead one to believe that so far from being associated with basic igneous rocks, it was actually in a gangue of quartz. C. F. Hartt, in his work on the *Geology and Physical Geography of Brazil*, page 448, quotes from E. Williamson‡, who states that platinum occurs with the usual common metallic sulphides, in the gold quartz vein called the Boa Esperanca, in the province of Parahyba do Norte, Brazil. Palladium has likewise been known for many years at Gongo Seco, in the province of Minas Geraes, and a variety of gold called "ouro preto" has received a special name, apparently because of this. Hartt in a footnote of the work just cited, page 542, states that the Brazilian gold is occasionally alloyed with platina. Platinum has also been reported from the gold quartz veins of the Beresovsk§ district, Russia. In a sample from Leavenworth, Wash., which the microscope proves to be a vein of crushed quartz with much pyrite, A. W. Johnston and the writer have found 0.375 ounce to the ton.

The allopalladium of the treaties on mineralogy was obtained in association with gold in veins of red hematite in diabase, at Tilkerode, Hartz Mountain.

The most interesting and, commercially speaking, the most important association of platinum is with copper-bearing minerals. Several such cases have long been matters of record, although they have been mostly overlooked. It is a strange fact that platinum was recorded from Spain, by the French chemist Vauquelin as early as 1806, when there existed only unconfirmed rumors about the Urals. Vauquelin reports it in amounts varying from traces up to 10 per cent in a silver ore from Guadalcanal. The ore contained in addition copper, lead, antimony, iron, sulphur, and sometimes arsenic. It occurred in a gangue of calcite, barite and quartz,\*\* and was considered to be a variety of tetrahedrite. A French mining engineer named E. Gueymard identified platinum in a tetrahedrite from the French Alps as early as 1847. The ore occurred in the valley of Drac in beds of crystalline limestone, in association with dolomite, quartz and barite. The other metals present were copper, antimony, lead, zinc, iron and a little arsenic. In a hundred assays, 20 gave either traces or weighable amounts. M. Gueymard afterwards found platinum in similar associations in several other localities in this same general region, and once in bournonite. His results were fully confirmed by the best chemists of Paris.††

The discovery by F. L. Sperry of a heavy metallic residue in the concentrates of the Vermillion mine, near Sudbury, Ont., and its subsequent identification

\*Pharmaceutisches Centralblatt. 1852. 72.

†J. B. Jaquet. *Records of the Geological Survey of New South Wales*, V. 1896, p. 33.

‡E. Williamson's paper, of whose volume and page Prof. Hartt did not know, is from the *Transactions of the Geological Society of Manchester*, Eng., VII. 113. 1866. A complete file is in the library of Columbia University, but some miscreant has cut this paper out.

§Phillips-Louis. *Ore Deposits*, page 546.

\*\*Vauquelin. *Annales de Chimie*. LX. 317. 1806.

††E. Gueymard. *Comptes Rendus*, XXIX. 814.

and description as sperrylite ( $PtAs_2$ ) by Professors Wells and Penfield\* first called attention to the existence of platinum in connection with the nickel-copper deposits of this region, and although it was first observed in the concentrates of a stamp-mill working for gold, it has since been observed in the base metal ores. Indeed, Clarke and Catlett† subsequently determined platinum in quantities respectively of 2.55, 1.8, and 7 ounces per ton in polydymite from Studbury. The metal received attention as a possible by-product in treating the mattes.

The most interesting announcement in this connection which has appeared in the last few years is that of the discovery of platinum in the copper ores of the Rambler Mine, 60 miles south of Laramie, Wyo. In a short note regarding them in the *ENGINEERING AND MINING JOURNAL* for December 28, 1901, W. C. Knight describes the ore as occurring in metamorphic rocks, and as exhibiting from the surface downward, the iron cap, oxidized ores, covellite and finally chalcopyrite. The platinum is especially rich in the covellite. The assays show quantities from 0.06 to 1.4 ounces per ton. A sample apparently of wall-rock which the writer has examined microscopically and which has yielded identifiable amounts of platinum proves to be a baked slate or hornfels, and doubtless came from the contact of an intrusive rock on slates or shales. The rock contains much pyrites. By panning down the covellite, Professors Wells and Penfield have detected crystals of sperrylite.‡

These discoveries make it extremely desirable to be on the watch for platinum and its associated metals in copper ores. Comparatively minute quantities may have been overlooked in the past and yet may be profitably saved in modern methods of electrolytic refining, especially while platinum rules at its present quotations. Its occurrence is, however, exceptional, and tests of electrolytic residues in some of our largest copper refineries have failed to show it.

It is likewise important to look for it in deposits of chromite since the latter is its commonest associate. But it is important to appreciate that if platinum should be found not associated with a smelting ore of copper or lead, it will be necessary to recover it by some smelting process or by some method of magnetic extraction, or by some other method which does not involve amalgamation.

#### AMERICAN EXPOSITION IN LONDON.

An American Exposition under the auspices of the "American Society in London" is to be opened at the Crystal Palace, London on May 1, and to continue until October 1. The exhibition is intended to demonstrate the great industrial development that has taken place in the United States during recent years, and, it is stated, will be the most important exposition of exclusively American products, arts, industries and inventions ever seen in the United Kingdom. A special effort is being made to secure a good representation of American bituminous coals. Producers interested in the development of an export coal trade will find an excellent opportunity in this exhibition to display and demonstrate the qualities of the American product.

#### A SIBERIAN GOLD FIELDS RAILROAD.—

In the Russian Ministry of Finance a project is being worked out for constructing a line of railroad from the upper reaches of the Angara River to the River Vitim. The projected railway will traverse the richest gold-bearing district of Siberia, which is that lying to the northeast of Lake Baikal, and it will be 600 miles in length. There are no transportation facilities in the region in question, and the nearest railroad accommodation is that provided by the Trans-Baikal section of the Siberian Railroad.

\*Sperrylite a new mineral. *American Journal of Science*, January, 1889, 67 and 71.

†A platinumiferous nickel ore from Canada. *American Journal of Science*. May, 1889, 372.

‡New Occurrence of sperrylite. *American Journal of Science*. February, 1902, 95.

## AN AUTOMATIC SYSTEM OF SAMPLING.

By PAUL JOHNSON, GREENWOOD, B. C.

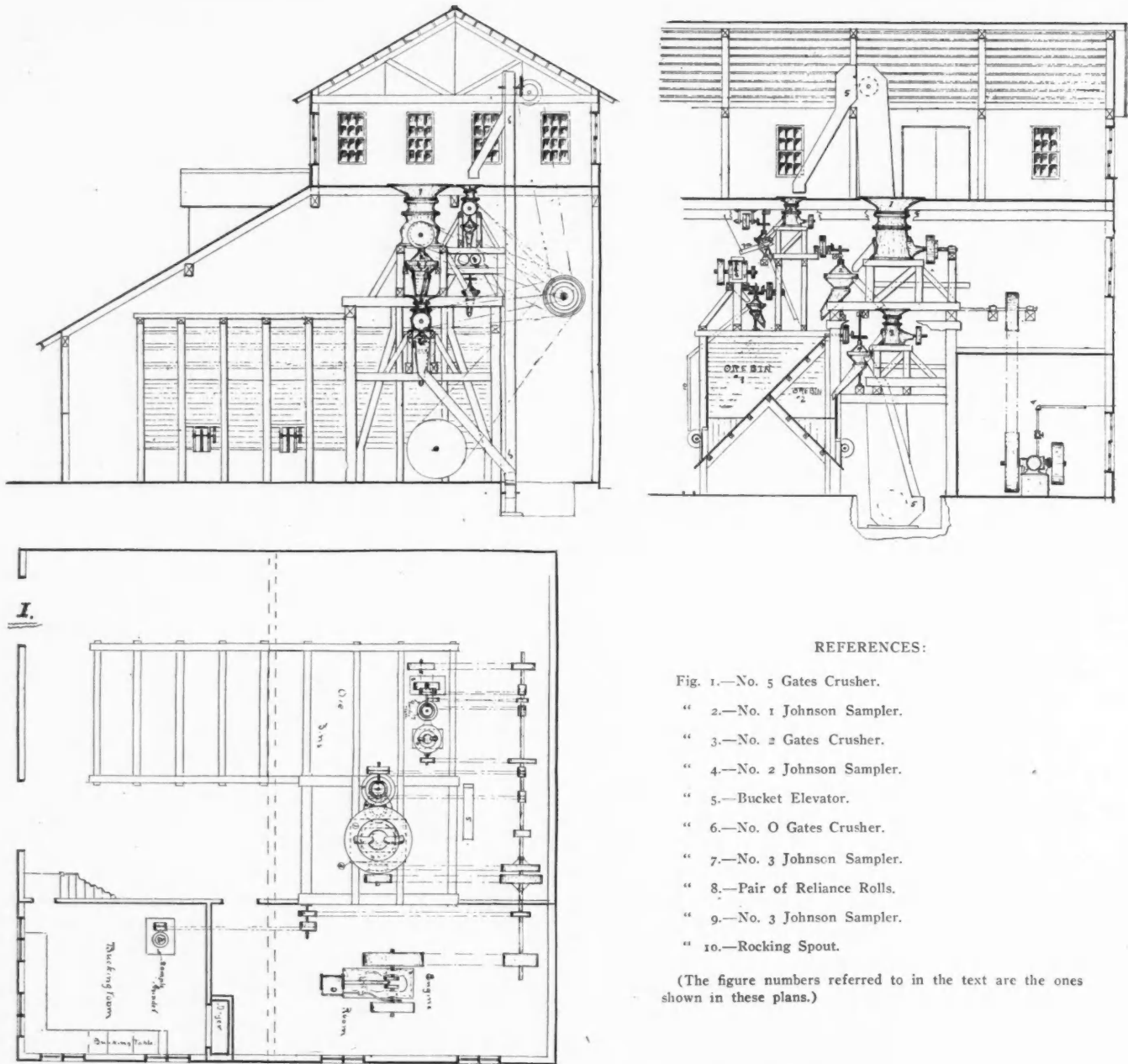
In connection with an article on the British Columbia Copper Company's smelting works at Greenwood, British Columbia, published in the Canadian Supplement of the *ENGINEERING AND MINING JOURNAL* of February 16, 1901, there was a short description of the sample mill attached to the smelting works. The sample mill was constructed on the automatic principle, and samplers of a new design were installed. The samplers were designed to avoid elevating the material before it had been crushed.

installed, however, I have sampled over 100,000 tons of ore of different kinds, much of which has been check-sampled, so that I can now speak of it with the confidence born of an extensive and varied experience in which actual practice has proved the success of the system. I feel, therefore, that I can give some further detailed description of our practice, considering the subject under two plans: (1) the arrangement, and (2) the samplers.

The ore for sampling at the smelter is brought to the upper ore bins, which are six in number. These are arranged side by side in parallel lines of three

come together they block up the ore gates and materially delay the drawing of the ore from the bins.

The scoop cars hold from 1 to 1 1/4 tons of ore each, and are run on a tramway of a 1 per cent grade to the top floor of the sampling mill. One man is able to handle two of these cars, as when once started they run by gravity. When it is desired to check the railroad scale weight these cars are weighed on a Fairbanks scale and are then pushed to the large hopper of a No. 5 Gates crusher and the contents immediately dumped. (See Fig. 1 of the drawings.) Lumps exceeding 11 inches in diameter are broken



SAMPLING MILL, BRITISH COLUMBIA COPPER COMPANY, GREENWOOD, B. C.

The original sample is cut twice before crushing, so that only 2 per cent of the total ore sampled has to be lifted. This 2 per cent is then crushed to a suitable size (below 1 1/2 inches), which entails less wear on elevator belts and buckets.

It was planned originally to use ordinary mechanical samplers, but it was found that these required more vertical space than could be allowed, as there were only 36 feet available. It was also desired to have the material rejected directly into the gravity bins, after being crushed and sampled, without further mechanical elevating. It was, therefore, necessary to design a new sampler, one that had not been tried before, and although everybody who saw the design expressed the opinion that it would work satisfactorily, I did not have confidence in its being adapted to any particular place. Since it has been

each. Each bin is 50 feet long, the railroad tracks going over the center line of each bin. Most of the ore is brought to the smelter in dump cars, usually of from 30 to 35 tons capacity. The cars are unloaded by simply opening the two doors in the cars, and the entire contents are dumped into the bin below. When the ore comes in box cars, as it occasionally does, it is unloaded by shoveling into the side bin adjoining the one over which the car stands. The ore after being dumped or unloaded into the bin is drawn through ore gates 3 feet wide by 2 feet high, into scoop cars traveling on rails. The ore gates have to be made this large as the miners, in spite of vigorous protests, seem to delight in shipping pieces whose weight sometimes amounts to 900 pounds apiece. This is, of course, bad practice, as when several of such lumps ranging from 18 to 24 inches

with sledge hammers to sizes that can be admitted into the 11-inch opening between the corrugated crusher head and the concaves of the crusher. The crusher is set to crush to a size of from 3 to 5 inches, corrugated crusher heads being used. If, as stated, the lumps of ore do not exceed 10 or 11 inches in thickness, there is no delay in passing the material through the crusher, which will then easily crush a ton of ore in from a half to three-quarters of a minute. The crushed material is then spouted down to the first Johnson No. 1 sampler, marked Fig. 2 in the drawings. This sampler makes between 6 and 7 revolutions per minute and cuts out either 10 per cent or 20 per cent, as desired for the first sample. In the arrangement shown by the illustration the sampler will taken 10 per cent of the material, but if the lid, *l*, is removed, and the second tongue, *tl*, is put

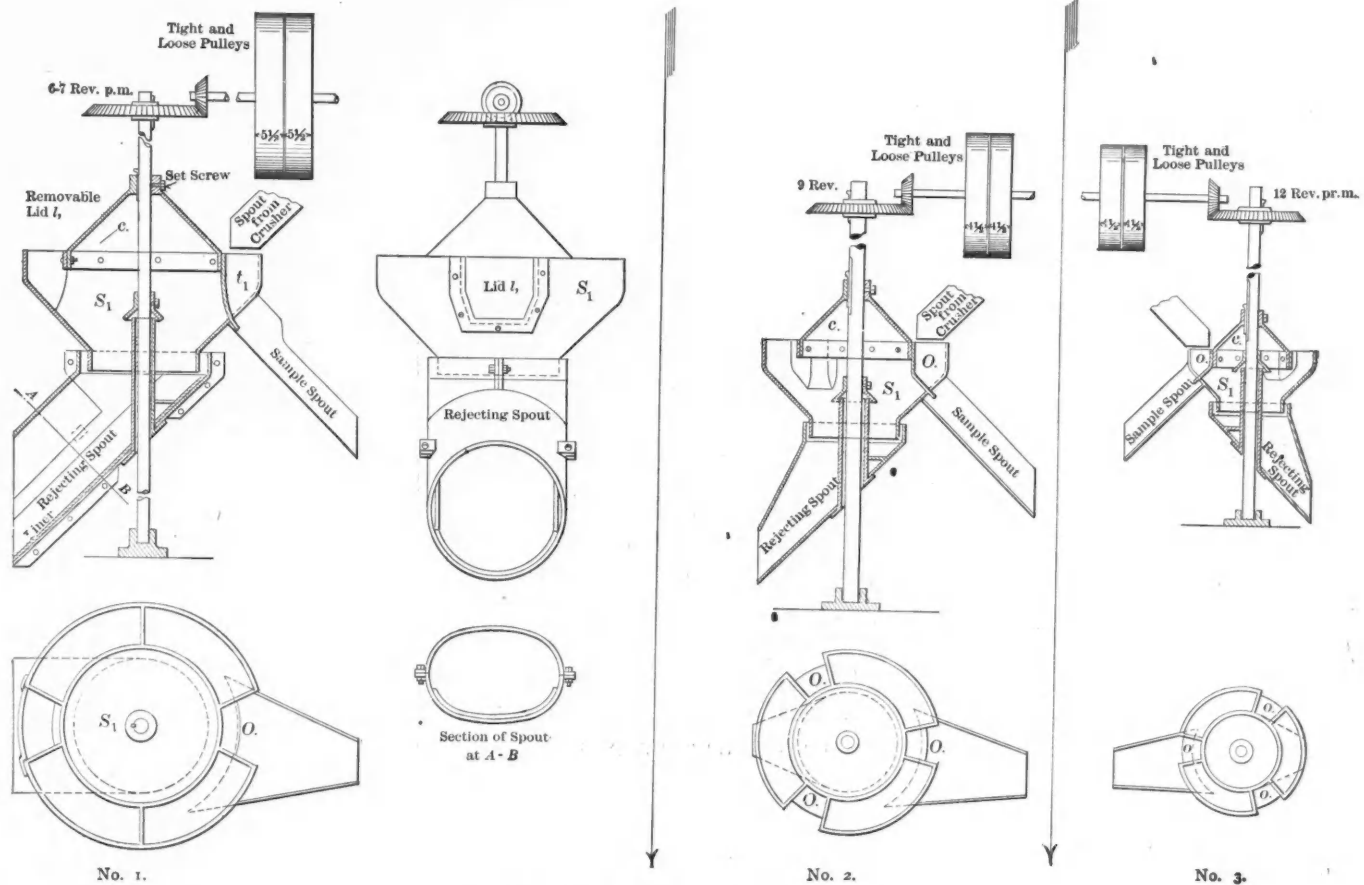


in the opening, the sampler will take two samples for each revolution, each one amounting to one-fifth part, or 20 per cent. The rejected 80 or 90 per cent passes through the rejecting spout into ore bin No. 1, while the sample passes through the sample spout to a No. 2 Gates crusher marked Fig. 3 in the drawings. The sample is now crushed in this second crusher to a size of from  $\frac{3}{4}$  to  $1\frac{1}{4}$  inches, and then passes through a No. 2 Johnson sampler. (See Fig. 4.) This cuts out three samples for each revolution and makes nine revolutions per minute. Twenty per cent is taken for the sample, while the remaining 80 per cent is rejected to the ore bin No. 2. The sample is now conveyed to the boot of the elevator (Fig. 5), and from there lifted about 55 feet to the top floor of the sample mill and dumped through a chute to a No. 0 Gates crusher indicated by Fig. 6 in the drawings. This reduces the sample to sizes from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch, and the material is conveyed through a spout to Johnson sampler No. 3 (Fig. 7).

the sample is finished through a 120-mesh sieve. By this process the total amount of ore received is crushed and submitted to the sampling operation. If 10 per cent is taken for the sample after the first crushing, and afterwards 20 per cent, or 1-5 each time, it will thus be seen that the final sample in the buggy car will weigh  $1-10 \times 1-5 \times 1-5 \times 1-5$ , which is equal to 1-1250 part of the whole. If the shipment of ore is not a large one, and I judge by this division that the final sample will be too small after crushing and sampling the lot four times as above, I adjust the No. 1 sampler so that it remains stationary and all the crushed ore is diverted through one of the sample openings (See O) to the No. 2 Gates crusher, and in this way we get only  $1-5 \times 1-5 \times 1-5$ , or 1-125 part of the entire lot for the final sample. In the same way we can also let No. 2 sampler remain inactive together with No. 1, so that all the crushed ore is taken to the elevator and crushed in the No. 0 Gates crusher and then afterwards sampled, in which case

vertical shaft as well as the protecting cast-iron cylinder, the weight keeping the suspended sampler plumb and in position.

The operation is as follows: The crushed stream of ore falls down the spout from the crusher to the circular opening of the sampler outside the top cone, C. The sampler is rotating at the same time, and every time the openings, O, come under the spout leading from the crusher, the ore is by means of the tongue, T<sub>1</sub>, diverted to the sample spout, and when this opening has passed ore drops inside the funnel-shaped inverted cone, S<sub>1</sub>, into the rejecting spout, R Sp, to the ore bin below. If the segmentary area, O, is made 1-10 of the entire circumference, 10 per cent is cut out of the sample, and if it is made 1-5 of the entire circumference, 20 per cent is cut out of the sample. The openings, O, of the No. 1 sampler are large enough to admit pieces of 12 inches, largest dimension. If No. 1 sampler is operated, as shown in the drawings, it will take 10 per cent for the sam-



JOHNSON'S AUTOMATIC ORE SAMPLERS.

This sampler, making 12 revolutions per minute and cutting 3 samples for each revolution, again cuts out another one-fifth for the sample. The remaining four-fifths are discharged into ore bin No. 1, while the sample is dropped upon a sloping feed table, 7A, which, with a reciprocating motion, feeds the sample to a pair of 10 by 16-inch Reliance rolls which reduce the sample to an average size of  $\frac{1}{8}$  inch. It now passes through a fourth Johnson sampler of the same size as the preceding one (No. 3) and again 20 per cent is cut out, while the remaining 80 per cent is dropped into ore bin No. 1. The now final sample is conducted through a spout and an 8-inch pipe to the sample buggy car and conveyed to the quartering plates. It is here cut down and mixed from one to three times, according to the size of the sample desired. The sample is then taken to the sample grinder and reduced quite fine, is again mixed and quartered down on the bucking plates. It is then reduced to a 100-mesh sieve and from this pulp the final sample is taken. Usually three bags are filled and sealed, one for the smelter, one for the ore shipper and a third for umpiring, in case of disagreement of the shipper and smelter assays. When I have a quartz ore in which I believe free gold to be present,

only 1-25 part of the whole lot is received for the final sample. Lots for sampling which weigh, say, 200 pounds, are fed directly to the No. 0 crusher on the top floor, and these lots are then only crushed and cut twice. If the lot to be sampled weighs only 100 pounds, sampler No. 3 is also kept idle and all the material is diverted to the rolls, and the fourth sample only cuts out a 1-5 part for the final sample.

In describing the construction of the samplers I shall refer to sheet No. 2 of the drawings. In operation, as will be seen, the sampler is hung on a vertical shaft by means of the top cone, C, and is secured to the shaft by means of a set screw. The funnel-shaped sampling part proper (S<sub>1</sub>) is bolted to the lower circumference of the top cone. Around the lower circular part of S<sub>1</sub>, with an intermediate space, is the stationary spout (R Sp) for rejecting the ore to the bin below. The vertical shaft is protected from the wearing effects of the crushed ore by a cylinder passing vertically through the rejecting spout. The sampler can, if desired, be made to hang or suspend by its vertical shaft. In this case the shaft would only come to the center of the circular lower portion of the top cone. This leaves the lower part, S<sub>1</sub>, and the spout, R Sp, entirely free from the

ple, but if the lid, L<sub>1</sub>, is unscrewed and a tongue, T<sub>1</sub>, bolted in its place, 20 per cent will be taken for the first sample. On the other samplers (sizes No. 2 and No. 3) three openings have been left, so that these samplers will cut out three samples for each revolution. Experience has shown that it is advisable to let No. 1 sampler make from 6 to 7 revolutions, No. 2 9 revolutions, and No. 3 12 revolutions per minute. The Gates crushers have been found to give a uniform product for sampling, and do not choke up. With the No. 5 Gates crusher over a ton of ore can be dumped into it without clogging its operations. I have found also that the jaw system of crushers is more liable to break the ore into the shape of slabs, whereas the gyrating crushers break up the pieces into a more or less rounded cubical shape, which is better for sampling purposes. The jaw crushers have a tendency to shake the foundations, as they make considerably more noise. The gyrating crushers have been found to be much easier on their foundations.

These automatic samplers have been found to fill the essential conditions for a good sample; that is, they will take a full cut of the entire stream of ore, and this at frequent intervals. They are easy to

keep clean, as it is necessary only to clean the openings (o) with a broom. I have with this sample mill crushed and sampled as much as 50 tons of ore per hour, while for looking after the entire sampling machinery and the engine used for driving the main shaft, only one man is necessary. All the belts for driving crushers, samplers, and the elevator are, as will be seen by plan I, driven from one main shaft. This by belting is operated by a 16 by 18-inch Erie City engine rotated at 100 horse-power and 100 pounds steam pressure.

The sample mill has at present a capacity for crushing and sampling 500 tons in 12 hours, or 1,000 tons by working double shifts. As stated before, everything is done automatically, all the work required being to dump the ore into the big crusher at the top, the sample being discharged to the sample car, and the rejected ore to the sample mill ore bin, without further handling.

When the mill is running at full capacity two men are required to draw the ore from the upper ore bins into the ore buggies. Two men are required to bring full cars down to the sample mill and to return the empty ones. Two men are required for weighing the ore and dumping it into the crusher, in breaking up the big pieces. One man is required to look after the sample mill machinery, and two or three men to bring the ore from the sample mill ore bin to the smelter mixing bin. When filling the nearest bins only two men are required, while for those further away three are needed.

By extending the main shaft and installing other sets of crushers, samplers, conveyors, and ore bins, the present sample mill capacity can be doubled or trebled. The dimensions of the present sample mill are 78 feet long, 65 feet wide, and 58 feet high.

Below is given the results of assaying checked samples of various lots, two independent samples, A and B, being taken of each lot. This indicates how nearly two independent samples will come to each other by this system of sampling. The character of the ore is also shown by the analyses following the assays. Quartz ores carrying free gold are liable to show the greatest differences,

Sample.	No. of Lot.	Size of Lot. Tons.	Cu. % wet.	Assay. Au. oz.	Ag. oz.
a.	1	32	6.6	0.04	1.00
b.	1	32	6.4	0.03	1.25
a.	2	65	6.10	0.12	1.80
b.	2	65	6.15	0.12	1.70
a.	3	110	3.85	0.01	2.17
b.	3	110	3.80	0.01	2.20
a.	4	150	1.70	0.145	0.34
b.	4	150	1.70	0.150	0.33
a.	5	27	1.70	0.52	1.30
b.	5	27	1.68	0.48	1.39
a.	6	32	0.90	0.15	0.41
b.	6	32	0.93	0.14	0.42
a.	7	60	0.88	0.20	0.45
b.	7	60	0.90	0.18	0.44
a.	8	17	0.00	0.74	5.60
b.	8	17	0.00	0.72	5.62
a.	9	30	0.00	0.36	2.00
b.	9	30	0.00	0.34	1.90
a.	10	110	0.00	0.29	9.70
b.	10	110	0.00	0.27	9.60
a.	11	17	0.00	0.04	25.70
b.	11	17	0.00	0.04	26.40

ANALYSIS OF ABOVE ORES:

Lot No.	Ins., %.	SiO <sub>2</sub> , %.	Fe., %.	CaO., %.	Sulph., %.
1	51.6	32.6	14.8	4.1	10.9
2	54.2	52.0	12.6	3.8	tr.
3	37.4	29.5	16.7	17.8	6.4
4	42.1	38.0	23.2	13.1	2.4
5	50.1	37.5	19.3	3.4	12.0
6	30.4	33.1	26.5	tr.	18.6
7	34.7	29.6	26.7	tr.	18.3
8	90.2	89.5	3.3	tr.	1.2
9	93.0	91.7	2.3	tr.	0.7
10	84.5	82.1	4.2	tr.	3.3
11	63.7	63.1	10.1	tr.	11.6

**A NEW GERMAN EXPLOSIVE.**—According to the London *Colliery Guardian*, a new explosive, patented in Germany, is constituted by a mixture of calcium carbide with barium hyperoxide. The cartridges are divided by a very thin sheet of tin into two separate parts, one of them containing the mixture of salts and the other diluted acid, which, in a comparatively short space of time, destroys the tin diaphragm and comes into contact with the salts. The reaction causes a violent explosion, occasioned by the simultaneous formation of acetylene, hydrogen and oxygenated steam, which unite.

REORGANIZATION OF THE UNITED STATES GEOLOGICAL SURVEY.

By HARRIET CONNOR BROWN.

A reorganization of the Geologic branch of the United States Geological Survey has been recently effected by the appointment of Dr. C. Willard Hayes to the position of Geologist in Charge of Geology. Dr. Hayes, whose career in the Survey has been of continual advancement during the past 15 years, entered upon the duties of his new office on March 1.

The work of the Survey is divided into various branches, including those of geology and palaeontology, hydrography, chemistry, physical research, mining and mineral resources, topography, geography and forestry, and each branch is under the supervision of an expert in that particular field of investigation.

When Mr. Charles D. Walcott became director of the Survey in 1894, he took upon himself the personal superintendence of the division of Geology and Palaeontology in addition to his duties as director. About five years ago the burden of his work became so heavy that Mr. Bailey Willis was appointed assistant to the director in Geology and Palaeon-



DR. C. WILLARD HAYES.

tology. By the recent appointment of Dr. Hayes to the head of the division, over which he now has complete administrative authority, Mr. Willis is freed from his duties as assistant and is now at liberty to give more attention to the division of Areal and Stratigraphic Geology, of which he has charge.

In announcing these changes at a meeting of geologists in the office of the Survey on February 20, the director called attention to the plan of organization of the geologic branch, set forth in the Twenty-first Annual Report, pages 20 and 21, and more fully elaborated in the forthcoming Twenty-second Annual Report. The fundamental idea of the organization is that scientific direction and supervision may be, and in most cases should be, separated from administrative control. The authority of the specialists placed in charge of the various divisions of investigation is in general limited to the consideration and approval of the scientific aspects of the work, while administrative authority remains immediately with the director.

The divisions of Geology and Palaeontology pursue their investigations along various lines under the supervision of their respective heads. These subdivisions include those of areal and stratigraphic geology, Pleistocene geology, Pre-Cambrian geology, Palaeontological geology, the economic geology of precious and non-precious metals, and the economic geology of non-metalliferous minerals. The last-named division has been in charge of Dr. Hayes, who will continue to direct the work.

Dr. Hayes' promotion comes as the well-merited

recognition of continuous and faithful service. It comes early, for Dr. Hayes can only boast of 42 years. His native state was Ohio, where he laid the foundation of his education at Oberlin College. Later he took his degree of Ph. D. at Johns Hopkins University. He first became connected with the United States Geological Survey in 1887, working in the division of general areal and economic geology until two years ago, when he was made head of the division he still superintends. He has done a great deal of important field work, and has, from time to time, published pertinent papers on subjects connected with theoretical and economic geology.

One of Dr. Hayes' most interesting contributions to geography was the result of a trip to Alaska made in 1891 with Lieut. Schwatka. That was in the days before the rush to the northern gold fields had begun and before the Survey had done any work in Alaska. The Schwatka expedition traversed about 1,000 miles of that unknown country, going from the Taku River, down the Teslin and thence across the White River basin and the Mount Wrangel Range to the headwaters of the Copper River. They were the first white men to explore the Copper River region, and Dr. Hayes' sketch map of the district was the first ever made.

The year 1897-98 was spent by Dr. Hayes in Nicaragua, where he took charge of the geological work done there by authority of the Walker Commission, particularly the borings to determine the character of the rock. His report on the geological conditions of the isthmus, particularly the volcanic phenomena, has an important bearing on the final choice of a canal route.

The greater part of Dr. Hayes' field work has been done in the Southern Appalachian region. The phosphates and the bauxite deposits of the South have claimed his particular attention, he having made reports on all the known deposits of bauxite in the United States. He spent six weeks in Cuba last year in charge of the reconnaissance survey of the mineral resources of the island which was made at the request of Governor-General Wood. He has recently returned from Beaumont, Texas, where he was engaged in the preparation of a report on the oil-fields.

Among the numerous papers published by Dr. Hayes might be mentioned the following: The Overthrust Faults of the Southern Appalachians; Geology of the Coosa Valley, Alabama; The Geomorphology of the Southern Appalachians; The Classification of the Southern Appalachian Iron Ores; The Bauxite Deposits of Georgia and Alabama; A Report on the Expedition Through the Yukon District; The Tennessee Phosphates; The Physiography of the Chattanooga District; Report on Physiography and Geology of Region Adjacent to Nicaragua Canal; The Bauxite Deposits of Arkansas; numerous papers on the Nicaragua Canal Route; reports on Areal Geology covering 10,000 square miles in the Southern Appalachians, published in the geologic folios.

THE ELECTRIC TREATMENT OF PEAT.—

Recently a factory has been built at Stangfjorden, in Norway, for the electric treatment of peat by the Jebesen process. According to a description given by the *Zeitschrift für Electrochemie* (January 16, 1902), the peat is first submitted to air drying, and is pressed until the water contents are reduced to 20 per cent or under. It is then charged into retorts of special design, heated internally by electric resistance coils. A gas useful for heating purposes, and a tarry oil, distill over, while a very pure form of peat charcoal or coke remains in the retorts. The tarry oil can be worked up for the recovery of paraffin, ammonium sulphate, and methylalcohol. The electric plant at Stangfjorden consists of five 128 horse-power turbines and five dynamos of equivalent power. A daily treatment of 100 metric tons of air-dried peat is possible with this plant, in the 12 retorts which are at present installed. It is understood that attempts are being made to introduce this process into Ireland, in connection with proposed water-power developments in that country.



## MECHANICAL UNDERCUTTING IN CAPE COLONY.\*

By JOHN COLLEY.

At the Indwe Mines, in the division of Wodehouse, Cape Colony, the management decided to adopt the use of mechanical coal-cutters for the following reasons: (1) Scarcity of labor. There is only a limited supply of trained natives available for this work; the raw Kaffir does very badly, and white labor is too scarce and costly for this work. (2) The high cost. The cost of native undercutting is fully 50 per cent more than similar work costs in Great Britain. (3) Inefficient hand labor. When it is stated that a native will not undercut more than 2½ feet in a seam of 6 feet thick, consisting of alternate banks of soft coal and hard shale which has to be brought down by blasting, it will readily be seen that a large percentage of valueless small coal is unavoidable. And (4) it was desirable to reduce the amount of explosives used, the cost of which varied from 6 to 8 pence per ton of coal mined.

The natural conditions would, at first sight, seem to be very favorable. The seam has a sound, hard, rock roof, and a fairly level floor, and the undercutting is very tough, but free from pyrites or ironstone. The bottom portion of the seam, where the undercutting is done, is a mixture of thin irregular bands, each about 1 inch thick, of coal and shale.

It was decided to start a small trial plant, and electricity was chosen as the motive power. The deciding factors were: Low first cost; absence of firedamp; utility of electricity for lighting; and a strong general opinion held by the management that electricity was preferable to any other means of power transmission.

The plant consisted of a disk-wheel cutter of British make, to undercut 3½ feet; and a multiplier, compound-wound continuous-current dynamo, of 23 horse-power. The engine has a single horizontal cylinder, 12 inches in diameter by 24 inches stroke, with positively-driven Corliss valves, intended eventually to work three or four cutters, when driven at 100 revolutions by steam of 100 pounds pressure.

After much trouble (occasioned in nearly every case by inattention to detail on the part of the makers of the electrical part of the plant) the work was got fairly under way. Among the difficulties encountered was the burning out of two of the field coils; after which it was decided to rewind all four, and they have since given very little trouble. The motor armature of the cutter was also wrecked after the first few hours' work; and it was only after a serious loss of time and money that the cause was discovered. The field-coils were so badly fastened on the field-magnets that when the machine was cutting they shook down on to the armature, with, of course, disastrous results. This was found out after the management had, as a last resource, bound the second armature, which had also been damaged from the same cause, with thin tar band, whereupon tar was found sticking to the field coils. These coils were clear of the armature when the machine was standing, and the completely enclosed motor prevented their changed position from being noticed while cutting was being done. It may be of interest to state that the tar band wound armature did good work, while the ruined one was being repaired and returned from Great Britain.

Four working faces were opened, each 360 feet long. Pillars, 36 feet thick, were left on each side of the main level, and faces started away to the right and left hand. After making 30 3-ft. cuts in each face there were decided signs of the roof giving way. The roof is of hard sandstone rock, and there is no gradual bend; it falls very suddenly over the whole worked out area. It was considered too risky to cut further than this distance from the pillars, and as it was slow and expensive work opening out these long faces, the management decided to try a chain cutter. One was procured from the United States to undercut to a depth of 6 feet, with a cut 44 inches wide. With this machine, it is quite possible to work on the pillar-and-stall system. Double

stalls were started, 60 feet wide, with a 30-ft. rib between each stall.

There are arguments for and against the use of each type of cutter; and a careful record of their performances has enabled a comparison to be made, which, of course, is only applicable to the conditions obtaining at these mines. As a result, it has been decided to adopt exclusively the chain type of cutter. The following conclusions are arrived at after 9 months' work with the disk cutter, and 3 months with the chain machine:

The chain machine requires less power. It cuts 18 square feet in 5 minutes with 30 amperes at 400 volts. The disk machine cuts 7½ feet 3 feet under 45 amperes, at the same voltage and in the same time. This shows a saving of 20 per cent in favor of the chain machine. The better class of gearing, and the better arrangement of the cutter bits in the chain machine, and the power needed to overcome the friction due to the side thrust of the disk machine, probably account for this difference.

The actual cutting capacity of the two machines is about the same. Moving the machine about from one place to another takes about the same time in each case; as, though the chain machine has to be moved five times to the disk machine once, it only takes one-fifth of the time to move it. Special means have to be taken in each case to maintain the machine at its work. The disk machine bent 20-lb. steel rails out of shape, and was constantly breaking the rear guide wheel. The present design of rails used is possibly original, and though somewhat clumsy, is very effective. Two 20-lb. steel rails are bolted permanently to steel sleepers, and form the track on which the machine runs. A third and outer 46½-lb. rail, also bolted to the sleeper, acts both as a check rail and stiffener, the thrust of the machine being against this rail. As the 46½-lb. rail stands 1½ inches higher than the 20-lb. rail on which the machine runs the machine cannot jump the track. The rails are fastened at the joints by means of ordinary fish-plates on the two 20-lb. rails.

There was also considerable trouble in keeping the chain machine to its cut. The effect of this machine not being jacked firmly down is to cause the machine not only to cut straight in, but to pull the chain towards the solid side of the cut, when the picks on the side of the chain begin to do work, as well as those in front. This requires more power than the motor will deliver, the machine draws up and the fuse goes. The screw jacks, one in front and one behind, are ordinarily used to fasten the machine down; but it required two additional jacks to keep this machine firmly in place. There was too much strain on the whole of the machine, however, so a new set for worm gear was designed to feed at two-thirds of the rate of the original gear. Consequently, it took 5 minutes to make the cut instead of 3½ minutes as formerly; but 5 minutes' less time was taken in moving the machine across and securing it ready to make another cut. Since this alteration, the machine runs smoothly, and with less than half the noise made by the disk machine.

The cutting is made in the softest part of the seam (a series of thin bands of coal and shale 5 inches thick), and 5 inches from the floor. With the disk machine, any unevenness of the floor, or if the rails are not laid properly as regards their height from the floor, causes the disk to climb, so as to pass up or down into this soft place. The machine then has at once to be stopped, so as to return the disk into the proper plane for cutting; this wastes a great deal of time. The chain machine shows no tendency to climb. Cuts have been made both immediately under and over this soft band, with no worse results than to require about 30 per cent more power. The cutting parts of both machines are difficult to keep properly oiled.

The chain machine requires moving and secure jacking for each cut it makes; but this, it is found, takes no more time per square foot cut than laying the rails for the disk machine. A deep undercutting disk might have some advantage over the chain type in this respect, but this would depend on whether the difficulty of keeping a disk machine to its work is in proportion to the distance undercut.

The cutter bits for the chain machine are much more simple than those supplied with the disk machine, being formed of straight bits of steel, ¾ by ½ inch in section. They cost about 3 pence each, while the disk wheel bits cost 3 shillings each. As the bits of both machines are constantly being lost or broken, the cost is an important matter.

The great drawback with the chain machine is that it requires 11 or 12 feet clear space from the coal face to the pack wall. At the Indwe Mines, however, it is quite possible to so work the seam that these conditions are easily maintained.

## FOREIGN USES OF OIL FUEL.

CONSULAR REPORT.

Consul D. T. Phillips, at Cardiff, has sent to the State Department a report on the use of petroleum for fuel in England.

An impetus was given to the use of oil for fuel five years ago, when petroleum discovered in Borneo was found to be well adapted for fuel purposes. This field is owned by the Shell Transport and Trading Company, Limited. Last year (1901) the exports exceeded 100,000 tons.

The Dutch Steamship Company uses this fuel in its boats; the Hamburg-American Line has built four new steamers adapted for oil fuel, and run them in the Eastern trade with marked success; the North German Lloyd has two local steamers using oil; the East Asiatic Company, of Copenhagen, employs this fuel in its local boats, and is building two ocean-going steamers with the intention of using it; and the China Mutual is preparing three boats for the employment of oil.

The prejudice against this sort of fuel is passing away. Several firms are contemplating a change in their method of steam production, which they predict will be as safe as the old method and more economical. The advantages are said to be:

First. The saving of labor is large; there will be no ashes to hoist overboard after each watch; no need of stoking. All that will be necessary will be to watch the water in the boilers; the feeding of the fuel to the furnaces will be automatic.

Second. Fewer deck hands will be needed, as the dirt caused by coal shoveling will be done away with.

Third. Under proper combustion no smoke will be generated; every atom of oil is of calorific value; there is no residue.

Fourth. The fuel may be stored in the double bottom of a ship, the forepeak, afterpeak, and tanks under the engine room, thus occupying space not utilizable in any other way. No rust is possible where it is stored. The space now filled by coal bunkers is thus available for cargo; oil stores in a space of 35 cubic feet per ton, as against 44 per ton of coal. The last results obtained show that Messrs. Thornycroft have evaporated 18.95 pounds of water per pound of oil in their torpedo-boat type of boiler, but in ordinary locomotive types 15 pounds of water per pound of oil is obtained.

Fifth. The oil fuel has a higher concentration of heat for manufacturing than can be obtained with coal.

Until recently, oil fuel was held at a figure which did not enable it to compete with coal. A few months ago, however, oil in tremendous quantities was discovered in Texas, and the Shell Company found that it was capable of giving the same results as are derived from Borneo oil. An enormous expansion of its use may be expected.

The Great Eastern Railway, of England, has already a large number of locomotives using this fuel. The officials state that by its use steam is more easily produced and is maintained up the steepest gradients, and great economy is effected by reducing the supply of oil when descending or remaining stationary; the life of the boilers is prolonged, inasmuch as the tubes do not foul; the nuisance of smoke and the danger of sparks to surrounding property are entirely obviated, and the rolling stock generally is kept in a state of cleanliness.

\*Extract from a paper read before the North of England Institute of Mining and Mechanical Engineers.

### ANOTHER SMELTER IN THE BOUNDARY DISTRICT, BRITISH COLUMBIA.

BY OUR SPECIAL CORRESPONDENT.

The purchase by the Montreal & Boston Copper Company, Limited, of Montreal, Quebec, of the smelter built early last year by the Standard Pyritic Smelting Company near Boundary Falls, B. C., has now been definitely announced. Reports had been in circulation for a week or more previous to the completion of the transaction to the effect that it had been closed, but these lacked confirmation until yesterday. The smelter property lately belonged to Mr. Wm. Price, of Quebec, he having foreclosed a mortgage he held over it, so the recent sale was made on his behalf. He was represented in this matter by Mr. E. J. Wilson, manager of the Standard Pyritic Smelting Company. The erection of the buildings and equipment of the smelter proceeded for some time under the direction of Mr. Andrew Laidlaw, now of Chicago, who also took a prominent part in organizing the Standard Pyritic Smelting Company, but before the plant was installed he

them. At a lower level the furnace floor extends east from the stone retaining wall 60 feet and has a length of 140 feet. The dust flue, of stone walls with arched brick roof, runs about 200 feet to the steel smoke-stack, which is 9 feet 6 inches in diameter and 112 feet high above a 14-ft. brick base. On the furnace floor level are two 75-horse-power engines, one to run the No. 7 Connersville blower and the other the sampling machinery. The furnace is 40 inches by 176 inches inside the tuyere line and has a nominal capacity of 300 tons each 24 hours. It is a larger furnace than those of the Granby and B. C. Copper Company's smelters. A 250-light Siemens-Halske dynamo run by a high speed Atlas engine furnishes lighting facilities. A well-equipped laboratory for assay purposes and commodious offices also form part of the establishment.

Mr. Wilson has already placed the purchasers in possession of the smelter, and it is stated that Mr. H. C. Bellinger, the well-known smelter expert, who reported on the works for the new owners, is preparing plans for a coarse crushing plant and various

feet and the Crown Silver to 262 feet, the total work on these properties in underground development done up to January 1, 1902, being 4,516 feet. It is stated that there are at least 250,000 tons of ore in sight above the 100-ft. level of the Sunset and that ore has been cut at both the 300 and 400 levels. Last year about 800 tons of ore were shipped to smelters, chiefly for test purposes. The plant at the Sunset includes two 80-horse-power horizontal return tubular boilers, half of a 20-drill duplex air compressor, two air receivers, ten 3/4 machine drills, a 100-horse-power double cylinder double drum link motion Jenckes hoisting engine, Laurie feed water heater, safety platform cage, electric light plant, well-found tool and repair shop, assay plant, etc. Recently commodious bunk and boarding houses were erected, ore bins with a holding capacity of about 2,000 tons, and elevated tramway from shaft to ore bins built, and other substantial improvements made. A railroad spur was recently put in to facilitate shipment of ore to the smelter. Latterly there have been between 50 and 60 men on the mine pay-roll. Captain Harry Johns is in charge and Mr. H. Galbraith, a McGill graduate, is assayer at the mine.



MONTREAL AND BOSTON COPPER CO.'S SMELTER NEAR BOUNDARY FALLS, B. C.

sought the assistance of Mr. Jas. W. Neill, of Salt Lake, Utah, for many years manager of the Taylor & Brunton Ore Sampling Company. Later Mr. Wilson, who had for some time been metallurgist in charge of the blast furnaces of the Great Falls smelter, Montana, arrived to take charge of the new works, but owing to the lack of a sufficient ore supply to keep the smelter running continuously and for other reasons, he advised that the furnace be not yet blown in. Then financial difficulties overtook the Standard Company, which was under considerable obligation to Mr. Price and others for money advanced, so the works have remained idle ever since.

The following description of the works has been supplied to the writer. The large main building—the smelter proper—is 182 feet in length by 120 feet in width. Measuring from the feed floor in the centre of the building the height is 64 feet, and from the furnace floor to the roof nearly 80 feet. Facing from the north, on the west end of the building is the sampling department, in which there are two 36-in. and two 48-in. automatic samplers, a 7 by 10 Blake rock crusher, two sets of 12 by 20 rolls and two belt elevators. East of the sampling department are located the bins for the sample discard. Next are placed two parallel rows of ore storage bins, eight in a row and each bin 34 by 10 feet. Further east are lime and coke storage bins, the whole group of bins occupying the central portion of the building from north to south, with double railroad tracks over

other improvements. The additional machinery will be ordered very shortly and preparations for starting up the works as soon as possible are being pushed, the intention being to smelt ores in the ordinary manner. There is a lot of coal and coke on hand and it is claimed that the Montreal & Boston Copper Company's Sunset Mine is now in shape to maintain an output of about 400 tons of ore per day. Mr. Albert I. Goodell, of Pueblo, Colorado, has been strongly recommended for the position of metallurgist, and it is probable he will shortly arrive at Greenwood to take charge of operations. Mr. Goodell has been engaged at the Philadelphia smelter, Pueblo, and the Kokomo smelter near Leadville, Colorado, and recently had charge of the Needles Smelting Company's copper matte plant, at Needles, California. Mr. C. R. Craig has already arrived from Seattle, Wash., to take the post of accountant at the smelter.

The Montreal & Boston Copper Company, Limited, was organized last year with a nominal capital of \$3,000,000 in 600,000 shares of \$5 each. The leading men in the company are Messrs. J. N. Greenshields, Montreal; Wm. Mitchell, Drummondville, Quebec; T. Crockett, Riviere Du Loup, Quebec; H. H. Melville, Boston; G. H. and A. A. Munroe, Montreal. The company owns the Sunset, Crown Silver, C. O. D., and Florence Fraction mineral mines, all adjoining and situate in Deadwood Camp, near Greenwood. The Sunset is opened up to a depth of 400

### A NEW ZEALAND GOLD DREDGE FOR BRAZIL.

The Otago Foundry Company, of Otago, New Zealand, has lately completed a gold dredge for use in Brazil. It was built for the Trans-Pacific Mining and Exploration Company, a concern which has concessions in Brazil, and of which Mr. J. H. Wall is manager. The dredge is described by the *New Zealand Mines Record* as follows:

The pontoon is of steel, 81 feet long, 25 feet wide, and 5 feet deep. The bottom plates are 5-16 inch and the sides 1/4 inch thick; but the side plates, both in the well and at the outer sides, are 3/8 inch thick where the tumbler frame and outer horses are fixed, and the whole pontoon is very strongly braced with longitudinal angles, lattices, and bulkheads. The decks are made of kauri, bolted to angle-steel deck-beams. The gantry and tumbler-framing are made of steel, the latter being unusually high, as the dredge is fitted with a sluice-box made to stack the tailings fully 8 feet above water. The engine is a 16-horse-power nominal, by Marshall and Sons, and the boiler is a 30-horse-power return flue, locally made. The shafting and gearing are exceptionally strong, and the main spur-wheel and pinion is of steel, the spurwheel being 6 feet in diameter and 4 inch pitch. The top tumbler is fitted with Hadfield's manganese steel corners, while the bottom tumbler is of cast steel, and is an exceedingly substantial job. The buckets are of 4 1/2 cubic feet capacity, but will hold about 5 1/4 cubic feet if filled to the top of the lips. They are especially heavy, being made of 3/8-inch steel plate, with 1/2-inch steel bottoms and 5-inch by 2-inch tire-steel links. The ladder is 54 feet long, and will dredge to a depth of 25 feet below water level. The centrifugal pump is a 12-inch, locally made, and is of the same design as a number of others working on local dredges with excellent results.

The winch is what is called a worm winch. It has six barrels and a surging drum set upon steel cheeks on sides, and each barrel or pair of barrels is driven with a separate steel worm running in an oil-bath, and carried on a fore-and-aft underlying shaft fitted with friction-clutch for each worm. The winch is driven off main gearing by a vertical shaft, bevel gearing, and this gearing is so arranged that the winch can be reversed or stopped at will by a lever. There are quite a number of improvements in this winch, which will make it handy for working, especially in rough ground.

As the dredge is to work in a district some considerable distance from where duplicate parts could be obtained, Mr. Wall has deemed it advisable to order and take with him duplicates for all those parts where there is any chance of a breakage or undue wear; but this possibility is reduced to a minimum when it is known that every gear wheel and pinion on the dredge is of cast steel, with the exception of one.



**THE ASPEN TUNNEL.**

By A. W. CLAPP.

The completion of the great Aspen tunnel, a part of the cut-off from Leroy to Bear River on the Wyoming division of the Union Pacific Railroad, has settled a puzzling project in engineering.

Among the many improvements on the Wyoming division that have been instituted under the administration of President Bert at a cost of over \$10,000,000, the cut-off from Leroy to Bear River is the most important on the entire Union Pacific system. This cut-off avoids the celebrated Tapioca Hill, a hard piece of road to operate at any season of the year, but particularly so in winter. Through this section the old road found its way as best it could, with many a sharp and dangerous curve, and with grades so heavy that helper engines were required for all trains going in both directions.

Leaving Leroy the new line with graceful curves, fellows from side to side the historic Mormon Pioneer Valley a distance of 11.45 miles to Aspen tunnel, which pierces Aspen Ridge, one of the Eastern foot hills of the Wasatch Range. Owing to the character of the material encountered, and to the pressure of water, oil and gases, the construction of the tunnel is one of peculiar interest.

The formation is of a carboniferous nature, a sort of shale which swells and contracts, and crumbles with the changes of temperature in the humidity around it. Against immense timbers and steel beams placed upright along the sides as the hill was penetrated this gigantic mass pressed with tremendous force, snapping the beams like kindling wood and bending the steel like the letter S.

In March, 1899, the West heading of the tunnel was opened; the Eastern, a month later. In August of the same year a shaft was sunk practically midway between the portals, for a distance of 300 feet. It was first intended that work should be pushed in

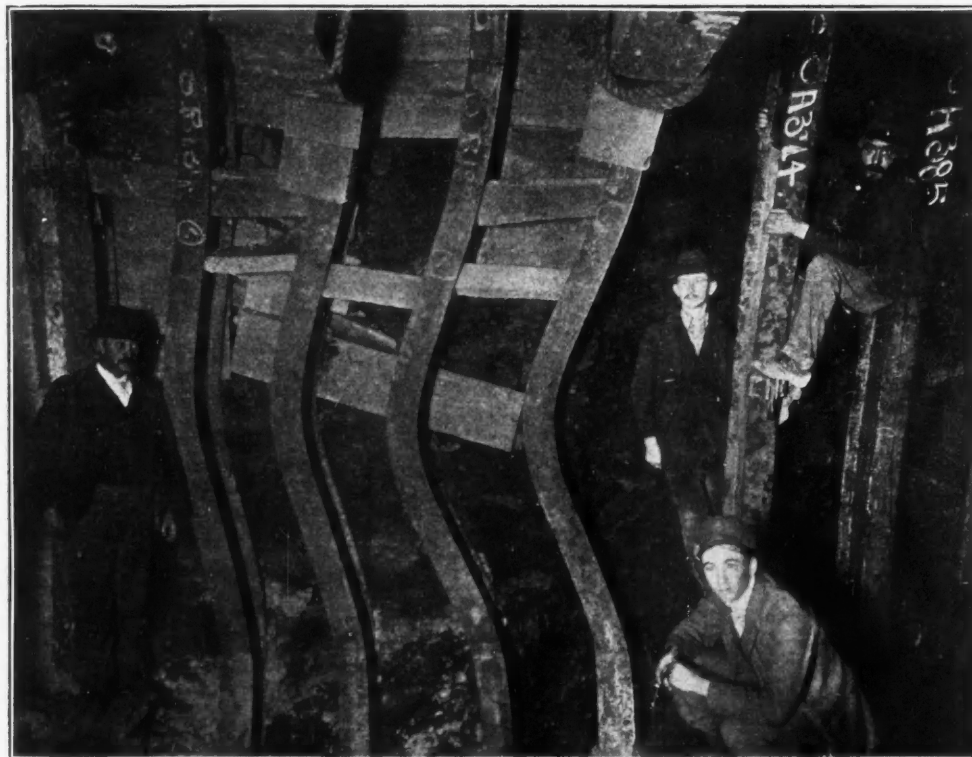
both directions from grade in the shaft, but this was soon found to be impracticable on account of the large amount of water encountered, and which flowed in on the workings often to the depth of four feet, stopping the work. Another factor which operated to the detriment of the work at this point was the inflow of mineral oil. When the shaft had been sunk to grade, a strong flow of oil was encountered which "mixed" with the water, and was pumped by a large Worthington pump to the Western entrance. It was not at first thought that this carried any danger, but an explosion which occurred in De-

ember, 1899, and which resulted in the death of three men, convinced the engineers that a new and dangerous factor which had to be taken into consideration had appeared. Preparations were made to draw off and store the oil, but subsequently this course was abandoned as well as the working in the shaft. At the present time the oil forms a coating of perhaps 2 inches on all water pumped from the tunnel. Deposits of coal have also been encountered in the course of the work.

so as to admit the steam shovel. One of these shovels, made by the Merriam Company, was employed at each end. Their capacity was such that as much material was removed in three hours as an entire gang of men could remove in three days. After the steam shovel had done its work, and the rough timbering had been finished, the plumb timbers were put in. These were of Oregon pine 12 by 10 inches in size. When they had been firmly placed and temporarily braced, steel caps 16 feet by



DRILLING IN ASPEN TUNNEL.



STEEL GIRDERS BENT IN ASPEN TUNNEL.

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From the time the shaft was abandoned, excavation was pushed at the ends only, over 4,500 yards of muck being taken out of the west end alone. The greatest depth below the surface is 456 feet, the highest point above the sea level is 7,296 feet.

The method employed in the excavation was as follows: A heading was driven by power drills 30 feet above grade for a distance of 16 feet with a diameter of 6 feet at each side, leaving what would be technically termed a core. This core was then removed by hand labor. Following this operation the flooring was removed until grade was reached

6 by 6 inches were raised into position by hydraulic lifts and they form the arch of the tunnel. When these were placed in position the first lift of concrete was put in, where the nature of the ground rendered it necessary, which was, as a matter of fact, for a distance of 500 feet near the center of the tunnel. This was followed by three other lifts until the entire surface was covered with concrete.

In the construction of this tunnel three distinct formations of ground were encountered. In the first the rocky ground was bored by Burley drills, and little difficulty was met. Then came shale which was easily removed by the steam shovels. Five hundred feet from the west end, however, slacking ground was struck and the real difficulties of the work commenced. This ground, to use a homely simile, was very much of the nature of the old fashioned pot of yeast, or it might be likened to the asphalt beds of Trinidad on a small scale. As soon as air was admitted to the tunnel it swelled after the manner of quicklime, resistlessly. The writer was shown an instance of this. A section of ground, perhaps 4 feet square, was uncovered to a depth of a foot. In ten minutes the excavated ground was not only level but above the contiguous earth to the height of 14 to 16 inches. Such a pressure of course was extremely difficult to overcome and a successful result has only been achieved by means of 96-pound steel rails laid close together and covered with 6 feet of Portland cement. Before this was done it was thought that 16 by 6-inch girders would overcome the pressure, but as will be seen by the illustration they were bent like wire as soon as erected, while 12-inch timbers were split and cracked literally into kindling wood. So sudden was the action of the ground that the men only escaped by running at full speed from a spot in the tunnel where 12-inch Oregon pine beams had just been placed. The effect was like an explosion, the ground swelling from the bottom and sides, entirely closing up the tunnel.

A few years ago this work which has been done in Wyoming would have been absolutely impossible. The present enterprise does not mean that the men who laid out the first road across the continent

did not do their work well. In those days it was a question of finding a feasible route and the beds of creeks, dry gulches and fertile valleys were followed because there was nothing else to do. It is even a wonder that the surveyor and engineer of the original road were able to get around those immense boulders and altitudes in so creditable a manner. As it is now the new line is about as short as it can be made.

The steam shovel has been an important factor in this work of reducing grades and filling gulches, so that they might be traversed easily and safely. It has been a familiar sight in the past two years in Wyoming—the immense shovel at the end of a long arm digging into the gravel banks, lifting its great handful, returning and dropping it into the car like clock work, almost a shovel full a minute. This working of the steam shovel in the Aspen tunnel is something new in tunnel construction, and has made such achievements as this one possible.

#### OIL SHALE IN NEW SOUTH WALES.

The *Australian Mining Standard* says that much attention is now being paid to the mineral oil deposits in the Australasian States. The large deposits of kerosene shale on the Capertee and Wolgan Rivers, in the counties of Hunter and Cook (N. S. W.), have long been known and Mr. Wilkinson, the late Government Geologist, expressed the opinion that the deposit existing in this field was the largest yet discovered in any country. Some nine years ago the Glen Alice Shale Company (a proprietary company) took up some 4,000 acres of land under mineral permits. The Capertee Shale Company also obtained leases of 2,560 acres, and several other smaller areas were held under mineral permit or lease, the latter amounting in the aggregate to about 8,000 acres. In addition to the land specified the back lands, which are only accessible through the properties already acquired, must amount to at least 20,000 acres. The whole of this land, except where erosion has taken place to below the shale measures, contains shale seams varying in width from 2 feet to 4 feet 3 inches in thickness. Taking the smallest thickness (2 feet) as a basis, each acre would yield 2,400 tons of shale, and taking 20,000 acres (a very small proportion) of the area to be undisturbed, this would produce 48,000,000 tons of shale, which, at 80 gallons per ton (also a very low estimate), would yield 3,840,000,000 gallons of crude oil for this deposit alone. Although there are no known deposits of the same extent and value as the Glen Alice and Wolgan field, there are many others in the State of New South Wales which would pay well to retort. Mr. Carne, Assistant Government Geologist, has paid many visits to the Glen Alice field, and has been engaged measuring the seams on that and all the other known fields for some time past, and he is obtaining accurate information with regard to these vast and valuable deposits which are only awaiting capital to develop them. Mr. Carne's book, with maps and sections of the seams throughout the State, is now being prepared, and will be published about June next. The persons chiefly interested appear to be waiting for the Federal Parliament to place a duty on kerosene. The duty of 3d. per gallon on burning oil proposed by the tariff does not satisfy them, as they fear that large quantities of crude petroleum oil will be introduced and refined here. They ask for a duty on the crude oil as well, and state that if the necessary encouragement be given, capital will be at once forthcoming to work the deposits. In that case large sums will be paid annually to the State Government for rents and royalties, employment will be given to numbers of miners, refiners and others, and the traffic of all the railways of the States will receive a material increase. It is also urged that as many war-ships and other vessels are being fitted with oil engines, from a national point of view it would be a great advantage in time of war that Australia should have its own oil supply instead of depending on Russia or any other foreign country. There is some weight in these considerations. Nevertheless, if the deposits are as extensive and valuable as stated, it must be possible to turn them to account without imposing additional burdens on the taxpayer.

#### A NEW COLORADO GOLD CAMP.

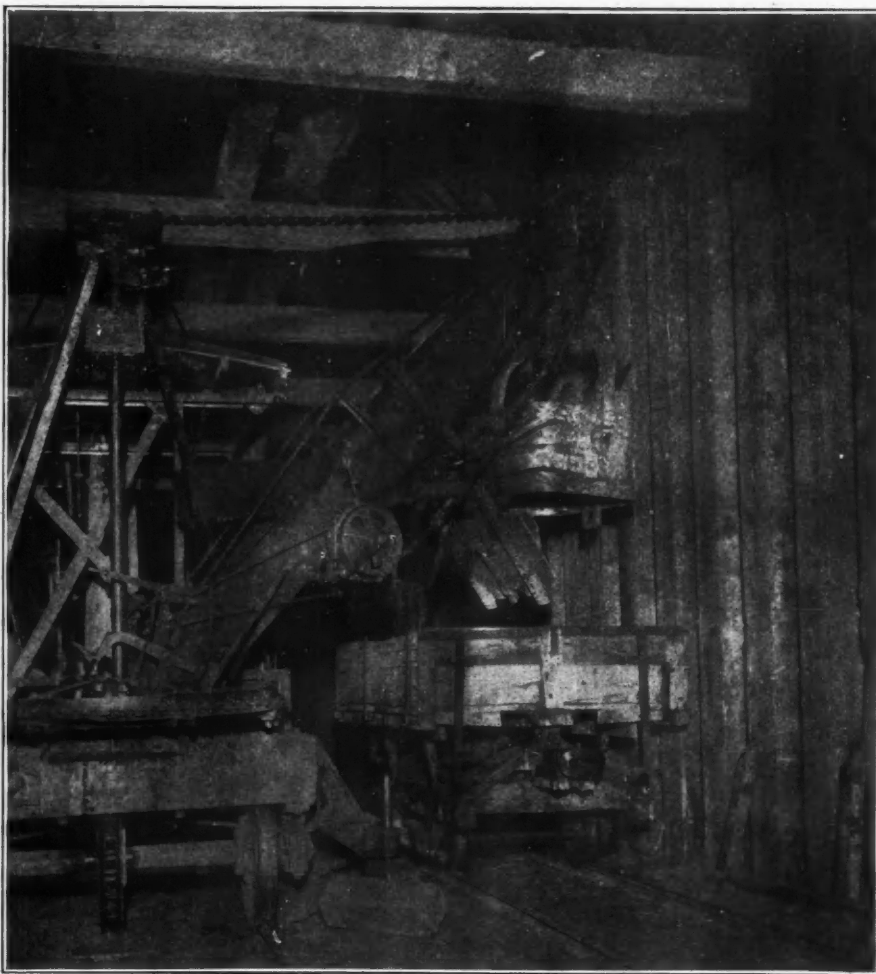
By Our Special Correspondent.

Attention is now being directed to the East Mancos mining district, located in Montezuma County, in western Colorado. Mr. James Doyle, locator of the Portland Mine at Cripple Creek, has been engaged, either personally or through trusted agents, in a thorough exploitation of this region for two or more years, but it is only within the last few weeks that the mining public has been informed of the nature and promise of this district.

From reports now published it appears that the district is not altogether a new one, as the original locators had a small stamp mill in operation for some time prior to these recent explorations. The Mancos region is described as one highly mineralized, in which the ore occurs in fissures and contact veins, the mineral varying in character from lead, copper, manganese and iron on the La Plata side, to silver and gold on the north.

#### CENSUS STATISTICS OF SELECTED INDUSTRIES.

Bulletin No. 150, issued by the Census Office, under date of March 14, contains the preliminary results of the investigations regarding the manufacturing and mechanical industries of the United States. The principal feature of the bulletin is a summary of the statistics relating to about 50 selected industries upon which special reports have been prepared, and which in value of products, represent about one-half of the aggregate of our manufactures. Some interesting results are shown in this compilation, particularly when compared with corresponding details at the census of 1890. In the first place it is shown that the total capital invested in these selected industries amounted in 1900 to \$5,434,629,405 as compared with \$3,781,966,081 ten years before, an increase of \$1,652,662,724, or 43.7 per cent. The aggregate value of the products increased in the same time from \$4,603,434,185, to



STEAM SHOVEL AT WORK IN ASPEN TUNNEL.

Though it is too early to pronounce with any degree of certainty on the actual or prospective value of this new district, there seems to be no question but that it is worth the attention of the prospector. The region is said to be well timbered, with water enough to meet present needs.

Mancos, the outfitting point for the district, is a station of the Denver & Rio Grande Railway in Montezuma County, and the mining district lies in the La Plata Mountains, the watershed to the northeast. It is an interesting fact that, in his earliest publications concerning Colorado, Hayden indicated on his now famous map the existence of placer gold about Parrott City, and of gold bearing areas in this La Plata mountain plateau.

**A BINDER FOR BRIQUETTING.**—For briquetting coal dust Herr Bruno Dumont du Voitel, of Memel, East Prussia, employs a thin dilution of starch as the binding substance; and the resulting paste, subjected to boiling for a short time, is filled into moulds without any great pressure, the briquettes being dried slowly at a moderate heat.

\$6,117,695,710, a gain of \$1,514,531,525, or 32.9 per cent. In the distribution of cost it is shown that the total wages paid increased only 23.8 per cent, while the salaries paid officials, clerical force, etc., increased 51.6 per cent. The inference to be drawn from this is not that wage earners are paid less now than they were two years ago, for an analysis of the statistics shows that the average amount paid each man in 1900 was \$421.7, as against \$408.6 in 1890. It rather shows that a higher grade and better class of labor is employed. This is further borne out by the large increase in capital employed as compared with the increase in product, the added capital being largely due to mechanical improvements which require a less number but a better grade of skilled laborers. The total number of wage earners in 1900 was 19.9 per cent larger than in 1890, while the wages paid them shows a gain of 23.8 per cent. They turned out products which had an increased value of 32.9 per cent. The salaried men in 1900 were paid 51 per cent more than in 1890, while their number increased only 24.6 per cent. In 1890 the wages paid for labor represented 19.5 per cent of



the total cost of production, while in 1900 the percentage of labor cost to the total was 18.1.

Among the half hundred selected industries included in the census report there are eleven more or less directly associated with the mining interests, the principal features of which are shown in the accompanying tables. They represent a capital invested of \$1,743,415,961, and a production during 1900 valued at \$1,405,768,299. The statement regarding iron and steel possesses peculiar interest, for it shows that the invested capital was \$580,041,710, and the value of the products, \$835,759,034, or in other words the value of the production in one year was nearly 50 per cent larger than the capital. This capitalization was the total for 725 establishments. The United States Steel Corporation, incorporated in the following year, was capitalized (including common and preferred stock, and mortgage bonds) at \$1,400,000,000, or nearly 2½ times the value of all the iron and steel works in the United States in the preceding year. It should be stated, however, that any money invested in iron and coal mines, coke ovens, quarries, etc., was not included in the census report, nor did it consider stock or bond issues. Still the figures offer some food for thought.

**A NOVEL MINING SCHEME.**

Methods of gold recovery are developing with startling rapidity, but the following report taken from a recent issue of a New York daily paper is particularly interesting. It looks as if Mr. Mulhatton had turned his reportorial energies in the direction of mining enterprises.

"A novel scheme has been discovered by several farmers on the Big Hole River, in Wyoming, for saving the flour gold along that stream, which had defied all the efforts and ingenuity of miners for many years. On the big bench which lies in the Big Hole Basin, a few miles from Wisdom, there is an immense glacial morain, covering an area of several thousand acres, and tests which have been made show that this immense deposit carries a value of about \$2 in gold to the ton. The gold is as fine as flour, and will float on water. Often in many years prospectors have attempted to save the gold by ground sluicing, panning, washing it over blankets, and every other means known to placer miners, but all proved failures. It was the conclusion that the gold could not be saved and would lie forever just without the reach of man. A few years ago a land company acquired possession of several thousand acres of this land and began breaking it up and seeding it down for grass. Recently an accidental dis-

**COAL PRODUCTION OF MISSOURI.**

We have received an advance sheet from the report of Mr. Charles Evans, inspector of coal mines for the State of Missouri, which is given in full below:

This report, covering the calendar year 1901, shows a larger growth and a greater development in the coal mining industry of the State than in any former year. The output of coal shows a very decided increase, and leads any previous year by over 800,000 tons of coal mined. More new mines have been opened, more improvements have been made, more men have been employed and more freedom from serious troubles than ever before experienced in Missouri. The mines were never so safe or their sanitary condition better, with every indication that the current year will witness still better conditions and an increased product.

The coal output of Missouri for the year was 3,810,767 tons, as against 2,995,022 tons for 1900, showing an increase of 815,745 tons, or 27 per cent. This product sold at the mines for \$4,712,181, compared with \$3,643,975, for the previous year, an increase in the money value of the product of \$1,068,206, or nearly 29 per cent. The average price received at the mines per ton of coal was \$1.24, or 3 cents in excess of the average price for the year before.

The total number of men employed in and about the mines during the Winter season was 10,650, as against 8,698 the year before, showing an increase of 1,952 men. The actual number of miners at work in Winter was 8,341, and during the Summer 5,968. The average number of all men employed throughout the year was 9,218. There were 419 mules worked in the ground in Winter and 341 in Summer. The 365 mines operated during the year are entered by 162 shaft openings, 61 slopes, 88 drifts and 54 strip-pits. There were 73 fans, 124 furnaces and 147 mines furnished with natural ventilation in the ventilation of the mines. Power was furnished by 6 electric plants, 102 steam plants, 143 horse-power plants, and 143 hand plants. There were 171 mines worked on the longwall plan, and 161 on the pillar-and-room system. In extracting the coal the miners used 100,622 kegs of powder, which cost them \$199,684.80.

Accidents in the mines number 31, of which 15 were fatal and 16 were non-fatal, there being two less accidents in 1901 than there were in 1900, although there were more men employed and a largely increased tonnage mined. Falls of roof and coal caused 48 per cent of the accidents, powder explosions 16 per cent, mine cars 16 per cent, premature explosions 7 per cent, returning too soon on shots 6 per cent, and windy shots 7 per cent. The averages per 1,000 men employed were 1.63 killed, and 1.74 injured, a total of 3.37 casualties. The average coal mined per man employed in 1901 was 413 tons.

**A CURIOUS COMPLAINT AGAINST DREDGES.**

—The Australian Mining Standard says: "Among the complaints made against dredging for gold is one that was recently preferred by the mining warden at Adelong, N.S.W., to the effect that it makes the water unfit for use; that stock will not drink it, and are in danger of dying from thirst; and that it constitutes, moreover, a danger to public health. There is no subject on which it is so easy to raise a senseless scare as that of health. It must be confessed, however, that the complaint in this instance seems to be very far fetched. If dredging produced any such deleterious results in creeks and rivers there would have been complaints long ago. That the water may be rendered muddy is easily conceivable. Very little ingenuity, however, would be required to make provision for allowing it to settle. Even before it has settled, mere earthy matter in suspension cannot be regarded as poisonous. The warden promised to send a sample of the water to Sydney for analysis. It seems, however, to be less a case for scientific refinements than for the exercise of a little common sense."

*Census statistics for manufacturing establishments allied to mining.*

**CAPITAL INVESTED.**

	1890.	1900.	Increase.	
			Amount.	Per cent.
Chemicals (acids, bases and salts).....	\$55,032,452	\$89,091,430	\$34,058,978	61.9
Explosives .....	13,539,478	19,465,846	5,926,368	43.8
Fertilizers .....	40,594,168	60,685,753	20,091,585	49.5
Clay products .....	108,705,670	147,913,323	39,207,653	36.1
Coke .....	17,462,729	36,502,679	19,039,950	109.
Gas, illuminating and heating.....	258,771,795	567,000,506	308,228,711	119.1
Glass .....	40,966,850	61,423,993	20,457,053	49.9
Iron and steel.....	405,771,786	580,041,710	174,269,924	43.
Petroleum, refining .....	77,416,296	95,327,892	17,911,596	23.1
Salt .....	13,437,749	27,123,364	13,685,615	101.8
Shipbuilding, iron and steel.....	7,769,966	59,839,555	52,069,589	670.1
Total.....	\$1,039,468,939	\$1,743,415,961	\$704,947,022	67.8

**WAGES PAID (not including salaries).**

	1890.	1900.	Increase.	
			Amount.	Per cent.
Chemicals (acids, bases and salts).....	\$7,308,411	\$9,401,467	\$2,093,056	28.6
Explosives .....	1,240,502	2,383,756	1,143,254	92.2
Fertilizers .....	3,417,870	4,185,289	767,419	22.5
Clay products .....	38,578,389	39,534,070	955,681	2.5
Coke .....	4,072,632	7,085,736	3,013,104	74.
Gas, illuminating and heating.....	8,499,625	12,436,296	3,936,671	46.3
Glass .....	20,885,961	26,529,748	5,643,787	27.
Iron and steel.....	89,273,956	122,710,193	33,436,237	37.5
Petroleum, refining .....	5,872,467	6,717,087	844,620	14.4
Salt .....	1,593,442	1,911,140	317,698	19.9
Shipbuilding, iron and steel.....	4,537,930	16,231,311	11,693,381	257.7
Total.....	\$185,281,185	\$249,126,093	\$63,844,908	34.4

**VALUE OF PRODUCTS.**

	1890.	1900.	Increase.	
			Amount.	Per cent.
Chemicals (acids, bases and salts).....	\$59,352,548	\$62,676,730	\$3,324,182	5.6
Explosives .....	11,352,615	17,125,418	5,772,803	50.8
Fertilizers .....	39,180,844	44,657,385	5,476,541	14.
Clay products .....	89,827,785	95,443,862	5,616,077	6.3
Coke .....	16,498,345	35,585,445	19,087,100	115.7
Gas, illuminating and heating.....	56,987,290	75,716,693	18,729,403	32.9
Glass .....	41,051,004	56,539,712	15,488,708	37.7
Iron and steel.....	478,687,519	835,759,034	357,071,515	74.6
Petroleum, refining .....	85,001,198	123,929,384	38,928,186	45.8
Salt .....	5,484,618	7,966,897	2,482,279	45.3
Shipbuilding, iron and steel.....	12,929,953	50,367,739	37,437,786	289.5
Total.....	\$896,353,719	\$1,405,768,299	\$509,414,580	51.2

The most striking increase in the statement is that shown by the iron and steel ship-building interests, whose capital invested increased 670 per cent, while the value of the products increased 290 per cent. The building of wooden ships showed a decrease both in capital employed and in the value of ships built.

Wages paid in 1900 by the eleven industries included in this table exceeded the amount paid in 1890 by 34.4 per cent, while the total number of wage earners increased only 23 per cent.

**COOLING COKE OVEN GASES.**—A method of cooling coke oven gases for recovery of the by-products, devised by Herr Emil Hulsbruch, Charlottenburg, Germany, consists in employing for this purpose fluids with low boiling point, such as light oils, benzole, liquid ammonia and sulphuric acid, with the object of simultaneously producing low-pressure steam for working engines.

covery was made of the means of saving the fine gold by several men engaged in ploughing. One of the ploughs in use on the ranch was an old one which had been bolted together with copper bolts. Part of the ranch which was ploughed up was an old placer dump at the mouth of Moose Creek, which had been washed over a number of years by placer miners, who had made an earnest effort to save values in the old morain, but without success. It fell to the lot of the old copper-bolted plough to turn over the old dump. One day the ploughman noticed something peculiar about the appearance of the bolt heads on the old plough. He investigated and found that on each of the bolt heads a chunk of amalgam had formed. He removed them and had the amalgam retorted, and secured about 50 cents in gold from each bolt head. The ranchers now believe they have made a discovery by which all the gold in the old morain may be saved. They have had all their ploughs copper plated on the under side of the mouldboard, and are now engaged in ploughing and reploughing the old glacial morain, and expect to make a fortune in gold instead of hay."

**MATTE SMELTING IN CELEBES.**

By S. J. TRUSCOTT.

At the Soemalata Mine, in the island of Celebes, where the ore to be treated consists almost entirely of sulphides, smelting for matte is undertaken. The coarse ore as it comes from the mine is picked over on the headgear, and the waste thrown out, the ore passing to the smelter bins. The finer ore is passed through rotary sieves, to be sized into three products, of which the two finer are jigged, while the third is hand-picked. The result of these dressing operations is a product having much the same composition as the clean coarse ore, which is about as follows: Sulphur, 30 per cent; iron, 50; copper, 1; zinc, 3; lead, 2; arsenic and antimony, 4; lime and alumina, 5; silica, 5 per cent. The ore carries an average of 1.5 ounces gold and 4 ounces of silver to the ton.

The charge for the smelter is generally about as follows: 2,600 pounds ore, 800 pounds coral and 200 pounds wood, or 70 pounds coke. Warm blast is used, and the smelting results in a concentration of 4 of ore into 1 of matte. This is essentially an iron matte, with 1 or 2 per cent of copper. At present it is shipped to Europe to be sold; but it is proposed to obtain a better concentration on the spot by roasting and re-smelting, so that instead of 6 ounces of gold to the ton it shall contain a much higher value. It is interesting to note that this is a case where an iron matte makes a very good extraction, with the help of only a very small amount of copper. The slag is fluid and clean.

Another interesting fact is that sometimes the smelting is entirely carried on with wood fuel. The wood is the branches of trees, cut up into small blocks, and it is used while it is still green. In weight it is 5½ per cent of the charge, while the proportion of coke to take its place would be 1.7 per cent. Such wood appears better than coal, because it is harder and resists pressure better. The coral for flux is obtained from the seashore.

The whole cost of this matte smelting would be only from 75 cents to \$1 per ton, if the smelter could be run continuously. The labor is cheap, because Chinese coolies have been taught to carry on the work, with only one European overseer to look after three shifts at the smelter.

**RECENT DECISIONS AFFECTING THE MINING INDUSTRY.**

SPECIALLY REPORTED.

**DUTY ON WIRE HAWSER.**—A wire hawser or wire rope, galvanized, attached to a reel, invoiced as an entirety and not separable for purposes of appraisal and classification, is dutiable as an entirety at the rates provided for wire rope in paragraph 137, act of 1897, and not as a manufacture of metal not specially provided for under paragraph 193 of said act.—Circular of Treasury Department.

**DUTY ON FERRO-MOLYBDENUM.**—1. A metallic alloy is not a manufacture of metal if the resulting composition is in a crude form of metal, capable of use only as such. (*Dana v. United States* followed.) 2. Ferro-alloy and ferro-molybdenum, an alloy composed of iron and molybdenum, used in the manufacture of steel as a crude metal, is dutiable at the rate of 20 per cent ad valorem under paragraph 183, act of 1897, as a metal unwrought, and not as a manufacture of metal under paragraph 193 of said act. 3. Alloys which have lost their identity as crude metals and have acquired a new name, character and use, are dutiable under paragraph 193 of said act, as manufactures of metal.—Appeal of Hempstead & Son from Collector of Customs at Philadelphia; Board of General Appraisers.

**VALUE OF FOREIGN COINS.**—In reducing foreign standard coins to United States currency for the assessment of duties, the basis in all cases is the pure metal value of such coins, and not their exchange value.

This rule is binding upon all parties; and where

\*Extract from paper read before the Institution of Mining and Metallurgy in London.

the Secretary of the Treasury, under the proviso to section 25, tariff act of 1894, assumes to order the reliquidation of an entry upon the basis of the exchange value of the Indian rupee, instead of its metal value, the action of the collector in obedience to such order is reviewable by the Board of Classification and the courts, being based on an erroneous view of the law.

The evidence in this case, coupled with the declared practice of the Treasury Department, held sufficient to show that the order of the Secretary proceeded upon an erroneous construction of the law, in that it took the true value of the rupee to be its exchange value, and not its pure metal value.

In this decision the Board follows the rulings of the United States Courts in the *Newhall and Beebe* cases.—Appeal of *Whitridge & Co.* from Collector of Customs at Baltimore; Board of General Appraisers.

**RIGHTS OF CO-TENANT IN MINING PROPERTY.**—A tenant in common of mining land may sue a co-tenant who has taken possession for an accounting, where such co-tenant has worked the mines on the property and has sold the deposits, since the action is not one to recover for the use and occupation or for rents and profits, but for a part of the estate itself, which the co-tenant has taken and carried away.—*Abbey v. Wheeler* (62 *Northeastern Reporter*, 1075).

**LIABILITY ON OIL LEASE.**—A person who accepts an oil or gas lease containing a stipulation to pay a monthly rental until a well is completed, or until the expiration of a certain fixed term, is bound to pay such rental, though he does not, within such term, enter on the land and complete such well, unless he was prevented from so doing by the act of the lessor, and not by mere personal default.—*Lawson v. Kirchner* (40 *Southeastern Reporter*, 344); Supreme Court of West Virginia.

**CONSTRUCTION OF COAL LEASE.**—Under a coal lease where the lessee agrees to pay a certain sum for each ton of merchantable screened coal, "the screen used not to exceed 1½ inches, and the screenings to belong to the lessee free of charge," whatever passes through the meshes of an 1½-inch screen belongs to the lessee, and the fact that he rescreens it over a smaller screen and that it passes over a smaller mesh does not make him liable for royalties on same. In such a lease where lessee agrees to pay 10 cents per ton of 2,240 pounds of merchantable screened coal, it obligates him to pay 10 cents on each ton of 2,240 pounds of the coal, and not on a ton of 2,000 pounds.—*Johnston v. Westernman* (50 *Atlantic Reporter*, 940); Supreme Court of Pennsylvania.

**LIABILITIES FOR INJURY TO SURFACE OF LAND CONVEYED.**—One reserving the minerals under the surface of the land conveyed with the right to mine the same, and to pass through and use the land below the surface as may be "necessary or convenient in mining from said land and from any other land, as fully and freely as if such grant had not been made, without making compensation therefor," and providing that he shall not be liable for "loss or damage which such acts may occasion to" the land, is not relieved from injuries caused by mining operations on adjacent land, which deprive the land conveyed of lateral support, the provisions of the deed applying to operations on the land conveyed. *Matulys v. Philadelphia & Reading Coal and Iron Company* (50 *Atlantic Reporter*, 823); Supreme Court of Pennsylvania.

**MEASURE OF DAMAGES FOR INJURIES BY MINING OPERATIONS.**—In an action against a mining company for injury caused by its use of inadequate appliances to control the dust from its coal breakers, the measure of damages is the cost of restoring the injured premises to their condition before such injury, not exceeding the value of the property and the decreased rental value during the time the wrong

continued. In such an action, where proof is submitted in support of such allegations as to the inefficiency of the appliances, it is for the jury to determine whether the injury results from negligence for the consequences of which the mining company is liable.—*Harvey v. Susquehanna Coal Company* (50 *Atlantic Reporter*, 770); Supreme Court of Pennsylvania.

**LIABILITY OF TENANT IN MINING PROPERTY FOR ACCOUNTING.**—The rule of the common law which protects a tenant in common in possession of the estate from an action by his co-tenant to recover for use and occupation, or rents and profits, or annual products, has no application where one tenant in common of mining lands has taken possession of same, the value of which consists substantially, if not entirely, in the mineral deposits, and extracts all the mineral, thus depleting the property for his own benefit exclusively. An action brought by the other co-tenant is not in any sense to recover for use and occupation, or for rents and profits, or annual products, but for a part of the estate itself, which the other co-tenant has taken and carried away. There can be no doubt under the decisions of the State of New York that such co-tenant has a right to maintain action under such circumstances against the other co-tenant.—*Abbey v. Wheeler* (62 *Northeastern Reporter*, 1075); Court of Appeals of New York.

**OIL LESSEE PROTECTED BY GOOD FAITH.**—Where a lessee drills one well on the leased premises, which yields from 1 to 2½ barrels per day, and he drills wells on various adjoining properties, which he owns, none of which, however, are good producers, and there is no evidence to show that he acted in bad faith in drilling these wells, or in failing to drill other wells on the leased premises, he is not liable to account to the lessor for royalties on oil produced on the adjoining lands of his own. It is an implied condition of every lease of land for the production of oil, when the existence of oil in paying quantities is apparent, the lessee shall put down as many wells as may be reasonably necessary to secure the oil for the common advantage of both lessor and lessee; but he is not bound to put down more wells than are reasonably necessary to obtain the oil of his lessor, nor to put down wells that will not produce enough to justify the expenditure.—*Adams v. Stage* (18 *Pennsylvania Superior Court Reporter*, 30); Superior Court of Pennsylvania.

**LIABILITY OF EMPLOYER FOR INJURY THROUGH NEGLIGENCE OF SUPERINTENDENT.**—The provisions of the Massachusetts employers' liability act, which gives a right of action against an employer for a personal injury caused to an employee "by reason of the negligence of any person in the service of the employer, entrusted with an exercising superintendence," whose sole or principal duty is that of superintendence, is remedial in character, and not to be so artificially and narrowly construed that the fact alone that one given authority or superintendence works with his hands the greater part of the time necessarily excludes him from being one whose "principal business is that of superintendence," nor do the decisions of the supreme judicial tribunals of that State require such a construction; and where a superintendent, although so working himself, is also during the same time that he is working actively exercising the duty of superintendence, that may be found, in a proper case, to be such "principal business."—*Canney v. Walkeine* (113 *Federal Reporter*, 66); United States Circuit Court of Appeals.

**ABSTRACTS OF OFFICIAL REPORTS.***Isle Royale Copper Company, Michigan.*

This company's report covers the year ending December 31, 1901. The financial statement shows receipts from copper sold, interest, etc., \$281,269. The mine expenses were \$344,967; smelting, transportation, etc., \$57,590; construction, \$305,039; total, \$707,596, leaving a deficit of \$426,327 for the year. The balance on January 1 was \$832,742; the deficit



reduced it to \$406,415 on December 31. The assets at the close of the year were: Cash and accounts receivable, \$419,504; mine supplies, \$50,224; Lake Superior Smelting Company stock, \$32,000; total, \$501,728. Bills and accounts payable amounted to \$95,313, leaving a balance of \$406,415, as above.

The directors' report says: "The total cost of mining and stamping a ton of rock is \$1.863, which includes the breaking of a great deal of rock under ground which has not yet been hoisted and from which copper has not been extracted. This is a very low cost and there is very little chance for further economy in the operations of the property. The results, however, of the work done during the year 1901 show that the yield in ingot copper per ton of rock stamped has been about 11.75 pounds. This is much lower than was expected. Of course, in the beginning a large quantity of rock was stamped which it was known would not under ordinary circumstances pay, but which had to be removed from the mine. Having once paid the mining expense it was better to get what copper we could to assist in paying back the cost.

"During the latter part of the year it was decided to cross-cut at various levels to the westward to try to find what is known as the Grand Portage lode, to see whether this lode continued in depth. The lode has been found wherever searched for, cross-cuts having been driven to it from five levels, and has shown a better average of copper contents than the Isle Royale lode proper. As this lode is situated only about 200 feet to the westward of the Isle Royale it can be worked through the present shafts and levels with practically no additional development expense excepting the openings, so that we have thus practically a second mine opened on our property.

"It can readily be seen that the future of the mine depends primarily upon an increase in the amount of copper in the rock, but it is impossible to say what we are to expect in this direction.

"The directors wish, however, to say in conclusion that they do not consider the results of the operations for the year 1901 furnish a fair criterion of the yield of copper in the rock which may be expected in the future."

*Exploration Company, Limited, London.*

The report of this well known company for the year 1901 shows a profit and loss account as follows: Transfer fees received, £535; transferred from contingency account, £181,416; total, £181,951. The debit charges were: General expenses, £19,937; investigation expenses, £6,397; depreciation on building, etc., £1,200; losses written off £190,741; total, £218,275. The debit balance of £36,324 was written off the surplus account.

The report says: "The loss of £190,741 is the balance of losses ascertained and written off after deduction of profits made, interest on investment, and agency fees paid by subsidiary companies, and has practically all been incurred through the realization of the bulk of the company's investments, including Paris Traction and Tramway Shares.

Sundry investments including Paris Traction and Tramway Shares standing in the books at £1,304,807 have been written down by the amount of reserve fund £364,024, thereby reducing the investments to £940,782. These investments, on December 31, 1901, stood in the books as follows:

Investments in Real Estate in Johannesburg.....	£128,494
South African Mining Shares.....	200,555
Investments in U. S. and Mexico, mostly Mining....	267,747
Mining Shares in Australia and New Zealand.....	21,105
Electric Traction and Tramway Shares in France and Belgium.....	27,445
Electric Traction and Tramway Shares in England and elsewhere.....	231,481
Miscellaneous holdings.....	63,895
Total.....	£940,782

"In order to show their value more clearly they have been classified as follows: 1. Investments in real estate in Johannesburg, £128,494; 2. Liquid realizable assets, at or under current market quotations on December 31, 1901, £421,032; 3. Investments in business maturing, not immediately realiz-

able, £287,647; 4. Assets difficult of realization, with large provision made for depreciation, £76,164; 5. Investments remaining in French and Belgian traction and tramway companies and in the Société Anonyme Westinghouse, with large provision for depreciation, £27,445. The directors consider that the company's investments are of the value given in the balance sheet.

"Loans against security stand in the balance-sheet for £251,073, of which £234,654 has been advanced to the Compagnie Générale de Traction. Financial arrangements affecting this loan have recently been made which, in the opinion of your directors, justify the expectation that it will be repaid in full, and the balance of £16,418 is fully secured.

"The directors regret to have to place before the shareholders a report showing such serious loss and depreciation of the company's assets, but they consider that in writing down the latter to the figures stated above, they have not only taken every possible precaution against further loss, but have placed the company's affairs on a basis from which they may hope to see a renewal of prosperity. The directors (other than the executive), since the date of the last meeting, have drawn only half the fees they are entitled to under the articles of association.

"During the year under review the following changes have taken place in the direction of the company—Mr. Harry Mosenthal resigned the chairmanship of the company at the last meeting, and Mr. R. T. Bayliss has now been appointed chairman, retaining his position as managing director. Lord Farquhar and Hon. C. S. Stanhope have resigned from the board, and Mr. J. H. Lukach has resigned both as managing director and director of the company. Mr. Oscar E. Warburg has joined the board. Mr. J. H. M. Shaw, the secretary of the company, has been appointed manager and secretary."

*Alabama Consolidated Coal and Iron Company.*

This company owns a number of coal and iron ore mines, and several blast furnaces in Alabama. Its report is for the year ending October 31, 1901. The capital account includes \$2,500,000 common stock, \$2,500,000 preferred stock and \$500,000 bonds. The income account is as follows:

	1900.	1901.	Changes.
Iron sales.....	\$853,743	\$981,357	I. \$127,614
Coke sales.....	226,537	313,413	I. 86,876
Coal sales.....	299,939	323,620	I. 23,681
Store sales.....	335,249	250,798	D. 84,451
Rents, etc.....	65,920	41,594	D. 24,326
Totals.....	\$1,741,388	\$1,910,782	I. \$169,394
Expenses.....	1,501,366	1,735,821	I. 234,455
Net earnings.....	\$240,022	\$174,961	D. \$65,061
Interest and dividends.....	\$158,033	\$136,818	D. \$21,215
Depreciation.....		28,885	I. 28,885
Total charges.....	\$158,033	\$165,703	I. \$7,670
Surplus.....	\$81,989	\$9,258	D. \$72,731

The statement shows a considerable increase in sales last year, with an increase in expenses also. Extensive improvements were made during the year on various properties of the company.

*Lehigh and Wilkes-Barre Coal Company.*

This company owns a large property in the anthracite coal region of Pennsylvania. It is controlled by the Central Railroad Company of New Jersey. The capital account includes \$9,212,500 stock and \$26,053,339 funded debt. The report covers the year ending December 31, 1901. The coal statement for the year is as follows, in long tons:

	1900.	1901.	Changes.
Coal mined.....	2,822,710	3,414,735	I. 592,025
Coal purchased.....	473,968	774,660	I. 300,692
Totals.....	3,296,678	4,189,395	I. 892,717
Coal sold.....	3,451,170	4,077,305	I. 626,135

In 1900 there were 154,492 tons drawn from stock; while in 1901 there were 112,090 tons added to stock. Of the coal sold 67.1 per cent was of the prepared sizes—chestnut and over—and 32.9 per cent. of the steam sizes—pea and smaller. There were mined 3,216,434 tons of coal from the company's land during the past year, and it was deemed advisable to set

apart out of income 10 cents per ton to represent the depletion of coal lands. Depletion of coal lands fund has been debited with the amounts thus credited to the mortgage sinking funds.

The receipts and expenses, with the average per ton so far as they can be calculated from the data given, were as follows:

	Total.	Per ton.
Coal sales.....	\$12,113,547	\$2.97
Coal mined by tenants.....	369,395	....
Other receipts.....	93,304	0.02
Total.....	\$12,576,246	\$3.08
Mining coal, royalties and improvements.....	\$4,991,710	\$1.46
Coal purchased.....	1,625,893	2.10
Transportation and selling.....	4,221,128	1.03
General expenses, taxes, etc.....	300,933	0.09
Depletion of coal lands fund.....	221,535	0.07
Total expenses.....	\$11,361,199	\$2.71
Leased coal added to stock.....	352,332	3.14
Expenses.....	\$11,008,867	\$2.70
Net earnings.....	\$1,567,379	\$0.38
Interest and sinking fund.....	1,569,297	....
Deficit for the year.....	\$1,918	....

The report says: "There was charged to income during the year for accruals of sinking funds for retirement of funded debt as follows: For consolidated extended loan due 1910, \$60,875; for 5 per cent loan of 1912, \$39,233. In addition \$11,754 was received from town lot contracts and credited to the sinking fund for the loan of 1912, making total accruals to the sinking fund for that loan \$50,987, leaving sinking fund payments in excess of requirements under this fund \$1,252,335.

"The collieries, equipment and other property have been maintained at the usual high standard for economical operation. It was found necessary to arrange to rebuild Nottingham breaker and it is expected the construction will be completed during 1902. The estimated cost of this work has been charged to colliery improvements, included in the expense account for 1901.

"It has been decided to change the fiscal year so that it will end on June 30 instead of December 31 as heretofore. The next report will therefore cover the period January 1 to June 30, 1902."

*Rio Tinto Company, Limited.*

The report of this company covers the year ending December 31, 1901. The capital account shows £1,625,000 in common stock; £1,625,000 in 5 per cent preferred stock and £3,241,640 in 4 per cent first mortgage bonds. The reserve fund amounts to £400,000, and the provident fund to £9,200.

The income account for the year may be stated as below:

Profit on sale of produce.....	£1,767,742
Huelva and Rio Tinto Railroad.....	14,694
Rents, interest, etc.....	28,713
Total.....	£1,811,149
General expenses.....	£67,384
Taxes and interest.....	148,289
Interest on debentures.....	131,646
Depreciation of plant and property.....	96,954
Total.....	£444,273
Net Surplus for the year.....	£1,366,876

Redemption of mortgage bonds..... £65,800  
 Added to Reserve Fund..... 40,000  
 Added to Provident Fund..... 4,000  
 Dividends on preferred stock, 5 per cent..... 76,680  
 Dividends on common stock, 7½ per cent..... 1,178,125

Total payments.....	£1,364,605
Balance for the year.....	£2,271
Surplus, January 1, 1901.....	22,174
Surplus, December 31, 1901.....	£24,445

The pyrites mined and shipped during the year are shown by the report as below in tons:

Mined:	1900.	1901.	Changes.
For shipment.....	704,803	633,949	D. 70,854
For local treatment.....	1,189,701	1,294,827	I. 105,126
Total.....	1,894,504	1,928,776	I. 34,272
Invoiced to consumers.....	665,967	641,935	D. 24,032
Sulphur ore shipped.....	116,305	119,683	I. 3,378

The average copper contents of the pyrites mined were 2.627 per cent last year, against 2.744 per cent in 1900. The reserve heaps at the mines were estimated at the close of the year to contain 136,457 tons of copper.

The copper produced and marketed during the year was as follows, in long tons:

	1900.	1901.	Changes.
Copper Produced:	1900.	21,100	D. 20
Produced at mines.....	21,120	21,100	D. 20
In pyrites shipped.....	14,612	14,248	D. 364
Totals.....	35,732	35,348	D. 384
Copper Sold:			
Refined copper.....	18,971	19,363	I. 392
Copper in sulphate.....	1,134	974	D. 160
Copper in pyrites.....	14,526	14,267	D. 259
Total.....	34,631	34,604	D. 27

The refined copper turned out from the company's works at Cwmavon was 20,190 tons, the quality being well up to standard. The stock at Cwmavon at the close of the year—including refined copper, copper in process of treatment, precipitated and matte—was 6,062 tons.

The report says: "By the operation of the sinking fund the amount of unredeemed 4 per cent mortgage bonds has been reduced to £65,800 drawn, and the total added to the general depreciation account, which now stands at £589,040.

"A new opencast, near the North Lode, known as the Lago Opencast, has been begun during the year, from which 72,207 cubic metres overburden have also been removed; the cost of which appears in the accounts. By the application of £9,688 to the reduction of extension and development account the balance now remaining is £105,845.

"The average price of G.M.B. Copper for the year was £66 19s. 8d., but struck for 11 months only, namely to November 30, it was £68 6s. od. against £73 12s. 6d. for 1900. There was a serious drop in price in December owing to holders of large stocks of copper in America, after being firm for months, suddenly giving away in price, and G.M.B.'s, which quoted £67 os. od. on November 18 were down to £47 12s. 6d. by December 24 and to £45 12s. 6d. by January 13 last. Improvement set in in February, and the price, after being £57 os. od., rose to £52 10s. od.

"The railway earnings from public traffic continue to increase and the net results are about £2,730 better than in 1900. Both railway and pier have handled the traffic admirably, and another attempted strike among the men at the latter was quickly overcome.

"A deputation of the directors visited the mines in November and December, looked into the working of the business in its various departments and found all carefully conducted."

#### Mohawk Mining Company, Michigan.

This company is engaged in opening a new copper mine in the Lake Superior region. Its report for the year 1901 gives the following financial statement: Balance from previous year, \$136,182; assessments Nos. 1 and 2, \$297,299; sale of 170 tons mohawkite, \$15,789; interest, \$2,075; total, \$451,345. Payments were, for expenditures at mine, \$413,311; Boston office, \$5,857; freight and insurance, \$792; total, \$419,960, leaving a balance of \$31,385 at the close of the year.

The report shows a large amount of exploration work done. The total underground openings include four shafts with a combined depth of 2,577 feet; 15,616 feet levels and 654 feet cross-cuts.

The peculiar copper mineral known as mohawkite, which was first found in this mine, has been referred to in a recent issue of the JOURNAL. Last year 170 tons were taken out and sold to reduction works. The value of this mineral is about \$75 per ton at current prices of copper. The occurrence of this ore was unexpected and its continuance or value per ton in no way affects the mine proper.

The agent's report says that the mine is looking well, and that good copper-bearing ground has been opened. His report is accompanied—as all reports should be, where possible—by a map showing the amount of work done.

President John Stanton's report says: "Steady progress has been made during the past year in the work of opening the mine and equipping it for production. The railroad connecting the mine with the mill site on Keweenaw Bay was put into

commission soon after the winter's snow had gone, and has been utilized for transportation of material for the erection of mill and other buildings, and for the conveyance of employees and supplies. A favorable contract has been made with the Hancock & Calumet Railroad to operate the road and furnish all of the equipment that may be required, as soon as the mill is ready to begin stamping, which it is expected will be in July next.

"A section of the mine appended to the report shows the extent of the openings on January 1, and it is apparent that by the time the stamp mill goes into commission we shall have a large mine open ready for regular production; the openings made during the year confirming the expectations we have heretofore expressed that the lode will be as productive at this point as it is at the Wolverine and other mines now working on it."

#### Ingersoll-Sergeant Drill Company, Limited.

This English company owns the larger part of the stock of the Ingersoll-Sergeant Drill Company, of New York. The capital stock of the English concern issued includes £150,000 in 6 per cent preference shares and £200,000 in ordinary shares. There is £50,000 in ordinary shares not yet issued. The report just issued from the London office says: "The balance sheet and profit and loss account for the period of 12 months ending December 31, 1901, show a total of £38,791 received in dividends from the American company. These dividends, together with the amount brought forward from last year (£9,373), and transfer fees and interest, less debenture interest and expenses, give a balance of £39,830 available for payment of dividends to the shareholders of this company. The half-yearly dividends on the preference shares, paid July 1, 1901, and January 1, 1902, together with the interim dividend on the ordinary shares, have absorbed £19,000, leaving a net balance of £20,830 to provide for the payment of a final dividend on the ordinary shares. The directors now recommend that the final dividend on the ordinary shares be paid at the rate of 1s. per share, free of income tax, leaving £10,830 to be carried forward."

#### Centennial Copper Mining Company, Michigan.

This company's report covers the year ending December 31, 1901. The financial statement shows receipts as follows: Cash on hand January 1, 1901, \$179,734; sales of copper, \$118,959; assessment collected, \$212,415; miscellaneous, \$13,031; total, \$524,139. The expenditures were: Mining, \$163,015; stamping, \$42,750; surface and railroad, \$15,386; general expenses and taxes, \$27,412; construction and equipment, \$38,094; fuel, \$15,516; bills payable, etc., \$42,322; total, \$344,495, leaving a balance of \$179,644 at the close of the year.

Superintendent Chynoweth says: "Including the drifting done the past year, there has been opened by levels a total of 7,899 feet on the Kearsarge lode. A small amount of stoping has been done, but we still have in reserve over 50,000 cubic fathoms of ground available for this purpose, the larger portion of which it would pay to treat in a modern stamp mill. As the sinking of A shaft has progressed, a perceptible improvement has been noticed from time to time in the character of the lode, and I fully believe, as depth is attained, that it will be uniformly as well mineralized as it is in the lower levels of the Wolverine mine adjoining. A shaft is being sunk with all possible speed, and by the time it reaches the 25th level I feel confident we shall have a profitable mine opened on this lode."

Openings were as follows: Sinking on Kearsarge lode, 1,385 feet; drifting, 2,424 feet; cross-cutting, 54 feet.

President Fay says: "We have delayed actual construction of a stamp mill as this seemed wise in view of the changes which have occurred in the general situation during the past year. Plans for additional railroad facilities which had long been under consideration have but recently taken definite shape. The possibility also of securing some other

modern mill by rental or purchase, at advantageous terms, has had an important bearing on the question and warranted, in our opinion, even a farther postponement of the outlay which a new mill at this time would involve. Repairs of our old mill were so frequent during the past year that it was decided in January of this year that the head must be put upon a new foundation if it was to be continued in use. The directors, therefore, voted to take advantage of the unsettled condition of the copper market, and the installation of our new Nordberg hoist, to stop all operations at the mill.

"The opening work is less than last year, due to the fact that in the 40-acre tract carrying the outcrop and in the narrow neck connecting the main body of the land therewith, the drifts both north and south have all been very short. Since the shaft passed the boundary, however, the drifts are growing slowly but steadily longer, and yet at the 25th level, which we hope to reach by the end of the year, we shall be 1,500 feet down into the mile square of the old Centennial property, giving a total length of over 2,500 feet on the course of the lode. We shall also effect a material saving in discontinuing operations at the old mill during the present unsettled condition of the copper market and devoting our attention, according to our present plan, to sinking the shaft and opening the mine."

#### 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.

*The Burning of Crude Oil for Steam Purposes, Particularly on Steam Vessels.* Bulletin No. 2, California Petroleum Miners' Association. San Francisco; published by the Association. Pamphlet, pages, 32.

*Locomotive Sparks.* By Prof. W. F. M. Goss. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 180; illustrated. Price, \$2.

*Review of the World's Commerce.* Prepared by the Bureau of Foreign Commerce, State Department. Washington; Government Printing Office. Pages, 232.

*Third Annual Report of the Bureau of Labor Statistics of Illinois on Free Employment Offices.* David Ross, Secretary of Bureau, Springfield, Ill.; State printers. Pages, 84.

*The Economy of Isolated Electric Plants.* By Isaac D. Parsons. New York; reprinted from the *Engineering Magazine*. Pamphlet, pages, 32.

*Fifteenth Annual Report of the Bureau of Industrial and Labor Statistics for the State of Maine.* S. W. Matthews, Commissioner. Augusta, Me.; State Printers. Pages, 212; illustrated.

*Systematic Organization of First Aid Corps for the Treatment of the Injured in Mines.* By Hamilton Fish, M. D. Ouray, Colo.; reprinted from the *Denver Mining Reporter*. Pamphlet, pages, 16; illustrated.

*Seventeenth Report of the United States Civil Service Commission.* Washington; Government Printing Office. Pages, 640.

*Easy Lessons in Mechanical Drawing and Machine Design.* By J. G. A. Meyer and Charles G. Pekar. In two volumes. New York; the Industrial Publication Company. Volume I, 406 pages; Volume II, 274 pages; illustrated. Price (for both volumes), \$10.

*The Mineral Wealth of the Black Hills.* Bulletin No. 6, South Dakota School of Mines. By Cleophas C. O'Harra. Rapid City, S. Dak.; published by the School of Mines. Pages, 88; illustrated.

*Field Columbia Museum. Annual Report of the Director for the Year 1900-1901.* Pages, 80; illustrated. *Geological Series, No. 9. The Dinosaur Beds of the Grand River Valley, Colorado.* By Elmer S. Riggs. Pages 8; illustrated. *Geological Series, No. 10. Morosaurus and Camarasaurus.* By Elmer S. Riggs. Pages, 8; illustrated. Chicago; Published by the Museum.



## BOOKS REVIEWED.

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

The first edition of this very convenient manual was issued in 1894, and experience has enabled the publishers to improve it with each issue. In condensed form it contains statistics of production brought down as closely as possible to date; lists of coal companies and individuals operating coal mines; and a mass of other information. Continued use of previous editions has shown the value of the information given, and its general correctness. It is indispensable to anyone interested in coal production and the coal trade.

*La Bauxite.* By Ing. Giovanni Aichino. Turin, Italy; reprinted from *Rassegna Mineraria*. Pages, 84.

In this book the author has given an account of the uses of bauxite, its occurrence and characteristics. The known deposits of bauxite in various countries are described and a number of analyses given. There is also some statistical information as to the production and consumption of the mineral. Some notes are given on the various impurities associated with it and the methods used for eliminating them. It is a convenient and interesting monograph on the subject.

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

This volume contains the papers read at the thirteenth annual meeting of the Society, together with a report of the discussions and the proceedings. A majority of the papers read relate to water supply, lighting and to other municipal questions. There is an interesting paper on Gypsum in Iowa and its Manufacture into Plaster; and another one on the Iron Mine at Waukon. The report shows that the Iowa Society is doing excellent work.

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

This volume includes the general report of the Minister of Mines for 1900, including full statistics of mine operation and production, and reports from the mine wardens of the different districts. There are also special reports on the gold-fields of the Colony and on the coal mines. Appended to these are several reports on geological explorations in different districts. The tables give the mineral production in full detail, and in the text there are many interesting particulars in relation to the mines. Some of the special reports are of much value to those engaged in mining and prospecting.

*Der Thalsperrenbau.* By P. Ziegler. Berlin, Germany, 1900; A. Seydel. Pages, 147; illustrated.

The author of this book is an inspector of construction for the Prussian Government and the work throughout has in mind chiefly German practice. The book, however, is in its way an excellent one, written with characteristic thoroughness and giving much information about the location, construction and maintenance of dams. The author first considers the selection of dam sites with regard to damages, cost and revenue and then discusses various types of dams. Practically this discussion is about dams of masonry and concrete, since earth dams, though frequently used in this country are not looked on with favor in countries where permanency and safety are the controlling factors in construction and cheapness or immediate results are of less moment. The second half of the work, some 110 pages, is mainly given to brief descriptions of various dams in Spain, France, Algiers, Germany, Italy, India, the United States and other countries. American engineers will doubtless take exception to the author's remarks on the construc-

tion of dams in this country, though his criticisms of their hasty and ill-planned construction are to a certain extent justified by some great disasters. The only American dams noticed are several on the Croton watershed, including the new Cornell dam, and the Crystal Springs, Sweetwater and Bear Valley dams in California.

These descriptions are followed by brief mentions of the failure of a number of dams including the Walnut Grove dam in Arizona and the Johnstown disaster in Pennsylvania. The book contains a large amount of interesting material with some mathematical discussions of the theory of dam construction and will be found an interesting reference work for the library of the hydraulic engineer.

*Plane Surveying.* By Paul C. Nugent. New York; John Wiley & Sons, 1902. Pages, 577; illustrated. Price, \$3.50.

In his preface to this book the author discusses the best method of presenting the subject of surveying to a class of learners. In view of the fact that modern engineering courses as taught in American colleges are crowded and that it is impossible for an engineering course to graduate its students as practiced draughtsmen, instrument men, computers and designers in all the varied branches in which they may be called to work, there are two lines along which instruction may proceed. The student may be taught theorems whose proofs are left largely to his own intelligence or the proofs may be taught with the theorems, the work being supplemented with practical applications in either case. The author chooses the latter method and seeks to present the various theorems and formulas with as far as possible the proper deduction in each case, attention being particularly directed to special cases. It is but just to say that the author has succeeded well in his efforts.

The work is a text-book and for the full realization of its purpose should be supplemented by class room lectures and by as much field work and practice in drafting as the student can get. The subjects discussed in order are: linear measuring instruments and range poles, chain surveying, compass and general surveying, the telescopes of surveying instruments, levelling, transit surveying, the planimeter and the slide rule, topographical surveying, hydrographic surveying, mine surveying, the solar instrument, the United States public lands and surveys. An appendix contains problems relating to the foregoing discussions, a description of the cyclo-tomic transit, the directions of the United States Land Office for restoration of lost or obliterated corners and subdivisions of sections and a reprint of an interesting paper on photo-topographic methods and instruments by J. A. Flemer of the United States Coast and Geodetic Survey.

The methods recommended for field work throughout the volume are usually excellent, particularly in the emphasis laid upon the care and proportions necessary in the simplest operations. The directions for chain surveying and the methods of solving various field problems in chain compass and transit are noticeably good. The author prefers the term "longitude" to "departure" and uses it throughout. The explanations of the various theorems are models of clear and concise statement, as are the rules given for correcting and balancing surveys. The directions given for supplying omissions in the length or bearing of one or more lines of a closed traverse are also worthy of mention as are the methods given for parting land and of working out various field problems. The discussion of the vernier is clear and sufficiently full as is that on the declination of the needle and the methods of testing and adjusting the needle and bearings of the compass. The chapter on the telescope of surveying instruments is unusually detailed and discusses the treatment of telescope adjustment as a problem apart from instrument adjustment in general, stating what should be the qualities of telescopes, with optical tests and directions for making various adjustments.

The chapter on levelling mentions various types

of rods and levels, the precautions necessary in levelling, the errors due to curvature and refraction, reciprocal levelling, and the making of profiles and the keeping of a note book. In discussing the tests of the level and its adjustments, the author uses, as he has previously used in treating of the surveyor's compass, the methods of descriptive geometry. In transit surveying the author takes up the methods ordinarily used in railroad work and in triangulation and the various tests and adjustments of the instrument. A discussion of the theories of the planimeter and slide rule by C. W. Crockett of the Rensselaer Polytechnic Institute is sufficiently clear and employs no mathematics higher than analytical geometry.

In the chapter on topographical surveying stadia methods are discussed the plane table, and the best methods of keeping a note book and of plotting the survey. A short chapter on mine surveying by Prof. William S. Hall, of Lafayette College, is one of the good features of the book. The writer shows a thorough familiarity with the best American practice and an appreciation of the difficulties that beset the mine surveyor. The remarks on connecting surface and underground surveys, while brief are concise and cover most cases. There are also remarks on the survey of United States mineral claims.

The chief value of this book is in its clear and concise descriptions of instruments, methods and adjustments, the equally good treatment of the mathematics and theorems involved and the recognition throughout the work of what may be called the best American practice. The book is a trustworthy guide for the student and a mastery of its contents with a thorough drill in the use of instruments in the field and drafting room should fit him to take up his profession with confidence.

## 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.

*Wood as Fuel in Reverberatory Furnaces.*

Sir:—In your issue of February 22, in the "Questions and Answers" column a question is asked regarding the use of wood as fuel for a reverberatory furnace. I will state for the benefit of the inquiring party that we have been smelting here for some time in reverberatory furnaces with wood as fuel with very satisfactory results, smelting as high as 15 tons of a mixture of calcined concentrates and siliceous ores per day, with a wood consumption of 4 Mexican cords—equivalent to 7.7 American cords—making a slag of about 40 per cent SiO<sub>2</sub>.

The furnaces used are 9 by 16 feet with a grate area of 16½ square feet and a depth from bridge to grate of 3 feet, using mechanical draft.

A mixture of oak and pine—say two-thirds of the former and one-third of the latter—would undoubtedly give very good results.

J. T. CANFIELD, Metallurgist.

San Fernando, Mex., March 12, 1902.

*Hot Blast in Copper Smelting.*

Sir: Thinking it might be of interest to the readers of your valuable paper, I offer a description of our satisfactory experience, which in certain respects is rather unusual, at the Val Verde Copper Company's smelter, at Val Verde, Arizona. Knowing the complex character of the ores to be handled, the management decided last fall to erect and start at first with a 48-inch round blast furnace, with the Bretherton hot blast stove attachment, instead of their large rectangular furnace then completed.

We have now been running very nicely for over a month, smelting on an average 108,000 pounds

net ore in 24 hours, exclusive of 45,000 pounds slag and flux, mostly the former, with only 4,950 pounds of ordinary Colorado coke in 24 hours. The iron for the slag is all obtained from sulphide ores and concentrates assaying 7 to 11 per cent of arsenic, the lime used being obtained from a copper ore (which contains some magnesia) shipped from the company's own mines.

We find from calculation that we burn off in 24 hours 7,380 pounds of arsenic and 18,000 pounds of sulphur, making a high concentration and good grade of matte with the hot blast heated to a temperature of 400° F. by about 1½ cords of wood alone. This is obtained with a loss of only about 325° F. in the gases escaping from the stove, which, taken with a good combustion of the wood, means a greater economy than that common to even the best boiler practice; and is in spite of the fact that the issuing blast is much hotter than the steam, greater than that obtained in a large U-tube stove supplying hot blast to a 300-ton furnace belonging to one of the leading copper companies, and on the success of which the company has just completed several similar ones. When Mr. Bretherton arrived here to start the blast furnace, with his stove, he felt confident that he could burn off most of the arsenic instead of shipping a mixed matte and speiss (which has been the product of the old local smelter when attempting to operate here before); but was pleasantly surprised to find that he could concentrate 12 tons into one in one operation and eliminate practically all the arsenic.

The company is now handling what is considered the most refractory sulphide ores of the district, making a high fire concentration, a close saving, and shipping a clean copper matte product without any roasting, and with only 4.6 per cent of fuel on the net ore or 3.2 per cent on the total burden. Thus it will be seen that by the use of 1½ cords of wood, there is a saving of roughly 5 tons of coke a day, besides the increased tonnage, a saving of roasting and the elimination of the arsenic on which the refineries are now charging such a penalty.

One peculiar feature of this practice is that the heat theoretically furnished by the sulphides burned (including the conversion of the iron to ferrous oxide), and the heat of the hot blast combined are not equal to that furnished by the amount of coke saved. The difference is due probably to the smaller amount of material in the furnace per unit of ore, cooler escaping gases so that the fuel is not wasted near the top of the furnace, and the combustion of at least a portion of the volatile sulphur atom and a portion of the arsenic.

CLARENCE A. GRABILL,

Head Chemist, Val Verde Copper Co., Ltd.  
Val Verde, Ariz., March 22, 1902.

#### QUESTIONS AND ANSWERS.

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

**Fibrous Material.**—Can you not put me in communication with or give me the address of parties interested in the manufacture of paper to whom a fibrous raw material might be of interest? There is an unlimited supply.—E. H.

**Answer.**—The largest consumer of such a material as you mention is the International Paper Company. Its office is at 38 Park Row, New York.

**Cement Making.**—Will you kindly give me a formula for cement, such, for example, as portland cement or for a similar preparation such as is used for concrete work—pavements, etc.?—M. A. R.

**Answer.**—It would be impossible to give a formula by which an inexperienced person could make portland or hydraulic cement. To make cement requires

judgment in selecting the proper materials; in grinding and mixing them, and in calcining the cement. A person without experience, even if supplied with good materials, would be very likely to turn out a lot of stuff of no value.

Spaulding, *American Cement*, pages 22 and 32, says: "The term portland cement is commonly used to designate hydraulic cement formed by burning to vitrification a mixture of limestone and clay in proper proportions and reducing the resulting mass to powder by grinding. . . . Portland cement is usually made by a mixture of limestone and clay, or of nearly pure limestone with stone of a high index, and in all cases the material must be very uniformly incorporated into the mixture. . . ."

"The normal composition of portland cement is usually within the following limits: Silica, 20 to 25 per cent; alumina, 5 to 9; iron oxide, 2 to 5; lime, 57 to 65; magnesia, 0.5 to 2; sulphuric acid, 0.25 to 1.50 per cent."

**Zinc Carbonate.**—Will you kindly inform me through the JOURNAL what the demand is for carbonate of zinc and what it is used for? Is the commercial product the normal or basic carbonate? How does it compare with zinc oxide or white lead as a pigment?—S. C.

**Answer.**—The present demand for zinc carbonate is not large. It is used chiefly in making some paints of the finer class. It is claimed that in certain pigments of this kind it is superior to zinc oxide. A very small quantity is used in certain medicinal preparations. The zinc carbonate of commerce is made from sulphate by a process of precipitation.

per cent manganese, but as the lime is a valuable ingredient it would best be shipped without concentration. What is this ore worth per ton at New York or users' market? Will thank you to publish answer and give information on points mentioned.—F. G. K.

**Answer.**—Your assumptions are partly correct. There is a demand for manganese ore, and the production is barely equal to the demand. It is by no means certain, however, that there are no reserves of ore in Cuba or Brazil. In the latter country especially it is claimed that there are very large reserves, several deposits of importance being practically untouched.

On the face of matters it would seem that manganese producers could dictate prices; but the influence of the buyers is very great in this case, as they form a limited class, and do not compete with each other for the supply to any extent.

#### IMPROVED BUFFALO DOWN-DRAFT FORGE.

The accompanying illustration shows the latest design of the Buffalo down-draft forge, manufactured by the Buffalo Forge Co. It is neat and compact but not filled to excess. This forge stands 27 inches to the top of fire pan, which is 24½ by 47½ inches. It has a watertank 6 by 47 inches and 10 inches in depth, and a coal box 10 by 14 inches and 47½ inches long. It is also furnished with a tool rack, a blast gate, an improved anti-clinker dumping tuyere, and the Buffalo patented down-draft smoke-exhaust hood. This forge, with the exception of the down-draft hood and anti-clinker



IMPROVED BUFFALO DOWN-DRAFT FORGE.

**Manganese Ore.**—I understand the production of manganese ores is very limited in quantity, quality and mines; that there is practically no reserves of the mineral in the mines of Cuba and Brazil; therefore are unstable and uncertain production. Also that these mines are controlled by the Steel Trust, who are practically main users of the mineral, aside from which there is little or no market for manganese ores, and that future manganese supply is a serious problem for the steel companies to solve, the consumption being greater than production, with increasing consumption and decreasing production. If this be true, it should, it appears, increase market value of ores, and it also appears that the producers and owners of manganese mines are in a position to dictate price of manganese ores instead of selling same at market price or quotations dictated by the Steel Trust. The price on a 50 per cent ore, I understand, is 30 cents a unit, or \$15 per ton. What is 60 per cent manganese worth? I have an ore analysis as follows: Average, 50 per cent manganese in oxide, 10 per cent iron oxide, 12 to 15 per cent lime spar, and 3 to 5 per cent silica. This can be concentrated by elimination of lime spar up to 55 or 65

dumping tuyere, which are of heavy cast iron, is constructed entirely of heavy gauge steel plate, and is thoroughly braced. It is best adapted to medium work and is also well suited to light and heavy forging.

**THOMSONITE (MESOLITE).**—One of the most pleasing of the American semi-precious stones, which has had a wide popularity throughout the Lake region, is so-called thomsonite (mesolite). There has been some doubt as to its identity. The local gem-stone called thomsonite, from Grand Marais, Minn., is not really that mineral, but the related species mesolite, according to Prof. N. H. Winchell, and the latter name should be substituted in any list of American gem-stones. True, thomsonite does not occur in that region, in any form suitable for use as a gem. The mesolite nodules that have been thus mis-called, occur as the fillings of amygdaloidal cavities in the igneous rocks; they are compact, fibro-crystalline, and concentrically zoned with red, brown, and white; and when polished form attractive local gem-stones that have a



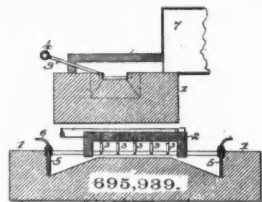
considerable sale. Lintonite, zonochlorite, and chlorastrolite, are related species similarly used, and were likewise formed in the cavities of igneous rocks, and weathered-out by the decomposition of the latter. Mesolite is a silicate of alumina, lime and soda, intermediate between the well known zeolite species, natrolite and scolecite.

**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.

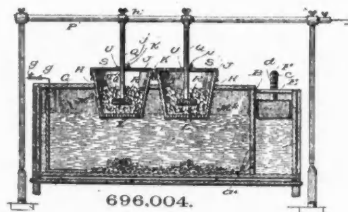
Week Ending March 25, 1902.

695,904. **KILN FOR BURNING BRICKS, ETC.**—Edward C. Brice, Colwyn, Pa. In a kiln a tunnel, sections having fire-boxes arranged at the sides thereof and communicating with the upper part of the tunnel, the end sections of the kiln being devoid of fire-boxes; a smoke-stack midway between the ends of the kiln, the kiln being otherwise devoid of smoke-stacks, and a heat-flue communicating with the smoke-stack and having lateral openings leading into the tunnel adjacent to the side of the truck-platforms.

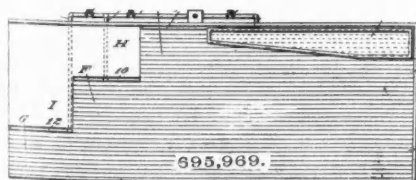


695,939. **METHOD OF MAKING OXIDES OF TIN AND LEAD.**—Clarence S. Lomax, Everett, Mass. The method consists in maintaining a horizontal layer of the metal of uniform cross-sectional area throughout its length in an oxidizing-chamber in a molten condition and at a suitable temperature for rapid oxidation by the action of a current of electricity conducted thereto by bodies of the metal of larger cross-sectional area, and in subjecting the metal in the oxidizing-chamber to the action of a current of oxidizing reagent which oxidizes the metal and carries away the metallic oxide.

695,967. **BLAST-NOZZLE.**—John S. Thurman, St. Louis, Mo. A blast-nozzle composed of like sections whose inner marginal faces are finished flush, spacing-washers for determining the thickness of blast, and means for securing said sections together.



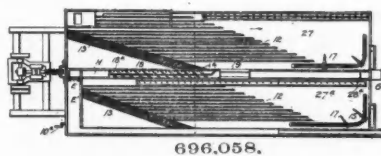
696,004. **ELECTRIC METAL-WORKING APPARATUS.**—George D. Burton, Boston, Mass. The combination of a receptacle for containing a substance to be treated, said receptacle having perforations in the bottom thereof adapted to admit an electrolyte into said receptacle, and to permit the treated substance to pass out there through, a cover for said receptacle provided with a slot therein, an electrode adapted to extend through said slot into said receptacle, and means for bringing the electrolyte into contact with the substance being treated.



695,969. **CONCENTRATOR.**—Bruce W. Traylor, Denver, Colo. A transversely-inclined concentrating-table mounted to reciprocate and composed of a number of sections extending rearwardly different distances, giving the rear edge of the table a stepped appearance in the plane of its concentrating surface or bed, the uppermost section on the transversely-inclined surface, extending the shortset distance toward

the rear, and the other sections in the order of their location, the lowermost section extending the farthest distance toward the rear, a wash-water feed located at the upper edge of the uppermost section, and a separate wash-water feed for each of the other sections, the wash-water feed of any lower section extending rearwardly from the rear extremity of the section next above, along the upper edge or step of the said lower section.

695,989. **DUPLEX STEAM-PUMP OR OTHER DUPLEX STEAM-ENGINE.**—Charles C. Worthington, Dunnfield, N. J. A duplex steam pumping-engine having horizontal steam-cylinders arranged in line one above the other and horizontal pump-cylinders arranged in line one above the other, and having a steam-valve movement for operating the steam-valves of each side of the engine by the piston of the opposite side provided with valve-levers actuated by the pistons and arranged to swing in vertical planes on one side of the engine.



696,058. **CONCENTRATOR.**—John A. Lehritter, Denver, Colo. A concentrating apparatus comprising a laterally-inclined, riffling table, having a slime-trough extending diagonally across its head at the extremities of the riffles, and provided with a screen through which the slimes pass to the trough, and a rib arranged along the slime-trough between the lower edge of the screen and the riffling portion of the table, to dam the water and also prevent any of the settled concentrates from passing through the screen into the slime-trough.

696,070. **MINING-CAR.**—John McAlister, Birwinsdale, Pa. In a car-truck, a wheel having an outwardly-extending sleeve; a journal extending through said wheel and having means to hold the wheel in place thereon, in combination with a cap 18 fitting over the extended end of said sleeve and said journal and provided with a spirally-disposed rib upon its internal surface to direct the oil normally inward.

696,092. **METHOD OF PRODUCING METALS.**—Guillame H. Clamer, Philadelphia, Pa. The art of reducing a metal from its ores, which consists in bringing the ore into contact with a flux and an alloy composed of the same kind of metal as the metal of the ore and an element more electropositive than that metal, heating all said substances and effecting the combination of the electropositive element with the substance with which the metal was combined in the ore, fluxing the compound of the electropositive element, and recovering the metal set free from the alloy and from the ore.

696,109. **APPARATUS FOR THE MANUFACTURE OF COMPOUND WIRE BARS BY ELECTRODEPOSITION.**—Richard D. Sanders, Blackheath, England. In apparatus for the manufacture of wire or the like by electrodeposition upon a mother wire in the form of a coil, the combination with the tank for containing the electrolyte liquid, of a shaft above the same provided with a coating of insulating material for supporting and rotating the coil, an anode located within said tank and a cathode connection between the coil and said shaft.

696,115. **CONVEYING APPARATUS.**—Oscar B. Stillman, New York, N. Y. The combination of a frame, means for raising and lowering same, a carrier secured to said frame comprising two parts detachably connected at or near the middle thereof, and means for automatically detaching said parts when the frame is lowered.

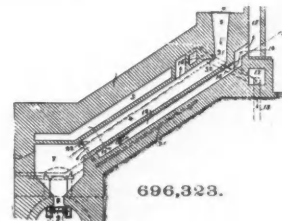
696,195. **STONE GRINDING AND POLISHING MACHINE.**—Isaac N. Rogers, New York, N. Y. The combination, of a horizontally-disposed rotary grinder-disk provided with a series of radial grooves on its upper surface having closed outer ends, means for feeding a grinding medium to said disk, and means for actuating the disk.

696,244. **METHOD OF MAKING ALLOYS.**—Edward Keller, Baltimore, Md. A method of reducing segregation in cast metal, which consists, first, in determining by analysis of a casting, whether segregation occurs toward or away from those portions of the casting first to solidify, and secondly in combining with the remelted metal or other portion of the same batch of metal when in a fluid condition, a substance foreign thereto, but soluble therein in such quantity as to maintain a homogeneity of the mass at the solidifying or freezing temperature and finally casting the treated molten metal.

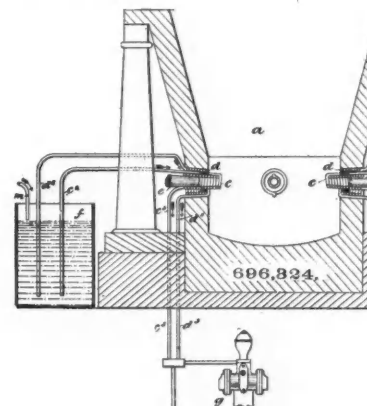
696,266. **STORAGE APPARATUS.**—Charles Piez and Robert H. Beaumont, Philadelphia, Pa., assignors to the Dodge Coal Storage Company, Naugatuck, Conn., a corporation of Connecticut. The combination with a fixed structure, of a swinging structure pivoted to the fixed structure, both the fixed structure and the swinging structure at the pivot-point being open at the center, elevating and conveying mechanism mounted on the swinging structure and arranged to pass through the open center of the pivoted structure and the open center of the fixed structure, and a platform at one side of the swinging structure directly above the plane of the pivot, said platform carrying the hoisting-engine by which the elevating and conveying mechanism is driven.

696,273. **CONVEYOR.**—John Roger, Denver, Colo. A conveyor, including a body having hoists, an operating device, a rod connected with said operating device, a shaft connected with said rod and with said body, a lever operatively connected with said connecting-rod, a plurality of shafts connected respectively with said connecting-rod and lever, a shaft supported by the lever and connected with said body, and guiding means for said plurality of shafts.

696,274. **CYANIDE PROCESS OF EXTRACTING PRECIOUS METALS FROM THEIR ORES.**—Eugen Schiltz, Johannesburg, Transvaal. A process consisting in thoroughly and intimately mixing peroxide of barium ( $BaO_2$ ) with precious-metal-bearing material, and then subjecting the same to treatment with an alkaline cyanide solution.



696,323. **QUICKSILVER-SEPARATING AND CONTINUOUS ORE-FURNACE.**—Christopher Fitzgerald, San Francisco, Cal., assignor of one-half to William B. Gester, Newcastle, Cal. An apparatus for treating quicksilver ore comprising an inclined muffle and a furnace, the fire-box whereof is directly removed from the ore-chamber, said muffle having a parallel floor and roof whereby the surrounding heat is equidistant from all parts of the surface of the ore, said roof having a short horizontal projection at its highest end for regulating the depth of ore in the muffle, an ore-inlet at the upper end of the muffle, a chamber in open communication with the lower end of the muffle, and removed from the direct roasting heat, means by which heated air may be delivered to the muffle, a vapor-outlet for the muffle, and means for condensing the mercurial vapors.



696,324. **METHOD OF CIRCULATING WATER THROUGH THE TUYERES AND COOLERS OF BLAST-FURNACES.**—William J. Foster, Darlaston, England. A system of tubes surrounding the tuyeres and connecting with a water tank, circulation being maintained by a special pump.

Week ending March 6, 1902.

493 of 1901. **ZINC REDUCTION.**—H. M. Taquet, Paris, France. Treating distilled zinc oxide with a sulphate of an alkaline earth, so producing metallic zinc and sulphide of alkaline earth.

2,883 of 1901. **MINERS' AXE.**—D. Rees, Rhondda Valley. A miners' axe with a cutting edge made in a separate piece.

3,327 of 1901. **SULPHURIC ACID MAKING.**—H. Rabe, St. Petersburg, Russia. Improvements in extracting sulphurous acid from other gases, for the manufacture of anhydrous sulphuric acid.

6,322 of 1901. **PHOSPHORIZING IRON.**—Sir A. Hickman and W. Hutchinson, Wolverhampton. Decreasing the silicon and increasing the phosphorus in iron and steel, by adding phosphate of lime to the molten pig.

7,623 of 1901. **MINE TROLLEY.** F. Radu, Colmar, Germany. A trolley for catching the debris from blasts and clearing it away without delay.

22,730 of 1901. **STEEL MAKING.**—H. Johnson and G. W. Grier, Victoria, Australia. Producing steel direct from ores by a plant combining a blast furnace converter and open hearth refinery.

23,277 of 1901. **COKE-OVEN.**—H. Koppers, Essen, Germany. Improved method of constructing the walls of coke ovens with vertical flues.

24,235 of 1901. **MAKING ALLOYS.**—C. A. Keller, Paris, France. Method of making alloys by reducing the metals in separate electric furnaces and then combining.

## PERSONALS.

Mr. E. P. Jennings, of Salt Lake, Utah, has been in Arizona witnessing the initial run of the new Concho Mill at Ryan.

Mr. S. J. Sullivan, Jr., who is looking after his father's interests in Chihuahua, Mexico, is spending a few weeks in Colorado.

Mr. Percy Williams, the well-known millman, has accepted a position as manager of the Blue Dick property near Prescott, Ariz.

Mr. Emil Sarlin, a representative of the Finland Government, visited Gilpin County, Colo., last week in the interests of his government.

Mr. J. J. Blow, formerly of Leadville, Colo., is now general superintendent of the Idaho Consolidated Gold Mining Company's property at Hailey, Idaho.

Mr. Thomas J. Curran, president of the Jura-Trias and Mogollon Gold and Copper companies, recently returned to New Mexico from a trip to New York City.

Mr. Daniel Davies is now general manager of the Virginia Iron, Coal and Coke Company, with headquarters at Bristol, Va. He succeeds Mr. James H. Brass.

Major J. W. Stillwell has resigned as general manager of the Tennessee Phosphate Company, of Mt. Pleasant, Tenn. He has been succeeded by Mr. A. E. Sheldon.

Mr. A. L. Collins, of the Smuggler Mining Company, of Telluride, Colo., was a visitor in Gilpin County last week looking after mining and milling interests.

Mr. C. H. Hannington has resigned as superintendent of the Iron-Silver Mining Company at Leadville, Colo., and Mr. J. Welsh has been appointed his successor.

Mr. Wm. Hale Thompson, of Chicago, Ill., one of the owners of the Old Channel Mining Company, recently looked over the company's property at Grants Pass, Ore.

Mr. Regis Chauvenet, retiring president of the Colorado School of Mines, is visiting Leadville and other mining camps of Colorado gathering statistical information.

Mr. C. A. Hopkins, one of the directors and the treasurer of the Quartette Mining Company, Searchlight District, Nevada, has been stopping in Los Angeles, Cal.

Mr. David Lyons, of Chicago, Ill., interested in the Lyons-Kyle Mining Company, operating property near Central City, Colo., was a visitor to the mines during the past week.

Mr. J. H. Henley, formerly superintendent of the Ibez Mining Company at Leadville, Colo., is now superintendent at the Elkton properties in the Cripple Creek District.

Mr. E. R. Kennedy, of New York City, president, and Mr. Benjamin Stearn, vice president of the Exposed Treasure Mining Company, recently visited the company's mines at Mojave, Cal.

Mr. Guillermo C. Dingey, recently returned to Durango, Mex., from a week's trip to Pachuca, where he has been putting in some New Standard concentrators for which he is the representative in Mexico.

Mr. W. H. Crawford, superintendent of the Trussville furnace of the Lacy-Buck Iron Company, at Trussville, Ala., recently resigned in order to become manager of the Hillman Land and Iron Company, at Grand Rivers, Ky.

Dr. Sanders, Judge W. A. Garrett and Messrs. J. H. Johnson, C. E. Pope and S. Rogers, of Holdrege, Neb., visited Black Hawk, Colo., last week, as stockholders in the P. K. Mine operated by the International Mining Company.

Mr. W. W. Charles, for a number of years connected with the American Smelting and Refining Company plants at Leadville, Colo., has accepted a position as secretary to the auditor of the company with headquarters in New York City and has left Leadville.

Mr. A. W. Thompson, president, and Mr. G. W. French, vice-president, of the Republic Iron and Steel Company, both of Chicago, Ill., were in Birmingham, Ala., last week looking over the properties of the company in that section.

Mr. J. A. Rutherford, of New York City, interested in the Lehigh Coal Company, recently formed to develop a large tract of coal lands in Blount County, Alabama, has been in the Birmingham, Ala., district during the past two weeks looking over the properties.

Mr. M. M. O'Shaughnessy, of San Francisco, Cal., is to act as consulting engineer for a large irrigation scheme on the island of Kauai, H. I. The water will be brought from the Makaweli River, and part of the line will be through an almost inaccessible canyon.

Mr. Gordon McLean, for the past 20 years superintendent of the Detroit Copper Mining Company's mines at Morenci, Ariz., and Mr. Frank H. Probert,

have gone into partnership as consulting mining engineers, and will open offices in Los Angeles, Cal.

Mr. Frank H. Probert, of the firm of McLean & Probert, consulting mining engineers, Los Angeles, Cal., is examining properties in Southwestern Utah in the interest of Boston men. He will visit San Francisco, Salt Lake City and Denver on his way to and from the properties.

Mr. C. S. Herzig has resigned as general manager of John T. Williams & Sons, Knoxville, Tenn., and of the Blue Wing Copper Company, Virgilina, Va., to accept a position as manager of a copper property in Southwest Africa for Messrs. S. Neumann & Company, of London, England.

Mr. Schuyler Frazier, of Elizabeth, N. J., has resigned his position as superintendent of the Tremley, N. J., plant of the Grasselli Chemical Company, and has been appointed superintendent of the Argentine Kans., plant of the United Zinc and Chemical Company. He will assume his new duties May 1.

Mr. Don. H. Bacon, chairman of the board of directors of the Tennessee Coal, Iron and Railroad Company, has returned to New York City after a visit to the properties of the company in the Birmingham, Ala., district. Preparations are now being made at Ensley, Ala., to install a new water purification plant to cost \$35,000, and supply the boilers at Ensley and Pratt City belonging to the Tennessee Company.

## OBITUARY.

George M. Brown, for 50 years in charge of construction work of the Delaware & Hudson Canal Company, died April 7 at Kingston, N. Y., aged 80 years. He was a devoted student of astronomy and owned one of the finest private observatories in the State.

S. B. Lundlum, superintendent of the Keyston-Placer Mining Company, whose mines are located about 4 miles west of Telluride, Colo., was almost instantly killed on April 5, by a hydraulic main which became unmanageable. The stream of water struck Mr. Lundlum at close range, and hurled him 50 ft. When rescued his body was floating in the torrent of water, 100 ft. away from the nozzle of the main. His shoulders, ribs, and other bones were broken. Mr. Lundlum was a hydraulic miner of many years experience and had had charge of large mines in California.

## SOCIETIES AND TECHNICAL SCHOOLS.

AMERICAN ELECTROCHEMICAL SOCIETY.—The first meeting of this society was held in Philadelphia, Pa., on April 3, 4, and 5. There were 87 members registered as in attendance. Nominations were made for a president, secretary, treasurer, 6 vice-presidents, and 9 managers. The vice-presidents are to hold office 2 years and the managers 9 years. The following nominations were made: President, Prof. J. W. Richards, Lehigh University; secretary, C. J. Reed, Philadelphia, Pa.; treasurer, Dr. P. G. Salom, Philadelphia; vice-presidents, Prof. J. S. Carhart, University of Michigan; Prof. W. D. Bancroft, Cornell University; Prof. C. A. Doremus, College City of New York; Prof. L. Kahlenberg, University of Wisconsin; Prof. W. R. Whitney, Boston; C. M. Hall, Niagara Falls, N. Y.; Managers—Prof. S. P. Sadtler, Philadelphia; Dr. E. F. Roeber, Philadelphia; C. O. Mailoux, New York City; W. D. Weaver, New York City; Dr. W. D. Sheldon, Brooklyn, N. Y.; Carl Hering, Philadelphia; Edward Weston, Waverly Park, N. J.; E. G. Acheson, Niagara Falls, N. Y.; Col. Samuel S. Reber, U. S. A., Washington, D. C.

A visit was made to the chemical works of Harrison Brothers & Company, to see the Darling process for the electrolytic production of sodium and nitric acid from nitrate of soda.

Twenty papers were presented at the meeting. The next meeting will be held at Niagara Falls in September.

## INDUSTRIAL NOTES.

The Gardner Electric Drill and Machinery Company lately shipped 4 drills to Australia and 2 to Mexico from its Denver, Colo., branch office.

The Baldwin Locomotive Works, of Philadelphia, Pa., is about to ship 12 locomotives to Fremantle for the West Australian Government Railways.

The Allis-Chalmers Company through its Salt Lake branch recently filled an order for a No. 8 Gates ball mill and a 5 by 22 ft. tube mill for the Portland Cement Company of Utah.

The Ingersoll-Sergeant Drill Company, of New York City, manufacturing air compressors, rock drills, coal cutters, etc., has established an office at 1212 Park Building, Pittsburg, Pa., in charge of Conrad Bolinger, Jr.

The Lackawanna Iron and Steel Company is building at its new works at Buffalo, N. Y., 1,000 coke ovens, on which more than 200 men are busy. There will be more than 20 batteries, with a complement of about 50 ovens each, stretched along the lake shore.

The Link Belt Machinery Company, of Chicago, Ill., is reported to be figuring on a large coal handling plant for the Calcutta docks, India. The contract will include the construction of warehouses, etc., which will mean the purchase of over 2,000 tons of structural steel.

The Southern Bauxite Mining and Manufacturing Company, of Ferrysmith, Ark., reports that it is about to construct a 2-mile light railway from its mills to its mines. The road will be constructed of either 25-lb. new or 30-lb. relaying rails and the company solicits offers for furnishing this material.

The arrangement that has existed for some time past between the Bullock Electric Manufacturing Company, of Cincinnati, O., and the Wagner Electric Manufacturing Company, of St. Louis, Mo., has been discontinued, and the sales department that has been conducted jointly by the two concerns now passes into the control of the Bullock Company.

The Pneumatic Ore Concentrating Company, with a capital stock of \$500,000, has been incorporated under the laws of the State of New Jersey. It is an Ohio concern, and its charter permits the company to manufacture by-products of iron, steel, etc. The incorporators are Jay J. Snyder, D. M. Stewart, of Xenia, O., and John O. Wilson, of Camden, N. J.

The Garden City Fan Company, of Chicago, Ill., manufacturer of exhausters, blowers, ventilating fans, hot blast apparatus, etc., has, owing to increasing business, built a new plant at Niles, Mich., and the company anticipates moving into this some time during April. The foundry will be 190 by 80 ft., part of which will be 2 stories in height, and the machine shop will be 200 by 80 ft. two stories high.

The Mexican National Dynamite and Explosive Company, which holds a concession from the Mexican Government for the manufacture of dynamite, etc., it is reported, will locate its principal works either at Monterey or Laguna, in the State of Durango. The terms of the concession require that the company must be ready to deliver dynamite by July 1, 1903. The concern will also establish works for the manufacture of smokeless powder.

Fairbanks, Morse & Company, of Chicago and New York, manufacturing steam pumps, electrical machinery, steam engines and boilers, marine machinery and railroad supplies, reports that all of its departments have been crowded to the utmost. It recently erected 3 large coaling stations on the lines of the New York Central & Hudson River Railroad, one on the Buffalo Creek Railroad, one on the Wisconsin Central, and one on the Baltimore & Ohio.

Arrangements have been entered into between the Parnall-Krause Manufacturing Agency and the Nordberg Manufacturing Company, of Milwaukee, Wis., by which the latter secures the sole right to manufacture stamp mill devices under the Parnall-Krause patent. There are reported to be now 35 Parnall-Krause heads in Lake mills paying a yearly royalty and the number is steadily increasing. The Adventure is the latest mill to adopt the Parnall-Krause mortars.

The Ferracite Machine Company, of Bridgeton, N. J., is reported to have received recently orders for considerable electrical outfits for armature work for the new plant now under construction at Trafford Park, near Manchester, for the British Westinghouse Electric and Manufacturing Company, Limited, and also for the General Electric Company in England. A quantity of special machinery is said to have been ordered for the British Government mint, and a 400-ton coining press for shipment to India.

For several weeks large consignments of steel works machinery have been made to the Monterey Iron and Steel Works, of which William White, Jr., of Pittsburg, Pa., is consulting engineer, and the United Engineering and Foundry Company, the contractors for machinery. Fifteen car-loads of the heaviest type of steel works equipment have been forwarded, and at least 15 additional cars will be shipped within a month. The shipments include a 44-in. blooming mill with tables, approach tables, manipulator, rail straightening presses, cambering machine and roll lathes. The new plant will roll rails, structural material and plates.

An international exposition is to be conducted by the Imperial Government of Japan from March 1 to July 31, 1903, at Osaka, the principal commercial city of the empire. A special invitation is being made to American manufacturers to exhibit their goods upon this occasion. The Japanese Government is seeking to arrange special freight facilities for exhibits for the projected samples building. Intending exhibitors in this building must forward their applications to the office of the Chief Commissioner for the Fifth Domestic Industrial Exhibition, in the De-



partment of Agriculture and Commerce at Tokio, not later than June 30, 1902.

The Allis-Chalmers Company recently shipped from its works at Milwaukee, Wis., a steel shaft 30 in. in diameter and 34 ft. long, with its fittings. The shaft is hollow forged, with a 10-in. hole, and was finished and fitted at the E. P. Allis Works, for use in one of the plants of the American Steel and Wire Company, at Cleveland, Ohio. The actual shipping weight of the shaft is 78 tons. It is intended for a 40 and 80 by 60 combined vertical and horizontal Reynolds rolling mill engine, carrying a rope wheel 23 ft. in diameter by 18 ft. face. The weight of the wheel is about 138 tons. The total weight of the finished engine is about 500 tons.

At the recent annual meeting of the Wellman-Seaver Engineering Company, action was taken to change the name of the corporation to the Wellman-Seaver-Morgan Engineering Company. Thomas R. Morgan, who for several years has been secretary of the company, will be secretary and works manager of the new company. He will have direct charge of the large manufacturing plant of the company now nearing completion. The list of officers is: S. T. Wellman, president; J. W. Seaver, vice-president; C. H. Wellman, general manager; T. R. Morgan, secretary and works manager; A. D. Hatfield, treasurer; C. W. Comstock, purchasing agent and assistant secretary.

The Ingersoll-Sergeant Drill Company, of New York City, has just received an order from the Gold Creek Consolidated Mining Company, of Jersey City, for a complete outfit, consisting of air compressors, receiver, drills, drill mountings, boiler and all fittings, to be used at the Mascot group of mines in Pierce City District, Shoshone County, Idaho, near the town of Orofino. The Gold Creek Company has also just placed an order with the Allis-Chalmers Company for 15 stamps, in addition to the 10, which they already have, bringing the daily capacity of the mill up to 125 tons. The president of the concern is Capt. E. E. Rodgers, and the general offices are at 25 Broad street, New York City.

The Mine and Smelter Supply Company, of Denver, Colo., recently made a large shipment of machinery, including several Durkee electric drills, amalgamating and cyaniding machinery, to the Inca Mining Company, of Tirapata, Peru, South America. Ten Wilfley tables were forwarded to the Montezuma Lead Company, Santa Barbara, Mex., and one concentrator to Puerto Cortez, Spanish Honduras, while 2 Wilfley concentrators were shipped to Alaska. This company, which has branches in Salt Lake City, El Paso, Tex., and the City of Mexico, has just opened a branch office at 139 Liberty Street, New York. It recently closed a contract with the Southern Wyoming Tramway Company, of Grand Encampment, Wyoming, for equipping the long aerial tramway to connect the smelter at Encampment with the Ferris-Haggerty mines.

Upon application of the United Gas and Coke Company of West Virginia, a heavy creditor, Robert F. Burnett, of Boston, has been appointed receiver for the New England Gas and Coke Company by Judge Colt, of the United States Circuit Court. The move is said to be the first step in a reorganization. The announcement of the appointment of a receiver was followed at once by the appearance of circulars issued by a committee representing the first mortgage 5 per cent bondholders and of the stockholders of the New England Gas and Coke Company, saying that Messrs. Kidder, Peabody & Company, of Boston, and J. & W. Seligman, of New York, at the request of many of the holders of securities of the company were preparing a plan for the reconstruction and reorganization of the company, which they will submit at the earliest possible moment, and inviting bondholders and stockholders to forthwith deposit securities with the Old Colony Trust Company, Boston, or with the Colonial Trust Company, New York, who will receive deposits.

The Northwest Steamship Company is making rapid progress on the interior changes of its crack passenger boats *Northwest* and *Northland*. These changes include boilers of the Scotch type and many changes of the interior fittings, the estimated cost to reach nearly \$500,000. On each boat there will be duplicate generating sets for electric lighting, consisting of two horizontal tandem compound engines made by the Buffalo Forge Company, of Buffalo, N. Y., direct connected with General Electric Company marine type 75 kw. generators. The engines are of the Buffalo Forge Company latest type, specially designed for this contract, the space available being limited and the builders have agreed to deliver the engines in an extremely short time. In addition the boats are being fitted with a complete set of the most improved ventilating apparatus for maintaining cool and pure air on board. Six Buffalo steel plate fans with direct-connected General Electric Company motors will be installed in each steamer with an elaborate network of galvanized iron ducts for delivering the air.

#### TRADE CATALOGUES.

An artistic little pamphlet published by the B. F. Sturtevant Company, Boston, Mass., is entitled "Mechanical Draft." It explains the differences between forced and induced drafts, gives illustrations of some plants at which mechanical draft apparatus has been installed and states some of the economies gained.

H. Minod, of Geneva, Switzerland, issues a 48-page pamphlet giving price list of minerals and rocks. These include typical rocks from Mt. Blanc, ore and vein stones from various places and a very full collection of igneous and metamorphic rocks from the Vosges Mountains, Saxony, the Tyrol, the Harz Mountains and other famous European localities.

The Cloit & Crist Manufacturing Company, of San Francisco, Cal., manufacturing steam power and electrically driven pumps and air compressors, issues a little 16-page pamphlet showing some types of its pumps, including boiler pumps, tank or light service pumps, deep well pumping engines, mine sinking pumps, etc.

A catalogue of unique design, issued by the Grasselli Chemical Company, of Cleveland, O., gives a brief history of the business now conducted by the company, a list of the chemicals the company makes and information about the various uses to which these products are put. The company manufactures chemically pure acids and ammonia, including sulphuric, hydrochloric, nitric and acetic acid, and muriate of ammonia; also barium sulphate, copper sulphate, ferric and ferrous sulphate, glycerine, glauber's salts, hyposulphite of soda, chloride of zinc, etc.

The C. W. Hunt Company, of New York City, issues a series of pamphlets calling attention to its products. Pamphlet 021 is about the company's steel coal tubs, the construction of which is described in some detail. The tubs are made in 7 sizes, holding from 370 to 2,000 lbs. of coal. The company also makes iron ore, sand and coal tubs. For use in hoisting the company recommends its patent "Stevodore" hoisting rope. This is stated to be made from the best selected manila laid up with plumbago and is regularly made in 5 sizes, from 1 in. to 1½ in. diameter.

The Wood Drill Works, of Paterson, N. J., of which Cory & Dexter, of 26 Cortlandt street, New York City, are Eastern agents, has issued the 1902 edition of its catalogue. The company states that it has been making rock drills and mining machinery since 1891, and claims for its drills lightness, strength, durability and excellent workmanship. The pamphlet calls attention to the merits of the construction of various parts of the drills, including the front head, packing sleeves, air head, valves, air chest, etc., and states that the drills are made in 8 sizes suitable for drilling the smallest holes to holes 26 or 28 ft. deep. The various sizes are described at some length, and weights of drills, power required, etc., are given.

The Trent Engineering and Machinery Company, of Salt Lake, Utah, issues an interesting series of illustrated pamphlets describing the mining machinery, engines, etc., that it manufactures or carries in stock. Catalogue No. 2 deals with hoisting engines of various sizes and designs, steam or electrically driven, from a small prospecting hoist to one for the heaviest work. Catalogue No. 6 describes the Monadnock mill, a modification of the Chilean roller mill, that is stated to combine the simplicity and massiveness of the Chilean mill with flexibility, adjustability and high efficiency. Catalogue No. 15 mentions improvements in copper converters, including vertical or pear-shaped converters. Catalogue No. 26 points out the merits of the Sisyphus dry pulverizer, a ball mill that is stated to be dustless in action.

A cloth-bound booklet of 81 pages on cut and planed gearing is issued by the R. D. Nuttall Company, of Pittsburg, Pa. The book is neatly printed and contains a great variety of information likely to interest a mechanical engineer, such as tables of diametrical and circular pitch and formulas for determining the dimensions of gears, also rules for calculating the speed of gears or pulleys, and tables of angles of bevel gears, strength of gear teeth, circumferences and areas of circles, specific gravity and properties of metals, sizes of iron and steel plate, weights of bar iron and round steel, standard dimensions of screw threads, etc. The Nuttall Company states that it makes a specialty of cut and plain gearing to order, and that its factory is equipped with the latest improved gear machinery. It will furnish spur gearing up to 15 ft. diameter, bevel and miter gearing to 8 ft. diameter and worm gearing to 6 ft. diameter.

Catalogue No. 4 issued by the Allis-Chalmers Company, Fraser & Chalmers Works, Chicago, Ill., is about Riedler pumps for mine drainage, irrigation, hydraulic power plants, etc. The pamphlet calls attention to the waste of steam from internal condensation in many slow-moving pumping engines and points out the economies gained in the Riedler system by the mechanically closed valve. The valve and

the valve seat are circular, made of bronze, and the valve has a lift of from 1 to 2 in. The valve is positively closed at the proper moment by the controller, preventing slip. One of the largest pumps erected by the company was for the Chapin Mining Company, of Iron Mountain, Mich. This is a triplex, differential Riedler pump, driven by a triplex tandem compound condensing Corliss engine and has a capacity of 2,200 gal. per minute to a total head of 1,700 ft. Two vertical triplex Riedler pumps driven by vertical triple-action expansion condensing Corliss engines with a capacity of 550 gal. per minute each against a pressure of 1,250 lb. per sq. in., are in use at the Pope Manufacturing Company's tube works at Hartford, Conn. These and other pumps installed by the company are shown in the catalogue, which contains numerous tables and a variety of information that will be found of interest to engineers generally.

#### GENERAL MINING NEWS.

*Petroleum Development.*—March made some heavy gains over February in completed wells and new production, says the Oil City *Derrick*, but so far as new operations were concerned there was no commensurate gain, a slight decrease being shown in the Pennsylvania and a small increase in the Buckeye fields. Nothing sensational was recorded during the month and the scarcity of available territory continues. Save for a few small extensions to districts already nearly fully developed, March proved utterly devoid of interesting features. The Buckeye oil fields of Northwestern Ohio and Indiana showed a decided gain in new wells and new production over the month preceding, while new operations can almost be regarded as a standoff. The Lima oil fields made a gain over February of 86 wells completed and 2,271 bbls. new production. There is a considerable area of fairly productive territory in sight in Indiana and the opening of spring will undoubtedly witness a considerable increase in active operations. Ninety-one wells were completed in Southeastern Ohio in March, but 37, or over 40 per cent, were devoid of oil; the new production footed up 737 bbls., or about 14 bbls. to the well. New operations at the close of the month showed a decline of 15 rigs and a gain of 4 wells drilling as compared with February. The Northern Pennsylvania oil fields are unusually quiet. There is no new territory to occupy the attention of operators and drilling edge wells and inside old lines seems to have lost much of its attraction on the present market. Allegany leads, so far as general activity is concerned, but wells above the 5-bbl. order are few and far between. During March 5,136 bbls., or over 80 per cent, of the total new production of 6,366 bbls., came from 189 productive wells in the Southwest. The remaining 1,236 bbls. was supplied from 167 productive wells in the other Pennsylvania oil districts. While the wells of the Southwest averaged 27 bbls., those of all the other fields averaged a little over 7 bbls. each.

#### ARIZONA.

##### COCHISE COUNTY.

*American Copper Company.*—This company, about 9 miles from Cochise Station, on the Southern Pacific, has been working several claims for nearly a year and has opened up a vein said to be from 4 to 10 ft. wide, showing carbonate ore that is reported to average 7 per cent copper.

##### GILA COUNTY.

*Old Dominion Mining Company.*—The new management has organized and elected Charles S. Smith, president, and Charles H. Altmiller, treasurer. Offices have been taken at 35 Congress street, Boston, Mass., the offices formerly occupied by the Quincy Mining Company. The old management made no contest over the recent election, as it had no effective argument to present. Charles H. Altmiller, the newly elected treasurer, began his mining career in 1887, when the Boston & Montana was brought out. Since that time he has been in charge of the financial department of the so-called Bigelow mines.

##### SANTA CRUZ COUNTY.

(From Our Special Correspondent.)

*Buena Vista Mining Company.*—This company, near Patagonia, recently installed an electric drill plant, which is running smoothly and giving satisfaction.

*Independencia.*—Work is being pushed in this gold mine at Patagonia.

*Pena Blanco Mining Company.*—This company has been organized with a capital of \$1,000,000, with headquarters in Nogales, Ariz., to mine and mill the ores of the San Francis Mine at Pena Blanco. It has a shaft down 100 ft. on the principal vein, and is erecting a steam hoisting plant. The ore is high grade silver-lead.

##### YAVAPAI COUNTY.

*United Verde.*—Senator W. A. Clark's copper mine at Jerome is said to be virtually closed as the result

of a strike, 500 men having been discharged there within a few days.

#### CALIFORNIA.

##### AMADOR COUNTY.

(From Our Special Correspondent.)

**Fremont Mining Company.**—This property at Amador City, Arthur Goodall, of San Francisco, secretary and manager, is to have heavy hoisting machinery erected at the Glover and Fremont shafts. The grading for the hoists is about completed. Engines, boilers and air compressors are to be provided and probably a 60-stamp mill. About 75 men are now employed.

**Keystone Consolidated Mining Company.**—This property at Amador City is owned mainly by M. J. McDonald, president, Mills Building, San Francisco; Charles Bunker is superintendent. The new mill operated by electricity has started and 60 stamps are dropping. It was at this mine that quartz mining in Amador County started, in the early 50's.

**New Western.**—This company, which has been some years milling the ore in the old Plymouth dump at Plymouth is reported to have changed control, W. E. Dargie, of Oakland, having succeeded F. J. Moffitt.

**Weist Process.**—N. W. Mahaffey, who has been experimenting with the Weist process at the Zeila Mine, Jackson, states that arrangements have been made to rent the chlorination works at Wieland, which will be arranged for the treatment of sulphurets and refractory ores by the process.

**Wildman-Mahoney.**—A body of good ore is reported found in the lowest level of the Wildman Mine at Sutter Creek, John Ross, Jr., manager.

##### BUTTE COUNTY.

(From Our Special Correspondent.)

**John Dix.**—This property on Butte Creek at Berdams, owned by R. Diller, comprises 480 acres on a gravel channel 300 to 600 ft. wide, lying under 750 ft. of lava cap. George Straugham and associates of Australia have bought the property and made a preliminary payment of \$4,000. J. J. Grossman reported on the mine.

**Williams.**—Lewis Williams, of Lumpkin, is building a 2-stamp mill on a mine in Devil's Ravine about 3 miles from Lumpkin. A mill there some years ago burned down.

##### CALAVERAS COUNTY.

(From Our Special Correspondent.)

**Fanny Marie.**—George W. Brown and E. H. Blake, of Boston, and E. M. White, of Yarmouth, Mass., stockholders in the company, are visiting this property at Glencoe. Mr. Brown is president of the company.

**Gold Hill Mining Company.**—This Illinois company owning a mine at Angels, C. Wolff, superintendent, is to run its mill and hoist by electricity. Charles Truax, of Chicago, president of the company, visited the mine recently.

**John Bull District.**—In this district 5 miles from Valley Spring, Frank Jantza and Hans Bauer have struck very rich specimen rock within a few feet of the surface.

**Mountain View.**—A strike of good ore is reported in this mine at Glencoe, owned by the Woodcock Bros. The shaft is down 120 ft.

**Old River Channel.**—Near the Day ranch on the road between El Dorado and Shepranch a shaft is being sunk through the lava capping to prospect for an old river channel. Charles Nuland is superintending work and Edward Rigney has the contract to sink to bedrock.

**Oriole.**—On this mine at Angels, a 6-drill air compressor is to be put in. The mine belongs to a company of which J. B. Freitas, of Stockton, is secretary, and F. E. Dunlap, of Stockton, manager.

**San Joaquin.**—This mine at Angels, H. F. Stewart, superintendent, has 5 stamps running on ore from the upper tunnel.

**Sheep Ranch Gold Mining Company.**—At this mine at Shepranch, James T. Langford, superintendent, on the 1,300-ft. level, 140 ft. from the shaft, a shoot of ore about 6 ft. wide has been found which shows plenty of free gold. The levels above have not shown rich shoots at this point.

##### ELDORADO COUNTY.

(From Our Special Correspondent.)

**Alpine.**—At this mine, at Georgetown, W. E. Mitchell, superintendent, 10 men are at work.

**Gold Bug.**—This mine at Georgetown, owned by a Cleveland, O., company, W. E. Thorne, manager, is operating a hydraulic elevator with 11 men busy.

**Josephine.**—On this mine at Georgetown, J. M. Nougues, Jr., superintendent, miners are retimbering the tunnel and preparing to install air drills.

**Little Gem.**—At this mine, near Josephine, operations will shortly be resumed.

**Wilton.**—Porter & Parker have purchased part of the Wilton claim, north of Georgetown, and are preparing to work it.

##### INYO COUNTY.

(From Our Special Correspondent.)

**Defiance.**—This mine at Darwin has been leased by James McDonald and a small force is at work.

**Panamint District.**—In this district the Radcliff Company, at Panamint, W. W. Godsmark, superintendent, is dropping 15 stamps steadily. The Mineral Ranch Company, C. Anthony, superintendent, is working 20 men.

**Panamint Queen Mining and Milling Company.**—This Los Angeles company is about to work a group of 5 claims near Panamint.

**Reward Gold Mining Company.**—This mine at Reward, H. C. Steele, superintendent, employs 35 men and is producing gold and silver. The main office is at Pasadena. A tunnel is being run on a vein recently found. A flume to carry 3,000 in. of water is being built and a water power plant is being installed. It is proposed to erect a 20-stamp mill near the mine, haul the ore through the new tunnel to the mill, and do away with the present 5,000 ft. of wire tram. Air compressors and power drills will be used. The present mill building will be utilized as a power house.

##### MADERA COUNTY.

(From Our Special Correspondent.)

**Josephine.**—This mine at Grub Gulch, formerly owned by the Risdon Iron Works, of San Francisco, has been sold and considerable development is to be done before a mill is erected. Miners are at work.

**Lucky Bill.**—This mine at Grub Gulch, formerly owned by J. Morrison and A. Davidson, has been bonded by the Montana men who recently bought the Gambetta.

**Savannah.**—On this mine at Grub Gulch, owned by L. H. Sharp, of 318 Pine street, San Francisco, a large vein of ore has been tapped. A 10-stamp mill is on the property.

##### MARIPOSA COUNTY.

(From Our Special Correspondent.)

**Buckeye.**—This mine, near Mariposa, has been sold by McRae & Heman to the Krogh Manufacturing Company, of 9 Stevenson street, San Francisco. The new owners will develop the property.

**McAlpine.**—On this mine, 5 miles from Mariposa, Spokane, Wash., men expect to resume work shortly and sink the shaft 600 ft.

**Tyro.**—At this mine, at Coulterville, arrangements are being made to start the 10-stamp mill shortly. Thomas J. Brown is superintendent.

##### NEVADA COUNTY.

(From Our Special Correspondent.)

**Bunker Hill.**—James Graham, of Grass Valley, owner of this mine near Sweetland, intends resuming work this summer.

**Champion Mining Company.**—Superintendent E. R. Abadie, of this company, at Nevada City, has started the mill on the Spanish claim. The mill has been undergoing repairs for some time.

**Coe.**—O. A. Turner, who won the controlling interest in this mine at Grass Valley, has returned prepared, he says, to pay off all indebtedness and work the mine again.

**Culbertson.**—This mine near Graniteville is to be opened by James H. English and 10 men are at work. Dr. A. H. Tickell, of Nevada City, owns a  $\frac{1}{4}$  interest and has a bond on the rest. He also has a bond on the National, on the same ledge. The ore will be crushed for the present in the Culbertson Mill.

**Eagle Bird.**—This old mine at Maybert, W. M. Wilson, superintendent, is to be started again at once. The litigation has been settled.

**Eclipse.**—Fire recently destroyed the hoisting works and buildings on this mine near Nevada City. The mine is owned by a Los Angeles company of which B. Hoskings is superintendent. A new plant will be erected and work resumed.

**Ensign.**—At this mine, near Sweetland, men are to be put to work by Dr. Pouch and the mill is to be overhauled.

**Red Cross.**—On this mine at Nevada City, Geo. Bonney, superintendent, new mill buildings have been put up to replace those recently burned.

##### PLACER COUNTY.

(From Our Special Correspondent.)

**Big Channel Consolidated Mining Company.**—A. C. Burrage, of Boston, Mass., who resides at Redlands every winter, has purchased 3,500 acres of gravel ground on the Forest Hill Divide, near Forest Hill, including the Grey Eagle, North Star, Mountain, Spring Garden, Natchez, Wolverine, Owl Creek, Union and Rough & Ready claims. Many of these are old locations. A consolidation of the holdings

was made some time since, but it is now stated that Mr. Burrage has bought the property outright.

**Tadpole Consolidated Mining Company.**—This mine near Westville, is having its tunnel continued. J. F. Brown, of Colfax, has been elected president; E. Rath, secretary, and J. L. Sparhawk, of Iowa Hill, superintendent.

##### RIVERSIDE COUNTY.

(From Our Special Correspondent.)

**Chuckawala Mining Company.**—At this mine near Salton, Charles F. Wyatt, superintendent, a cyanide plant is being erected to treat the ore directly. The company's office is at 112 North Los Angeles street, Los Angeles.

**Desert Queen.**—This mine, at Banning, owned by S. F. Zambro, of San Bernardino, has not been worked for some time, but development work is now being done.

**Lost Horse Mining and Milling Company.**—This property at Banning is now owned by this company of 906 Main street, Kansas City, Mo., with S. M. Kelsey, superintendent. The property has been idle since last May on account of scarcity of water.

##### SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

**Bon Ton.**—This placer, at Dale, is being worked.

**Brooklyn Company.**—This company, at Dale, has finished its well and has a good water supply. The company, which now has a 3-stamp mill, is to erect a larger one. Ames & Yeager are the principal owners.

**Paradise Valley.**—W. J. Beaver and H. Galeron, of San Bernardino, intend putting up a mill on mines in Paradise Valley, about 20 miles from Daggett.

**Vulcania.**—A strike of gold ore and of water has been made in this mine at Danby.

##### SHASTA COUNTY.

(From Our Special Correspondent.)

**Afterthought.**—This mine in Furnaceville District, near Redding, owned by J. G. Enright, of San Jose, Wm. McDermott, superintendent, is supposed to have been sold to the Tarbett Syndicate. The old machinery is being hauled into Redding and will be replaced by new, and some sacked ore is being shipped to the Selby Smelter. The ores carry copper mainly.

##### SISKIYOU COUNTY.

(From Our Special Correspondent.)

**Consolidated Mining and Dredger Company of Pittsburg.**—This company, of which E. H. Scott is superintendent, is making a 30-day trial run with the new dredger at Callahans. The machinery was built by the Risdon Iron Works of San Francisco. Electric power is used. The ground is somewhat heavy and the ladder is designed to dig to 40 ft.

**Dewey.**—This mine at Gazelle, owned by the Squaw Creek Mining Company, of 185 Summer street, Boston, Mass., is being reopened under Superintendent H. Tissot. Some very rich ore was taken out 2 years ago but the mine has been idle for some time.

**Wright & Fletcher.**—This hydraulic mine at Oro Fino is worked by Wright & Hamilton with a full crew and water for a long run. At the Campbell Mine operated by Mr. Brokaw, the hydraulic elevator is working satisfactorily.

##### SONOMA COUNTY.

(From Our Special Correspondent.)

**Cloverdale.**—This quicksilver mine, at Pine Flat, owned by Charles and Henry Lawley, is shipping 40 flasks of quicksilver monthly.

**Cochise.**—This claim, on Stuart Creek, near Glen Ellen, is located by Jesse T. Meddock, of San Francisco. The quartz is supposed to carry gold, though there are no gold mines in this county.

**Mercury.**—Bad weather has prevented hauling in new machinery for this quicksilver mine at Pine Flat. At the Eureka Mine, same place, work was suspended for the same reason.

**Socrates.**—The rock crusher and quicksilver storage vats for this quicksilver mine at Pine Flat are being hauled in. New furnaces and machinery have been erected.

##### TUOLUMNE COUNTY.

(From Our Special Correspondent.)

**Grizzly.**—This mine at Carters, W. R. Hall, superintendent, has let a contract for sinking 100 ft.

**Soulsby Consolidated Gold Mining Company.**—This company, at Soulsbyville, Wm. Sherwood, superintendent, owns 7 claims and employs about 80 men. The mill is kept steadily running. The company recently began work on a claim west of the Platt and Gilson.

**Two Brothers.**—This mine, near Groveland, has been bonded and work will start at once under R. O'Brien.



## YUBA COUNTY.

(From Our Special Correspondent.)

**Blue Point.**—This mine at Smartsville, owned by the Blue Gravel Mining Company, Patrick Campbell, superintendent, has been in litigation for some years over a mortgage. The suits now have been dismissed and judgment satisfied, the Weissbein Brothers, of Grass Valley, having paid the claims and secured possession under a trust deed. The new owners will put the mine in shape and work it. The mine is one of the larger hydraulic properties of California. It has a reservoir, ditch and considerable land.

## COLORADO.

## BOULDER COUNTY.

**Colorado & Northern Gold Mining Company.**—A good strike of silver ore is reported in the tunnel above Salina, on Four Mile Creek, owned by this company. The vein was cut at a distance of 1,330 ft. from the mouth of the drift and at a perpendicular depth of 410 ft. It is 18 in. wide and carries gray copper, with silver and some gold.

## CHAFFEE COUNTY.

(From Our Special Correspondent.)

**Independence.**—Messrs. Denham and Jones of Tur-ter are preparing this mine for active development.

**Sunrise.**—This group of 9 claims and 2 placers, in the Four Mile District, is reported sold to the Sunrise Gold Mining and Milling Company, of which the incorporators are J. Weinstine, P. Bauro, N. Golphor, P. W. McCaffey and Andrew A. Mauro.

## CLEAR CREEK COUNTY.

**Newhouse Tunnel.**—Work on this tunnel at Idaho Springs has virtually stopped and Manager Hanchett has announced that the bore will not be run farther at present. The tunnel is in a total length of about 13,200 ft. and in this distance, it is said, over 100 veins were encountered. Contracts had been made with the tunnel company for transporting mineral and waste through the tunnel. At present, however, only 3 companies are working through the bore, the Sun & Moon, the Gem and the Bertha. When the tunnel was started it was expected that all of the companies owning property on the line of the tunnel would make contracts and work their claims through the tunnel. The tunnel, as originally designed, was to have extended to the California Mine at Nevadaville, a distance of 4½ miles. Another objective point was the Saratoga Mine in Russell Gulch. The breast of the tunnel at present is about 1,000 ft. from the Saratoga vein. The tunnel is said to have been driven about 285 ft. during March. The closing of the tunnel throws out of employment from 30 to 35 workmen. A portion of the Newhouse plant is kept in operation to furnish air and power to the 3 companies which are now working through the tunnel. S. Newhouse, the chief owner, has given out the impression that as far as he is concerned the tunnel will not be continued further in Gilpin County unless some satisfactory arrangements can be made with the owners of the veins cut.

## GILPIN COUNTY.

(From Our Special Correspondent.)

**Mining Deeds and Transfers.**—L. B. Suydam to E. H. Ryan, ½ interest Legal Tender Lode, Hawk-eye District; Joseph Fleiss to M. Fleiss, the Moonlight and 39 lodes, and Silver City tunnel site, Pleasant Valley, Lake, Gregory and Enterprise Districts; M. Hazard to F. Neumwyer, 1-6 interest Hill Top and Early Bird placers, Kansas District; W. B. Baker to Gustafson, 1-3 interest Green Bay and Baker lodes, Pine District; Clear Creek Mining and Reduction Company to C. R. Niccum, the Cyclops tunnel, Enterprise District; L. T. Tappan, 1-12, O. B. Mowry, administrator, 1-12, and J. H. Smith, 5-6 interest Tucker lode, Quartz Valley District to B. F. George; J. E. Daugherty to Nettie Price, 1-2 interest Eureka, Head Lump and Phoenix placers, Central District; John Reed, Sr., to John Reed, Jr., Minnesota lode, Central City District; P. Rohling to E. Ely, Bay State lode, Enterprise District; A. P. Morrison to R. St. J. Cleary, Sunshine lode, Lake and Gregory Districts; B. F. George to the Lyons-Kyle Mining Company, Tucker lode, Quartz Valley District.

**Gilpin County Ore Shipments.**—For March the shipments of smelting and crude ores, tailings and concentrates from the Black Hawk depot to the smelters and outside points of treatment were 357 cars or 6,605 tons, the record this year. The shipments for the first quarter of last year were 858 cars or 15,873 tons, while this quarter shows a total of 992 cars or 18,360 tons, a gain of 2,487 tons, or over 15 per cent.

**Specie Payment.**—During the past month this property on Bellevue Mountain near Russell Gulch shipped 90 cords of milling ores, a daily average of 25 tons; its smelting product reached over 100 tons. The ores are of a very good grade and the Rhode Island stockholders will receive close to \$50,000 this year in divi-

dends if the present record continues. E. W. Williams, Central City, is manager.

**After Supper.**—Massachusetts and Cripple Creek parties are the purchasers of this lode near Black Hawk, supposed to be the extension of the Sleepy Hollow and Fisk veins. The purchase price is in the neighborhood of \$25,000, the deal being made through J. W. Ray, of Cripple Creek. The new owners will install heavier machinery, erect larger top buildings and start heavy operations. Local parties were the former owners, and the property has been a fair producer of lead ores.

**California.**—Operations have been suspended by the Patch Mining Company on this and the Hidden Treasure group in Nevada District. The California mine is the deepest gold mine in the State, being down 2,230 ft., and it is feared that it will be allowed to fill with water again. Over a year of hard work has been done unwatering it, putting the shaft in excellent shape and doing considerable dead work in the lower levels. A. L. Collins represents the English owners.

**Defiance Gold Mining Company.**—New Orleans, La., parties who are the operators have suspended operations to install a larger plant of machinery. Some high grade ore has been opened up. Mr. Robertson, Russell Gulch, is in charge.

**Independent Sampling Works.**—Since the consolidation of the State Ore and the Chamberlain sampling works, a movement has been under way to start an independent works, and from present indications it will materialize. The Golden Smelter people are behind the movement and ample means can be raised.

**Rocky Mountain Mill.**—Boston parties are figuring on the purchase of this 25-stamp mill and concentrator of about 40 tons daily capacity. As soon as the necessary alterations can be made the transfer will take place. The purchase price is to be about \$35,000. English parties are the owners and the property has been under the management of A. L. Collins.

**Stewart Gold Mining Company.**—A run on a 15-cord lot of milling ore from the Stewart Mine cleaned up a gold retort of 65¼ ozs., the tailings making 30 tons which sold for \$27 per ton, bringing the ore up to almost 8 ozs. gold per cord, a very high average. The company is figuring on erecting a stamp mill near its property, as the ores are now hauled 7 miles for treatment. James A. Gilmour, Central City, is manager.

**Tucker.**—Chicago parties purchased this property in the Quartz Valley District paying a cash price of \$15,000 to B. F. George, of Denver, and will operate as the Lyons-Kyle Mining Company, with W. Woods, of Central City, as manager. The shaft is now 430 ft. deep, and some very good grade lead and yellow copper ore has been opened.

## GUNNISON COUNTY.

(From Our Special Correspondent.)

**Good Hope.**—The main shaft of this mine at Vulcan is being retimbered.

## LAKE COUNTY.—LEADVILLE.

(From Our Special Correspondent.)

**Leadville Ore Market.**—The ore market is exceedingly dull. Lead sulphides are stagnant and the iron market is now affected. The valley and local smelters are overstocked and have curtailed receipts of iron ores. The Home Mining Company has been cut down from 250 to 150 tons daily; the Caribou from 200 to 50 tons daily. The Midas and a number of smaller producers have been notified to curtail shipments. It is believed this decrease will not last over 30 days.

**Leadville Output.**—The estimated tonnage for March shows a total of about 60,000 tons divided as follows: Leadville basin mines, 650 tons daily; Carbonate Hill mines, 275 tons; Brece Hill, 450; California Gulch and Iron Hills, 350; Fryer Hill, 75; zinc ores, 100 and outlying districts, 100 tons; total 2,000 tons daily.

**American Placer Mines Company.**—Milwaukee men are behind this new concern under the direction of Edw. A. Horner of Leadville. They have 10,000 acres of placer land south of Leadville and will work on a large scale using steam shovels. The incorporators are A. G. Clark, E. A. Horner and A. L. Welch.

**Big Six Mining Company.**—Copeland & Company are shipping some fair ore showing good bismuth values. The territory is blocked off in 24 blocks which are being sub-leased.

**Catalpa-Crescent.**—Shipments are light pending the new work which consists of sinking 2 old shafts to cut the iron bodies below.

**Corona.**—Condon & Co., the new lessees, are retimbering the old 180-ft. shaft which has been lying idle since 1880.

**Dorez Mining, Milling and Tunnel Company.**—Articles of incorporation have been filed of \$1,000,000 shares at \$1 a share. The incorporators are C. H. Smith, A. W. Peters, D. B. Smith and E. P. Sheesley.

The Doria B. and Grace C. lodes have been transferred to the company.

**Fanchon Gold Mining Company.**—A new 300 ft. vertical shaft is being sunk and 2 drifts will be run to catch the Dinero and the Orinoco veins.

**Graham Gulch Mining Company.**—This new company under the direction of G. H. F. Meyer of Leadville is sinking a new shaft on the old Star of the West group to open up an oxidized iron shoot discovered in the old workings years ago. The new shaft is now down 460 ft. and has cut a fine iron contact.

**Greenback Mining Company.**—The shaft is following the diamond drill explorations on the largest body of iron ever opened in the district. Shipments are very light.

**New Jersey Gold-Copper Reduction Company.**—This company has a 10 years lease on the old Harrison Reduction Works old dump. The company is capitalized for \$5,000,000, and is headed by Dr. J. A. Jeannotte president, and C. A. Miller secretary, both of Leadville.

**New Leadville Home Mining Company.**—At the annual meeting J. M. Maxwell was elected president; W. K. Burchinell, vice-president; E. J. McCarty, treasurer; W. A. Moore, secretary. The first three named and Messrs. John Law, Arthur Lumsden, D. D. Sullivan and E. J. Gaw compose the board of directors. The work for the past 11 months shows a total tonnage of 81,776 tons from which the company received \$301,593, an average price per ton of \$3.68. The total expenses for the same period exclusive of dividends were \$224,021, total cost of mining a ton of ore \$2.74; netting 94c. a ton. The exact cost of mining and shipping exclusive of development work, taxes, insurance and general expenses is placed at \$1.44 per ton. The average monthly pay roll has been \$12,783 and average total expenses per month \$20,161. The company will not pay dividends until it can make heavier shipments than now. The company paid \$112,500 in dividends during the past year making a total of \$237,500 to date. The physical condition of the properties is reported to show material improvement and the company is prepared to increase its output greatly. The Penrose has been the principal producer and has taken out \$750,000. The Bon Air and the Starr ground come next.

**Printer Boy Mining Company.**—This combination is again in trouble and has closed down. The men have attached the machinery, etc., for \$1,680 wages due. The pumps have been pulled and work will not be resumed for the present. New York people who are interested have had trouble with their manager ever since they started work.

**Silent Friend Leasing Company.**—P. D. Lynch of Leadville has charge for eastern people. The company has been working over 18 months, has sunk its shaft from 150 to 300 ft. and run drifts. Some carbonate ore is being extracted which runs from \$12 to \$25 per ton, and the shoot appears to be improving.

**Stone Mining Company.**—Lessees on the Baby shaft are down 40 ft. and in a drift have opened up 6 ft. of iron carbonates some of which shows 15 per cent lead. On the Redrock claim 4 cars a month are being shipped, some of the ore running quite high in silver.

## SUMMIT COUNTY.

(From Our Special Correspondent.)

**Gold Cord Mining and Smelting Company.**—This company owning several claims on Jacque Mountain has a lease and bond on the Clara and French claims at Kokomo, near the Queen of the West Mine. It is driving a tunnel into Jacque Mountain.

## TELLER COUNTY.—CRIPPLE CREEK.

(From Our Special Correspondent.)

**Cripple Creek Output.**—The March output is estimated at 53,300 tons valued at \$2,074,100, compared with 45,000 tons in March 1901.

## IDAHO.

## IDAHO COUNTY.

**Consolidated Hydraulic Mining Company.**—This company began work recently on the Cow Creek placers at Lucile. The company will bring an ample supply of water on to the property, which has heretofore been considered of little value because of its height. There is an old back channel of the Salmon crossing the property which is believed to be very rich. Within a month operations will be begun at Freedom. The improvements contemplated include a suspension bridge across the Salmon 225 ft. high and 480 ft. long, to carry 5,000 in. of water on to the Fockler high bar on the west side of the river.

**Thunder Mountain.**—Recent reports from this district are that there will be a great inrush of people as soon as travelling by the trails is better. One trail to the district has been open all winter and at present nearly 50 men daily are going in or coming out. The country has been covered with locations made on several feet of snow. There is a great mass of low grade breccia with occasional irregular streaks carrying high

values, but no well defined lodes, hence the prospects are there will be a great amount of vexatious litigation over apex rights. In fact, a large part of the region may be tied up in lawsuits before the end of the summer.

## OWYHEE COUNTY.

**Ivy Grace.**—This property at Flint is owned by Messrs. Marcus and Percy White, of Flint, and Dave Adams of Silver City. A 5-stamp mill erected late last fall has been running steadily since January. The Ivy Grace Mine is opened by about 1,000 ft. of levels. The lower level is in 450 ft., with backs of about 200 ft. at its face. The vein is from 2½ to 9 ft. wide. The ore is gray copper with occasional streaks of galena and pyrites. The values are copper, silver and a little gold. The mill has 5 850-lb. stamps, 2 4-ft. Frue vanners, and canvas cotter tables.

## SHOSHONE COUNTY.

**Sonora.**—The discovery of a 6-ft. vein of lead and copper in this company's property near Wallace is reported. John F. Moffatt is general manager.

## WASHINGTON COUNTY.

**Sturgill Bar.**—Charles W. Luck of Weiser, Ida., and W. H. Tibbals of Salt Lake have secured a bond on these placers on Sturgill Creek. The terms of the option call for \$50,000 to be paid in 120 days, it is said, the time granted being for the purpose of conducting examinations and making reports. The balance of the purchase price is to be made in 2 payments 6 and 12 months after. It is stated the option was secured in the interests of eastern men.

## ILLINOIS.

(From Our Special Correspondent.)

**Miners' Wages.**—The agreements between the miners and operators at Indianapolis have been ratified by the Illinois miners. In the various local districts meetings have been held by both operators and miners as to local matters pertaining to yard, or narrow work time, to begin work, and other minor details. Some of those meetings have not been satisfactory to both parties, but there will be no stoppage of work.

Another attempt at a combination has been started lately to control all the mines on the Wabash Railroad in Illinois. Little can be said of it so far.

## MOULTRIE COUNTY.

(From Our Special Correspondent.)

A valuable coal seam has been discovered at Lovington by a prospecting hole put down by the Sullivan Diamond Drill Company, of Chicago. The hole was drilled to a depth of 940 ft., where a core taken out showed a seam of coal 8 ft. thick. Fifteen seams of coal were cut through by the drill, but the lowest was the thickest. This 8 ft. seam corresponds to seams No. 1 and No. 2 which have run together. These seams are found run together at Assumption and Litchfield. The find at Lovington is valuable, as no large seams have been found in that part of the State; the core taken out showed the coal to be of high grade, clear of sulphur, with a white ash, and a block coal appearance. The find is at the junction of the Wabash and Terre Haute & Indiana Railroads. The owners are negotiating for a large plant.

## SANGAMON COUNTY.

(From Our Special Correspondent.)

**Thomas R. Gray Coal Company.**—Thomas R. Gray, of Springfield, has sold his interest in this company to his partner, James W. Jefferson, of Springfield. It has not yet been determined what name will be given to the mine, which is located on a spur of the Baltimore & Ohio Southwestern Railroad, about 3 miles southeast of Springfield.

**Consolidated Coal Company.**—It is reported that this company, with headquarters in St. Louis, Mo., which owns and operates a number of mines throughout the State, is buying some of the mines along the Wabash Railroad in this county.

## INDIANA.

## CLAY COUNTY.

(From Our Special Correspondent.)

The block coal mines on April 4 rejected the operators' ultimatum and adjourned sine die, which indicates a long suspension of work. The deadlock was over the operators' proposition to pay last year's scale provided the miners would remove the "gob" and slate from the entry. The miners insisted that the operators should do this. The matter will go before the national board for final consideration. Over 6,000 miners and other mine employes are idle, and all of the engineers are out on account of the operators refusing their demands for a 9-hour day.

## GIBSON COUNTY.

(From Our Special Correspondent.)

**Tyreshire Coal Company.**—This company, of Oakland City, was incorporated on April 3, with a capi-

tal stock of \$50,000. The board of directors is headed by David Ingle, of Oakland City. The company will open and operate mines in this county.

## SULLIVAN COUNTY.

(From Our Special Correspondent.)

**Standard Oil Company.**—This company has secured options on 5,000 acres of land in this county and, it is said, proposes to operate an extensive coke oven plant and a system of coal mines. The company will build its own railroad to its ovens and mines.

## MICHIGAN.

## COPPER—HOUGHTON COUNTY.

**Atlantic.**—The product for March was 306 2-3 tons of mineral, which is exceeded by only one month in the history of the mine. The feature of the month was the discovery of a mass of copper weighing half a ton, something unheard of in Atlantic rock.

**Franklin.**—The March output aggregated 168 tons of mineral, which compares with 329 tons for February, 1901, and 165 tons during March, 1901.

**Isle Royale.**—At the annual stockholders' meeting in Jersey City, N. J., the retiring board of directors was re-elected.

**Wolverine.**—The output for March was 254¼ tons of mineral.

(From Our Special Correspondent.)

**Baltic.**—The mill is now treating 750 tons of rock per day with 2 heads in commission. The output is increasing gradually. The washing machinery for the third head is installed but the stamps are to be delivered and it will go into commission about June 1. The March product was 276 tons of mineral.

**Calumet & Hecla.**—The building to contain the new sandwheel, which will handle the tailings from the mills at Lake Linden, is nearly all enclosed. The American Bridge Company, of New York, has the contract. The building is 65 by 78 ft. and 94 ft. high. Eleven steel columns, each 67 ft. long and weighing 24 tons, and 4 trusses, each weighing 24 tons, were used in the framework. About 500 tons of steel will be used in the entire building. The first consignment of segments for the wheel has been received from Baltimore, Md. The shipment weighed 100 tons.

**Lake Superior Concentrating Company.**—The plant belonging on the tailings from the old Franklin stamp mill has been started. The capacity of the plant, 350 tons per day, will be doubled this year.

**Rhode Island.**—Sinking in No. 2 shaft has been resumed and after some additional depth is gained a cross-cut to tap the Alouez conglomerate lode will start. Recently a cross-cut from the bottom of the shaft, 600 ft. from surface, cut the lode. It is 22 ft. wide but barren of copper except a rich shoot running through the middle. Three drills are in use, 1 in sinking and 2 in drifting. No. 1 shaft is idle, but clear of water.

**Union Copper Land and Mining Company.**—At the annual meeting of the directors in Boston, R. L. Barstow was elected a director, succeeding S. R. Dow, resigned. The total expenses for the past year, both in Michigan and in Boston, less interest received, have been \$8,464, leaving a cash balance on January 1, 1902, of \$92,702.

## IRON—MARQUETTE RANGE.

**Bradt.**—These explorations on Section 19 near Negaunee seem to be progressing favorably. There are 35 men employed sinking and drilling. Already some high grade ore has been cut by the drill and sinking a shaft is well under way.

**Negaunee.**—It is stated that the Cleveland-Cliffs Company has secured a 50-year lease on this big mine in Negaunee, and will take charge of the property at the expiration of the lease, October 1, 1903, at present held by the United States Steel Corporation.

## IRON—MENOMINEE RANGE.

**Appleton.**—At this old mine the Eleanor Mining Company has been pushing preparations for unwatering. New foundations have been put under the engine and hoisting drum, a large boiler house has been erected and 3 new boilers placed.

## MINNESOTA.

(From Our Special Correspondent.)

Daily shipments over the Duluth & Iron Range now reach about 18,000 tons, and over the Duluth, Missabe & Northern half as much. They are small yet on the Eastern Railroad of Minnesota as its docks are solidly frozen in. The Duluth & Iron Range is now hauling as a regular thing trains of 70 cars averaging about 28 gross tons each and the system is working well.

No open pit mines have started shipments yet, but steam shovels are working in stockpiles. These are solidly frozen, however. Stripping is under way at the various mines where such work is contemplated.

A large number of drills and exploring outfits are starting work in Itasca County, on the westerly extension of the Mesabi range.

## IRON—MESABI RANGE.

(From Our Special Correspondent.)

Ore as been found in the n w of the n w of section 21 T 58 R 19, where the State gave a lease some years ago.

Explorations are under way near Mariska, in T 58 R 17, where the Minnesota Iron Company has erected exploring camps and is preparing for considerable work.

The Holman forty, the s e of the n e of section 21 T 56 R 24, is being sold to Messrs. Jones, Pearce and Miller, of Duluth, for \$30,000. It is shown to contain considerable ore of a sandy nature, much like that of the Arcturus.

**Hull.**—This property, at Hibbing, is shipping heavily and a steam shovel has been put in the large stockpile. The other Hibbing properties operated by the Minnesota Iron Company are very busy.

**McComber Property.**—This exploration in T 62 R 14, has been optioned to Messrs. Swift and Fay, of Duluth, and Yawkey, of Detroit, Mich., and by them optioned to a large independent interest. The fee is owned by the Steward Iron Company, the stock of which is held by a Minnesota man. The McComber has been in litigation for many years. It was opened in 1886 by Capt. McComber, and was developed by him till there was a lease of very fine blue hematite exposed in a drift from the shaft. The property lies on the north side of Sand Lake, 12 miles east of Tower. Work will commence at once.

**Morrow.**—This new property, adjoining the Pillsbury, is sinking a working shaft.

## IRON—VERMILLION RANGE.

(From Our Special Correspondent.)

R. Whiteside has purchased land in section 20 T 62 R 14, and expects to explore there later.

Work has been discontinued on the McDonald forty of section 30 T 63 R 11, where the Midway Company has been exploring for some time.

**Section 30.**—The fee owners, Messrs. Eaton, Lornstorf, Merritt and Fagan, will begin some explorations on their own account. The Minnesota Iron Company did some work several years ago when its title was supposed to be valid. A short time ago Miller & Brown sunk a shaft near the line between the Eaton & Merritt tract and the McDonald forty, that they were exploring. Offers have been made these fee owners by at least 2 concerns, one for a lease at 50c. royalty and a bonus of something like \$250,000 and the other a straight 50c. royalty. The minimums on both propositions were large. It is expected that another bidder for this property will be a large concern that is not yet identified with mining in this field.

## MISSOURI.

## JASPER COUNTY.

(From Our Special Correspondent.)

**Joplin Ore Market.**—Zinc ore continues to climb, and an advance of 50c. per ton is reported during the past week for the ore of the Excel Mining Company, though prices for the greater part of the output remained unchanged. Much of the low-grade ore advanced in proportion to the prices paid the preceding week, but the greater part of the high-grade ore remained unchanged. A number of large producers pooled their output for a higher price and did not sell. It is estimated that 1,500 tons of zinc ore are included in this pool. A number of the purchasing agents state that unless zinc ore can be purchased cheaper the smelters will be compelled to shut down several blocks, and it is estimated that the demand will be reduced 500 tons per week if this is done.

The highest price paid for zinc ore during the past week was \$38 per ton. Many sales were made at \$37.50, and the low-grade ore in proportion. Lead ore brought \$21.75 per 1,000 lbs. delivered.

Following is the turn-in by camps of the Missouri-Kansas District for the week ending April 5:

	Zinc lbs.	Lead lbs.	Value.
Joplin .....	1,932,880	479,620	\$43,291
Galena-Empire .....	1,203,090	134,330	19,775
Cartersville .....	1,356,010	322,840	28,040
Aurora .....	892,840	36,440	15,420
Spurgeon .....	239,180	25,070	2,937
Zincite .....	533,670	18,760	9,480
Oronogo .....	295,010	12,340	5,153
Webb City .....	223,280	42,320	4,150
Duenweg .....	274,800	52,230	4,548
Central City .....	119,190	1,640	1,386
Granby .....	271,000	52,000	4,040
Cave Springs .....	139,800	6,470	3,379
Roaring Springs .....	113,090	4,210	1,449
Carl Junction .....	104,520	.....	1,598
Sherwood .....	44,220	.....	693
Total .....	7,687,670	1,174,550	\$143,487
Total, 14 weeks .....	141,400,860	17,311,830	\$2,425,816
Zinc value for week .....	\$117,671; lead .....		\$25,816;
Zinc value, 14 weeks .....	1,952,491; lead .....		373,325

## MONTANA.

## BEAVERHEAD COUNTY.

**Ajex Mining Company.**—A. J. Noyes is manager of this company. The ore crusher and Huntington mill has been hauled from the Old Faithful Mine in the Elkhorn District to the Ajex Mine, where it will



be used in the erection of a concentrator. The mill has a capacity of about 20 tons of ore per day.

## FERGUS COUNTY.

**Boston.**—Moshner and Flynn have begun development on this group of claims in the Whisky Gulch country. The group consists of 5 claims on the north slope of the Judith range.

**Great Northern.**—Work is progressing on the winze in the main tunnel of these mines at Gilt Edge. It has now reached a depth of 160 ft. and will be continued to 200 ft., when drifting from the bottom to cross-cut the formation will begin.

**New Sapphire Syndicate.**—This company is starting work on its mines near Yogo for the season. It is driving a new tunnel through the hill upon which it is mining, to meet the tunnel heretofore used. A shaft is down 100 ft. To do the work properly as planned considerable machinery will be brought in, including a large hoist. The sapphires lay in a perpendicular vein of blue rock. If the development expected is carried out the company will work 75 men during the season. James E. Sites is manager.

**Paymaster Mining Company.**—This company in the North Moccasin was recently merged into the Abbey Cyanide Gold Mining and Milling Company. The capital stock of the company has been raised from 1,250,000 shares to 1,500,000 shares of \$1 each. Out of this capitalization 500,000 shares have been placed in the treasury and the remainder are in the hands of the incorporators, who are John R. Cook, president and treasurer; Jack Wilmot, of Spokane, vice-president and director; John Logan Lovell, secretary and director and Elling Johnson, of Portland, Ore. The property consists of 10 claims, the principal of which is the Abbey.

## FLATHEAD COUNTY.

**Silver Cable Mining Company.**—John L. Hartt is manager of this company at Libby. Seven men have been at work since October. As soon as supplies can be taken in the concentrator will be repaired, a tramway erected and other necessary improvements made; it is reported to be the intention to have the concentrator ready by July 1. The development consists of about 1,700 ft. of tunnels and upraises and the 50-ton concentrator is connected with the upper workings by a tramway. The vein is about 6 ft. wide carrying gold, silver and lead.

## JEFFERSON COUNTY.

**Montana Verde Copper Company.**—This company, recently organized under the laws of South Dakota, intends to work a group of 16 claims 4 miles from Bernice, and about 12 miles from Butte. The capital stock is \$2,500,000, divided into \$1 shares. The officers are: President, F. W. Wornock; secretary and treasurer, W. F. Normandy; vice-president, J. E. Rickards. The entire group formerly belonged to F. W. Wornock, of Butte. The ground was located in 1896. There is a shaft down 250 ft. on one claim and a tunnel on another.

## MADISON COUNTY.

**Gold Dredging.**—At the Bannack boats the work of repair has been going on for some time and both the "Electric" and the "Grater" will be in good shape at the opening of the placer season. Reports from Grasshopper Creek are that the season is to open at an early date.

**Montana Gold Dredging Company.**—E. L. Hall is superintendent of this company and has men busy repairing the dredge boat at Bon Accord and getting the machinery ready for the season's work.

## SILVER BOW COUNTY.

The Washoe smelters at Anaconda were practically at a standstill this week for several days because of the strike of the hoisting engineers of the Anaconda and Parrot mines. More than 3,000 men were idle in Anaconda by reason of the strike. The miners' union has taken steps toward a settlement between the Amalgamated and the striking engineers.

**Butte Copper Company.**—This new corporation has been organized to work some claims in and around Saratoga Canyon, a short distance south of Columbia Gardens. Ex-Governor Thomas M. Waller, of Connecticut, is president of the corporation; several Montana men are interested. It is said that the company has bonded and bought 36 claims and will soon begin development. The company is capitalized at \$1,000,000. Carl Kleinschmidt, of Butte, has been made manager of operations. The first work is to be on the Saratoga claim. The directors of the new corporation: Thomas M. Waller, Connecticut; Col. E. E. Britton, Brooklyn, N. Y.; Woodford Brooks, New York City; Charles A. Leighton, New York City; Frederick H. Schroeder, New York City; Francis H. Wiggins, New York City; H. V. Ruthford, New York City; Carl Kleinschmidt, Butte; H. L. Rodgers, Butte; A. B. Clements, Butte.

## NEVADA.

## STOREY COUNTY.

**Gold Canyon Tunnel Extension Company.**—This company, with a capital stock of \$1,000,000, has been incorporated at Virginia City by W. E. Sharon and J. W. Eckley, of the Bank of California, of Virginia City, and Franklin Leonard, Jr., of New York City. The directors are ex-Governor Colcord and W. E. Sharon, of Nevada; John Landers, of San Francisco; C. G. Miller, S. C. Mead and Franklin Leonard, Jr.

The company is organized to do a general mining and milling business and to extend a tunnel under that portion of the Comstock lode, between the works of the Alta and Dayton mining companies, which has shown large ore bodies down to the water level and produced close to \$400,000 last year. This tunnel will connect with the South Lateral branch of the Sutro Tunnel, at the Alta drift, and will enable development to proceed some 800 ft. below present workings. The Comstock Tunnel Company will receive royalty upon the basis now established with all mines on the Comstock.

The plan of extension proposed by the company does not involve any transfer of titles or ownership and a royalty basis of 15 per cent of ores to a value of \$25 per ton and 20 per cent of higher grade ores has been fixed. Most of the mines in question if not drained by a tunnel, must soon put in pumps or abandon their works and it is stated that no other practicable tunnel can be run at so low a level. The complete co-operation of the people of Silver City seems assured. The territory to be drained has produced from the upper levels, more than \$10,000,000, according to reports of the United States Mint, at Carson City. It is a complete mining community in itself, and is not to be confused with the famous old mines of Virginia City, which still stand at the head in point of production.

## NEW MEXICO.

**Union Ore and Reduction Company.**—P. W. McCaffrey, general manager of this Denver company is reported as about to put men at work on the copper deposits in Mora and San Miguel counties. In connection with the mines it is proposed to erect several reduction plants.

## LINCOLN COUNTY.

(From Our Special Correspondent.)

**Old Abc.**—Operations have started again on this mine at White Oaks. The mine is one of the oldest in that district.

## OREGON.

## JACKSON COUNTY.

**Bowden.**—This mine at Gold Hill under the management of Houck and Huff is in good ore. The main shaft is being sunk below 100 ft. in 3½ ft. of free milling ore. The mine is 2½ miles east of Gold Hill in the granite belt.

## PENNSYLVANIA.

## ANTHRACITE COAL.

**Delaware, Lackawanna & Western Company.**—The 2,500 mine workers at the Woodward, Avondale and Pettibone collieries of this company, who have been on strike for 6 weeks, have refused a proposition of the company to effect a settlement. The company offered to give the discharged firemen other work, but refused to displace the men now firing. The mine workers refused to accept this and decided to continue on strike.

**Lehigh Coal and Navigation Company.**—This company has started construction of the Red Ash Breaker at the No. 6 workings at Tamaqua. The White Ash breaker is completed and the machinery is being placed. The twin breakers will be the largest in the region.

## BITUMINOUS COAL.

It is said that a Pittsburg syndicate has purchased 10,000 acres of coal land in Indiana County, the price being \$650,000. The property lies along Black Lick Creek, near Black Lick. Contracts have been let for the erection of mining and coking plants, the latter to consist of 250 ovens. The property will be pierced by the new extension of the Buffalo, Rochester & Pittsburg Railroad, which is soon to develop 60,000 acres of Indiana County coal lands owned by affiliated interests.

**Ada.**—These coke works, at Cheat Haven, have been sold by Isaac W. Seamans to a company composed of A. W. Bliss, J. D. Boyd, Charles E. Doyle, McCland Leonard, F. C. Vandusen and J. E. Dawson for \$50,000. The plant embraces 60 acres of coking coal and 18 ovens and tipples.

**Dilworth Coal Company.**—This company's mine is situated about half a mile below Lock No. 6, at Rice's Landing. The company owns about 700 acres of coal and nearly half a mile of river front. The officers are: H. P. Dilworth, president; George M. Dilworth, secretary, and C. B. McLean, treasurer. The directors are F. E. Richardson, J. Marshall Lockhart and N. A. Hemphill. The shaft is 175 ft. deep

and the coal is 7½ ft. thick. The size of the main shaft is 20 by 12 ft., and the air shaft 18 by 12 ft. to out. Hoisting is done by a pair of 22 by 36 in. direct acting hoisting engines, with conical drums 7 to 9 ft. in diameter, built by the Vulcan Iron Works, of Wilkes-Barre. Steam is supplied by 4 18 ft. by 72 in. horizontal tubular boilers, built by R. Monroe & Son, of Pittsburg. Loaded cars run from the cage by gravity to the Phillips automatic cross over dump in the tippel. After the cars are dumped they go by gravity to a switch-back, and thence to the foot of an incline operated by a chain haulage. This carries the empty cars to the top of the incline, where they are automatically released and run by gravity to a switch-back, which returns them to the rear of the car to be pushed on and pushes the loaded car off the cage. Only two men are employed in handling the cars, one at the tippel dump, and the other at the shaft. The mine is ventilated by a Capell double inlet fan 15 ft. in diameter, 7 ft. wide, direct connected to a Chambersburg high-speed engine with 19 by 16 in. cylinder, and is guaranteed to produce 250,000 cu. ft. of air against a water gauge pressure of 3½ in. W. G. Wilkins, of Pittsburg, designed the plant.

**Merchants' Coal Company.**—Negotiations are pending for the sale of this company's holdings and mines in Somerset County to the Berwind-White Coal Company. The sale means a transfer of about 18,000 acres of coal land. The Berwind-White Company, it is said, already owns about 30,000 acres, which, with this proposed purchase, will give them 48,000 acres in the northern part of the county. The Merchants property lies near the Somerset & Cambria branch of the Baltimore & Ohio Railroad. A spur from Friedens, on the branch, to Boswell, 16 miles in length, to tap the Merchants coal fields, is in course of construction and will be completed by August. Thomas Boswell is president of the Merchants Coal Company, and the stockholders are principally Baltimore, Md., men.

## SOUTH DAKOTA.

## CUSTER COUNTY.

(From Our Special Correspondent.)

**Crown Mica Mine.**—A car-load of mica has lately been shipped from the mine, near Custer, to Valparaiso, Ind., where the company has a plant. The mica comes from the 50-ft. level, and is of superior quality.

**May Mining Company.**—Work is to be resumed on Lightning Gulch as soon as the snow is off. The company is composed of business men of Custer.

## LAWRENCE COUNTY.

**Bee-Lode Mining Company.**—Two shafts are being sunk on a vein of free gold quartz. The mine is at Roubaix, the principal office at Sioux Falls, S. D., F. W. Taylor being president and W. I. Howland, secretary and treasurer, both of Sioux Falls.

**Clover Leaf Mining Company.**—Ten of the new stamps in the mill have started. The name of the town where the mine is located has been changed from Perry to Roubaix.

**Globe Gold Mining Company.**—A large body of free milling ore is being developed adjoining the town of Lead, on the west and next to the Homestake Mine. The company has lately purchased a millsite and water right at Nahant, in Pennington County, on Little Rapid Creek, paying \$5,000 for it.

**Golden Reward.**—The leaching vats at the new 300-ton cyanide plant in Deadwood are being filled. The solution will not be turned on for several weeks.

**Hidden Fortune Gold Mining Company.**—An experimental cyanide plant is to be built on Deadwood Gulch, above the company property. Thomas J. Steele, late of Sioux City, Ia., has succeeded George M. Mix, as general manager, and has removed to Lead, to take charge of operations. Nicholas Treweek, for years mine foreman at the Homestake, has been engaged as consulting engineer.

**Spearfish Gold Mining and Reduction Company.**—The new cyanide plant is treating 150 tons a day. A night shift is to be put on during early summer.

**Wasp No. 2 Mining Company.**—The mill is to be enlarged from 100 to 150 tons capacity this year. John Gray, of Terraville, S. D., is manager.

## PENNINGTON COUNTY.

(From Our Special Correspondent.)

**Cochran Mining Company.**—John Madill has resigned as superintendent of the company, and has been succeeded by C. D. Ridgeway, of Telluride, Colo. Twenty-seven men are employed, cross-cutting the ledge. Work has also started in the old Alta-Lodi shaft, 100 ft. east of the main shaft, the 2 shafts to be connected by a cross-cut.

**Grantz Gold Mining Company.**—The ledge has been found again. Since the purchase of the ground by the Grantz Company from the old St. Elmo Company prospecting has been in progress with a large

force. The 10-stamp mill is to be started as soon as enough ore is taken out to supply it.

**University Gold Mining Company.**—A shaft has been started on the Cumberland Gulch property lately purchased of B. J. Heath, near Rochfort. An open cut shows the ledge to be 50 ft. wide.

#### UTAH.

(From Our Special Correspondent.)

**Salt Lake Bullion Settlements.**—The settlements for the week ending April 5 are: Silver-lead ores, \$158,200; bullion, \$71,300; gold bars, \$9,100; copper bullion, \$23,100; auro-cyanides, \$6,000.

#### BEAVER COUNTY.

(From Our Special Correspondent.)

**Frisco Shipments.**—During the week ending April 5, 9 cars were shipped from the Horn Silver.

#### BOX ELDER COUNTY.

(From Our Special Correspondent.)

**Brooklyn.**—Several samples taken from a 6-ft. vein at a depth of 150 ft., it is said, gave an average assay of \$700 to the ton.

#### JUAB COUNTY.

(From Our Special Correspondent.)

**Tintic Shipments.**—During the week ending April 5 the following shipments were sent to the samplers at Salt Lake: Carisa, 5 cars; Eagle & Blue Bell, 1 car; May Day, 2 cars; South Swansea, 11 cars; Grand Central, 11 cars; Yankee Consolidated, 14 cars; Bullion-Beck, 5 cars; Lower Mammoth, 5 cars; Ajax, 4 cars; Mammoth, 8 cars.

**Fish Springs Shipments.**—For the week ending April 5 the following cars were marketed: Utah, 1 car; galena, 1 car.

**Lower Mammoth.**—A rich find of copper and silver ore is reported on the 600 ft. level.

**Mammoth.**—Leave to file a counter-claim against the Grand Central was denied by Judge Marioneaux and the Mammoth has filed a new suit and secured a temporary injunction and order to show cause on June 4 next. The plaintiffs costs as retaxed amount for the two trials to \$3,800, but this will probably be cut down somewhat.

**Uncle Sam.**—The working force is cut down one-half and the men retained will be put on development. Shipments are temporarily stopped.

**Utah.**—Two new finds are reported in drifts from the bottom of shaft at a depth of 850 ft.

**Yankee Consolidated.**—The damages to the property by an explosion of powder in the mine were slight.

#### SALT LAKE COUNTY.

(From Our Special Correspondent.)

**Bingham Shipments.**—The following shipments have been made for the week ending April 5: Ben Butler, 1 car; Columbia, 3 cars; New England Mining Company, 2 cars; United States leasers, 3 cars.

**Highland Boy Smelter.**—Shipment was made during the week ending April 5 of 4 cars copper bullion aggregating 240,000 lbs., to the eastern refiners. R. T. White has been superseded by W. C. Thomas, of Butte, Mont., as superintendent of the works.

#### SUMMIT COUNTY.

(From Our Special Correspondent.)

**Park City Shipments.**—The following consignments were made during the week ending April 5: Daly, 62,950 lbs.; Daly-West, 729,750 lbs.; Anchor, 421,680 lbs.; Ontario, 760,000 lbs.; Quincy, 410,550 lbs.

**Daly-Judge.**—It is reported that J. J. Daly has rounded up one of the largest deals in the history of Park City and closed it by the purchase of the Anchor property. The Daly-Judge, it is claimed, becomes the owner of over 1,200 acres of patented ground in the boundaries of the mineral zone that contains some of the largest producers of the State. It is understood the consideration was above \$750,000.

**Quincy.**—The property has been formally turned over to the Daly-West and the force of men has been slightly reduced, but extraction will continue from the Quincy ground.

#### TOOELE COUNTY.

(From Our Special Correspondent.)

**Stockton Shipments.**—The following cars were sent to the samplers during the week ending April 5: Cynet, 1 car ore; Ophir Hill, 9 cars of concentrates.

**Ophir.**—This Stateline property will start work after lying idle since February on account of the Andrew's failure in Detroit, Mich. It is stated the mine will have plenty of water from the Johnny Mine and that 50 or 60 men will be employed.

#### VIRGINIA.

##### CHESTERFIELD COUNTY.

**Midlothian Mining Company.**—This company's property in the Richmond coal basin was recently sold at auction to Lorenzo Burrows, of Albion, N. Y., for \$30,000. Judge Signor, of Albion, acted as attorney

for Mr. Burrows in bidding in the property. Mr. Burrows made the purchase as one of the trustees, to protect the interests of the bondholders, and will sell the property again. The property is about 13 miles from Richmond, and embraces nearly 1,900 acres in the mining section of Chesterfield. The sale carries all the mining rights with it.

#### WASHINGTON.

##### FERRY COUNTY.

(From Our Special Correspondent.)

**Butte & Boston.**—At this Republic mine the cross-cut from the bottom of the main shaft is in 111 ft. in all and has 77 ft. to run to cut the west ledge. The superintendent reports that in cross-cutting the east vein he passed through ore averaging \$8 per ton and 40 ft. wide. The west vein is over 6 ft. wide and is said to average \$40 per ton.

**Congress.**—A stockholders' meeting will shortly be held to consider a sale of the property. The lower tunnel shows a vein 45 ft. wide, said to average \$100 per ton in nickel, copper and gold. This property is on Bridge Creek, on the south half of the Coleville Reservation.

**Clackamas.**—The tunnel is in about 250 ft. and is expected to cut the vein at 15 ft. further.

**Flagstaff.**—Work is to be resumed shortly.

**Gold Cord.**—At this claim in Bridge Creek an upper tunnel cuts the vein 8 to 10 ft. wide at 150 ft. in. The values are chiefly silver with some copper.

**Gold Ledge.**—The main tunnel is in about 900 ft.

**Monroe.**—The tunnel is in 230 ft.

**Morning Glory.**—Four men are employed at this Republic mine. The ore is assorted in two classes.

**Tom Thumb Gold Mining and Milling Company.**—At the recent annual meeting in Spokane, Greenville Holbrook, Lake D. Wolford, Richard W. Nuzum and Geo. T. Eves, of Spokane, and Herbert McArthur, of Walla Walla, were re-elected trustees. The officers are: President, Lake D. Wolford; vice-president, Greenville Holbrook, and secretary-treasurer, E. C. Warner. The main working shaft is down 402 ft. Three Leyner drills have been received at the mine.

**Wauconda.**—Two shifts are driving the main tunnel 3 ft. per day. It is now in 1,165 ft. and intersected a new ledge 12 ft. wide at 1,150 ft. in. The new machinery has all been installed and the mill will start about April 10.

#### WEST VIRGINIA.

##### MINGO COUNTY.

**New Central Coal Company.**—This company which some time ago purchased 3,000 acres of coal land at Stafford, on the line of the Baltimore & Ohio, expects to have its mine in working order soon. The shaft has been completed and the machinery installed. The tiple, which has a capacity of 1,500 tons daily, is 75 ft. high and built entirely of steel. The boiler house, engine house, fan building and blacksmith and carpenter shops are completed. They are built of white brick.

##### TAYLOR COUNTY.

**Empire Coal Mining Company.**—Wm. L. Sweet, president of this company, and his associates have purchased the mines and properties of the Tygarts Valley Coal and Coke Company, have taken immediate possession and continue work without interruption under the name of the Tygarts River Coal Company with offices at Grafton, W. Va., and selling department with the Empire Coal Company, 1 Broadway, New York City. The mines are on the Baltimore & Ohio Railroad.

#### FOREIGN MINING NEWS.

##### CANADA.

##### BRITISH COLUMBIA—YALE DISTRICT.

**Platinum Discoveries.**—According to a local paper, two samples of ore were sent from Princeton to Baker & Company, Newark, N. J., a few months ago. One sample was from the Olympia claim on Kennedy Mountain, owned by McRae Bros., and the other from Diamond B., a claim belonging to J. Beaver and situated about 3 miles south of Princeton, towards Wolf Creek. Both samples were found to contain platinum in commercial quantities, it is said. There has been quite a rush for extensions on the David B. lead, and the ground in the vicinity of that property has been pretty well staked.

##### MEXICO.

##### CHIHUAHUA.

**La Reforma Mining Company.**—This company has \$1,500,000 capital. The officers are: President, A. A. Wilson, of Detroit, Mich.; vice-president, T. A. Conlon, of Detroit; treasurer, George F. Minto, of Milan; secretary, Fred W. Smith, of Detroit. The directors are the officers named, together with J. A. Zahn, of Detroit; C. W. Minto, of Durand, Mich.; W. E. Case, of Milan, Mich.; C. W. Curtis, of Detroit, and Alonzo Wasson, of Guadalupe y Calvo, Mexico. The

mine is an old one, having been abandoned in 1830, when a cave-in occurred. C. W. Curtis is to superintend the construction of a plant.

##### COAHUILA.

(From Our Special Correspondent.)

**Coahuila Mining and Smelting Company.**—This company is thinking of building a smelter at some convenient point near its mining property in the Viesca District.

##### DURANGO.

(From Our Special Correspondent.)

**Descubridora Mining Company.**—This company has recently received a large shipment of machinery.

**San Luis Mining Company.**—L. W. Fischer, assistant manager of this company, recently of Panuco, was in Torreon recently. The company is said to be getting out some rich ore and will soon start to build a railroad from its St. Lucas properties to Canatlan, a station on the Santiago branch of the Mexican International.

**Velardena.**—Rumors still assert that the mines have been purchased by the Guggenheims. Confirmation is lacking, however.

##### SONORA.

(From Our Special Correspondent.)

**Cerro Verde.**—Wm. K. Kiddle has leased this group of mines near San Xavier, and started work on a large scale.

**Chicago & Sonora Gold Placer Mining Company.**—This company is moving in a large amount of lumber for building dredges, flumes, etc., at Saqui Grande. E. W. Haynes, president of the company, is on the ground superintending the work.

**Columbia Mining Company.**—Wm. Moller, of Juarez, is secretary of this company. Three car-loads of mining machinery have been shipped to the company's gold mines at Dos Picachos near Baceraac for a mill and concentrating plant.

**El Copete.**—There appears to be no immediate prospect of the smelter resuming work, as there is a deadlock between the stockholders. Most of the stock is owned by William Meltzer and Walter S. Logan, of New York City.

**Saqui Grande Mines Company.**—The new mill at the Cardanina Mine is ready. Over 8,000 tons of ore are reported at the mill ready for stamping. The mill is to be increased by 10 stamps. The properties are owned by Pedro B. Chisem, of Guaymas, Sonora; George H. Sullivan and Col. W. S. Morrow, of New York City.

**Sonora Mining and Milling Company.**—Charles Holtzman, formerly cashier of the International Bank, of Nogales, Ariz., is now auditor of this company. The machinery for the new 50-ton smelter is on the ground, and the plant will soon be in operation. O. O. Saxhang, vice-president of the company, will supervise the erection of the smelter. Mr. Saxhang built the smelter for the Cobre Grande Mine at La Cananea. The machinery is built by the Llewellyn Iron Works, of Los Angeles, Cal. Development work has been pushed for some months and there are said to be on the dumps about 7,000 tons of first-class ore.

**Torrecon Smelter.**—The new smelter has started work. The smelter is under the management of N. R. Wilson.

**Union Minera.**—These properties, at La Colorado, have been bonded to some San Francisco men, and machinery is on the way to the camp. Sinking is to start on the Don Ignacio as soon as the hoist arrives. The property attracted attention 2 years ago from having been bonded by some Indiana men, who after having paid the first instalment of the contract price, and spent some money in the development, about \$80,000 in all, became involved in a suit with the owners and lost the properties. The present price is \$225,000.

**Zubiato.**—Recent development in the lower levels have, it is said, opened a large body of very rich silver ore. Drew R. Oliver is president of the company. The mill is about to start.

##### NEW ZEALAND.

The Mines Department reports the total exports of gold in January at 32,860 oz., against 21,893 oz. in January, 1901; an increase of 10,967 oz., or 49.8 per cent. The total this year was equal to 29,995 oz. fine gold, or \$619,999. The silver exported was 36,375 oz., against 33,076 oz. in January, 1901; an increase of 3,299 oz., or 9.9 per cent.

(From Our Special Correspondent.)

**Gold and Silver Exports.**—During February the colony exported 41,632 crude ozs. of gold, valued at £161,197 (\$805,985), and 48,843 ozs. of silver, valued at £5,662 (\$28,310).

**Reefton Gold-field.**—The mines of the New Zealand Consolidated Gold-fields Company continue to yield payable returns. The last monthly return was £13,086 (\$65,430), from 6,827 tons.



**MINING STOCKS.**

(Complete quotations will be found on pages 540 and 541 of stocks dealt in at):

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

New York. April 10.

Professional traders have the copper share market well in hand. Prices fluctuated on narrow limits whenever a short interest tried to cover. Comparatively little outside buying is being done, while some stockholders who have become dissatisfied with Amalgamated tactics, sell at every upward turn of the market. Unfortunately, however, most of them purchased at prices over \$75, and some even stepped in around \$130, or at about double what is offered to-day. On April 7, sales of Amalgamated were made at \$66½@64½, on Tuesday, at \$67½@65½, and later in the week around \$65. Anaconda was quiet at 115@113¼ per cent. The curb coppers received little attention, and were weak. Greene Consolidated of Mexico made sales at \$21½@20¼, White Knob, of Idaho, \$21½@21½; Tennessee, \$10½@10, and Montreal & Boston, of British Columbia, at \$3¼@3. Ontario Silver, of Utah, is again up to \$9.

Colorado shares are very quiet. The Cripple Creek section is unsteady, owing to an unfavorable Western market. Elkton sold down to 87c., the lowest in some time. Isabella hangs around 27c. Portland, upon passing its regular 5c. quarterly dividend fell. This company has been a punctual dividend payer for years, and has distributed \$4,207,080 on a capital of \$3,000,000, an excellent showing, which is unequalled by any other Cripple Creek gold property.

The Comstock shares have fluctuated little, as trading is limited. For Consolidated California & Virginia \$1.35 has been received, and for Ophir, \$1.

Boston. April 9.

(From Our Special Correspondent.)

Activity in Copper Range Consolidated has overshadowed everything else in this market. Dealings for the past week have aggregated over 86,000 shares, and the price has risen \$8.12½ to \$62.50, with subsequent reaction to \$58.50 and the close to-night \$59. Buying has been quite general, including some large orders from New York. Lawson has been a large factor in this stock, and a letter advising its purchase last week set the ball rolling in good shape. Criticism is made that the stock is selling too high in comparison with established dividend paying stocks, such as Tamarack and Quincy, but this will not prevent those who are believers in the property from putting it many points higher. Sixty-two for the Consolidated stock is equivalent to \$93.25 for old Copper Range, as in the consolidation it went in one share for 1½ of Baltic.

The activity in Copper Range naturally attracted attention to the rest of the list, and for a day or two United States Oil, American Zinc and United States Mining came in for a share of the attention. The latter, particularly, showed strength, advancing \$1.25 to \$20.25. United States Oil has advanced \$2.37½ to \$15.12½, and Zinc moved up \$1.25 to \$14, but all yielded slightly to-day. The management of these three properties is the same, and may account for the simultaneous movement. Buying orders in American Gold Dredging stock moved it up from \$2.37½ to \$3.75 per share. It is claimed that an option has been given on a majority of this stock at between \$6 and \$7 per share, and that an agent is now abroad trying to place the stock at a better figure. The company more than paid expenses last year, and the coming season, which opens about May 1, is expected to yield about \$40,000 profit.

Centennial, which was so active a few weeks ago, is almost lifeless, and the stock has fallen back to \$20, with Arcadian off to \$8. Osceola spurred up to \$66.75, but yielded to \$63. The seventh head of stamps was started at the mill this week. Bingham Consolidated has been fairly active at from \$29.37½ to \$27.75. Considerable bullish talk is heard on this Utah property. Mass mining rose to \$20, and Mohawk to \$37.50, but Tamarack broke \$10 to \$170, with a \$5 recovery.

Dominion Coal touched \$140, but dealings have diminished considerably, owing to the prohibitive price. The only buyers are the Canadian interests. Dominion Iron & Steel was a feature, rising \$16.87½ to \$68.50 early this week, followed by reaction to \$59, and a final \$62.50. Speculation in this stock ran wild for a while, but has quieted down.

Colorado Springs. April 4.

(From Our Special Correspondent.)

The condition of the market for the week ending to-day has been far from satisfactory. Three incidents have occurred which have given Cripple Creek a temporary set-back—John Hays Hammond's cable-

gram to the London office of Stratton's Independence that the exploratory work in the lower levels had not proved satisfactory has been taken up by the press agencies, which heralded abroad that the great mine was about to shut down. An injustice has been done which a fuller knowledge of facts would have obviated. Mr. Hammond has just returned from Ouray, Colorado, where he has been investigating the condition of the Camp Bird Mine. He stated to-day in authorized interviews that his position on Cripple Creek has been misrepresented. He says he does not take a pessimistic view of Cripple Creek generally, and on no occasion has he publicly expressed any adverse opinion of the camp. He says he has carefully avoided expressing any opinion in any way derogatory to other mines in Cripple Creek, but he was called on to tell the shareholders of the Independence the true condition of their mine, and while the reports were unfavorable, it refers to that mine only and to conditions local to that mine. Moreover, this does not say that ore will not be found in the mine. This property contained an immense rich shoot which at 900 ft. pitched into the Portland Mine on the north. It has not been lost to the camp, and will be opened by the Portland at about 1,500 ft. depth.

The Colorado Springs Mining Stock Exchange and the brokers at large are being besieged with telegrams and letters asking if Cripple Creek has gone to the bottom, and a decidedly panicky state of affairs has existed up to to-day. The effect has been that stocks have suffered.

The report sent out that the Portland had laid off 900 men is false. This was also sent out by the press reports with the conclusion that this mine was played out also. The report locally hurt the market because of the numerous inquiries which have come in asking for facts. The mine has laid off about 200 men, who have been engaged on producing ore awaiting the completion of the new chlorination mill at Colorado City, which will handle 8,000 tons of ore a month after that date. These shares were weak all week, closing to-day at \$2.30.

The management of the Elkton Consolidated Mining Company is deserving of criticism because of the lax method of mining followed by its late superintendent. For four months this mine has been running behind about \$1,500 a month. The extravagance has been in the items of employing too many miners at the property and paying excessive prices for mine material, etc. A meeting of the board of directors was held some time ago, when Camp was deposed and a competent Leadville superintendent instated. The disclosure of the mismanagement, coupled with an internal fight in the board of directors, caused a violent slump in these shares, which sold down as low as 86c. to-day, closing at 87½@91. On the 26th the stock sold at \$1.17, breaking to \$1.14½. By Saturday the stock had broken to \$1.10. Monday, however, was the day of reckoning, when the shares broke again violently from \$1.05 to 97½. Tuesday a still further break occurred to 90. The same day the regular monthly meeting of the directors was held and a candid statement of the affairs of the company made. It showed that the governing committee had been negligent in allowing the superintendent to mismanage the property, and rigorous steps were taken to right the wrongs. The new superintendent was instructed to curtail the working force and to enforce economy all along the line. These steps have already been taken. To-day the stock broke again, going to 86c., the lowest point reached yet. The decline had all the appearances of being the result of a bear raid planned by a coterie of operators, who are taking advantage of an adverse situation. The stock is looked for to go some lower, although a turn may take place any day.

With such an array of discouraging events it is not to be wondered at that a bad week ensued. The balance of the list was practically stationary, or when suffering losses was affected by the slump in the leaders. There was absolutely nothing new to report from the prospect mines.

Salt Lake City. April 5.

(From Our Special Correspondent.)

The week has been one of the most satisfactory for some time past, owing to the apparent solidity of prices. The fluctuations were narrower than during the week previous. Ajax has been active, marketing 108,200 shares at 40@63c. Consolidated Mercur has held steady around \$2, showing sales of 9,225 shares. Carisa has moved up, and sales of 101,950 shares were made at 46@37½c. Daly-West has not been as active as last week, owing to its being less of an element of speculation and marketed but 3,644 shares, as against 10,082 shares last week. Lower Mammoth has made its proportion of gains look large, besides, some of those from which much is expected having advanced 40c. a share over the prices of last week, and the sales have doubled. They were 16,150 shares at prices between \$1.90@1.20. May Day has held steady at 48@38c., which prices brought out but 58,700 shares. Uncle Sam marketed 47,100 shares at lower prices than last week, the range being 31 to

27¼c. California leads the list in number of shares, with a total of 162,900 shares and at a higher figure than last week.

San Francisco. April 5.

(From Our Special Correspondent.)

Mining stocks have been quiet, with little business doing and prices weak. Nothing in the news or current rumors has excited any special interest. Consolidated California & Virginia sold at \$1.25@1.30; Ophir, 94@95c.; Best & Belcher, 25c.; Gould & Curry, 7c. The rest of the list was a little off last week's quotations.

In oil stocks trading was active and prices again firmer. Kern sold at \$5; Sterling, \$1.45@1.50; Sovereign, 30c.; Petroleum Center, 9@10c. Sterling and Petroleum Center were especially active.

London. March 29.

(From Our Special Correspondent.)

The mining market has been very quiet this week. The death of Mr. Rhodes was not unexpected, so it had no effect on the market, though Chartered shares were naturally inclined to be weak. These shares will be the chief sufferers from his death, as they are highly speculative and non-dividend paying. The future value will depend largely on the successors, and no doubt if Dr. Jameson has the management of Mr. Rhodes' schemes in the future the shares will maintain the value on the whole. The diamond and gold shares were unaffected, as Mr. Rhodes' share in the development and organization of these industries was completed long ago. The speculation in South African shares generally is at a low ebb, and nobody seems inclined to buy when there are so many sellers about desirous of reaping their profit. The Stock Exchange is trying to prophesy a boom after the Easter holidays, but it is a case of the wish being father of the thought.

In the midst of the dullness an attempt has been made to float a new company—the Klerksdorp Extended, Limited. This is a subsidiary company of the Klerksdorp Gold and Diamond Company, Limited, which itself was a recent reconstruction of a company of similar name. The properties are of limited interest, and it is doubtful whether a great number of shares will be placed. As regards the war news and peace rumors, neither of these have any effect on the market nowadays, but if there should be a general collapse of the enemy, and hostilities were terminated with very favorable advantage on the British side, there is no doubt that things would boom here. But the market does not expect anything nowadays for fear it should be disappointed.

The West Australian market has been upset again by Lake View Consols. Mr. Govett, the new chairman of the company, has just returned from the mine and the preliminary report by the new man-

**ASSESSMENTS.**

Name of Company.	Location.	No.	Delinq.	Sale.	Am't.
Belcher	Neve.	Apr. 4	Apr. 29	.05	
Canton Placer	Cal.	Apr. 23	May 14	.01	
Chollar	Neve.	Apr. 23	May 14	.05	
Con. Imperial	Neve.	Apr. 27	May 27	.01	
Crown Point	Neve.	Apr. 27	May 27	.05	
Eureka Con. Drift	Cal.	Mar. 31	Apr. 31	.00½	
Int'l Copper	Utah	Apr. 5	Apr. 30	.00½	
Keystone	Cal.	Apr. 25	Apr. 25	.03	
Little Chief	Utah.	Apr. 11	Apr. 19	.01	
Little Standard Oil	Cal.	Apr. 12	May 12	.10	
Martha Washington	Utah.	Apr. 9	May 10	.01	
Old Colony & Eureka	Utah.	Apr. 16	May 2	.00½	
Old Evergreen	Utah.	Apr. 5	May 3	.03	
Ophir	Neve.	Apr. 14	May 6	.15	
Overman	Neve.	Apr. 8	Apr. 29	.10	
Potosi	Neve.	Apr. 16	May 7	.08	
Prospect Mtn. Tun.	Neve.	Apr. 19	Apr. 19	.002½	
Savage	Neve.	Apr. 15	May 6	.10	
Tanana	Cal.	Apr. 7	Apr. 29	.10	
Petro	Utah	Apr. 1	Apr. 28	.01	
Tintic	Utah.	Apr. 10	Apr. 28	.00½	
Tomboy	Utah.	Apr. 19	May 19	.00½	

**DIVIDENDS.**

Name of Company.	—Last Dividend—		Total to Date.
	Date.	Per Share.	
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. Fuel & Iron com.	Apr. 15	1.75	402,500 1,642,500
Doe Run Lead, Mo.	Apr. 15	1.50	13,000 507,072
Empire State Ida.	Apr. 15	.05	25,277 1,359,448
Finance Con., Colo.	Apr. 10	.002	2,000 2,000
Gold Coin, Colo.	Apr. 25	.03	30,000 1,080,000
Helena, Oregon	Apr. 25	.00½	6,500 144,000
Homestake, S. D.	Apr. 25	.25	52,500 1,073,750
Homestake, extra	Apr. 25	.25	52,500
Houston Oil, pf., Tex.	Mar. 15	3.00	225,000 225,000
Iowa, Colo.	Apr. 15	.01	16,667 236,835
Mary McKinney, Colo.	Apr. 10	.03	30,000 420,000
Mong. River C. & C. pf.	Apr. 15	1.75	347,165 1,735,825
N.Y. & Hond. Rosario, C. A.	Apr. 30	.10	15,000 1,735,000
Pacific Coast Borax, Cal.	Apr. 28	1.00	19,000 1,060,000
Penn. Salt	Apr. 15	3.00	150,000 13,000,000
Phila. Gas, com.	Apr. 21	1.50	221,282 2,028,393
Pittsburg Coal, pf.	Apr. 25	1.75	560,000 5,278,168
Rambler-Cariboo, B. C.	Apr. 30	.01	12,500 138,000
Standard, Idaho	Apr. 25	.05	25,000 2,565,000
United Zinc, com.	Apr. 15	.05	3,749 7,498
United Zinc pf.	Apr. 15	.50	7,499 75,087
Va-Car. Chem., pf.	Apr. 15	2.00	240,000 5,550,000
Westmoreland Coal.	Apr. 15	1.50	375,000 7,125,000

\*Monthly. †Quarterly. ‡Semi-annual.



agers, Messrs. Bewick, Moreing & Co., has just been published. It appears that Mr. Hartman's management was not at all systematic and that the developments do not show anything like the results he reported. In fact, the amount of payable ore in sight is comparatively small, though there is a large amount of low-grade ore that might pay if economies in mining and treatment were effected. The mine has really had no chance of proper development—what with the struggle for control and the constant change of managers. The shares now stand at a low price, but holders are not inclined to clear out, for they hope Bewick, Moreing & Co. will be able to restore its fortunes.

The long wrangle about the Siberian Gold-fields Development Company is at an end, and progress will now be possible. It will be remembered that this company was a promotion by the Hooley group, and that the Russian Government would not grant the concessions when the facts of the promotion were known. The company went into liquidation and a new company, the Nerchinsk Gold Company, was formed to take over the properties in case the concessions were given. The representatives of the new and old companies conducted prolonged negotiations in Russia, and have obtained the concessions. The terms are that £10,000 shall be lodged in a Russian bank as security for debts incurred, and that £50,000 shall be raised as working capital. In addition the shares belonging to people under Hooley influence are to be placed in the hands of trustees, so that they shall lose their voting power. The Russian authorities very candidly told the company that though these terms might be complied with, there was no very brilliant outlook for the company, owing to the over-capitalization and to the fact that the properties are of only hypothetical value. The shareholders have, however, decided to pay up their assessment and proceed to business. The properties are very extensive, and it is said that there is a large tract of gold-bearing gravels. There seems, however, to be a shortness of water, so that ordinary hydraulicking cannot be resorted to. In fact, the method of treatment will require special study.

Paris. March 30.

(From Our Special Correspondent.)

There was really nothing new to report in the mining stock department of the Bourse during the past week. There has been little speculation, and the Easter holidays also came in to shorten the week and quiet business still more.

The preliminary reports, just issued, give the iron and steel production of France for the past year as follows, in metric tons:

	1900.	1901.	Changes.
Pig iron	2,714,298	2,400,240	D. 314,058
Wrought iron, bars, plates, etc.	708,274	554,309	D. 153,965
Steel in finished forms	1,226,537	1,151,170	D. 75,367

The production of steel ingots is not given. The pig iron output was the smallest in five years. The decreases shown are 11.6 per cent. in pig iron; 21.7 per cent in wrought iron; and 6.1 per cent in steel. It is some consolation to say that while there was an important decrease in production last year, there was no industrial crisis and no extreme depression, such as existed in some other countries.

There has been some dissatisfaction expressed by bankers that the new Russian loan should have been placed through Berlin. Upon the whole, however, it seems best that there should be some distribution of these loans; though there is little doubt that French investors would have furnished the money, had the opportunity been given them. AZOTE.

COAL TRADE REVIEW.

New York. April 11.  
ANTHRACITE.

The condition of the anthracite coal trade shows that spring has arrived. The new price lists have not been out long enough to show what effect they will have on buying, though a large amount of coal is going forward, particularly to buyers along the Atlantic seaboard. It is believed that there will be no general strike at the mines. The published utterances of John Mitchell, president of the United Mine Workers, show a conservative and conciliatory attitude, and if a strike should come it will be due to the influence of one or two of the district presidents in the Wyoming and Lackawanna regions. The discount of 50 cents per ton for April buying, it seems, was due to the general conviction of the operators that it was better to issue spring price lists and take the chances of a strike than to seek to maintain prices at winter level for another month.

Much has been written recently about the action of the Reading in cutting off discounts to jobbers along its lines. This action did not excite surprise among those in the trade who understand the situation, since one of the avowed objects of the community of interests is to do away with middlemen as far as convenient and bring consumer and producer in closer touch. It is not unlikely that other

anthracite roads will follow the Reading's lead, though there will probably be no abrupt general changes, and the central selling agency plan for large centers like New York is still in embryo.

At the head of the lakes the market shows little activity, but the prospects favor more active ordering with the opening of navigation than was the case last year. In Chicago territory, likewise, the opening of navigation will see rather more ordering than a year ago. Along the lower lakes and in Canadian territory trade is rather quiet as yet, though at some points the demand is greater than was anticipated. As last year, buyers along the Atlantic seaboard are first to take advantage of the April discounts, this is particularly true of large dealers along Long Island Sound and at points beyond Cape Cod. The total demand from all consuming territories is sufficient to take all the coal produced, and aside from the inducement of the April discount there is probably some buying from a fear that after all there may be a strike at the mines by May 1. Production is still below what it might have been, but for the winter's floods. A number of mines will not be able to get out a normal tonnage for some time yet, particularly in the Lehigh region.

The April prices for free-burning white ash coal, f. o. b. New York Harbor shipping ports, are: Broken, \$3.75; egg, stove and chestnut, \$4.

BITUMINOUS.

The Atlantic seaboard soft coal trade is generally in a much easier condition than it was a few weeks ago. Car supply at the mines has increased and now averages about 75 per cent of the total number needed. Transportation from the mines to the tidewater shipping ports, while not as quick as last week, yet is much speedier than it has been recently, cars coming through from the mines in less than a week. The freer arrivals of coal at tidewater have permitted most of the pressing needs in the market to be satisfied and consumers can now think of laying in supplies. Contracts continue to be closed slowly, as consumers are averse to accumulating contracts just at present.

In the far East coal is arriving freely, though no stocks have accumulated there yet. At one or two ports there is a shortage of pier room for arriving vessels and as a result demurrages are accruing on coal waiting to be unloaded. Along Long Island Sound there is still a shortage of coal, particularly of the better grades, but it is being sent there as fast as arrivals at the shipping ports permit and the outlook is for easier conditions. At New York Harbor points freer arrivals have resulted in falling prices, and we hear of \$2.55 f. o. b. New York Harbor shipping ports having been named for the poorer grades of Clearfield, while better grades of Clearfield range up to \$2.65@2.70. Consumers in the all-rail trade are worse off than in any other territory; some manufacturers have great difficulty in getting coal enough, and are obliged to shut down their plants at times.

Transportation from the mines to tidewater is slightly slower than last week. Car supply averages about 75 per cent of the demand. In the coastwise vessel market vessels are not in as good supply as they have been. We quote current rates from Philadelphia as follows: Boston, Salem and Portland, 90c.; Providence, New Bedford and Long Island Sound, 75 @80c.; Portsmouth, 95c. Rates from Baltimore are 5@10c. higher.

Birmingham. April 7.

(From Our Special Correspondent.)

During the past week the Valley Creek Coal Company, capital stock \$50,000, was incorporated and mines will be opened in the lower part of Jefferson County. Coal is now being shipped from the mines at Garnsey in Bibb County, operated by the Galloway Coal and Coke Company.

The coal miners in Alabama will, during April, receive the maximum wage under the present contract. The committees of miners investigated sales-books of the operators and announcement was made Saturday that the same price would be paid for mining as in March, 55c. per ton. It is believed that this price will be in effect until the expiration of the contract, June 30.

The executive committee of the Alabama District, United Mine Workers of America, has called the annual scale convention to be held in Bessemer, June 16, and the joint convention with the operators June 23. The scale now in effect will be asked for by the miners, it is believed, with some concessions as to the rules governing mining. The officers of the district state that within the next two weeks or so all the miners in Walker County, some 3,000, who retired from the organization a year ago, will return to the fold.

Chicago. April 8.

(From Our Special Correspondent.)

Anthracite coal is selling heavily, under the reduction of 50c. per ton from the nominal price of \$6,

made for the month of April. Retail dealers are buying in their stocks for the rest of the year, and there is no complaint about the volume of business being done by wholesalers. The supply of all grades of anthracite continues plentiful. Bituminous coal shows the effect of spring weather; the demand has fallen off greatly. The uncertainty about spring prices, no new schedules having been promulgated yet, is also affecting trade. Hocking quotations are still \$3.25, but dealers are reported glad to get \$2.80 for any part of the generous supply. Indiana block remains at \$2.45; Indiana semi-block has declined to \$2.10; Clinton lump is also 10c. to 20c. lower, bringing \$1.90@2; West Virginia splint is unaffected in price, selling at \$3.25. There are no changes in quotations of Indiana lump, \$2@2.10; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2. No demand exists for the smokeless coals or for Youghiogheny. Blacksmith's coal alone is scarce and firm at \$3.50. The opening of navigation is said to be assuring the Northwest of a relief from the scarcity that has prevailed there all winter, though its effect has as yet not been felt by the Chicago trade.

Cleveland. April 8.

(From Our Special Correspondent.)

The first cargoes of coal from the ports along the south shore of Lake Erie have been started up the lakes during the last week, and one cargo has been delivered already at Milwaukee. The first week of the season of navigation will not, however, show up with similar periods for other years, which is accounted for by the fact that the season opened unusually early and caught both the boats and the railroads unawares. The fleets of the big ore-producing concerns did not carry coal on their up trips, and the independent fleets have hardly started as yet. The brisk movement of coal toward the lakes will hardly set in before May 1, but by that time the fleet will be far enough along in its preparations for the season's trade to be able to handle the business. Going charters are all made on the basis of 35c. to the head of the lakes, and 45c. to Milwaukee. On the same basis the first contracts of the season have been made during the last few days. The Pittsburg Steamship Company arranged to send 100,000 tons to the head of the lakes, Ellsworth & Co. have arranged for the transportation of another 100,000, and other parties, of which the Pittsburg Coal Company constitutes a part, have arranged for the movement of an additional 500,000 tons.

Pittsburg. April 9.

(From Our Special Correspondent.)

Coal.—Contrary to expectations, the Pittsburg Coal Company has not issued a new circular of prices for the season. It is reported, however, that no long-time contracts are being entered into and higher prices may rule in a short time. The present prices of railroad coal at the mines is \$1.45 a ton for 1 1/4-in., \$1.35 for 3/4-in. and \$1.25 for run-of-mine. The rates of the Monongahela River Consolidated Coal and Coke Company, the river combination, for the local markets are practically the same as the railroad combine. It is reported that the river company has shaded the price on some important local contracts. The rivers are still navigable and nearly 5,000,000 bush. of coal went to the lower markets during the week. All the mines are in full operation. Shipping to the lake ports for the Northwestern trade will soon be actively commenced. The railroads have promised more cars for lake shipment and if a sufficient number of cars are provided the shipment of coal from the Pittsburg District to the Northwestern markets will be greater this season than in former years.

Connellsville Coke.—Prices of coke, both standard Connellsville and outside coke, are much firmer this week. The circular price of \$2.25 for furnace and \$2.75 to \$3 for foundry is still quoted for the first half, but no new business is being taken at those rates. The anticipated announcement of a stiff advance for the second half has not been made. The last issue of the *Courier* gives the production of the Connellsville region for the previous week at 219,915 tons, a gain of over 5,000 tons. The shipments for the week aggregated 11,514 cars, distributed as follows: To Pittsburg and river tipples, 3,578 cars; to points west of Pittsburg, 5,698 cars; to points east of Connellsville, 2,238 cars. This was a decrease of 80 cars compared with the shipments of the previous week.

Foreign Coal Trade. April 10.

Export trade here shows no special feature. No further shipments have been made to Germany. Business with Mediterranean ports is fair. Trade with the West Indies and South America shows no special features.

The coal imports of Germany in January are reported as below, in metric tons:

	1901.	1902.	Changes.
Coal	346,469	348,680	I. 2,211
Brown coal	643,081	492,330	D. 150,751
Coke	37,010	32,244	D. 4,766
Briquettes	10,858	4,782	D. 6,076

The coal was chiefly from Great Britain; the brown



coal from Austria. Exports for the month were as follows:

	1901.	1902.	Changes.
Coal	1,196,153	1,186,077	D. 10,076
Brown coal	2,569	1,243	D. 1,326
Coke	197,230	154,740	D. 42,490
Briquettes	50,021	59,193	I. 9,172

Exports of coal were chiefly to Holland, Austria, Belgium and Switzerland. The coke went principally to France, Austria and Switzerland.

The production of coal in Germany for the two months ending February 28 is reported by the *Kohlen Zeitung* as follows, in metric tons:

	1900.	1901.	Changes.
Coal	18,031,662	16,902,727	D. 1,128,935
Brown coal	7,327,166	7,009,101	D. 318,065
Total	25,358,828	23,911,828	D. 1,447,000
Coke made	1,629,578	1,379,987	D. 249,591
Briquettes made	1,429,658	1,397,329	D. 32,329

Of the total this year, the Prussian mines furnished 15,798,931 tons of coal and 5,877,313 tons of brown coal or lignite. The decrease in production this year was 6.2 per cent.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of March 27 that the tone of the Welsh coal market remains unaltered. On account of the approaching holidays business is very limited. Quotations remain practically unaltered throughout as follows: Best Welsh steam coal, \$3.66@ \$3.78; seconds, \$3.60; thirds, \$3.30; dry coals, \$3.24; best Monmouthshire, \$3.24@ \$3.42; seconds, \$3.12; best small steam coal, \$2.04; 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.

Owing to the near approach of the holidays but little business is passing, and the freight market has a downward tendency. Some rates quoted from Cardiff are: Algiers, \$1.25; Marseilles, \$1.35; Genoa, \$1.32; Naples, \$1.32; Singapore, \$2.64; Las Palmas, \$1.56; St. Vincent, \$1.74; Rio Janeiro, \$3.12; Buenos Aires, \$2.88.

IRON TRADE REVIEW.

New York. April 10.

The pressure on producers continues, and while there have been few official changes in prices, premiums for early delivery are frequent. The pressure is especially strong for structural steel, but all makers of finished material are rushed. Pig iron and steel billets are practically sold up for the balance of the year.

Some further buying of steel in Germany is reported. Most of the purchases are small, but the aggregate must be considerable.

The April reports of the furnaces show an increase of nearly 10,000 tons in the weekly capacity of the active stocks. The production is now at the rate of 338,000 tons a week. The unsold stocks have been reduced to about 95,000 tons, or less than half the quantity reported on January 1.

The American Iron and Steel Association reports the production of open-hearth steel for the past year as below, in long tons:

	1900.	1901.	Changes.
Acid	853,044	1,037,316	I. 184,272
Basic	2,545,091	3,618,993	I. 1,073,902
Total	3,398,135	4,656,309	I. 1,258,174

The increase in acid steel was 21.6 per cent; in basic steel, 42.2 per cent, and in the total production 37 per cent. The remarkable progress made by the basic process is the feature of the statement. Last year 77.7 per cent of all the open-hearth steel made was basic steel, against 75 per cent in 1900. The total last year included 301,622 tons of castings made direct from the furnace.

Birmingham. April 7.

(From Our Special Correspondent.)

The demand for iron is good, while the quotations are firm. It is believed now that the efforts of the manufacturers to hold down prices and prevent a wild market will prevail, with the exception of premiums on immediate delivery iron. The basis is still \$12 for No. 2 foundry iron, and sales are being made with delivery in the last months of the year.

Production in Alabama is keeping up well. The furnaces in blast appear to be in good shape. The big new furnace of the Republic Iron and Steel Company, at Thomas, is practically completed. During the past week the big engines were tested. Other parts of the machinery will be given tests shortly.

The following quotations are given: No. 1 foundry, \$12.50; No. 2 foundry, \$12; No. 3 foundry, \$11.50; No. 4 foundry, \$11; gray forge, \$10.50; No. 1 soft, \$12.50; No. 2 soft, \$12.

The Alabama Steel and Wire Company is making active preparations looking to the manufacture of

both iron and steel in the future. Mr. J. J. Shannon, formerly furnace manager at Ensley for the Tennessee Coal, Iron and Railroad Company, has accepted a position with the Alabama Company, and will during the next 30 days travel in the furnace districts of the United States looking at the latest improved furnaces with an end in view of building a couple of furnaces for the company.

Buffalo. April 9.

(Special Report of Rogers, Brown & Co.)

A noticeable feature of the market in this vicinity during the past week has been that a number of buyers who supposed they had fully covered their requirements through the year, or until the last two or three months of the year, have found they are using so much more pig iron than they figured on using that they have been compelled again to enter the market in an endeavor to pick up something with which to fill in. As to whether or not they secure the required material depends largely upon the time of delivery required. Odd lots of iron for various deliveries continue to come to the front and are quickly absorbed at premium prices. With the promised improvement in railroad facilities, on account of the abatement of floods and snow blockades, furnaces should be in better shape to make deliveries on their contracts, providing they are able to obtain raw materials. However, the unsettled labor conditions in some of the coke fields have greatly embarrassed several of the furnaces tributary to this section. We quote below on the cash basis, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$19; No. 2, \$18.50; Southern soft No. 1, \$19.75; No. 2, \$19.25; Lake Superior charcoal, \$20.50.

Chicago. April 8.

(From Our Special Correspondent.)

With everything sold out to the last quarter of the year, and no abatement of the eager buying of pig iron by foundrymen, the prices of both Northern and Southern iron are limited only by the cupidity of the sellers. That there is a handsome profit in sales at \$18@ \$19 is freely admitted by furnacemen, but there is also a disposition to consider that the foundryman is getting more out of the condition of things than the producers of pig iron. Deliveries are running and will continue to run for the year about 9 months behind orders; the iron now being used by foundries was bought at \$4 to \$5 less than the present prices, and consequently the foundry proprietors are reaping full benefit of the flood tide of prosperity. What market conditions will be at the end of the year, when present orders are being actually filled, is being seriously considered by producers of pig iron. Upon the ability of the country to take foundry products depends the welfare of the furnaces, and there is not a little uneasiness lest prosperity should overreach itself with disastrous results. Yet apparently there is no likelihood of over-production for a year at least, and in that time the sun will shine brightly while both producers and consumers of pig iron gather their harvests.

Northern remains at \$18.50@ \$19 for No. 1 and \$18 @ \$18.50 for No. 2. Southern quotations are still nominally \$16.15@ \$16.50 for No. 1 and \$15.65@ \$16.15 for No. 2, with well authenticated statements that as much as \$3 more per ton is being paid on actual sales. Lake Superior charcoal is greatly in demand at \$21.50 @ \$22, and very scarce.

Coke shipments still fail to meet the demands of furnaces: West Virginia is still supplying the greater part of that used in the Chicago District; Connells-ville coke is much needed and sought, but the diversion of cars by the railroads to eastern lake ports, due to the opening of lake navigation, is so general that there seems little prospect of a greater supply for some time to come. The price of coke remains \$5.25@ \$5.50.

Cleveland. April 8.

(From Our Special Correspondent.)

Iron Ore.—The immediate end of the fight between the shippers and the vessel owners over the season rate is at hand, all but a few of the fleet managers having accepted the lower rate proposed by the United States Steel Corporation and its allies. During the last week vessel capacity for the movement of 1,000,000 tons of ore was taken by the Steel Corporation at the lower rate, 75c. between Duluth and Ohio, and the rate is fixed. There is a small contention still over going rates, but this will likewise be presently adjusted. The buying of ore has hardly been up to expectations, because there is more ore on the docks than had been expected, and because some Michigan ore is to be brought into this territory this year, 1,000,000 tons in all, that will replace the south shore product. The old prices hold of \$4.25 for bessemer old range, \$3.25 for non-bessemer old range, and bessemer Mesabi.

Pig Iron.—The principal interest of the market this week has been the sale of 200,000 tons of bessemer pig at \$17.25 Pittsburg to the United States Steel Corporation, which takes up about the entire capacity of the furnaces in the Bessemer Association. Basic prices are firm at \$17.50 in the Valleys, and

sales are brisk, but most of the material is already sold up. Activity in foundry grades is limited because the supply of iron is short. Nominally No. 2 foundry is quoted at \$19 in the Valleys. The coke supply is easier, and the production of pig iron is again almost normal.

Finished Material.—The buying of structural material continues for first quarter delivery of 1903, and the mills are more willing to make sales for that period now that it has been established that there is to be no further increase in the price of raw material. The market quotations of 1.70c. on mill sales, and 2¼c. @ 3c. out of store have been continued. A better demand for sheets has shown up, and the market is very active at the old prices of 3.45c. @ 3.60c. for No. 27 one pass cold rolled out of store, and 3c. at the mill. The bar prices are stable, despite the frequent recurrence of the report that advances are to be made. Bessemer steel bars are bringing 1.60c. Pittsburg and open hearth steel bars 1.70c. Pittsburg, while bar iron is now being quite generally quoted at 1.80c. Pittsburg. The demand for pipe continues heavy and the quotations unchanged, black pipe bringing 60c. to 67c. off list, Pittsburg basing discounts, and galvanized pipe bringing 48c. and 55c. off list. The plate market is strong, with this year's product about covered by contract, while some inquiries are made for material for next year. The quotation is still 1.70c. There is a good call for billets and sheet bars, but the market has no material for sale. Jobbers are naming their own prices.

Old Material.—The market is still brisk with orders coming in steadily and the prices holding steady, as they have been for two or three weeks.

Philadelphia. April 10.

(From Our Special Correspondent.)

Pig Iron.—To-day's development in pig iron indicates a somewhat easier feeling in regard to supply and quotations due in a measure to the action of the United States Steel Corporation in its enormous purchases and in its having practically fixed values for the rest of the year. At least, this is the view of the matter. Bessemer does not form a very important part of the business of this market, but the influence of transactions in other markets is direct, particularly on basic pig, the supply of which has been exceedingly scarce for some time past. Quotations may be given at \$21 for No. 1 foundry, \$20 for No. 2, \$19 for plain and \$18.25 for gray forge. These are called outside quotations, but the price is being paid. Basic is quoted at \$19.50.

Billets.—Careful inquiry into the billet market does not show that any sales have been made recently. Quotations for billets are given at \$33.50 and there is certainly an urgent need for supplies which must be met within a month.

Bar Iron.—Bar iron has stiffened up considerably, although there is no advance actually over the quotations given a week ago. A good deal is selling at 2c. and even 2.10. Stocks in store, city and country, are being re-stored, distribution is active in a retail way and the entire bar iron trade is in a very vigorous condition.

Merchant Steel.—Merchant steel has advanced in consequence of the enormous orders recently placed throughout the West and latest inside advices are that business is going through now, which will put the mills in a position where they cannot fill orders early or late. All consumers of merchant steel are worried over the situation, but are not attempting to buy very largely, trusting to circumstances.

Plates.—The only actual news given to-day concerning plates is that a number of small buyers are still prowling around trying to make terms and arrangements by which they can keep on their work during the spring and summer. Prices are high and unquotable, in fact, for special accommodations. Sales of flange have been made at 2.10c.

Structural Material.—A very feverish condition exists on account of the continued placing of heavy orders and to the fact that a great deal of business is held up because it cannot be properly placed. There is a local demand for 50 to 100 and 200 ton lots for local requirements which will be taken care of, although the buyers have to pay what might be regarded as fancy prices. They are perfectly willing to do this, as the purchases are not heavy.

Steel Rails.—No new developments have occurred in steel rails. Girder rail requirements are beginning to size up again, but no exact information can be had in regard to whether business has been placed recently or at what figures. There are larger requirements to be covered during the next 30 to 60 days.

Scrap.—Old iron rails are quoted as high as \$26 and very little stuff is to be had at that high figure. Some choice railroad scrap has sold at \$25. Light forge is to be had and brings about \$17. Machinery cast is worth \$17.50; old car wheels, \$18; iron axles, \$26.50; there is quite a scramble for scrap and those who have it deal it out as they see fit at very high figures.



Pittsburg. April 9.

(From Our Special Correspondent.)

The iron and steel market is quiet, the only buying this week being for immediate requirements. Practically all the business in finished material for the first half has been done and consumers are not ready to place additional orders for the second half at prices now ruling. All sales of pig iron this week are for early delivery. The United States Steel Corporation late last week concluded negotiations with the Bessemer Furnace Association for 300,000 tons of bessemer pig iron for delivery in the last quarter and the first quarter of next year. The price agreed upon is \$16.50, Valley furnaces. While this price was positively settled for 225,000 tons, it is reported that the price on the additional 75,000 tons is subject to a change and is likely to be higher. While it is generally supposed that the big steel combine has contracted for its full requirements for the year, it is reported that an effort is being made to get 100,000 tons additional for the third quarter. Quotations for bessemer iron are firmer this week, but all sales made were for delivery within the next two or three months.

The threatened trouble growing out of the demand of the blast furnace employes promises to be more serious than was at first supposed, according to statements of the leaders. They declare that the demand has been made for all furnace employes, with the exception of those in the Buffalo District. They seem confident that they can enforce the terms in the Pittsburg District, but this is said to be impossible, as few men are now employed at the modern furnaces in this section owing to improved equipment. In the event of a strike the places of the men who stop work, it is believed, can easily be filled. In the Mahoning and Shenango valleys the conditions are different. Fully 3,000 men are employed and to change from the two-turn to the proposed three-turn system an additional 1,500 men will be required. Furnace owners say it will be impossible to secure that number of new men. They are determined to resist the demand and are not alarmed over the prospect of a strike. It is believed the workmen will soon realize that a suspension will result in the installation of modern equipment at the Valley furnaces and their services will not be required.

Prices of steel in the foreign market have advanced to a point that renders importation impossible. This was proven to be correct by a cablegram received by A. F. Baumgarten from W. F. Bonnell, of Cleveland, who was commissioned by a number of independent sheet steel manufacturers to go to Europe to buy sheet bars. He wired that prices are prohibitive. A meeting was held yesterday at Portsmouth, O., by the purchasers of the Burgess steel plant at that place and arrangements were completed for putting it in operation on May 1. The plant was bought by the Laughlin Nail Company and the Whitaker Iron Company, of Wheeling, and A. F. Baumgarten, of this city. It has four 30-ton open-hearth furnaces and two additional furnaces may be built. The product of the works will be sheet bars and will more than supply the requirements of the Laughlin and Whitaker sheet mills and the surplus which will be sold will relieve the sheet bar market to a certain extent.

Contrary to expectations, the cut nail manufacturers advanced prices 5c. a keg to \$2.05 in car-load lots. Prices of cut nails and wire nails are now the same.

The National Association of Shafting Makers of America is meeting here, and it is believed an advance of \$5 a ton will be ordered. The present discounts of 45 per cent for less than car-load lots and 50 per cent for car-load lots may be changed to 40 and 45 per cent.

**Pig Iron.**—Several sales of bessemer pig iron, aggregating about 2,000 tons, were made this week for delivery within the next three months at \$17.50 to \$18, Valley furnaces. Gray forge is firm at \$18 to \$18.25, Pittsburg, and about 2,500 tons were sold. Foundry No. 2 is quiet this week and is quoted at \$18 to \$19, Pittsburg, although \$20 can be had for immediate delivery.

**Steel.**—Bessemer steel billets have advanced to \$32.75, Pittsburg, but only a few small sales were made. The steel bar market is quiet under the new price of 1.60c., as many sales were made before this price went into effect last week. Tank plate is still quoted at 1.60c.

**Sheets.**—There is but little doing in the sheet market and prices are steady. Some independent mills claim to be getting a higher price than is quoted by the American Sheet Steel Company. No. 28 gauge remains at 3.10 to 3.15c. and 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.**—The demand is fair and 80 per cent domestic is still quoted at \$52.50.

New York. April 11.

**Pig Iron.**—The market is very firm, and spot iron is harder to get. The quotations given below are for deliveries in the third quarter of the year. We quote

for tidewater delivery: No. 1X foundry, \$19.25@ \$19.50; No. 2X, \$18.50@ \$19; No. 2 plain, \$18@ \$18.50; gray forge, \$17.25@ \$17.75. For Southern iron on dock, New York, No. 1 foundry, \$16.50@ \$17; No. 2, \$15.75@ \$16.50; No. 3, \$15.50@ \$16; No. 4, \$14.75@ \$15.75; No. 1 soft, \$16.50@ \$17; No. 2, \$16@ \$16.50.

**Bar Iron and Steel.**—Demand continues good. We quote 1.70c. for common bars in large lots on dock; refined bars, 1.83c.; soft steel bars, 1.83c.

**Plates.**—Buying is yet brisk, even at the advances asked by certain mills. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 1.78@ 1.80c.; flange, 1.88@ 1.90c.; marine, 1.98@ 2c.; universal, 1.78@ 1.80c.

**Steel Rails.**—Mills are very busy and some rails wanted cannot be delivered before the last quarter of the year, perhaps not before 1903. Standard sections are still quoted at \$28 at Eastern mills; light rails at \$30@ \$33, according to weight.

**Structural Material.**—Demand is still active and spot material commands good premiums. We quote for large lots at tidewater as follows: Beams, 1.90@ 1.95c.; tees, 1.85c.; angles, 1.80c.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 542.)

New York. April 11.

**Heavy Chemicals.**—Trade is practically unchanged, as large consumers of the sodas are well under contract over this and next year. Occasionally a new order for future delivery is booked, but no change in price is made by domestic makers. Importers are not booking in a large way, as domestic makers are fully able to meet the demand and at more advantageous terms. In fact, the domestic production has grown so rapidly in recent years that the time is near when few consumers will buy foreign alkali. Quotations on domestic manufactures are per 100 lbs. f. o. b. works, as follows: Alkali, high test, 80@ \$2 1/2c. for prompt shipment, and 75@ 77 1/2c. for forward; caustic soda, high test, \$1.90@ \$1.92 1/2 for early delivery, and \$1.85@ \$1.87 1/2 for futures; bicarb. soda, ordinary, \$1, and extra, \$3; sal soda, 55c.; chlorate of potash, \$8@ \$8 1/4 for prompt, and \$7.75 for contracts. For foreign goods we quote per 100 lbs. in New York: Alkali, high test, 90@ 92 1/2c.; caustic soda, high test, \$2.25; sal soda, 65@ 67 1/2c.; chlorate of potash, \$10 1/4@ \$10 3/4; bleaching powder, \$1.65@ \$1.80, according to make and seller.

**Acids.**—Orders are chiefly on standing contracts, while deliveries are only moderate. Prices are generally firm, although competition has shaken up oxalic. Blue vitriol is stronger, owing to the opening of the export season.

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.....\$4.60@5.00
Blue Vitriol.....\$4.50@4.62 1/2	Sulphuric, 50 deg., bulk
Muriatic, 18 deg.....1.50	ton.....14.00@16.00
Muriatic, 20 deg.....1.62 1/2	Sulphuric, 60 deg.....1.00
Muriatic, 22 deg.....1.75	Sulphuric, 60 deg.
Nitric, 36 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.....4.87 1/2	bulk.....21.00@23.00

**Brimstone.**—An arrival of 3,105 tons at New York is noted. Market is quiet at \$23.25 per ton for spot best unmixed seconds, and \$22 1/2 for shipments. Best thirds are about \$2.50 per ton less than seconds.

Exports from Sicily are less than last year, while stocks have accumulated, amounting on March 1 to 301,650 tons, against 231,325 tons on the same date in 1901; showing an increase of 70,325 tons, or over 30 per cent. High prices are responsible for this condition.

**Pyrites.**—Market continues firm. Freight rates on Spanish pyrites are 10s. 3d. (\$2.46), this month's sailing.

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.**—Gas liquor holds steady at \$3 per 100 lbs. on spot, and \$2.97 1/2 for shipment. Buying is more widespread as the agricultural season is on. Domestic production is growing.

**Nitrate of Soda.**—This market is very firm, as spot supplies are exhausted. Small sales from store have been made recently up to \$2.75 per 100 lbs., the highest price in a long while. The steamer E. M. Phelps, with 32,500 bags, arrived at Philadelphia, and is held at \$2.35 ex-dock. The future market in Chile is strong, and so \$2 is the best that can be done for shipments. Freight rates, however, are easy, 450 seems to be the range and 18s.@ 18s. 9d. (\$.32@ \$.33) from the west coast of South America to Hampton

Roads for orders for May-July sailings. Last year freights were 21s. 3d.@ 25s., showing a drop in 1902 of 3s. 3d.@ 6s. 3d. (78c.@ \$1.50).

**Phosphates.**—High-grade rock is in better demand for export, and some good-sized shipments are already on the way to European consumers. Prices are expected to be pretty steady during the year, as the superphosphate manufacturers are working more in harmony.

Ocean freights are lower than last year. A charter has been booked from Tampa to Nantes, France, at 14s. 9d. (\$3.54), June sailing.

Exports of Florida high-grade rock from Savannah in the quarter ending March 31 amounted to 27,039 tons, which compares with 38,551 tons last year; showing a decrease of 11,512 tons, or nearly 30 per cent. Shipments were principally to German superphosphate manufacturers.

Messrs. Auchincloss Brothers report the exports of Florida high-grade rock in the first 2 months of this and last year as below, in long tons of 2,240 lbs.:

Destination:	1901.	1902.	Changes.
Austria .....	2,750	I. 2,750	
Belgium .....	6,517	I. 7,365	I. 848
England .....	3,348	I. 4,254	I. 906
Germany .....	32,413	D. 23,347	D. 9,066
Holland .....	5,457	I. 550	D. 4,907
Italy .....	.....	I. 2,012	I. 2,012
Scotland .....	2,300	I. 3,100	I. 800
Total, tons .....	50,035	43,378	D. 6,657

The falling off this year is equal to 13.3 per cent, and is due entirely to the curtailed demand in Germany.

Tennessee rock exports in the same 2 months were:

Destination:	1901.	1902.	Changes.
England .....	1,782	I. 2,019	I. 237
France .....	6,113	I. 8,867	I. 2,754
Belgium .....	3,000	.....	D. 3,000
Germany .....	1,567	I. 159	D. 1,408
Italy .....	12,837	I. 3,005	D. 9,832
Total, tons .....	25,299	14,050	D. 11,249

The decrease this year is heavier than for Florida rock, amounting to 44.5 per cent., chiefly in Italian trade.

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%).....	\$7.25@7.50	6 1/4@7d	\$9.75@10.92
*Fla. land pb. (68@73%).....	3.00@3.25	4 1/2@5d	6.65@ 7.00
*Fla. Peace Riv. (58@63%).....	2.25@2.50	4 1/2@5d	5.70@ 6.00
†Tenn. (78@80%) export.....	3.50	6 @6 1/2d	9.48@10.27
†Tenn., 78% domestic.....	3.00@3.25	.....	.....
†Tenn., 75% domestic.....	2.75@3.00	.....	.....
†Tenn., 73@74% domestic.....	2.40	.....	.....
†Tenn., 70@72% domestic.....	2.10@2.25	.....	.....
‡So. Car. land rock.....	3.25	4 1/2@5d	5.67@ 6.30
‡So. Car. river rock.....	2.75@3.00	.....	.....
Algerian, rock (63@70%).....	.....	6@6 1/2d	8.04@ 8.70
Algerian, rock (58@63%).....	.....	5@5 1/2d	6.00@ 6.30
Tunis, Gafsa (58@63%).....	.....	5@5 1/2d	6.00@ 6.30

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

Liverpool. March 26.

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

The export demand for heavy chemicals shows little if any improvement, while quotations at the same time are well maintained. After to-morrow the market will be practically closed for about a week, owing to the Easter holidays.

Soda ash is in steady request at usual varying prices as to market. We quote nearest spot range for tierces about as follows: Leblanc ash, 48 per cent, £5 15s.@ £6; 58 per cent, £6 2s. 6d.@ £6 7s. 6d. per ton net cash; Ammonia ash, 48 per cent, £4 5s.@ £4 10s.; 58 per cent, £4 10s.@ £4 15s. per ton net cash; bags 5s. per ton under price for tierces. Soda crystals are in fair jobbing demand at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export quarters. Caustic soda is quiet, but holders demand full prices. We quote spot prices, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Bleaching powder attracts little attention from buyers, and hardwood is nominally quoted at £6 15s.@ £6 17s. 6d. per ton, net cash, with special quotations for Continental and a few other export markets. Chlorate of potash is slow of sale at 3d.@ 3 1/4d. per lb, net cash. Bicarb soda is quiet but firm at £6 15s. per ton, less 5 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 limited supply and market is strong at a further advance, holders now quoting £12 3s. 9d.@ £12 7s. 6d. per ton, less 2 1/2 per cent; for good gray, 24@ 25 per cent in double bags f. o. b. here, as to quality. Nitrate of soda is selling to a fair extent on spot at £10 12s. 6d.@ £10 15s. per ton, less 2 1/2 per cent for double bags f. o. b. here, as to quality.



METAL MARKET.

New York.

Apr. 10.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in February and Year.

Table with columns: Metal, 1901, 1902, 1901, 1902. Rows: Gold Exports, Gold Imports, Silver Exports, Silver Imports, Excess.

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 April 10, 1902, and for years from January 1, 1902, 1901 and 1900:

Table with columns: Period, Gold Exports, Gold Imports, Silver Exports, Silver Imports, Total Excess Exports or Imports.

The gold exported this week went chiefly to Paris and the silver to London. Imports were mainly from Central and South America.

Financial Notes of the Week.

Trade continues active and generally prosperous, though the speculative markets are generally quiet. The latter condition is largely the result of higher rates prevailing for money for speculative uses.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending April 5, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

Table with columns: 1900, 1901, 1902. Rows: Loans and discounts, Deposits, Circulation, Specie, Legal tenders, Total reserve, Legal requirements, Balance surplus.

Changes for the week, this year, were increases of \$3,148,900 in loans and discounts; decreases of \$735,000 in deposits, \$363,200 in circulation, \$4,128,500 in specie, \$371,300 in legal tenders, and \$4,316,050 in surplus reserve.

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

Table with columns: -1901-, -1902-. Rows: N. Y. Ass'd, England, France, Germany, Spain, Netherlands, Belgium, Italy, Russia.

The returns of the Associated Banks of New York are of date April 5, and the other April 4, 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 silver market has continued absolutely dull and featureless, holding steady around 24 3/4 d. and closing slightly firmer in tendency.

The United States Assay Office in New York reports receipts of 46,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to March 26, are reported by Messrs. Pixley & Abell's circular as follows:

Table with columns: 1901, 1902, Changes. Rows: India, China, The Straits, Totals.

Arrivals for the week, this year, were £62,000 in bar silver from New York, and £14,000 from Australia; total, £76,000. Shipments were £102,500 in bar silver to Bombay, £20,000 to Calcutta, and £2,500 to Madras; total, £125,000.

Indian exchange is easier, and the Council bills sold in London brought an average of 15.97 d. per rupee. The demand for bills was only moderate. For the Indian fiscal year, which ended March 30, the total amount of Council bills sold in London was 268,765,050 rupees, the average obtained being 15.9885 d. per rupee.

Prices of Foreign Coins.

Table with columns: Bid, Asked. Rows: Mexican dollars, Peruvian soles, Victoria sovereigns, Twenty francs, Twenty marks, Spanish 25 pesetas.

OTHER METALS.

Daily Prices of Metals in New York.

Table with columns: Apr., Sterling Exchange, N. Y. Cts., London Pence, Lake Cts. per lb., Electrolytic per lb., London per ton, Lead per lb., N. Y. cts., St. L. cts.

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes, is usually 0.25c lower than these figures.

Copper has ruled quite firm throughout the week, and the market has been rather active. From Europe, especially, there was a very good demand, and fair orders have been placed at full prices. We quote Lake copper at 12@12 1/2 c.; electrolytic, in cakes, wirebars and ingots at 11 1/2@11 3/4 c., in cathodes at 11 1/2@11 1/4 c.; casting copper at 11 1/2@11 1/4 c.

The foreign market, which closed last week at £52 12s. 6d., opened on Monday at the same figure, but advanced later in the week, and the closing quotations are cabled as £53@£53 2s. 6d. for spot, £53 2s. 6d.@£53 5s. for three months.

Refined and manufactured sorts we quote: English tough, £55 10s.@£56; best selected, £56@£56 10s.; strong sheets, £66 10s.@£67 10s.; India sheets, £65 10s.@£66 10s.; yellow metal, 6@6 1/4 d.

Exports of copper from New York and Philadelphia in the week ending April 9 are reported by our special correspondent as follows: To Great Britain, 1,123 tons; Germany, 205; Holland, 1,012; Austria, 281; Italy, 34; Sweden, 95; Russia, 350; total, 3,100 tons. Also 104 tons matte to Great Britain.

Baltimore exports for the week were 71 tons to Germany, 150 tons to England and 302 tons to Belgium, a total of 523 tons. Imports were 300 tons.

Tin.—The market has again been very active, and large business has been done at advancing prices. Spot tin continues scarce. Rumors have been current that the regular sales of Banca tin by the Dutch Government will be curtailed. At the close we quote spot tin at 27 3/4 c.; April, 27 1/2 c.; May, 27 1/4 c.; June, 27 c.

The foreign market, which closed last week at £119 10s., opened on Monday at £123, and reached the highest point on Wednesday when £125 12s. 6d. was paid for spot. On Thursday a reaction set in, and the closing quotations are cabled as £123 7s. 6d.@£123 10s. for spot, £123@£123 5s. for three months.

In well informed quarters the opinion is expressed that the production of this metal will not exceed that of last year by more than a few per cent.

Lead is dull and unchanged. The ruling quotations are 3.97 1/2@4.05c. St. Louis, 4.05@4.10c. New York. The foreign market is firm, Spanish lead being quoted at £11 8s. 9d.@£11 10s., English lead £11 11s. 3d.@£11 12s.

There has been a very good demand from abroad.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is steady. Missouri and chemical brands are selling at

3.97 1/2@4c., while argentiferous lead brings 4.05c. The demand is rather light.

Spelter has again ruled very firm indeed throughout the week, producers being rather reluctant sellers. We quote the market at 4.25c. St. Louis, 4.40c. New York.

The foreign market is steady, good ordinaries being quoted at £17 15s., specials at £18.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is strong at 4.25c. At this price the demand has been quite active of late for both present and future delivery. The ore market continues strong, and if present prices of ore continue a while longer it is our belief that sellers of spelter will have to get more money for their metal.

Antimony is unchanged. We quote Cookson's at 9 3/4@10c.; Hallett's at 8@8 1/2c.; Hungarian, Italian, Japanese and United States 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. The London price is £8 15s. per flask, with the same figure quoted from second hands.

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

Table with columns: Aluminum, Per lb., Ferro-Tungsten, Per lb., Magnesium, Per lb., Manganese, Per lb., Nickel-alum, Per lb., Bismuth, Per lb., Chromium, Per lb., Copper, red oxide, Per lb., Ferro-Molyb'dum, Per lb., Ferro-Titanium, Per lb., Tungsten, Per lb.

Variations in price depend chiefly on the size of the order.

Average Prices of Metals per lb., New York.

Table with columns: 1902, 1901, 1902, 1901, 1902, 1901. Rows: January, February, March, April, May, June, July, August, September, October, November, December, Year.

Average Prices of Copper.

Table with columns: Month, Electrolytic, Lake, London Standard. Rows: January, February, March, April, May, June, July, August, September, October, November, December, Year.

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

Average Prices of Silver, per ounce Troy.

Table with columns: 1902, 1901, 1902, 1901, 1902, 1901. Rows: January, February, March, April, May, June, July, August, September, October, November, December, Year.

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

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices from April 3 to April 9, 1902.

\*Per cent.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations for New York, listing companies and their prices from April 3 to April 9, 1902.

Total sales, 418,905 shares. \* Ex-dividend.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, PA, listing companies and their prices from April 3 to April 9, 1902.

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 9,327 shares.

MEXICO.

Mar. 29.

Table of stock quotations for Mexico, listing companies and their prices as of March 29, 1902.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies and their prices from April 3 to April 9, 1902.

Official Quotations Boston Stock Exchange. Total sales, 249,097 shares. \*Holiday. †Ex-dividend

SPOKANE, WASH.\*

Apr. 4.

Table of stock quotations for Spokane, Wash., listing companies and their prices for April 4, 1902.

Total sales 61,000 shares. \*Reported by Hunner & Harris.

ST. LOUIS, MO.\*

Mar. 31.

Table of stock quotations for St. Louis, Mo., listing companies and their prices for March 31, 1902.

\*From our Special Correspondent.

SALT LAKE CITY.\*

April 5.

Table of stock quotations for Salt Lake City, listing companies and their prices for April 5, 1902.

\*By our Special Correspondent. Total number of shares sold, 603,864.



STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

LONDON.

Mar. 27.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, dates (Mar. 31, Apr. 1, Apr. 2, Apr. 3, Apr. 4, Apr. 5), and sales.

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

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

PARIS.

Mar. 20.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Firminy, Huta-Bank, 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, British Columbia, Carboe Mex., etc., with columns for par value, dates (Apr. 1, Apr. 2, Apr. 3, Apr. 4, Apr. 5, Apr. 7), 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, dates (Apr. 3, Apr. 4, Apr. 5, Apr. 7, Apr. 8, Apr. 9), and sales.

MONTREAL, CANADA.

Apr. 7.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, Can. Gold Fields, etc., with columns for par value, dates (Apr. 7), and sales.

Total sales, 28,550 shares. 1Ex-dividend.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasive—			Barium—			Graphite—Am. f.o.b. Provi-			Paints and Colors—					
	Cust. Meas.	Price		Cust. Meas.	Price		Cust. Meas.	Price		Cust. Meas.	Price		Cust. Meas.	Price
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.	\$0.08	Oxide, Am. hyd. cryst.	lb.	\$0.0234	dence, R. I. lump.	sh. ton	\$8.00	Metallic, brown	sh. ton	\$19.00	Red	"	16.00
Grains	"	.10	Sulphate (Blanc Fixe)	"	.02	Pulverized	"	30.00	Ocher, Am. common	"	9.25@10.00	Best	"	21.25@25.00
Corundum, N. C.	"	.07@.10	<b>Barytes—</b>			German, som. pulv.	lb.	.0134@.0114	Dutch, washed	lb.	.0434	French, washed	"	.0134@.0114
Chester, Mass.	"	.0434@.05	Am. Crude, No. 1	sh. ton	9.00	Best pulverized	"	.0114@.02	Orange mineral, Am.	"	.0734@.0714	Foreign, as to make	"	.0734@.1134
Barry's Bay, Ont.	"	.0734@.0934	Crude, No. 2	"	8.00	Ceylon, common pulv.	"	.0234@.0334	Paris green, pure, bulk	"	.12@.1214	Red lead, American	"	.0534@.0534
Crushed Steel, f.o.b. Pittsburg	"	.0534	Crude, No. 3	"	7.75	Best pulverized	"	.04@.08	Foreign	"	.0634@.08	Turpentine, spirits	gal.	.4834@.49
Emery, Turkish flour, in kegs	"	.0334	German, gray	"	14.50	Italian, pulv.	"	.0134	White lead, Am., dry	lb.	.0434@.0414	American, in oil	"	.0534@.0534
Grains, in kegs	"	.05@.0534	Snow white	"	17.00	<b>Gypsum—</b> Ground	sh. ton	8.00@8.50	Foreign, in oil	"	.0734@.0934	Foreign, in oil	"	.0734@.0934
Naxos flour, in kegs	"	.0334	<b>Bauxite—</b> Ga. or Ala. mines:			Fertilizer	"	7.00	Zinc, white, Am., ex dry	"	.0434@.0434	American, red seal	"	.0634
Grains, in kegs	"	.05@.0534	First grade	lg. ton	5.50	Rock	lg. ton	4.00	Green seal	"	.07	Foreign, red seal, dry	"	.0534@.0834
Chester flour, in kegs	"	.0334	Second grade	"	4.75	English and French	"	14.00@16.00	Green seal, dry	"	.0634@.0634			
Grains, in kegs	"	.05@.0534	<b>Bismuth—</b> Subnitrate	lb.	1.40	<b>Infusorial Earth—</b> Ground	"							
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"	.0134	French	"	1.65	American, best	"	20.00						
Grains, in kegs	"	.0234	<b>Bitumen—</b> "B"	"	.0334	French	"	37.50						
Crude, ex-ship N. Y.: Ab-			"A"	"	.05	German	"	40.00						
bott (Turkey)	lg. ton	26.50@30.00	<b>Bone Ash</b>	"	.0234@.0234	<b>Iodine—</b> Crude	100 lbs.	2.45						
Kuluk (Turkey)	"	22.00@24.00	<b>Borax</b>	"	.0734@.0734	Iron—Muriate	lb.	.05						
Naxos (Greek) h. gr.	"	.26.00	<b>Bromine</b>	"	.40	Nitrate, com'l.	"	.0134						
Garnet, as per quality	sh. ton	25.00@35.00	<b>Cadmium—</b> Metallic	"	1.40	True	"	.04						
Pumice Stone, Am. powd.	lb.	.0134@.02	Sulphate	100 lbs.	2.00@2.50	Oxide, pure copperas col.	"	.05@.10						
Italian, powdered	"	.0134	<b>Calcium—</b> Acetate, gray	"	1.30	Purple-brown	"	.02						
Lump, per quality	"	.04@.40	" brown	"	.90	Venetian red	"	.01@.0134						
Rotenstone, ground	"	.0234@.0434	Carbide, ton lots f.o.b. Niagara Falls, N. Y., or Jersey City, N. J.	sh. ton	75.00	Scale	"	.01@.03						
Lump, per quality	"	.06@.20	Carbonate, ppt.	lb.	.05	<b>Kaolin—</b> (See Clay, China.)								
Rouge, per quality	"	.10@.30	Chloride, com'l.	100 lbs.	.75@.80	<b>Kryolith—</b> (See Cryolite.)								
Steel Emery, f.o.b. Pittsburg	"	.07	Best	"	1.00	Lead—Acetate, white	"	.0734@.08						
			<b>Cement—</b>			Brown	"	.06						
			Portland, Am., 400 lbs.	bbbl.	1.70@1.90	Nitrate, com'l.	"	.0634						
			Foreign	"	1.65@2.25	" gran.	"	.0834						
			"Rosendale," 300 lbs.	"	.75	<b>Lime—</b> Com., abt. 250 lbs.	bbbl.	.80						
			Slag cement, imported	"	1.65	Finishing	"	.90						
			<b>Ceresine—</b>			<b>Magnesite—</b> Greece.								
			Orange and Yellow	lb.	.12	Crude (95%)	lg. ton	6.50@7.00						
			White	"	.1334	Calced	sh. ton	14.00@15.00						
			<b>Chalk—</b> Lump, bulk	sh. ton	2.75	Bricks	M	170.00						
			Ppt. per quality	lb.	.0334@.06	Am. Bricks, f.o.b. Pittsburg	"	175.00						
			<b>Chlorine—</b> Liquid	"	.30	<b>Magnesium—</b>								
			Water	"	.10	Carbonate, light, fine pd.	lb.	.05						
			<b>Chrome Ore—</b>			Blocks	"	.07@.03						
			(50% ch.) ex-ship N. Y.	lg. ton	24.75	Chloride, com'l.	"	.0134						
			Sand, f.o.b. Baltimore	"	33.00	Fused	"	.20						
			Bricks, f.o.b. Pittsburg	M	175.00	Nitrate	"	.60						
			<b>Clay, China—</b> Am. com., ex-			Sulphate	100 lbs.	.75@.95						
			dock, N. Y.	lg. ton	8.00	<b>Manganese—</b> Powdered,								
			Am. best, ex-dock, N. Y.	"	9.00	70@75% binoxide	lb.	.0134@.0114						
			English, common	"	12.00	Crude, pow'd.	"	.0134@.0234						
			Best grade	"	17.00	75@85% binoxide	"	.0134@.0234						
			Fire Clay, ordinary	sh. ton	4.25	85@90% binoxide	"	.0234@.0334						
			Best	"	6.00	90@95% binoxide	"	.0334@.0534						
			Slip Clay	"	5.00	Carbonate	"	.16@.20						
			<b>Coal Tar Pitch</b>	gal.	.08	Chloride	"	.04						
			<b>Cobalt—</b> Carbonate	lb.	1.75	Ore, 50% Foreign	unit	.20@.21						
			Nitrate	"	1.50	Domestic	"	.30						
			Oxide—Black	"	2.26@2.30	<b>Marble—</b> Flour	sh. ton	6.00@7.00						
			Gray	"	2.28@2.40	<b>Mercury—</b> Bichloride	lb.	.77						
			Smalt, blue ordinary	"	.08	Mica—N. Y. gr'nd, coarse	"	.37@.04						
			Best	"	.20	Fine	"	.04@.05						
			<b>Copperas</b>	100 lbs.	.30@.35	Sheets, N. C. 2x4 in.	"	.30						
			<b>Copper—</b> Carbonate	lb.	.18@.19	3x3 in.	"	.80						
			Chloride	"	.25	3x4 in.	"	1.50						
			Nitrate, crystals	"	.35	4x4 in.	"	2.00						
			Oxide, com'l.	"	.19	6x6 in.	"	3.00						
			<b>Cryolite</b>	"	.0634	<b>Mineral Wool—</b>								
			<b>Explosives—</b>			Slag, ordinary	sh. ton	19.00						
			Blasting powder, A	25 lb. keg	2.65	Selected	"	25.00						
			Blasting powder, B	"	1.40	Rock, ordinary	"	32.00						
			"Rackarock," A	lb.	.25	Selected	"	40.00						
			"Rackarock," B	"	.18	<b>Nickel—</b> Oxide, No. 1	lb.	1.00						
			Judson R. R. powder	"	.10	No. 2	"	.60						
			Dynamite (20% nitro-glycerine)	"	.13	Sulphate	"	.20@.21						
			(30% nitro-glycerine)	"	.14	<b>Oils—</b> Black, reduced 29 gr.								
			(40% nitro-glycerine)	"	.15	25@30, cold test	gal.	.0934@.134						
			(50% nitro-glycerine)	"	.1634	15, cold test	"	.1034@.114						
			(60% nitro-glycerine)	"	.18	Zero	"	.1134@.1234						
			(75% nitro-glycerine)	"	.21	Summer	"	.0934@.0934						
			Glycerine for nitro (32 2-10° Be.)	"	.1234@.13	Cylinder, dark steam ref.	"	.0834@.1034						
			<b>Feldspar—</b> Ground	sh. ton	8.00@9.00	Dark, filtered	"	.1134@.1334						
			<b>Flint Pebbles—</b> Danish, Best	lg. ton	14.75	Light filtered	"	.1434@.1734						
			French, Best	"	11.75	Extra cold test	"	.2134@.2634						
			<b>Fluorspar—</b>			Gasoline, 86@90°	"	.14@.19						
			Am. lump, 1st grade	sh. ton	\$14.40	Naphtha, crude, 68@72°	bbbl.	9.05						
			2d grade	"	13.90	"Stove"	gal.	.12						
			Gravel and crushed, 1st gr.	"	13.40	Linseed, domestic raw	"	.62@.63						
			2d grade	"	12.40	Boiled	"	.65						
			Ground, 1st grade	"	17.90	Calcutta, raw	"	.85						
			2d grade	"	16.50	<b>Ozokerite</b>	lb.	.1134						
			Foreign, lump	"	8.00@12.00	<b>Paints and Colors—</b>								
			Ground	"	11.50@14.00	Chrome green, common	"	.05						
			<b>Fuller's Earth—</b> Lump	100 lbs.	.75	Pure	"	.16						
			Powdered	"	.85	Yellow, common	"	.1034						
						Best	"	.25						
						Lampblack, com'l.	"	.0434						
						Refined	"	.07						
						Litharge, Am. powd.	"	.0434@.0534						
						English flake	"	.0834@.0834						
						Glassmakers'	"	.0734@.0734						

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.