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Contents

The Alaska Coal Cases

The Ballinger-Pinchot controversy, the Cunningham claims, and all the rest of this trouble will be thrashed out in a Congressional inquiry, pending which the country may relieve its mind of the criminations and recriminations that have been flying fast and furious. We refer to the matter now only in the hope that Congress may learn enough about the mineral-lands laws of the United States to overcome its own supine stupidity and become ready to enact something adequate.

We hope, moreover, that the Congressional committee will enlist the services of mining engineers of recognized standing and will not rely merely upon bureaucratic advice.

We say this in the hope that such wisdom may arise in the Congressional mind to make it perceive that there is something more important involved than the mere quarrel between Mr. Ballinger and Mr. Pinchot, this being the policy of the nation with respect to the bestowal of its remaining mineral resources. As to the coal lands, it is impossible under the existing law to acquire coal, develop a mine, and stick to the letter of the law. Consequently it has been necessary to dodge the law, which has thereby put a premium upon perjury.

In the scandal over the Alaska cases there is a great deal more smoke than there is fire. In a recent article in *McClure's Magazine* there is an "exposure" with a thread of truth which is involved among a distressing lot of nonsense. The talk about billions of tons of coal, worth $1 per ton, in the ground, *now*, is bosh, and even 50c. per ton is highly doubtful. But whatever might be a fair royalty, capitalization on basis of the probable period of realization would be a very much less amount than the simple multiplication of tonnage by a value per ton. We are inclined to think that the alleged plunderers of the Government are by this time a much disgusted lot of people, of whom the only happy ones may be some promoters who have been successful in selling stock.

Even the "Guggenheims" have their troubles. In this case it is not the affair of either of the smelting companies or the exploration company, but a venture of some of the Guggenheims personally along with J. P. Morgan & Co., The building of the Copper River & Northwestern railway ought to be to the benefit of Alaska. It never could have been done by the "hardy prospector," or by any but a powerful group of capitalists, and the boldness of this group in spending $22,000,000 excites the admiration of most intelligent persons, accompanied by doubts as to the successful outcome of the adventure.

The Katalla coalfield and the Copper River mines are of no value without a railway to serve them, and the railway along with other necessary developments costs a great deal of money. We are not defending any of the malefactors in this part of Alaska, but are only seeking to correct the false impression that there are billions of treasure merely awaiting removal without risk to anyone if a complaisant Government will permit.

The persons who have been trying to evade the letter of the law ought to be turned down, whether they be Guggenheims, or senators, or bartenders.

The law ought to be amended, with the aid of a commission of experts and without the meddling of Congressional wire-pullers, so as to permit an honest development of natural resources by necessary methods and upon an adequate scale.

The Government ought not to give away its resources for a song, but in behalf of all the people it ought to derive a return from them commensurate with their value, as is done by some of the States in the disposal of their coal and iron lands.

It is particularly absurd that the nation should be practically defenceless on the Pacific coast for lack of coal, the transportation of huge quantities from the Atlantic coast for naval purposes being even now required, when it possesses immense deposits of its own in Alaska.

All of these things have been repeatedly brought to the attention of Congress by President Roosevelt, by the executive authorities, by representatives of the mining industry and by the press. If the inquiry be broad enough to open the eyes of Congress to the importance of this subject and lead it finally to act sanely in the interest of the nation, neither Mr. Ballinger nor Mr. Pinchot will have lived in vain.

The Copper Statistics for December

The American statistics, published on Monday last, have been regarded as the most favorable that have appeared for many months, and there is some ground for this opinion, but the statistics should not be taken too optimistically or wholly upon their face. The deliveries, both for export and for domestic account, increased largely over the deliveries in November, representing the shipment of copper contracted for during the large sales of November. Upon the face of the returns, the most hopeful feature of the December statistics, is the falling off in production, which has been regarded on the street as showing the curtailment of which there has lately been much talk. However, if any material curtailment has been inaugurated at the smelteries December would have been too early to show it in the refinery statistics. The ability of a refiner to curtail on his own account is rather limited. We are disposed to think that the decline in production shown by the December statistics was accidental rather than intentional. However, the result was a decrease of over 11,000,000 lb. in the visible supply in the United States, and nearly 4,000,000 lb. in the world's supply. For this we may be thankful, even if not made much more buoyant in our hopes.

North Butte

The air has been full of rumors respecting the conditions of the North Butte mine, where there are supposed to have been some adverse changes in the lower levels. What has happened is wholly a matter of surmise in so far as the public is concerned, the management of the company refusing to communicate any information. The stockholders of the company are entitled to an official report as to the facts. The silence of the North Butte company at this time compares unfavorably with the frankness that has been exhibited by some other companies, the Homestake, for example, when there have been developments seriously affecting the interests of the stockholders. There is at present strong suspicion as to the status of North Butte, which has been intensified by the reduction of the dividend. The longer Mr. Cole and Mr. Ryan withhold their confidence from their stockholders the greater will be their sacrifice of esteem.

The Pittsburg Coal Company

The position of the Pittsburg Coal Company is still uncertain. The proposed voting trust for a controlling interest in the stocks hangs fire, having received no general response from large holders, who seem to believe that they can do better individually than collectively. The current reports are that the recent buying of the stock is in the interest of the owners of the Western Maryland railroad, who are planning the extension of that line to Pittsburg at an early date. This would mean the bringing of coal from the Pittsburg district to the seaboard in much larger quantities than heretofore; a result that would be anything but welcome to the districts now supplying the seaboard trade. Operators in those regions have already about all the competition they can stand up against, and have worked for the past two years on a margin of profit so small that it has frequently reached the vanishing point. An invasion by the Pittsburg interests would probably result in little profit to the new comers.

The Pittsburg incident has led to the revival of the report which has been more or less current at times during the past two years, of a great bituminous coal combination. According to the present version such a merger is in process of formation with the Consolidation Coal Company as a nucleus, the Pittsburg company to be the first addition. These reports are still vague, and can only be given as current, any confirmation at the present stage being impossible. It may be said, however, that the interests concerned are too large and too divergent to make such a combination easy or possible except after long negotiation.

Stealing or "High Grading"

The eleventh arrest made on Dec. 19 in connection with the theft and sale of Cobalt ore gives some idea of the extensive organized thieving, which has been a concomitant of mining in the rich Ontario camp ever since its advance from the stage of the one-man prospect to that of incorporated operating companies. The present prosecution involves those who are alleged to have used a small smelting plant at Chippewa as the outlet, *via* various middlemen in Cobalt and Toronto, for ore stolen from the Cobalt mines. Managers of rich mines in every mining camp have been confronted with this problem which is at present receiving more definite and organized attention in the United States, as well as in the territory of our northern neighbor. Recently at Goldfield the three principal operating companies united in asking the court for an order to restrain the promiscuous sale of ore, except upon notification to the complaining companies. Though this savors of special legislation, it was perhaps the logical outcome of the peculiar conditions.

It seems unquestionable that some provision should be made to require authentic proof of the ownership of ore that is subject to sale. The exact form of legislation that would be effective is a matter that requires careful consideration. The Ontario mining act makes it a criminal offense to purchase ore without a cer-

tificate from the mine management, but this had not served to eliminate the stealing when there were channels for easily disposing of the stolen ore. This practice of ore stealing, though not new, has received a particular impetus in recent years from the ideas promulgated by certain socialistic organizations which have declared that the ore in a mine does not belong to the shareholders of the company that put up the capital to work the property.

The effect of these statements upon the unorganized or atrophied conscience is apt to be that its owner becomes more prone to appropriate an opportunity to distribute this "unattached" wealth, under the vague impression that it is only "high grading." We believe that this is frequently done by men who would not take money or merchandise above ground, because to their minds that plainly would be stealing, the other being merely "high grading," a sort of "sport" indulged in by those about them under propitious circumstances. Many men now indulge in this practice, simply because it is done by others about them, and would cease to do so if more stringent legislation were enacted eliminating the easy channels for disposing of the stolen ore. If the practice were persistently referred to by its actual and proper designation of stealing, instead of the sugar-coated appellation of "high grading," it would assist official legislation in this matter by creating a malodorous and unpleasant atmosphere for its devotees.

The Corporation Tax on Mining Companies

It is reported from Boston, on apparently good authority, that some of the Lake Superior copper companies are taking steps to contest the validity of the new Federal corporation-tax law. The test point will be on the constitutionality of the law, and the arguments will probably be based on the limitations of the taxing power of Congress, under which the Supreme Court declared unconstitutional the income-tax law. Whether the provisions of the law itself will be brought into question is not stated.

Under the law no special provision is made for mining companies, and they are classed with the manufacturing companies. The tax is imposed on net earnings, and under the interpretation of the Treasury Department, recently issued, these would be the difference between the cost of production and the actual selling price of the article made. In the case of an ordinary manufacturing company there would be usually no great difficulty in determining costs, but with a mining company the questions arising are much more complex. In making copper, for instance, most of the Lake companies publish yearly reports showing the cost of mining, treatment, etc., and giving the cost per pound of copper produced at the mine. Presumably the difference between this and the selling price would be assumed as the net earnings; but the cost of transportation and selling are legitimate charges and would, we believe, be allowed under the law.

The questions most likely to arise in the enforcement of the law are connected with the provision for a "reasonable" allowance for depreciation. Probably in the case of an ordinary factory this could be determined within moderate limits. In the case of a mine the actual depreciation of the machinery and equivalent can also be determined. But the production of the mine each year diminishes its resources and consequently its value. No provision is made in the law for this progressive depreciation or for amortization in any form; though it would seem only just to include some such charge in the expenses of the year. Friction and litigation are pretty sure to arise on this point, should the law be held valid.

The same point holds with all mining companies. The extraction of 1,000,000 tons of ore from one of the great iron mines of the Mesabi range, for instance, leaves the mine worth so much less. The value of the iron ore in the ground, in this case, would be a fair addition to the expenses of the year; but we do not see any provision of the law which would allow such a charge. The difference between actual cost of mining and the selling price, minus a "reasonable" allowance for depreciation of equipment, seems to be the basis on which the tax is to be calculated.

It is quite possible that the determination of such questions may be postponed till the courts pass on the general constitutionality of the law. The Lake copper companies, probably, will not be the only ones to raise this question.

The Australian Colliery Strike

The strike of the coal miners in New South Wales has become general, and has reached a point where there is serious embarrassment to business and manufacturing in Australia. The New South Wales collieries furnish the greater part of the supply for the Commonwealth, and the prolonged stoppage of shipments is being severely felt in all the large cities and towns. The miners recently offered to submit all the points in dispute to an open conference, but the operators refused to accept the offer. Lately negotiations have been resumed, but the proceedings are kept secret and the outcome is uncertain.

The absence of exports from Newcastle is making an opportunity for Japanese coal in eastern ports where Australian coal has heretofore held the market, both for local and steamship coal. It is an opportunity of which the Japanese will not be slow to take advantage.

The change in royalty demanded by the Ontario government from a number of non-dividend paying mines at Cobalt will be a welcome relief to those mines which have not been fortunate enough to develop bonanza properties, and to which the royalty heretofore demanded has proved onerous under the conditions existing in the district. The action taken on Dec. 16 by the Provincial government at Toronto changes the royalty from 25 per cent. of the gross value of the ore at the shaft mouth to 25 per cent. of the net earnings. If, however, the annual profits are less than $10,000, no royalty is to be paid. Four shipping mines will be immediately benefited and it is likely that other properties will be stimulated to increased development.

If the enlarged Utah Copper Company is going to improve its position by increasing its output; and if the proposed general merger is going to improve the status of copper by curtailing the output; if Phelps, Dodge & Co., Calumet & Hecla and W. A. Clark, besides others, stay out; and if Nevada Consolidated maintains independence; it would appear that the burden would fall wholly upon the Amalgamated and the Cole & Ryan groups. Even Mr. Morgan may find it difficult to reconcile this discordancy.

CORRESPONDENCE AND DISCUSSION

VIEWS, SUGGESTIONS AND THE EXPERIENCES OF READERS

Spurious Potassium Cyanide

The letter of F. A. Ross in the JOURNAL of Oct. 23, 1909, raises several interesting questions, and emphasizes the necessity of carefully analyzing the products supplied by manufacturers to mines and metallurgical works. At the outset it may be remarked that much mystification would be avoided if the practice were adopted of reporting the cyanogen contents of cyanide samples in terms of cyanogen instead of calculating them as KCN or NaCN. The absurdity of talking about commercial sodium cyanide as 125 per cent. KCN would thus be avoided.

Let us first consider the analyses No. 1 and No. 2 quoted by Mr. Ross. It is obvious, if these are correct, that any difference between the two brands of cyanide cannot possibly have been due to the different properties of KCN and NaCN, as the proportions of these two cyanides are identical within ordinary limits of error. The analyses, however, leave 1.8 per cent. unaccounted for, and it is quite possible that one or the other may have contained some ingredient detrimental to the extraction of gold or silver. The mysterious and contradictory differences between KCN and NaCN which are noted from time to time in the correspondence columns of technical journals, may, I think, be safely referred to entirely different causes.

If, as there is good ground for supposing, all the soluble metallic cyanides (with the exception of mercuric cyanide) are completely dissociated in dilute solutions into the metal and cyanogen, it would seem that the primary reaction on the gold or silver must depend solely on the presence of the cyanogen. Be this as it may, it is easy to convince oneself by actual experiment that the nature of the alkali metal exerts absolutely no influence on the extraction. I have on more than one occasion made laboratory experiments in which portions of the same ore were treated respectively with solutions of potassium, sodium and calcium cyanide, each containing the same weight of cyanogen and otherwise similar, the extractions being identical in each case.

It may, I think, safely be asserted that no ore has ever yet been treated commercially with pure KCN. The commercial product sold under the name of "potassium cyanide" is, and always has been, a mixture in variable proportions of the two cyanides with more or less considerable quantities of carbonates, chlorides and cyanates, and usually smaller amounts of sulphides, sulphates, thiocyanates, ferrocyanides, formates and perhaps other substances. These impurities are not intentionally introduced, but arise from the process of manufacture or may be originally present in the raw materials. In most methods of making cyanide, a ferrocyanide is produced as an intermediate product. This is treated with sodium carbonate, or in more modern practice with metallic sodium. By the former method a certain percentage of cyanate is due to the reaction:

$$K_4Fe(CN)_6 + Na_2CO_3 = 3KCN + KCNO + 2NaCN + Fe + CO_2.$$

In the latter case a mixture of cyanides is formed:

$$K_4Fe(CN)_6 + 2Na = 4KCN + 2NaCN + Fe.$$

As pointed out by Mr. Ross, one reason for the employment of sodium or sodium compounds is to be found in the relative scarcity of potassium salts. Also there are greater difficulties in preparing metallic potassium than metallic sodium. Probably the chief reason why potassium ferrocyanide is still largely used in preference to sodium ferrocyanide in the manufacturing process is that the latter crystallizes with 12 molecules of water whereas the potassium salt has only 3.

Now a few words as to the impurities in commercial cyanide. If carbonates, chlorides and cyanates alone are present, these substances neither help nor hinder the extraction of the precious metals, though the carbonate may be of some benefit as "protective alkali." Small quantities of sulphides frequently occur; large amounts would certainly be detrimental, but the minute quantities generally present are rapidly eliminated in practice by oxidation or precipitation as zinc sulphide. It occasionally happens that ammonium salts are found. In such cases, when the cyanide is exposed to the air there is a loss of cyanogen in the form of volatile ammonium cyanide, and probably also the cyanide, after it has been dissolved, will show a somewhat rapid deterioration in cyanogen strength owing to some such reaction as the following:

$$NaCN + NH_4Cl = NaCl + NH_4CN.$$

Ammonium cyanide is volatilized and partially decomposed at 36 deg. C. On one occasion a brand of cyanide supplied to a metallurgical plant was found to contain a perceptible amount of a soluble hyposulphite (thiosulphate), which had the effect of making the apparent strength in KCN, as determined by $AgNO_3$ and KI indicator, higher than the truth. The presence of this impurity may easily be detected and its amount estimated as follows: A weighed quantity of the cyanide is dissolved in distilled water and standard acid run in until, on adding a few drops of methyl orange, a pink tint is just permanent. If now a standard solution of iodine in KI be added, the disappearance of the iodine color indicates that a hyposulphite is present, and its amount may be accurately estimated by running in standard iodine until a permanent tint just remains, adding a little starch near the finish as indicator.

Not long ago I had occasion to examine a brand of NaCN sold as "cyanide of sodium, 126 per cent." When dissolved in distilled water and titrated in the ordinary way with $AgNO_3$, the full strength was apparently obtained. When, however, a case of this cyanide, weighing about 200 lb., was dissolved in the calculated quantity of solution in a storage tank, (which already tested 0.12 per cent. KCN or thereabouts), to give a 0.25 per cent solution, the actual strength obtained was only 0.21 per cent. Time and opportunity were lacking for the investigation of the mystery, but it would be interesting to know if any of the readers of the JOURNAL have had similar experiences.

J. E. CLENNELL.

Creston-Colorado Company, Torres, Sonora, Mexico, Dec. 24, 1909.

The Sauntry Process

On Feb. 20, 1907, we prepared a report on the Sauntry process for E. F. Colborn, William Sauntry and others. On June 26, 1907, E. F. Colborn told us that he had met with difficulty in bringing our rather long report to the attention of people who ought to read it, because they would not take the trouble to do so unless they first had a brief statement putting the matter in such a light that it would seem worth their while. He asked us to sign such a brief statement which he had drafted, assuring us that it was to be used solely as an introduction to our report, and we did so.

Since then we have been informed by Mr. Sauntry and others that he has been in the habit of showing our letter without showing or mentioning the report itself. We have repeatedly addressed him by registered post, asking him to permit

us to add a few words to our brief letter mentioning the existence of our full report in order that those to whom he showed the letter might know of the report, to which the letter was to be used only as an introduction. As the matter has now been running along for several months without our receiving any answers to our several letters, we feel compelled to inform the public that our letter to Mr. Sauntry is not our report upon the Sauntry process, and we ask the JOURNAL to publish this letter, of which we are sending a copy to Mr. Sauntry.

H. M. HOWE.
BRADLEY STOUGHTON.

New York, Dec. 30, 1909.

Recording Claims in Ontario

The Toronto correspondent of the JOURNAL in the issue of Dec. 11, in referring to a lawsuit brought by one Caley to enforce an interest in some mining lands, made some reflections on the Ontario Department of Mines which are not warranted by the facts. It might be inferred from these statements that "inside information" was secretely or surreptiously given out by some one in the department with regard to the situation of certain mining claims, and that an investigation by the department is in order.

As a matter of fact the department, at the date in question, was the recording office for filing claims in the Gowganda territory, and under the mining laws of this province these records and the maps upon which the claims are laid down, are public and may be examined by anyone, upon payment of a small fee. There was nothing clandestine or improper in the transaction so far as the department is concerned. THOMAS W. GIBSON.

Deputy Minister of Mines.

Toronto, Ont., Dec. 18, 1909.

Dust Problem in Coal Mines

The experience of Joseph Virgin with the use of calcium chloride to lay dust in coal mines, as described in the JOURNAL, Oct. 9, 1909, under the title of "Dust Problem in Coal Mines," is of intense interest to those engaged in that work. I would, however, like to correct in one particular an erroneous impression which seems to be given in this description.

Mr. Virgin used ordinary salt and found it to be about 50 per cent. as efficient as calcium chloride. As a matter of fact, it is perfectly well known that ordinary salt, if pure sodium chloride, is not in any degree hygroscopic. It has no affinity for water whatever and will remain dry in any atmosphere however moist. Ordinary salt, however, as usually furnished (crude) is decidedly hygroscopic, taking up moisure from the air to such an extent that the containing sacks may become wringing wet. This absorption of moisture is due to the calcium and magnesium chlorides present in the crude salt as impurities, often to the extent of 3 or 4 per cent. Pure sodium chloride (the best table salts are almost pure) has no affinity for water whatever. It cannot, therefore, be of any value for dust laying.

It must be a case of mistaken judgment to say that ordinary salt, even if it contains 4 or 5 per cent. of calcium chloride, is about one-half as efficient for dust laying as pulverized calcium chloride containing from 60 to 75 per cent. The ground calcium chloride which Mr. Virgin found more convenient for mine use can be obtained, though at a slightly higher cost, from the Solvay Process Company, Syracuse, N. Y., under the name of granulated calcium chloride.

L. C. JONES.

Syracuse, N. Y., Dec. 13, 1909.

Mining Investments

I would add one further piece of advice to investors to the list of warnings given by John Hays Hammond, in the admirable address published in the JOURNAL, Jan. 1, 1910, and that is: Never invest in any mining enterprise what you cannot conveniently afford to lose.

JAMES DOUGLAS.

New York, Jan. 4, 1910.

Precipitation of Gold by Lime

Some time ago the JOURNAL mentioned an experiment to test the reducing power of lime containing unfixed carbon on certain gold solutions, and, if I remember rightly, over 80 per cent. of the gold was precipitated. Two experiments carried out on lime used for neutralizing the acid in an ore may be of interest.

To a rich solution of chloride of gold made by dissolving pure gold in nitro-hydrochloric acid, boiling nearly to dryness and diluting, was added ¼ a.t. of lime. This was allowed to stand for 24 hours, after which the lime was filtered and washed. The lime and solution were assayed, showing a precipitation of 82 per cent. of the gold or $1280 per ton of lime.

Next a solution of $AuCl_3$ was digested with hot KCN solution, forming the double cyanide $KAu(CN)_2$. This was allowed to stand 24 hours with ¼ a.t. of lime. In this case the lime precipitated $1.06 per ton of lime, or about ½c. per ton of ore, using 10 lb. of lime to the ton.

The question is, why should lime that precipitates $1280 per ton from the chloride precipitate only $1.06 from the double cyanide? Can it be that so much acid was present in the $AuCl_3$ as to neutralize some of the lime and precipitate $Au(OH)_3$, or is it likely that the CO_2 set free by the action of $CaCO_3$ on HCl had a precipitating effect?

ALGERNON DEL MAR.

South Pasadena, Cal.

The Murex Magnetic Process

In the JOURNAL of Aug. 21, 1909, one of its correspondents had an article about the Murex Magnetic Company's process. In it reference is made to the expression "magnetic solution" and it was intimated that it was like a quack medicine. The inclosed pamphlet will convey an understanding as to the nature of the "quack medicine" to which the JOURNAL'S correspondent referred. At the time the article must have been written our patents were not published and we think it must be agreed that we, therefore, had a very good reason for not giving too many particulars on the subject. At the end of the article reference is made to a weak point in the statement, viz., as to the weights of the products of which assays and extractions were given. The particulars in the pamphlet are those obtained from official tests and the extractions are from actual weights.

MUREX MAGNETIC COMPANY, LTD.

London, Nov. 26, 1909.

[The pamphlet inclosed with the above letter consists chiefly of a technical article by W. H. Goodchild. After reading this article we are of the opinion that our London correspondent was in no way unfair in his comments. Briefly the Murex process consists of stirring pulverized ore in an emulsion of oil and magnetite, the oil being treated with a small amount of a solution of alum. This produces a magnetic paint, which, according to the description of the process, coats certain kinds of mineral particles, but not all. The pulp, suitably diluted, being discharged upon a traveling belt, a magnet picks off and discharges the painted particles. By calcination the oil is burned from the latter and the magnetite is recovered by feeding the calcined concentrate under a magnet.

The article sent us by the company does not go into many matters that we should like to know about. It states that it has been found feasible to prepare liquids possessing widely different properties. Thus when calcite is present it may be put into the concentrates or tailings at the will of the operator. In the treatment of blende-galena-pyrites it is claimed to be possible to pick out the blende and galena, leaving the pyrites behind, and the blende and galena can then be separated efficiently by treating with a solution of sodium silicate and passing over concentrating tables. Unfortunately no explanations as to the remarkable behavior of these minerals is offered, while the data as to extraction and working cost are still unsatisfactory, just as our London correspondent said last summer.—EDITOR.]

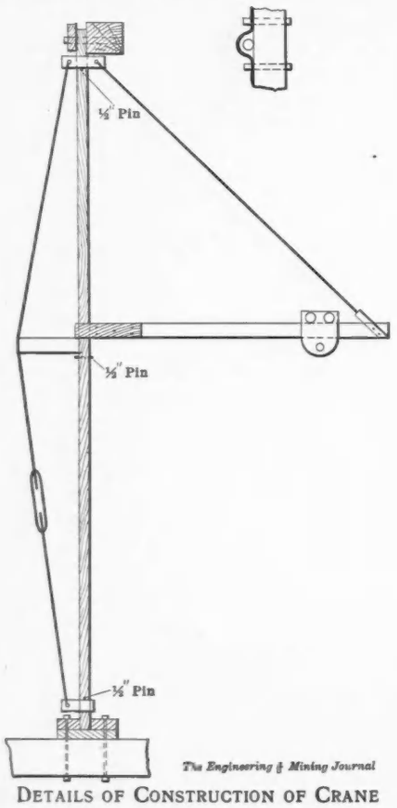
DETAILS OF PRACTICAL MINING

NOTES OF INTEREST TO OPERATORS OF SMALL AS WELL AS LARGE MINES — THINGS THAT HAVE TO BE DONE IN EVERY DAY MINING

Readers of the JOURNAL are invited to contribute to this department. Articles should be brief, thoroughly practical, and preferably illustrated by drawings or sketches. Our draftsmen will prepare properly any kind of a pencil sketch that is intelligible. Something that is an old story in one district may be quite unknown in another. Articles accepted and published are suitably paid for.

Crane for Mill Machinery

The accompanying sketch shows a cheap and easily constructed crane used for handling rolls, crusher and other machinery in mills. There are also many places in shops and quarries where it could be used to advantage.



DETAILS OF CONSTRUCTION OF CRANE

It is 16 to 18 ft. high, the main column being a 4-in. pipe. The arm is of 1½x4-in. iron and about one-half the length of the column. On the arm is a carriage or truck to which a differential block is attached. The truss rod is 1 in. thick, and is in two parts, connected by a turnbuckle.

A crane of this description will handle 3000 to 4000 lb. One stationed between two sets of rolls will serve both, and in case it is necessary it is not difficult to move the crane. These cranes are used extensively in the Joplin district in Missouri.

Bucket Dumping Device

BY HORACE F. LUNT*

The essential part of this bucket-dumping device is the door to the chute leading to the ore pocket, waste bin or car. This door, when raised as in Fig. 1, in the accompanying sketch, allows the bucket to be hoisted between the supporting beams. The door is then lowered as in Fig. 2, and the brake on the drum of the hoist released; this allows the bucket to dump itself as in Fig. 3, when the door is supported by the sides of the chute. The bucket is then hoisted to the position shown in Fig. 2, the door raised and the bucket lowered into the shaft.

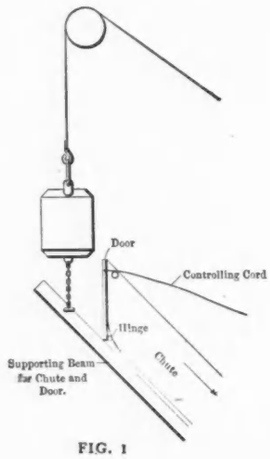


FIG. 1

FIG. 2

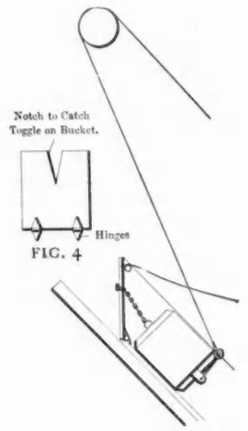


FIG. 4

FIG. 3

The Engineering & Mining Journal, N. Y.

BUCKET-DUMPING DEVICE

The door is operated by a lever within reach of the hoistman. The same lever may be used to operate a trap door over the shaft. The door may be built of heavy sheet iron or of wood. Two-inch plank is heavy enough for a 500-lb. capacity bucket. The wood should be ironed to prevent too rapid wear.

*Mining engineer, French Gulch, Cal.

It is possible to have double doors with two chutes—one toward, and one away from the hoist—thus keeping the ore and waste separate. It is also possible to dump to one side of the line from hoist to sheave providing precautions are taken to keep the hoisting rope from jumping out of the groove in the sheave.

Dewatering Tailings

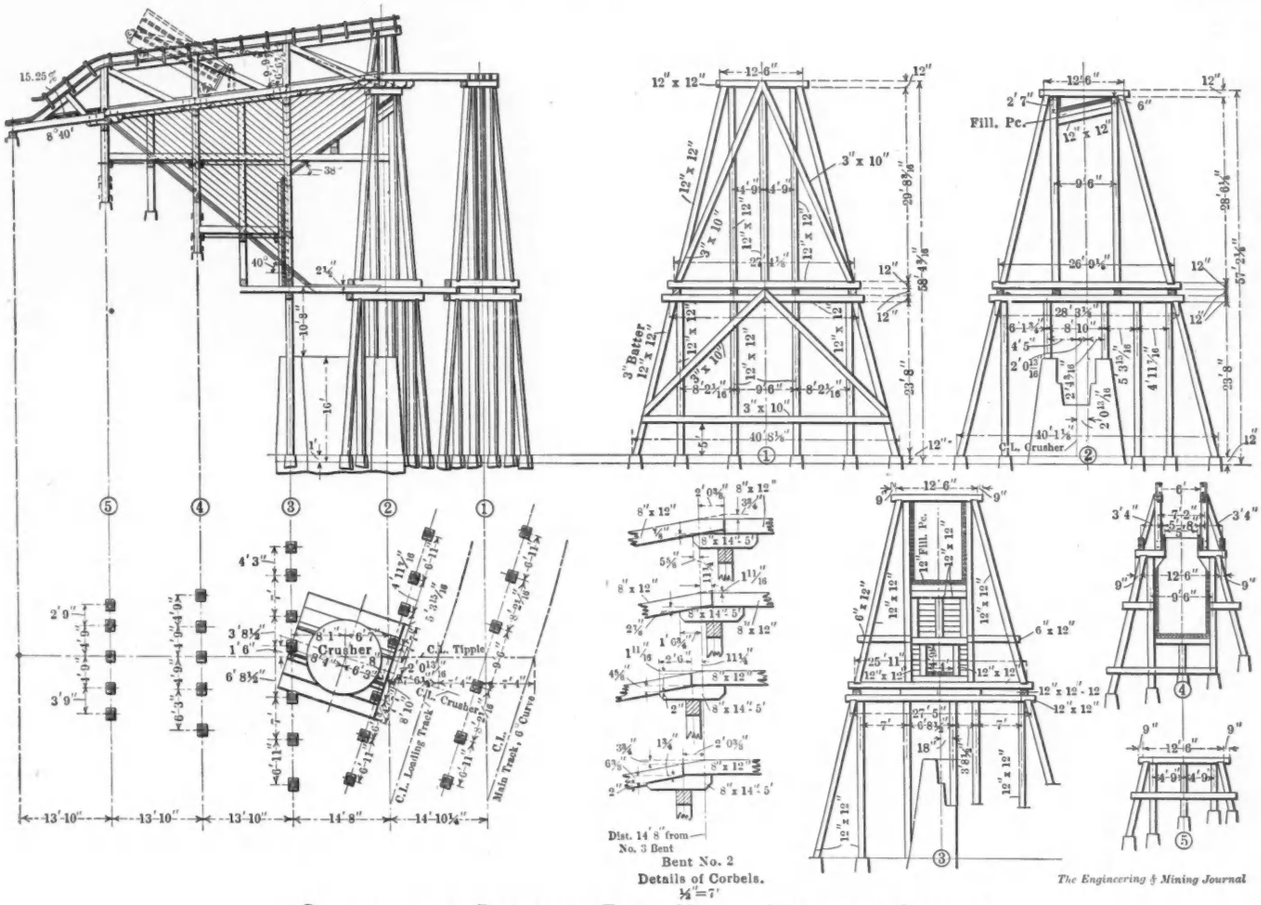
A system of dewatering tailings was recently installed at the Oronogo Circle mines which is essentially as follows: The coarse chats from the roughing jigs are elevated and passed through a 36x48-in. trommel. The screen used is 1½ mm. The water and fine sand pass through the screen and return to the slimes, while the coarse material, minus the water, goes into a storage bin. The sands and slimes from the sand jigs pass by another elevator to a second trommel, 36x120-in. placed above the same receiving bin. The screen on this trommel is ¾ mm. The sand size from this trommel is delivered into the same bin with the coarse chats, from which it is emptied into cars and deposited on the waste dump. The slimes and fine sand that pass through the second trommel go back to classifiers to be distributed upon tables for further treatment. By dewatering the tailings in this way they may be stacked much higher without encroaching upon adjoining property. The slimes from the tables are run into large settling ponds.

Tipple Construction in the Birmingham District

The tipples used by the Tennessee Coal, Iron and Railroad Company and the Republic Iron Company at the slopes of their iron-ore mines on Red mountain, Alabama, are different from those seen at any other slopes in the Birmingham district. These companies hoist in 10-ton skips, whereas most of the other companies use trains of five 2-ton cars. The accompanying drawing shows the constructional details of the tipples at a slope on the Muscoda division of the Tennessee company's ore mines. The slope entry is not perpendicular to the main railroad loading-track below the tipple, this accounting for the angle at which the Nos. 1 and 2 bents are placed.

The tipple carries two sets of tracks one above the other. The upper one, set at 6-ft. gage, engages the rear wheels of the skip, thus elevating it into the position of dump shown by dotted line. The front wheels follow the lower tracks which are set at the regular 5-ft. spacing. The door of the skip is hinged at the top and held tightly closed during hoisting, by the bale of the skip. When the rear of the skip is raised the bale swings up and allows the door to open and the load to discharge. The ore is dumped into a bin, holding about 150 tons and made long enough at the top so that the skip will not have to be dumped within close confines in order to discharge entirely within the bin. The ore bin is built with double planking on bottom and sides and is 9 ft. wide, about 26 ft. deep at the No. 3 bent and has slopes to the bottom, of 40 and 38 deg. as shown in drawing. This insures that the ore will feed freely to the gyratory crusher, which is set on a concrete base, between No. 2 and 3 bents. The crusher, a No. 8 Austin, delivers its product directly into railroad cars which are let down the track by gravity.

Details of the framing of the bents, five of which are used in this particular tipple, are shown fully in the drawing. They are framed from 12x12 timbers battered 3 in. to 1 ft. and cross braced with 3x10 plank. The bents are set on concrete bases. The details of the corbels of the No. 2 bent are also given in the cut. This construction gives a strong and satisfactory tipple at a not too excessive first cost. The Tennessee company uses these wooden tipples at all of its ore mines on Red mountain, but the Republic company has substituted steel construction for the wooden type. The general form of tipple, however, is retained.



CONSTRUCTIONAL DETAILS OF TIPPLE USED IN BIRMINGHAM DISTRICT

Origin of Mine Fires

The origin of mine fires is often mysterious and unaccountable. The case of the recent disaster at Cherry, Ill., in which so many lives were lost, due to fire starting in a pile of hay brings to mind two cases, the damage of which was practically nil, yet show how the fire may originate. In one case the mine surveyor and assistant superintendent had walked down an incline shaft at about 1:30 p.m. Upon returning within an hour, the mouth of the shaft was a mass of flames. The only way in which this fire could be accounted for was that a miner had walked out shortly after the surveyor had entered the mine, and hung his lamp on the dry timbers. This is often done in order to keep the lamp out of the draft at the surface, and also to dispose of the lamp while the miner is in the open air. The other case was where a miner was seen to deliberately set his lamp behind a post and against the side of a bin to prevent the wind from blowing out the light while he walked away 75 yd. to get some track timbers. By the time he had made three trips for ties, the lamp had thoroughly charred the dry pitch-pine timbers and a small blaze was seen. When the miner's attention was called

to this by a bystander, he replied, "I did not think it would burn." It is just such carelessness and thoughtlessness as this that has resulted in many of the fires and explosions in mines. The miner above referred to should have been made to feel the sting of the burn by being "fired."

Rapid Estimation of Pulp in Cyanide Tanks

By Mark R. Lamb*

The table presented herewith is compiled as an aid to the calculation of the pulp contents of cyanide tanks and should be extremely useful to all who are in actual contact with cyanide-plant operations. All calculations in the table are based on the weight (in grams) of the liter of pulp, placing the specific gravity of the slime at 2.5.

The tonnages per foot of depth cover various sizes of slime tanks and may be made to include the intermediate sizes if thought desirable, but as the internal diameters of wooden tanks are not ordinarily made to even feet and as steel tanks are not always made exactly to specified dimensions, each operator must calculate a column to fit his own tanks. Such a column can be interpolated easily and quickly by using a slide rule, setting the area of any tank over the area of one of the tanks in the table and reading the desired capacities per foot depth over the various capacities given in the table for various consistencies. A space is left for writing in an additional column.

The figures could have been worked out to a greater accuracy but as the measure of the depth of slime in the tank is rarely made closer than within an inch of accuracy and as the sample weighed usually contains less slime than the real average of the charge owing to the settlement in the tank and in the sampling bucket or dipper, the accuracy of the table is much greater than that of observation. The figures opposite the lower percentage of the moisture are, of course, only accurate with saturated pulps. I am indebted to a similar tabulation by E. M. Hamilton for the idea and for some of the figures.

PULP TABLE FOR CYANIDE TANKS.

Tons of Dry Slime per Foot of Depth of Tank. Diameter of Tank, Feet.							Wt. of Liter in Kilos, Sp.Gr.	Weight per Cu.Ft., Tons.	Cu.Ft. of Pulp per Ton.	Cu.Ft. of Pulp per Dry Ton of Slime.	Water in Pulp, Per Cent.
12′	16′	20′	24′	28′	30′						
0.07	0.125	0.20	0.28	0.38	0.441	.....	1.012	0.0316	31.6	1600	98
0.145	0.26	0.40	0.58	0.78	0.907	.....	1.024	0.032	31.2	780	96
0.22	0.39	0.61	0.88	1.17	1.37	.....	1.037	0.0324	30.8	515	94
0.30	0.53	0.83	1.18	1.6	1.86	.....	1.050	0.0328	30.4	380	92
0.38	0.67	1.05	1.5	2.02	2.36	.....	1.064	0.0332	30	300	90
0.46	0.81	1.27	1.82	2.45	2.85	.....	1.077	0.0337	29.7	248	88
0.54	0.956	1.5	2.15	2.9	3.36	.....	1.092	0.0341	29.3	210	86
0.63	1.12	1.75	2.5	3.36	3.92	.....	1.106	0.0346	29.9	180	84
0.71	1.25	1.95	2.82	3.80	4.42	.....	1.121	0.035	28.5	160	82
0.80	1.44	2.24	3.22	4.33	5.05	.....	1.136	0.0355	28.2	140	80
0.90	1.59	2.5	3.57	4.8	5.6	.....	1.152	0.036	27.8	126	78
0.99	1.76	2.76	3.96	5.32	6.20	.....	1.168	0.0365	27.4	114	76
1.09	1.93	3.02	4.34	5.83	6.80	.....	1.184	0.037	27	104	74
1.19	2.12	3.3	4.76	6.4	7.45	.....	1.201	0.0375	26.6	95	72
1.29	2.29	3.6	5.15	6.9	8.04	.....	1.219	0.038	26.2	88	70
1.41	2.50	3.9	5.64	7.6	8.84	.....	1.237	0.0386	25.8	80	68
1.51	2.68	4.2	6.02	8.1	9.44	.....	1.255	0.0392	25.4	75	66
1.62	2.90	4.5	6.45	8.7	10.10	.....	1.275	0.0398	25	70	64
1.74	3.08	4.85	6.95	9.3	10.85	.....	1.295	0.0404	24.7	65	62
1.86	3.30	5.15	7.42	9.9	11.6	.....	1.315	0.0411	24.3	61	60
1.98	3.53	5.5	7.93	10.6	12.4	.....	1.337	0.0417	23.9	57	58
2.10	3.73	5.8	8.37	11.2	13.1	.....	1.358	0.0424	23.5	54	56
2.26	4.02	6.18	9.05	12.12	14.15	.....	1.381	0.0431	23.1	50	54
2.40	4.28	6.7	9.6	12.9	15.02	.....	1.404	0.0438	22.8	47	52
2.51	4.47	7	10	13.45	15.70	.....	1.429	0.0445	22.4	45	50
2.7	4.78	7.5	10.7	14.4	16.8	.....	1.453	0.0454	22	42	48
2.86	5.03	7.85	11.3	15.3	17.7	.....	1.479	0.0462	21.6	40	46
2.98	5.30	8.3	11.9	16	18.6	.....	1.506	0.0470	21.2	38	44
3.14	5.57	8.75	12.5	16.8	19.6	.....	1.533	0.0479	20.8	36	42
3.33	5.92	9.25	13.3	17.8	20.8	.....	1.562	0.0488	20.4	34	40
3.54	6.28	9.85	14.1	18.9	22.1	.....	1.592	0.0497	20	32	38
3.65	6.43	10.4	14.6	19.5	22.8	.....	1.623	0.0507	19.7	31	36
3.91	6.94	10.9	15.6	20.4	24.4	.....	1.655	0.0517	19.3	29	34
4.03	7.17	11.3	16.1	21.6	25.2	.....	1.689	0.0528	18.9	28	32
4.20	7.45	11.7	16.7	22.3	26.2	.....	1.724	0.0539	18.5	27	30
4.54	8.05	12.6	18.1	24.2	28.3	.....	1.760	0.055	18.2	25	28
4.70	8.36	13.1	18.8	25.2	29.4	.....	1.798	0.0562	17.8	24	26
4.92	8.73	13.7	19.5	26.3	30.7	.....	1.838	0.0574	17.4	23	24
5.15	9.13	14.3	20.5	27.5	32.1	.....	1.879	0.0587	17	22	22
5.38	9.56	15	21.5	28.8	33.6	.....	1.923	0.0601	16.6	21	20

Note—Column left blank for insertion of exact figures representing tank in use.

*Milling and cyaniding engineer, Milwaukee, Wis.

An Iron Smokestack Constructed in a New Way

The usual method of erecting smoke stacks has been to place the laps on the outside of the stack, so that the rain flows down and runs off on the outside without lodging in pockets. No account was taken of the fact that the rain also runs down on the inside and lodges in the pockets formed at each lap joint, as shown in Fig. 1 at *A;* also, that the soot and ashes lodge at *A* in the same pockets.

Everyone who has had charge of ash-conveying machinery knows how very destructive wet ashes are to the iron, and how short-lived the iron conveyer buckets are. All gas-plant men also know that gaspipes must not be laid in ground containing ashes.

W. N. Zurfluh in *Power,* Oct. 26, 1909, says that by constructing the smokestack so the laps are reversed, as shown in Fig. 2, the rain runs down on the inside without collecting in pockets filled with ashes, as there will be none with this method of construction. The pockets formed on the outside with the Fig. 2 construction can be looked after and kept painted,

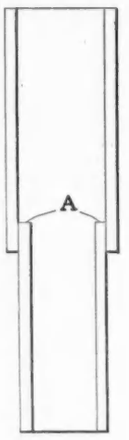


Fig. 1

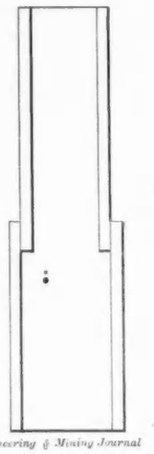
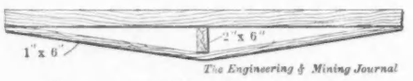


Fig. 2

whereas it is a difficult matter to get at the lap joints on the inside of a stack after it has been sooted up. It has also been noticed that the iron stacks always start to rust out first at the joints on the inside of the stack. This is, as mentioned, due to the ashes in the pockets being wetted by the rain. It is claimed that this reverse method of construction will give double the length of service compared to the old style.

Wooden Truss for Troughs

The accompanying sketch shows a form of truss that is used in the Joplin district in place of metal rods. It is



Truss for Wooden Launders

simple and consists of a 1x6-in., or possibly two 1x4-in. boards bent over a 2x6-in. strut, the width of the trough in the center, and nailed at both ends of the trough as shown. This truss is also used to strengthen foot-boards which are put up along the tailings troughs. It has the advantage that it may be used in acid water.

Mineral Land Legislation

SPECIAL CORRESPONDENCE

Congress has now practically determined to undertake an investigation of conditions relating to public lands. The evidence seems to indicate that this inquiry will last during much of the remainder of the session and will be one of the chief, if not absolutely the chief, feature of the months still remaining. The moving purpose of the inquiry is undoubtedly political, otherwise it would not have been allowed to occur at this particular time. There is, however, a strong disposition to have the investigation deal in part with the conditions under which public lands producing minerals and metals are allowed to pass into private ownership. This object has been freely talked of among those members of Congress who believe that present public-land legislation is obsolete and tends to give rise to fraudulent operations. The idea of separating the mineral or metallic deposits of public lands from the right to the surface of the soil has been a good deal discussed since the opening of the session, but there has been a substantial degree of opposition to its being put into effect. The proposed policy is too unfamiliar to numbers of legislators to enlist their hearty support, and others find that the interests of their constituents would not be served by it. Still others, while really of the opinion that some such change of policy would be desirable, do not think they are as yet sufficiently familiar with the details under which it would have to be carried out to act intelligently. On all these accounts, it is urged by various members that the investigation shall be really a public-land inquiry rather than merely an investigation into the doings of the Land Office or of the head of the Department of the Interior. The idea is not altogether opposed even by some of the antagonists of the leasing policy, which President Taft has proposed for the control of the public lands. Unless some means of delay can be contrived, immediate legislation looking toward a new land policy might be forced through Congress and the proposed inquiry, unless much shorter than is now expected, would doubtless defer the legislation until another session—perhaps even until another long session, two years hence.

POLITICAL ASPECT OF INQUIRY

The purely political aspect of the demand for an investigation is seen in the request made by Secretary Ballinger and his friends that the Forest Service shall be studied by the Congressional committee which is to take the matter up. This request means that the investigation desired is to deal very largely with personalities. Only one point of importance is really open between the Interior Department and the Forest Service and that is the question of jurisdiction over mineral deposits situated within national forests. The view of the Forest Service is that this point was thoroughly adjudicated under President Roosevelt who issued an order on the subject. Interior Department officials do not acquiesce in this attitude, but the chief interest they have at the present time in connection with the Forest Service is that of fastening upon the latter organization responsibility for the charges against Secretary Ballinger that have been so generally set afloat. In connection with all of these matters, however, the subject of Government control of mining lands and its relation to the mining industry in general will be likely to receive a great deal of attention. It is still uncertain whether the investigation will be so directed as to bring about a real study of mining legislation and the problem of amending it in such a way as to eliminate the causes of criticism that have been alleged against the existing methods.

Tombstone Consolidated

The annual report of the Tombstone Consolidated Mines Company, Tombstone, Ariz., for the year ended Sept. 30, 1909, is largely devoted to a resumé of the situation in regard to the pumping operations at the mines, and is described elsewhere in this issue by W. F. Staunton. The mill has been operated and ores and concentrates shipped from the 700- and 800-ft. levels, but the product did not pay the expenses of operation and pumping. Development was done on the various properties of the company to the amount of 4543 ft., mostly on the Contention group.

During the year there were produced and treated 15,070 tons of ore, of which 10,670 tons were milled and 4400 were smelted. Of the milling ore, 4443 tons were zinc ore and averaged 0.04 oz. gold, 10.5 oz. silver, 13.3 per cent. lead, and 22.6 per cent zinc; the silicious ore averaged 0.12 oz. gold, 7.5 oz. silver and 2.7 per cent. lead. The total recovery from mill and smelting is given as 1710 oz. gold, 137,408 oz. silver, 1,812,329 lb. lead and 1,122,478 lb. zinc. The costs of working are not stated.

Smelting in Bond

SPECIAL CORRESPONDENCE

Professor Hofman, of the Massachusetts Institute of Technology, and a number of men interested in the new rules governing smelting in bond under the tariff of 1909, had a conference with Secretary McVeagh, on Dec. 30, at which Chief Montgomery, of the Customs Division of the Treasury was also present. The conference related to the details of the rules which are in process of preparation and is understood to have resulted in determining several points that had previously been unsettled. Professor Hofman is now about ready to make his report on the question of wastage and the conditions of smelting the ores under the new tariff from the technical standpoint. This will enable the officers of the department to begin at once the work of drafting the official test of the regulations, and it is believed that they may be made public within five or six weeks. It would be possible to get them ready sooner, but the fact that the smelting interests have moderated their impatience and are willing to proceed under the tentative regulations which were established by the customs division in letters written some weeks ago.

A Newspaper Lie That Might Mislead

A couple of weeks ago the newspapers published a made up story of a $15,000,000 merger of trade papers that included the three papers of the Hill Publishing Company.

The *New York American* called up our president, Mr. Hill, said they had the story "from a reliable source" and asked if it was true.

Mr. Hill declared that it was not true, he had not been asked to go into any such combination and would not go if he was asked—yet they published the story.

Now comes *The Paper Trade Journal,* taking us to task for "going into the hands of Wall Street," and abandoning the things that "built up our papers."

This editor did not even take the pains to call us up and inquire. He says, "Naturally the whole story is denied by the men concerned" and intimates disaster when subscribers and advertisers learn that outsiders own the paper, etc.

We need hardly assure our readers that this whole story is a malicious falsehood; that the Hill papers at least have gone into no combination; that all our stock is owned by employees and one ex-employee of the concern; that Mr. Hill owns an overwhelming majority and intends to keep it.

This concern has been built up on the line of minding its own business and making the best newspapers that it knows how in the industries it represents.

This policy will be followed in the future as in the past. We shall "do things" in the publishing line, and "do them first." This is now the largest independent engineering publishing house in the world. The only "merger" we will ever go into is one that we own and control.

Cripple Creek in 1909

By E. P. Arthur, Jr.*

During 1909 the Cripple Creek district made steady shipments of ore, but there were no spectacular developments in the mining industry in this camp. The output was not quite up to the mark of 1908, due principally to the fact that no attempt, especially during the latter part of the year, was made to do any mining below the water level. With the exception of six or eight of the large mines the bulk of the output was produced by lessees both as large leasing companies and individual miners.

The Roosevelt drainage tunnel made rapid progress during 1909 and it is expected that it will be completed in 1910 to where it will commence to drain some of the mines

As has been the case for several years the Mine Owner's Association controlled the labor situation in the Cripple Creek district in 1909. The stock market was rather quiet during the year, but the stocks of the good properties commanded fair prices.

The milling situation remained practically unchanged. The Golden Cycle mill at Colorado City continued to handle the bulk of the mill ore and the balance was treated by the United States Reduction and Refining Company, the Portland mill and a few local mills. The smelting ore as usual was treated principally by the American Smelting and Refining Company.

Mining Operations

The Golden Cycle mine was, in 1909, the heaviest producer in the district. This mine, with the Portland, Strong, Elkton, Vindicator and Cresson, are the only ones that are being worked heavily on company account. The Golden Cycle made a number of improvements in its plant and is blocking out a large amount of ore. About the middle of the year the Portland made a number of retrenchments and is not making any great effort for a heavy production, especially of the lower-grade ores, but is waiting until the new mill at the mine is completed. No pumping has been done by this company for several months. The pumps at the Strong were also pulled about the middle of the year. The Strong, Cresson, Vindicator and Elkton mines produced regularly. The Isabella is partly worked by lessees and partly on company account. The Victor mine is being worked under lease and is making a fair production. The Mary McKinney and Gold King joined the ranks of large mines which are being operated by lessees. The Jerry Johnson is making a heavy production under lease as is also the Gold Dollar. The Independence is being worked principally by lessees.

*Mining engineer, Old Mining Exchange building, Cripple Creek, Colo.

The Mills

No noteworthy change in the local milling situation was recorded in 1909. The Independence mill is running on dump ore from that mine and is said to be doing quite well. The Isabella mill operated all year on low-grade ore of that mine. The W. P. H. mill is treating Jerry Johnson ore. A wire-rope tramway was constructed from the Midget mine to the Wishbone mill on Spring creek and some ore is being handled. The Ironclad mill suspended operations in April and no work has been done since. The Anaconda mill is being repaired and will run on ore from mines in its vicinity. Work is being pushed on the new Portland mill, but it will not be ready to run for some time. This mill is designed to treat ore of a very low grade by a process developed by metallurgists in the employ of the Portland company. The outcome is being watched with interest by local operators. The Golden Cycle erected a plant at the mine in which crushing and screening of the low-grade ores is being done. The Wild Horse, Blue Flag and Trilby mills operated part of the year on ore from those mines. The Homestake, Little Giant, Copper Mountain and Trail Mountain mills were idle all year.

Dividends

The Elkton, Vindicator and Portland were regular dividend payers in 1909, though the latter reduced its payments considerably, due principally to the reduction of its force and the building of the new mill. (The sums paid in 1909 were respectively $237,500, $112,500 and $120,000.) It is also understood that the Strong and Cresson paid good dividends, but as they are close corporations the amount is not known. The Golden Cycle did not pay any dividends during the year but is reported to have accumulated a large treasury reserve. The Gold Dollar Consolidated, Doctor-Jack Pot, United Mines, Acacia, Mary McKinney, Jerry Johnson, El Paso Consolidated, Stratton's Cripple Creek Mining and Development, Granite and Free Coinage companies also paid dividends in 1909. The Moose and Gold Coin made payments from sale of property.

The mining outlook for the district in 1910 is good, but the output will probably not be increased over that of 1909 as the drainage tunnel will not be completed in time to allow much mining below the water level. The tendency during 1910 will most likely be for the big companies to exploit new ground above the water level; and leasing companies will take hold of the ground of smaller companies not hitherto developed. Tribute mining will be carried on to a large extent as it is at present. Toward the end of the year, if the predictions with regard to the completion of the drainage tunnel are carried out, some preparation, especially on Beacon hill, will be made for deeper mining.

The Copper Deposits of Katanga

The section of the Rhodesia-Katanga railway, from Broken Hill to the Congo border, 131 miles, was opened Dec. 11, 1909. Of the Belgian section, 160 miles, from the border to Star of the Congo mine, eight miles have been built. At the meeting of Tanganyika Concessions, Ltd., in London, Dec. 17, Robert Williams made the following report:

"The railway contractors have more than kept up to their promise, and, given a fairly accommodating wet season, will be at the Star mine next June, instead of October as expected. Work at the Star mine and smeltery is being rapidly pushed and according to Allan Gibb, chief engineer, the Union Miniére du Haut Katanga should be ready in 12 months to produce 2500 long tons of copper per month. Drill prospecting at Star mine has proved about double the ore previously estimated. Mr. Gibb now estimates the development of ore that will yield 50,000 tons of copper by ordinary smelting methods in the Star mine, and 150,000 tons in Kambove. The proposed smelting plant at Lubumbashi will produce about 12,000 tons of copper per annum."

In spite of all criticism, Mr. Williams is of opinion that all of the silicious ore of Katanga can be treated profitably by special process when copper content is upward of 4 per cent. The Star mine is developed to yield 50,000 tons of copper from ore of this class, and Kambove 250,000. The plant under erection for this class of ore is expected to produce 1500 tons of copper per month.

Smelting is now being done at the Kansanhi mine, where about 1000 tons of copper bars are now awaiting arrival of the railway, and the small furnace, producing 80 tons per month, is being enlarged. Mr. Williams states that the first shipment will represent in value more than the entire money spent on this mine since it was discovered. Also that cost of production approximately bears out the previous estimates.

Coal supplies appear to have been developed in the region traversed by the railway and other deposits are being explored. It seems highly probable therefore that Katanga will begin to ship copper in the latter part of 1910, and if Mr. Williams' expectations be borne out it will in 1911 have works in operation that will produce at the rate of about 70,000,000 lb. per annum when completed. The chief doubt exists respecting the sucecssful treatment of the silicious ore.

The London Lead Market in 1909

The market opened firm for metals generally, the most notable feature in lead being the high premium paid for forward delivery. This was chiefly due to the serious aspect of the strike at the mines of the Broken Hill Proprietary Company, which threatened to cut off supplies from that important quarter for some considerable time. Up to £13 17s. 6d. was paid early in the month for April delivery, while prompt delivery could be had at £13 6s. 3d. This state of things prevailed more or less throughout the month, the value of prompt metal being held down by heavy arrivals. The consumptive inquiry was intermittent and at no time sufficient to raise values, which registered a slight decline on the month; foreign brands closing at £13 2s. 6d. for early delivery, and English at £13 5s.@£13 7s. 6d. per ton.

February found consumption still languid and supplies in excess of demand for prompt delivery. Opening at £13@ £13 2s. 6d. for foreign brands, price fell away gradually to £12 15s. on Feb. 8. By this time the stoppage of supplies from the Broken Hill mines began to be felt, particularly in Australian and eastern markets. Reports were current of reshipments from England to Australia, and of China turning to English smelters for supplies. This naturally prompted speculative purchases which, coupled with slightly improved trade demand, initiated an improvement in values which was persistent for the rest of the month. A significant feature was that a certain number of producers and smelters met in conference, exchanged opinions in regard to the position and prospects of the market and the possibility of their exercising some collective control, and adjourned the meeting. No such event had previously occurred in the trade. The London market developed considerable activity toward the close, when foreign brands commanded £13 11s. 3d., and English £13 15s.@£13 17s. 6d. per ton.

March was uneventful, consumptive demand being very moderate and restricted to early requirements; otherwise, prices might have advanced sharply in view of the total cessation of arrivals from Australia and the reshipment of several parcels to that country. The labor dispute at the Broken Hill mines was submitted to arbitration, and the award was given in favor of the men which, however, did not indicate an immediate resumption of work. The turnover on the London market was at no time large, but the tendency indicated increasing firmness, closing prices being £13 13s. 9d.@£13 15s. for foreign brands for early delivery, with a few shillings premium for extended delivery, and £13 15s. @£13 17s. 6d. for English brands.

In April business opened on a small scale, though supplies were none too plentiful, and prices eased in consequence of some arrivals just before, and during and immediately after the Easter holidays. Starting at £13 15s. for foreign brands, the price gradually declined to £13 3s. 9d., demand being very quiet and the consuming industries very slack. It was not until April 22 that the first sign of recovery was manifest. Thereafter inquiry improved, and a fair volume of business was transacted on the exchange. The price recovered to £13 7s. 6d., but eased a little at the close of the month, again in consequence of arrival parcels being pressed in the absence of demand. Closing values were £13 6s. 3d. for foreign brands, and £13 11s. 3d. for English.

May opened with a depressed market wherein sales of early arrivals were forced, and realized no better than £13@ £13 2s. 6d. Other markets, however, developed considerable activity, and lead soon shared in the general improvement. A large business was done with consumers, though little transpired on the Metal Exchange; so that by the middle of the month foreign brands commanded £13 5s., and English £13 7s. 6d.@£13 10s. Demand for export also improved and—with some speculative support—maintained these values for the rest of the month.

June was uneventful on the whole. A fair volume of business kept the market steady for the first few days, and this was followed in the second week by a few shillings' advance, due to improved trade in America and more general activity in the metal markets. Starting at £13 2s. 6d., foreign brands advanced to £13 6s. 3d., while £13 7s. 6d. was paid for July delivery. From this point values drifted slowly downward, partly by reason of consumers' apathy, but more in consequence of forced sales of English brands. The turnover on the Metal Exchange was relatively small, but there was a fair volume of business with the Continent. Closing prices were £12 17s. 6d. for foreign brands, and £13@£13 2s. 6d. for English.

July opened with a firmer market on cessation of recent sales forced by speculative and other holders. Foreign brands were held for £13; but the general slackness of trade deterred consumers from supporting the market which—on renewal of speculative realizations—drifted gradually down to £12 12s. 6d. A transient renewal of activity improved values by a few shillings; but demand slackened. Political trouble in Spain then caused some apprehension as to the continuance of supplies from that country, and some active buying took place in consequence; closing values being £12 12s. 6d.@£12 13s. 9d. for foreign brands, and £12 15s.@£12 17s. 6d. for English.

August opened with a loss of 2s. 6d. per ton in values, due to pressure of sales for early arrival. These brought down the price to £12 6s. 3d. on Aug. 10, by which time the low price began to attract consumers, and speculative interest revived on the London exchange. Thereafter for a fortnight there was a large volume of business done with consumers who had hitherto held back but were now alert to participate in the general improvement in trade. The closing days of the month found demand fairly satisfied but the market steady and with improved inquiry for forward delivery. Foreign brands stood at £12 12s. 6d. with £12 15s. for English.

In September the market opened quietly but with a firm undertone and a slight improvement to £12 13s. 9d. for foreign brands and £12 17s. 6d. for English, which figures were maintained with little variation down to Sept. 27; consumptive inquiry being fair throughout and sufficient to absorb all incoming supplies. Thereafter demand improved and enabled sellers to command up to £13 3s. 9d. and £13 6s. 3d., respectively.

October opened with brisk inquiry for home and foreign consumption, with some improvement in the value of mining shares. Prices gradually advanced, in spite of unfavorable conditions in other metals, incoming supplies being hardly equal to current demand, until—on Oct. 18—foreign brands commanded £13 6s. 3d. to £13 7s. 6d. per ton. By this time demand was fairly satisfied and speculative holders pressed what little they had for sale. Values gradually relapsed under the influence of dearer money and reduced demand, the month closing quietly with £13@£13 2s. 6d. asked for foreign brands, and £13 2s. 6d.@£13 7s. 6d. for English.

November was free from any wide fluctuations in values, which were fairly maintained throughout the month. Consuming industries were active, and some scarcity of supply was threatened by a widespread strike of coal miners in Australia; but the supplies were sufficient for current requirements, and speculative holdings sufficed to check any rapid upward movement. Early in the month a fair business was done with consumers in foreign brands at £13. A slight advance toward the middle of the month gradually improved the price. Closing values were £13@£13 2s. 6d. for foreign brands, and £13 5s.@£13 6s. 3d. for English.

In December buying was restrained by the approaching end of the year and the reduced demand incidental to the season.

The Passing of Anthracite

SPECIAL CORRESPONDENCE

The approximate and inevitable exhaustion of the anthracite coal mines of northeastern Pennsylvania, is a question of more than academic interest to the rest of the country. It is one which affects the business and domestic interests of the American people. The disappearance of anthracite as a commercial product and an industrial asset will affect concurrently the economic conditions of the population of the bituminous regions and also that of the hard-coal territory.

Hard coal is sometimes placed in the category of domestic luxuries, not always appositely, but sometimes with an appreciation of the actual conditions that transforms a generalization into a qualified truism. Anthracite is not at the present moment a luxury either for poor or rich. It is relatively cheap and plentiful, although each year that passes will see the supply more restricted and the cost enhanced.

The hard-coal measures vary from place to place in breadth, thickness and estimated weight of volume. It would be rash to assume that there remain no undiscovered seams of anthracite that can be made commercially profitable. There are yet large tracts of coal land in the anthracite regions surveyed and appropriated, from which a ton of coal has never been extracted. These facts tend to allay the apprehension expressed in some quarters that the visible and covert supply of anthracite will begin appreciably to dimininsh within the next 15 years or sooner as a dominant factor in the coal trade. One authority declares that the profitable exploitation of anthracite coal cannot be carried on over a period, which he estimates from 20 to 25 years.

Coal companies, whose taxation is partially estimated by the quantity of coal assumed to be below the surface of an acre of coal land, emphatically assert that at the existing rate of production, anthracite will be exhausted for all practical purposes in 14 or 15 years in the most productive of the strata, and within 10 years in the least productive. Others again, disinterested perhaps, enthusiastic at any rate, maintain that they have been listening during the past 40 years to warnings of the proximate exhaustion of the anthracite coalfields, but that so far from the hard-coal measures giving out, they are more productive, more varied and more valuable than they ever were before. These statements are not as conflicting as they seem. So far as the personal equation enters into them, they may be taken as erring on the side of optimistic anticipation rather than pessimistic formularies that have little or no foundation in reality. The truth probably is intercalated between the extremes of the asservations. Anthracite coal occurs only in a comparatively small section of northeastern Pennsylvania, geographically in 16 or 17 valleys, in 5 or 6 counties.

The centenary of the discovery of anthracite, if it can be called a discovery, was celebrated some three or four years ago. Of course the rate of production bears a direct ratio to the decrease of the supply in the mines. The production of anthracite has increased from 52,000,000 tons in 1897 to 70,000,000 tons in 1908 (I am eliminating the odd numbers). The question is postulated by a consideration of existing facts, whether it is too late to make an attempt to conserve the anthracite that remains, not niggardly, but with such circumspection as would prolong the amount of anthracite coal still in the earth. Concerted effort might do something in this direction, despite the disheartening factors that seem to contravene the hope.

It is inevitable under existing conditions, that the wholesale and retail price of anthracite is conditioned by the wholesale and retail price of bituminous. While this is so, the expectation that economy in the use of anthracite will arise automatically in sympathy with a diminishing supply, is as foolish to postulate as it would be to assume that Sunday newspapers will diminish their circulation in view of the fact that there is a diminishing area of timber from which to manufacture wood pulp.

National economy of natural resources is not characteristic of the American people. There is, however, no reason why anthracite should come into competition with bituminous for steam-generating purposes, beyond the fact that the smaller sizes of anthracite coal are not altogether suitable, as at present prepared, for stove fuel. An immense, if not the larger, bulk of anthracite coal in the past was absorbed in the generation of steam. This was a ruthless misapplication of a mineral more precious relatively than gold. In order to comply with the "smoke ordinances" of our large cities, the manufacturers in towns like Philadelphia and New York used nothing but anthracite, and in fact they were compelled to do so. It is now too late to suggest that boiler rooms can be easily and effectively adapted to consume their own smoke. They do so and have been doing it for years in London; they have done it and are doing it still more effectively in Berlin.

The Manufacture of Briquets

One of the most effective, and as far as I can see, the only effective method of conserving anthracite is by briquetting. As I have already stated, the production of anthracite has reached the enormous productiveness of 70,000,000 tons annually. We may go on in the anthracite regions for a few years longer to dig that amount; however, the day is fast approaching when the law of diminishing returns will come into full and tangible operation, and when, instead of producing 80,000,000 tons of anthracite to meet a demand for 90,000,000 tons, we shall be producing 50,000,000, 40,000,000, 35,000,000, or even 20,000,000 tons, where 100,000,000 tons would be marketable. In the meantime, by eliminating anthracite as a steaming fuel, and briquetting all the smaller sized coal that is cast into the furnace, say, nearly one-half of the entire output of the anthracite mines, the time at which the law of diminishing returns would come into active play, might be indefinitely postponed. In the meantime, native ingenuity would probably have called into existence a method of utilizing bituminous coal in a way that would bring about its combustion without smoke or smell.

A Disastrous Coal-mine Explosion in Japan

A terrible explosion occurred at the Onoura colliery, Fukuka Prefecture, Japan, on Nov. 24, involving a loss of 762 lives. The Onoura mine is one of the largest in southern Japan, employing 4755 miners, having an output of 44,000 tons monthly. Only 43 of the miners employed underground, managed to reach the surface. The mine management gave $100 to the family of each victim.

Coal Mining in Michigan During 1909

The coal production in Michigan during 1909 was approximately the same as the output in 1908. It is stated that 30 mines were in operation the entire year, and that 2000 men were employed in the mine at a wage of $3 per day. The cost of production averaged about $1.70 per ton. Labor and transportation facilities were adequate throughout the year. Almost all of Michigan's coal output is used by the local trade in the manufacturing cities along the lake front.

Coal Mining in Iowa in 1909

BY JAMES H. LEES *

The coal industry has been marked during 1909 by a gradual recovery from the effects of the financial and industrial depression of 1907-1908. Although figures for the production of coal during the entire year are not yet available, sufficiently reliable data are at hand for a close estimate. These figures show that while the increase in the output will probably not bring the total quite up to that of 1907, the difference is quite small. The year 1907 was the banner year in Iowa coal production. The output was 7,574,322 tons. The next year the production dropped to 7,149,517 tons and during the year just closed the improvement of conditions brought the output up to approximately 7,500,000 tons.

There are several reasons for this increase in adition to the betterment in financial matters. As one of the most important of these, may be mentioned the fact that during 1908 a number of important mines were abandoned, and while others were opened and considerable prospecting was carried on, the tonnage so derived would not counterbalance the loss from the closing of the large mines. In 1909 the new mines increased their output and the results of extensive prospecting and development became evident in the larger tonnage. Another factor which contributed to an increased output in 1909 was the fact that there were no serious strikes or other disputes, and that freedom from these was practically assured by the agreement between the miners and operators regarding wages and other conditions. This agreement was made in April of 1908, and while it was pending considerable time was lost by the mines being idle. The agreement terminates on April 1, 1910, and it is to be expected that a similar cessation of activity will tend to reduce the production somewhat during this year. Aside from this, however, the indications are that the industry will at least retain its present position. There will be probably considerable development work in 1910, as several fields have been thoroughly prospected and found to be underlain by large bodies of coal. Parts of Monroe and Lucas counties seem to give the best promise of any undeveloped coalfield in Iowa.

In the first and third of the three inspection districts of Iowa there was a decided increase in the quantity of coal mined and also in the number of men employed. The second district, however, shows a decline in the output and also a slight reduction in the number of employees. The total number of persons engaged in mining was 18,150 in 1909, as compared with 17,312 in 1908. Accidents to miners were of about the same frequency as in the preceding year. No figures are yet available for exact comparison. The use of mining machinery was less extensive than it was in 1908, as all the machines in the first district have been taken out following an arbitration board's ruling advancing the price of loading machine-mined coal.

Perhaps a word regarding the southwestern Iowa field may be in place. The coal here is in the Upper Coal Measures and unlike that of eastern Iowa, which is in the Lower Coal Measures, lies in one continuous seam. It is only 12 to 20 in. thick, and while the market is good the output is diminishing annually owing to the scarcity of labor which in turn is caused by the difficulty of mining. The output from the three counties in which mining is carried on amounted to 41,000 tons, in securing which 245 men were employed. The price at the mine ranges from $2.50 to $3.50 per ton, varying in different localities. The statistics for this article have been kindly supplied by the State mine inspectors.

Coal Mining in Tennessee in 1909

BY R. A. SHIFLETT †

The year 1909 was not especially encouraging to the coal operators of Tennessee. The market was low, particularly on steam coal. The long mild spring and fall contributed to some extent to the slump in prices and production, and a number of the mines were idle throughout the summer months and many are still idle. Present conditions, however, are more encouraging, but the price of steam coal has not advanced perceptibly. The cold weather now prevailing has caused large orders for domestic coal and the mines that are in position to fill these contracts will undoubtedly realize a profit from this source.

SUMMARY OF COAL PRODUCTION IN TENNESSEE DURING 1909.

Coal production (estimated), tons	6,234,922
Total value	$7,481,906
Coke production, tons	224,204
Total value	$504,459
Number of fatal accidents	25

Only five new mines were opened during 1909 and 42 mines are still idle, waiting for better prices and better conditions. As the market for Tennessee coal is exclusively in the South, the trade will depend largely on local developments.

The fatal accidents occurring in Tennessee coal mines in 1909, were due to the following causes: Falls of roof, 18; haulage, 3; motor, 1; explosions (kegs of powder), 2; electricity, 1.

More Than Two-thirds of the Accidents Due to Falls of Roof

It will be seen that over 66 per cent. of the fatal accidents in the coal mines in this State were due to falls of roof, and a large per cent. of them were due to carelessness and negligence. While the number of fatal accidents was not large, many of them could have been avoided by reasonable degree of care and caution.

The mining department is making every effort to reduce the number of accidents to the minimum by using every precaution that can be devised, also by instructing the miners in their work, formulating special rules governing the employees and the operation of the different mines, restricting the number of shots in working places, the charge of powder used, character of tamping used and forbidding the storage of explosives in mines, allowing the miners to take into the mines only a sufficient quantity of explosives for actual use for each shift, the employment of skilled men as shot-firers, gas bosses and inspectors, competent mine foremen and assistant foremen, competent men for timbering, employment of trip riders and trip conductors, and the employment of competent men on ventilation.

*Assistant State geologist, Des Moines, Iowa.

†Chief mine inspector, Harriman, Tenn.

While a number of Tennessee mines are liberating explosive gases, we have been fortunate thus far in the freedom from serious accidents. The mining department is endeavoring to keep the mines free of dust as far as possible, and to have haulage roads and working places sprayed when there is a tendency to dryness. I am also using my best efforts in trying to bring about more rigid discipline in the mines and in getting the miners and officials to observe the mining laws, the result of which has been exceedingly encouraging, and when the miners and operators are forced to observe the law as they do in England and other foreign countries, we will have fewer appalling disasters now of such frequent occurrence. Only a small area of Tennessee is in the coal-mining belt, thus the mining department does not receive the support it should have throughout the State. However, the people are awakening to the great importance of protecting the lives of the miners who have very little opportunity to study and to familiarize themselves with the dangers that surround them. The department should have a force of inspectors, competent men trained for this specific purpose, to make more frequent and thorough inspections of the mines than can be made with the present force, and I shall use every effort in securing additional help when the legislature convenes, as the present force is inadequate.

The North Dakota Coal Industry in 1909

BY T. R. ATKINSON *

The State engineer, who is ex-officio State coal-mine inspector, has been actively engaged during the past two months making his annual inspection of the mines as provided by law. Jay W. Bliss, assistant to the State engineer, has made personal examination of about four-fifths of the mines, and from the mines already inspected, it is estimated that the total output for 1909 will be slightly less than for 1908. The output for 1909 will be about 336,000 tons while that of 1908 was 338,000 tons. The number of mines now in operation is 96, and 835 men are employed in mining operations. Many of the mines only operate during the fall and winter months.

It is generally known that North Dakota contains a large area of workable seams of lignite coal estimated at 32,000 square miles and an estimated total tonnage of workable coal of 500,000,000,000 tons. Thus far only 4,000,000 tons have been mined. The beds are usually nearly horizontal and at a depth of from 50 to 200 ft. beneath the surface.

Our lignite coal is exceptionally free from sulphur, which is so common in Eastern bituminous coals, and it contains only 8 per cent. of ash, while Eastern bituminous coals contain from 8 to 20 per cent. Properly burned, North Dakota lignite coal never clinkers. The fuel-testing department of the United States Geological Survey, located at Pittsburg, is making extensive investigations into the problem of briquetting lignite, and Professor Babcock, of the North Dakota school of mines at Grand Forks, is likewise studying this problem, so it seems quite probable that within a short time the manufacture of briquets from North Dakota lignite will be a profitable business.

The Use of Lignite for Manufacturing Producer Power Gas

The State engineer believes that the most important method of handling our lignite and the method which will prove extremely profitable to North Dakota is the manufacture of producer power gas. The United States fuel-testing department has made exhaustive tests with North Dakota lignite in the gas-producer plants, and surprisingly successful results have been obtained. They have found that North Dakota lignite burned in the gas producer will develop more power than any of the Eastern bituminous coals burned on the grate. To develop one horsepower per hour by steam engine requires 4.46 lb. of Virginia anthracite and 3.97 lb. of Ohio bituminous, while one horsepower per hour can be obtained from only 2.29 lb. of North Dakota lignite when burned in the gas producer. Assuming Ohio bituminous in North Dakota at $6 per ton and lignite at $3 per ton, a saving of 71 per cent. would be effected by using lignite in a gas-producer plant, over the use of Ohio bituminous in an ordinary steam engine. However, the proposition that will very likely be the most practical for the future use of our lignite is the burning of this coal at the mines in the gas producer and transmitting the power electrically to all parts of the State, furnishing power to light our cities, for our manufacturers and for electric-railroad lines constructed for the benefit of our people.

Coal Mining in Arkansas During 1909

BY JAMES DOUGLAS †

There were 65 mines in operation in the State of Arkansas. Of this number, 34 were worked by shafts, 25 by slopes, and 6 by drifts. About 4516 men were employed in the mines in 1909. There are 6 coal-producing counties in the State, viz: Johnson, Pope, Logan, Sebastian, Scott and Franklin. They are situated in the northwestern part of the State. The counties producing the most coal are Johnson, Franklin and Sebastian. There are 12 slopes, nine shafts and one drift in Sebastian county; three slopes in Scott county; seven shafts and one slope in Johnson county; three shafts in Franklin county; three slopes in Pope county; four slopes and 1 shaft in Logan county.

The mines in Sebastian county are owned by the Bolen-Darnell Coal Company, Central Coal and Coke Company, Woodson Coal Company, Smokeless Fuel Company, Western Coal and Mining Company, Sebastian Smokeless Coal Company, Smokeless Coal Company, Pig Coal Company, Patterson Coal Company, Bach-Denmen Coal Company, Conrady Coal Company, Greenwood Coal and Lumber Company, Fidelity Fuel Company, Hoffman Coal Company, Finey Coal Company, Mammoth Vein Coal Company and Quillin Coal Company.

The mines in Scott county are owned by the Harper Coal Company and the Bates Coal Company.

The mines in Franklin county are owned by the Western Coal and Mining Company and the Doddson Coal Company.

The mines in Johnson county are owned by the Pennsylvania Anthracite Coal Company, Little Rock Packet Coal Company, and Western Coal Company.

*State engineer and ex-officio mine inspector, Bismarck, North Dakota.

†Chief State mine inspector, Hartford, Ark.

The Protection of the Surface above Anthracite Mines

SPECIAL CORRESPONDENCE

Mine Inspector H. B. Johnson delivered a remarkable address a few days ago to the members of the West Scranton Board of Trade. This is the section of the city in which mine cave-ins have most frequently occurred and where they are most apprehended. The Board of Trade in inviting Mr. Johnson to speak on this subject anticipated that the speaker would assume the attitude that is thoughtlessly formulated by nine out of every ten of those who speak or write on the subject, that is, that the operators should be prevented by legislation from "robbing" pillars. Mr. Johnson pointed out, however, that the supreme court of Pennsylvania had already decided that the terms of the original grants of coal lands to the railroad companies, and to the individual operators who are now in possession of such lands, are of such a character that any legislation that the legislature might adopt would be unconstitutional; that it would be as subversive of constitutional property rights as if the legislature were to circumscribe the agricultural operations of the farmer by prescribing to him what character of crops he should sow, and what not to cultivate. Inspector Johnson said that he was not there to criticize the fact; he was there merely to point it out; to remind those who were making foolish and extravagant proposals, that they were dealing with a condition and not with a theory. The speaker said that owing to the economic conditions that prevailed in the coal trade, every pound of coal available would be brought to the surface regardless of surface consequences. He pointed out that the actual operators were not the only persons interested in the anthracite-coal industry.

Mr. Johnson said he knew of operators who would willingly abandon mines that were not producing an adequate return on the capital that was invested in them by way of improvements, not to speak of the original capital, yet who were forced to continue working these mines, which meant practically robbing pillars in order to meet the terms on which these mines were leased or transferred.

Mr. Johnson declared emphatically that the only remedy for the existing situation was to raise the price of coal to the purchasing public. In most instances, he asserted, coal was sold at the breaker below the cost of production, and that the only revenue derived from its sale and production was the profit made by railroads on transportation.

Mr. Johnson also said that it was within the power of the legislature to tax the coal before it left the confines of the commonwealth to such an extent that the money derived from this tax might be applied to safeguarding the ground surface over localities from which pillars have been and will be "robbed." He said that the consuming public could not legitimately complain of this. The public, the American people, have been procuring anthracite coal for nearly a century far under its intrinscic value. The individual operators who became millionaires in the strict sense from the sale and purchase of anthracite coal might be counted on the fingers of two hands yet it is an indisputable fact that there is no section of the globe from which so much mineral wealth, relatively and absolutely, has been reproduced as in the anthracite coalfields of northeastern Pennsylvania during the past 60 years.

List of State Mine Inspectors in the United States

The following list of State mine inspectors is as complete as possible, and has been corrected to September, 1909:

ALABAMA—Edward Flynn, chief mine inspector, Birmingham. James Hillhouse, assistant mine inspector, Birmingham. Robert Neill, assistant mine inspector, Wylam.

ARKANSAS—James Douglas, State mine inspector, Hartford.

ARIZONA—

COLORADO—John D. Jones, State coal-mine inspector, Denver. David J. Griffiths, deputy coal-mine inspector, Denver.

GEORGIA—No inspector; no mine laws.

IDAHO—F. Cushing Moore, State inspector of mines, Boise.

IOWA—John Verner, State inspector of mines, Charlton. R. T. Rhys, State inspector of mines, Ottumwa. Edward Sweeney, State inspector of mines, Des Moines.

INDIANA—James Epperson, chief mine inspector, Indianapolis. Jonathan Thomas, assistant inspector of mines, Brazil. Robert M. Irving, assistant inspector of mines, Cayuga. Frank I. Pearce, assistant inspector of mines, Brazil. Albert A. Sams, assistant inspector of mines, Chandler.

ILLINOIS—David Ross, secretary, bureau of labor statistics, Springfield. State inspectors of mines: Hector McAllister, Streator. Thomas Hudson, Calva. James Taylor, Peoria. Thomas Weeks, Bloomington. Thomas Moses, Westville. John Dunlop, Peoria. W. W. Williams, Litchfield. Walton Rutledge, Alton. W. S. Burris, Duquoin. Thos. Little, Carbondale.

KANSAS—Frank Gilday, secretary of mine industries, Pittsburg. Deputy mine inspectors: John Gilday, Chicopee. Thos. Morrisey, Leavenworth. William Harvey, Peterton. John Halliday, Pittsburg. Joseph Ryan, Mineral.

KENTUCKY—Chas. J. Norwood, chief inspector of mines, Lexington. Assistant inspectors: Thos. J. Barr, Lexington. Perry V. Cole, Pittsburg. William Burke, Pikeville. Thos. O. Long, Earlington. Huw D. Jones, Central City.

MARYLAND—John H. Donahue, mine inspector, Frostburg.

MICHIGAN—Richard H. Fletcher, commissioner of labor, Lansing. Peter Daw, mine inspector, Calumet. John T. Quine, mine inspector, Ishpeming.

MINNESOTA—W. H. Harvey, mine inspector, Eveleth.

MISSOURI—George Bartholomaeus, secretary, bureau of mines and mine inspection. Jefferson City. Inspectors zinc and lead mines: I. J. Pirtle, Frederickstown. Chas. P. Wallace, Carterville. W. S. Brown, Joplin. Coal-mine inspectors: Robert Richards, Bevier. Michael Gavin, Lexington.

MONTANA—Joseph B. McDermott, State coal-mine inspector, Helena.

NEW MEXICO—Jo E. Sheridan, U. S. mine inspector, Silver City.

NORTH DAKOTA—T. R. Atkinson, State engineer, Bismarck.

OHIO—George Harrison, chief inspector of mines, Columbus. Thomas Waters, Wellston. Edward Kennedy, Sand Run. Jno. L. McDonald, Glouster. W. C. Wiper, Malta. W. H. Turner, Cambridge. Alexander Smith, Mineral City. W. H. Miller, Massillon. Lot Jenkins, Bellaire. Thos. Morrison, Sherrodsville. L. D. Devore, Bellaire.

OKLAHOMA—Wm. Cameron, U. S. supervisor of mines, South McAlester. Peter Hanraty, chief mine inspector, McAlester. District mine inspectors: Wm. K. Patterson, Coalgate. Martin Clark, McAlester. Frank Haley, Henryttta.

OREGON—No inspectors. See letter Aug. 9, 1909.

PENNSYLVANIA—James E. Roderick, chief of department of mines, Harrisburg. Anthracite inspectors: P. J. Moore, Carbondale. L. M. Evans, Scranton. H. O. Prytherch, Scranton. D. T. Williams, Scranton. H. D. Johnson, Scranton. Hugh McDonald, Pittston. Thos. H. Price, Wilkes-Barre. P. M. Boyle, Kingston. D. T. Davis, Wilkes-Barre. Jos. J. Walsh, Wilkes-Barre. David J. Roderick, Hazleton. P. C. Fenton, Mahanoy City. A. B. Lamb, Shenandoah. Jas. A. O'Donnell, Centralia. Benjamin I. Evans, Mt. Carmel. H. McLaughlin, Shamokin. Isaac M. Davies, Lansford. John Curran, Pottsville. M. J. Brennan, Pottsville. Chas. J. Price, Lykens. Bituminous inspectors: Alexander McCanch, Monongahela. C. B. Ross, Greensburg. Thomas K. Adams, Mercer. Elias Phillips, Du Bois. Isaac G. Roby, Uniontown. T. D. Williams, Johnstown. Arthur Neals, Crafton. Joseph Knapper, Philipsburg. P. J. Walsh, Connellsville. Joseph Williams, Altoona. D. R. Blower, Scottdale. Roger Hampson, Punxsutawney. John F. Bell, Dravosburg. David Young, Freeport. Alexander Monteith, Patton. W. H. Howarth, Brownsville. John I. Pratt, 7812 Kelly street, Pittsburg. Thomas S. Lowther, Tyrone. Charles P. McGregor, Irwin. Nicholas Evans, Somerset. F. W. Cunningham, California; temporarily Charleroi, Hotel Walfred.

TENNESSEE—R. A. Shiflett, chief mine inspector, Nashville. J. W. Allen, district inspector and statistician, Nashville. District inspectors: L. O. Stone, Coal Creek. E. P. Tipton, Dayton.

UTAH—J. E. Pettit, State coal-mine inspector, Salt Lake City.

VIRGINIA—James B. Doherty, commissioner of labor, Richmond.

WASHINGTON—D. C. Botting, State coal-mine inspector, Seattle.

WEST VIRGINIA (Corrected to Dec. 9, 1909)—John Laing, chief of department of mines, Charleston. District mine inspectors: Karl F. Schoew, Fairmont. F. E. Parsons, Clarksburg. L. D. Vaughan, Grafton. W. B. Plaster, Elkins. E. A. Henry, Clifton. B. H. Hill, Chelyan. James Martin, Charleston. R. Y. Muir, Prince. L. B. Holliday, Beckley. Arthur Mitchel, Bluefield. Wm. Nicholson, Bluefield. P. A. Grady, Huntington.

WYOMING—State coal-mine inspectors: Joseph Bird, Diamondville. E. S. Brooks, Big Muddy.

Coal Industry in Australia During 1909

BY F. S. MANCE

The record of the coal-mining industry in New South Wales made a disappointing showing when compared with that of the preceding year, and the exports for the first nine months of the year under review show a decline of 1,100,000 tons and £516,500 in value. The decrease is especially noticeable in the shipments to over-sea ports. At the time this article was being written, the whole of the coal mines in the State had been idle for a fortnight owing to the miners coming out on strike, and the situation was one of considerable gravity. The coalfields in the other States are being more systematically opened up than formerly, and in Queensland and West Australia particularly a steady trade in bunker coal is being established. At Powlett river in Victoria, a coalfield of some extent has recently been opened up, the seams being proved by means of bores to be of good thickness and quality.

The Coal Industry in Virginia During 1909

Approximately 6200 miners were employed in the coal mines of Virginia in 1909. Practically all of the mine workers in the State are unorganized and most of the coal-mining operations are conducted on the basis of the 10-hour day. Labor troubles are probably less frequent in Virginia than in any other State in the Union. About one hundred mining machines were in use during the year and there has been an increase in the tonnage won by these machines.

The first bituminous coal mined in the United States was taken from what is usually termed the "Richmond basin," a small area in the vicinity of the city of Richmond. The coal beds in this field are much distorted and the coal is of rather low grade when compared with the product from other districts in the State. At present what little coal is produced in this Richmond basin is for local consumption only.

It has been estimated that the total coal area in Virginia originally contained 22,500,000,000 short tons. From this source, approximately 65,000,000 tons were mined up to the close of 1909.

New Mine Explosives

E. S. McCullough, national vice-president of the United Mine Workers of America, has returned to headquarters in Indianapolis from Pennsylvania, where the executive board met the joint committees of the miners and operators of the Pittsburg district, that have had under consideration the matter of the new mine explosives and the effect of these explosives on the safety and wages of the miners.

No agreement was reached between the committees, however, as the method of procedure in the investigation had not been agreed upon. President Feehan, of the mine workers of the Pittsburg district, objected to the joint committees' reporting to other than the international executive board, in regard to any recommendations they might have to make. Mr. McCullough attended the meeting as a member of a committee that had been appointed by the executive board, to hear what recommendations the joint committee had to make, and he says the miners are unduly exercised over the alleged use of the new explosives.

The Shan-si coalfield in China has an area of 55,000 sq.m. One bituminous seam in this field is 20 ft. thick. According to the *Queensland Gov. Min. Journ.*, Sept. 15, 1909, there are probably larger deposits of anthracite coal in China than in any other country.

A Bill for the Separation of Mining Rights on Coal Lands

SPECIAL CORRESPONDENCE

Representative Mendell, chairman of the House Committee on Public Lands, has prepared a bill assigned to provide for the separation of mining rights on coal lands from the agricultural surface of the soil. The bill entitled, "A Bill to Provide Agricultural Entries on Coal Lands," has been referred to the Committee on Public Lands, and during the past week was by that body sent to the secretary of the Interior for his study and analysis. A reply has just been received from the secretary and will shortly be published. In this Mr. Ballinger expresses his approval of the bill in the main, but makes some suggestions for amendment and modification along lines suggested quite fully in his annual report. The bill applies only to the mainland territory of the United States, and has no reference to Alaska.

Chairmban Mondell says that he believes the conditions surrounding mining in Alaska are sufficiently stable and satisfactory for the present, and should not be disturbed for some time to come. It is further his opinion that the system of separating the land from such minerals as may be found there ought not to be applied to public lands in general. An exception is made by him with reference to coal lands because he says of the special conditions which govern the mining of coal and occurrence in nature. Mr. Mondell expects to antagonize any proposals for general substitution either of the lease system or of a plan like that put forward in this bill for the present mode of passing mineral lands into private ownership.

The bill introduced by Mr. Mondell will be reported in nearly its present form shortly after the holidays. As now drafted it reads as follows:

That from and after the passage of this act lands which have been classified as coal lands, or are known to be valuable for coal, shall be subject to appropriate entry under the homestead laws, the desert-land law, in selection under section four of the act approved Aug. 18, 1894, known as the Carey act, and to withdrawal under the act approved June 17, 1906, known as the Reclamation act, whenever such entry, selection, or withdrawal shall be made with a view of obtaining or passing title, with a reservation to the United States of the coal in such lands and of the right to prospect for, mine, and remove the same. But no desert entry made under the provisions of this act shall contain more than 160 acres, and all homestead entries made hereunder shall be subject to the conditions, as to residence and cultivation, of entries under the act approved Feb. 19, 1909, entitled, "An Act to provide for an enlarged homestead."

SEC. 2. That any person desiring to make entry under the homestead laws or the desert-land law, any State desiring to make selection under section four of the act of Aug. 18, 1894, known as the Carey act, and the Secretary of the Interior in withdrawing under the Reclamation act lands classified as coal lands, or known to be chiefly valuable for coal, with a view of securing or passing title to the same in accordance with the provisions of said acts, shall state in the application for entry, selection, or notice of withdrawal that the same is made in accordance with and subject to the provisions and reservations of this act.

SEC. 3. That upon satisfactory proof of full compliance with the provisions of the laws under which entry is made, and of this act, the entryman shall be entitled to a patent to the land entered by him, which patent shall contain a reservation to the United States of all the coal in the lands so patented, together with the right to prospect for, mine, and remove the same. The coal deposits in such lands shall be subject to disposal by the United States in accordance with the provisions of the coal-land laws in force at the time of such disposal, and the United States or its grantees shall at all times have the right to enter upon the lands so patented for the purpose of prospecting for, mining and removing the coal contained therein, but the owner under such limited patent shall be entitled to damages, the amount of which shall be determined by a court of competent jurisdiction, for any damage to the surface or his improvements, not necessarily or reasonably incident to the prospecting for, mining, and removal of such coal: Provided, that the owner under such limited patent shall have the right to mine coal for use upon the land for domestic purposes at any time prior to the disposal by the United States of the coal deposits: Provided further, that nothing herein contained shall be held to deny or abridge the right to present and have prompt consideration of applications to locate, enter, or select, under the land laws of the United States, lands which have been classified as coal lands with a view of disproving such classification and securing a patent without reservation.

Heretofore hyacinth has been found in California mainly at the gem mines in San Diego county, but now hyacinth-bearing rock has been discovered on the Wells place in Frazier valley near Porterville, Tulare county. Whether or not the new find is a commercially valuable one is yet to be determined, though the stones so far found are said to be of good quality.

Analysis of Mine and Mill Practice on Rand—I

The Tendency Is toward Consolidations to Permit Large-Scale Mining and Milling; Discussion of Equipment and Operation of the New Mills

BY E. M. WESTON*

The economic evolution of the Rand mining industry still proceeds apace, and the lines along which this evolution proceeds are, as might be expected, those along which are moving the organization and development of other industries all over the world under the stress of the economic forces which make up our present civilization. These lines of development as represented among the mines of the Witwatersrand are:

(1) The consolidation of a number of smaller mines into others of large area with consequent reduction of administration and other general expenditure charges.

(2) The development of these areas by a smaller number of shafts of large dimensions.

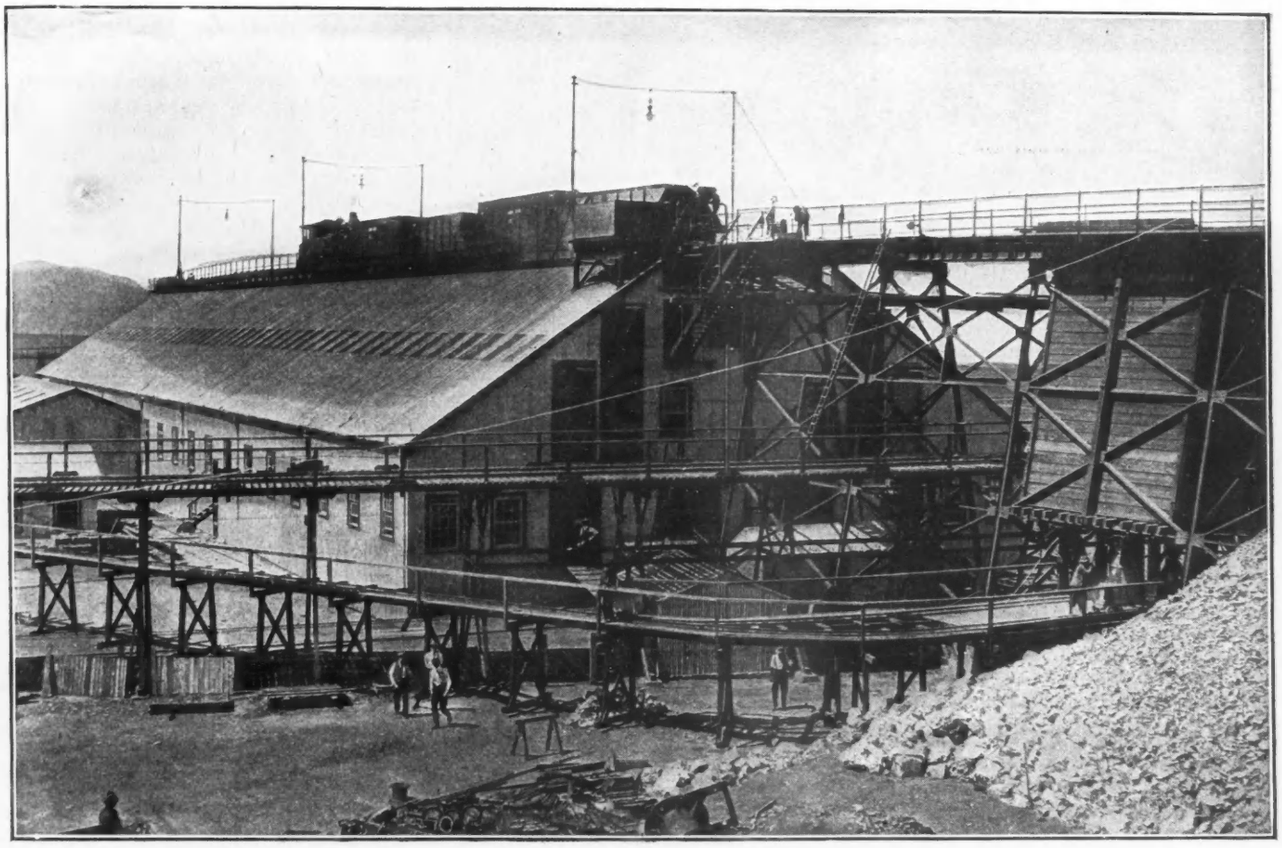
(3) The equipment of these mines with larger units of machinery having a greater efficiency and capacity per unit than those hitherto installed.

(4) The provision of power generated electrically by large units in central stations under a most favorable load factor.

(5) The adaptation of electric power for traction, winding and crushing operations above and below ground.

(6) A striving after greater efficiency in the labor force employed in all mining operations, by means of better organization and supervision and by the provision of better conditions of living, work and recreation.

(7) The attention turned to the utilization of all byproducts, and to extracting the greatest percentage of all valuable mineral from material treated in the smallest possible number of operations.



SIMMER DEEP 300-STAMP MILL, SHOWING TRANSPORTATION ARRANGEMENTS

TENDENCY TOWARD CONSOLIDATIONS

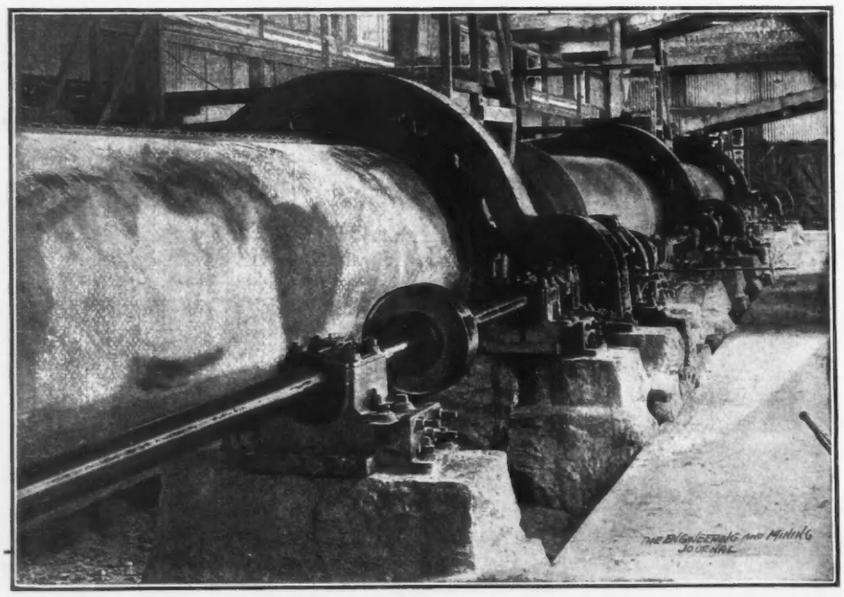
The greater number of mines on the Rand have long been under the control of a few financial houses. This development took place on the Rand long before the tendency became apparent in America and England, where now the chief mines tend more and more to fall under the control of large corporations. Consolidations are thus easily arranged whenever the controling houses think them advisable. In many cases outcrop mines were approaching the exhaustion of ore of a grade payable to work on a small scale, while their plants and financial resources were available to aid in the development of adjoining deeper areas. When such areas were united work could be carried out on a larger scale and the older mine exploited for undiscovered or neglected reserves of low-grade ore now rendered profitable to extract. As the chairman of the Rand Mines, Ltd., explained at the last annual meeting of the company, many other considerations make such amalgamations advisable.

"The knowledge acquired since the inception of operations on this field has proved that the formation is remarkably regular over large areas; but not necessarily so over any small area. Acting on this knowledge, larger blocks of ground than were given to any one company in the past are now necessary; regular returns on capital are thereby in-

*Mining engineer, 20 St. Mary's buildings, Johannesburg, South Africa.

sured. By developing large bodies of ore, selective mining is avoided as much as possible and concentration of work averts constant removals of the labor force. Underground costs are thus reduced, especially under the heads of development, stoping, shoveling and tramming, to the lowest limit compatible with efficiency. While it may be remunerative to install mechanical appliances for the handling of ore underground where levels contain large tonnages, it is not so for small tonnages, the cost of amortization and and removal of plant being too heavy.

"Fluctuations of yield which have to be counteracted in small areas by selective mining, can be obviated by large reduction works, which again are justified only if the total tonnage to be mined warrants the expenditure. Development becomes less costly as the number of drives, shafts, stations, etc., is reduced."

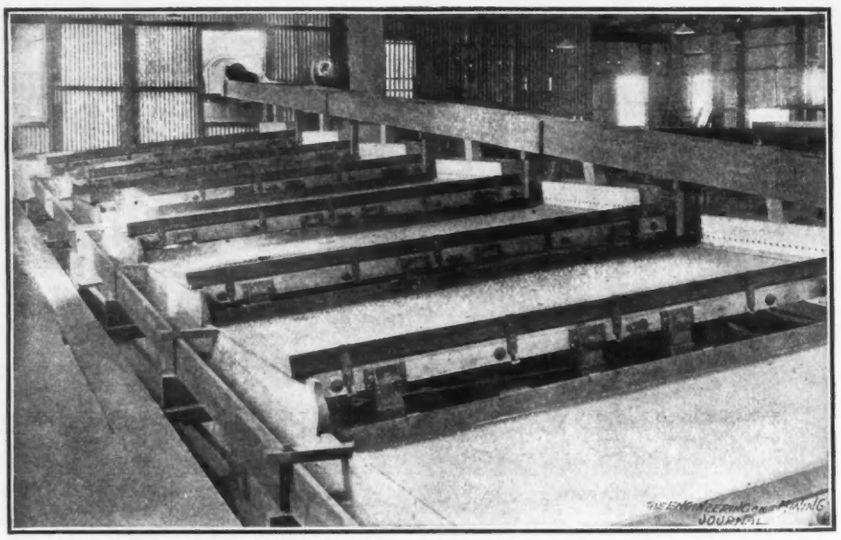


TUBE MILLS AT NEW MODDERFONTEIN MILL

PUBLIC WANTS LONG LIVED MINES

Such are some of the arguments advanced in favor of consolidation. Other considerations had, however, weight with the mining houses. They found that the public was not content with the policy of short life and maximum production for a given area, and was reluctant to buy shares in mines having a short life. Again, they held large areas on the dip of the main reef where the deposit lay at a depth of 3500 to 6000 ft. To hold this ground entailed considerable outlay and the mining houses were threatened with increased taxation and a confiscation of these unworked areas by the Government so it was most convenient to sell them for shares in a producing or dividend-paying mine which at the same time could be offered the advantage of having its life "prolonged indefinitely."

In other cases some of these "Deep-Deep" companies had a considerable sum of working capital on hand which, though not sufficient to develop their mines, became most useful in extending the equipment of the shallower mines. Differences of opinion may exist as to the advisability of some of the schemes proposed and carried out, particularly in the case of the amalgamation of large self-contained companies having their mines already equipped and developed, and having separate crushing plants of 100 to 200 stamps already in operation. There is undoubtedly a danger of some concerns being too large and scattered for efficient management under one control.



NEW BANTJES MILL—SHAKING AMALGAMATING TABLES AFTER TUBE MILLS

COMPANIES OWN LARGE TERRITORY

The policy has already led to the formation of some large mines; but it seems probable that most of the more desirable schemes are not carried out. One of the largest mines thus formed is the Crown Mines, Ltd., a fusion of several large producers with deep-level ground. The share capital is £2,000,000, with a working capital July 1, 1909, of £740,000. It possesses 1979 unworked claims, or 4.8 square miles of ground, underlain by reef.

In its various plants there are 675 stamps and 15 tube mills; 100 heads of new stamps, 1650 lb. weight, to crush 10 to 15 tons per day each are under order. It is intended to crush 1,620,000 tons per year. Ore reserves now stand at 4,500,000 tons of 7.94-dwt. grade. An average yield of 29s. 10d. per ton at a working cost of 15s. 6d. is expected, while the life of the mine may be anything from 25 to 50 years, depending on the value of the very deep ground and the working costs at great depths. This subject will be returned to later.

Another large fusion is the East Rand Proprietary Mines, formed by amalgamating four crushing companies with a number of deep-level claims. This immense corporation crushed 156,000 tons in one month, milling with 820 stamps and 15 tube mills. The value of the output was £224,200; profit, £103,253; working cost, 15s. 1.4d. This property has its own central power station and central air-compressor station. The Simmer Deep, Knight Central, Nourse Mines, Village Deep, Kieinfontein Deep, West Rand Consolidated, Randfontein and Randfontein Central are all great mines with long lives formed by amalgamations.

THE CITY DEEP

Perhaps, however, the most interesting mine on the Rand at present is the City Deep, formed by the fusion of several undeveloped deep-level properties. It holds 1084⅔ claims and a large freehold. The reef (the main reef leader) was struck in No. 2 shaft in March, 1908, and

in No. 1 shaft some months later. These shafts are 4400 ft. apart. From No. 2 shaft levels have been driven at 2725, 2875 and 3000 ft., and from No. 1 shaft at 2984 and 3174 ft. The average dip of the reef is 38 per cent. (about 21 deg.) and 35,000 tons per claim are expected from the main reef leader alone over a stoping width of about 60 to 66 inches.

On the level connecting the shafts this reef has been driven on over 6000 ft., and in this distance there is no stretch of unpayable ore shown. The full length of this level will be over 10,000 ft. The average assay of the ore is between 8 and 9 dwt. per ton. There are about 1,500,000 tons of ore developed and 1,000,000 tons available for stoping. For the quarter ended June, 1909, 328,000 tons assaying 10.8 dwt. across 60 in. were developed. Such rapid and favorable development at such a great depth is a most remarkable record and has renewed confidence in the deeper portions of the main reef.

this duty, and as 10 stamps of 1960 lb. weight on the West Rand Consolidated have already attained a duty of 15 tons per day (which constitutes a world's record), it is probable that the capacity of these stamps will approach that figure. This tonnage was crushed through a 100-mesh screen. Open-front boxes are being adopted and it is probable that in the future screens of 81 to 64 per sq.in. will be employed.

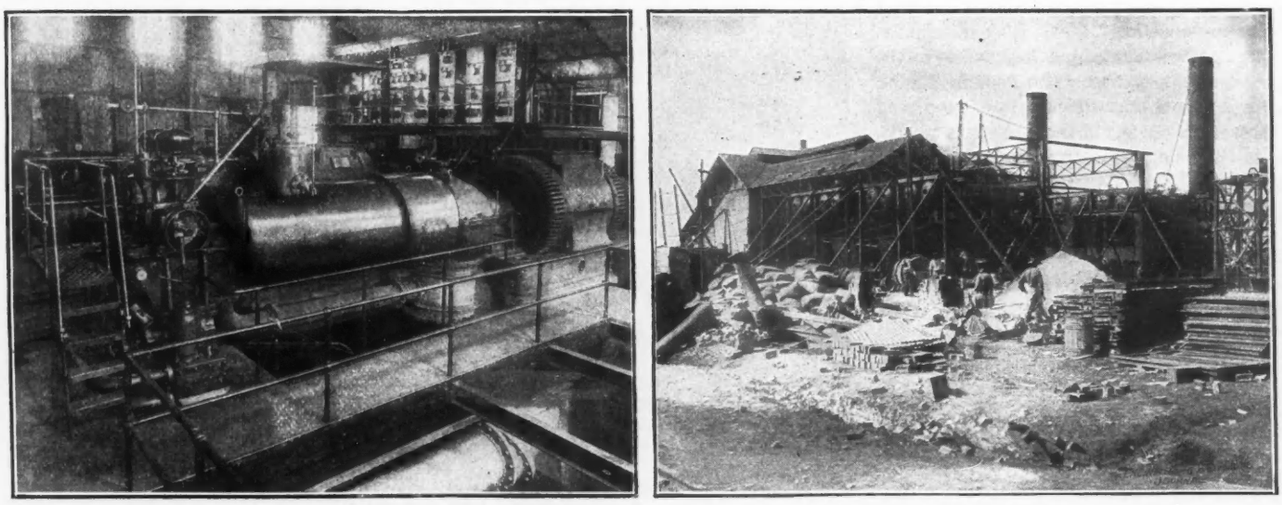
One of the chief difficulties encountered in the design of stamps of such a weight has been that the cam shaft has been exposed to severe stresses which, combined with constant vibration, have tended to shorten its life to a few months. To overcome this difficulty a patented design has been adopted.

In this design timber king posts are replaced by reinforced concrete pillars having a 6-ft. base length parallel to the end of the stamper box and a width of 14 in. They will be 7 ft. high and 4 ft.

doubled the number hitherto installed per 100 stamps. These mills will be driven by separate motors by helical gearing. All amalgamation will be done after the tube mills on 72 shaking tables of the Frue vanner principle, shown in the illustration of the Bantjes mill. These will be placed in one building with precipitation boxes and all other gold-handling and collecting appliances.

In the cyanide and slimes plant native labor will be reduced to a minimum. Blaisdell distributors and excavators will be employed in the sands, tanks and sands will be stacked by belt conveyers. Slimes will be agitated by compressed air in modified Brown tanks with an estimated saving of 60 per cent. of power over centrifugal pumps. The agitation vats will be 42 ft. in diameter and 30 ft. deep, being thus much wider and shallower than usual. Solution sumps will be built of reinforced concrete.

On the main or 8th level double track



PARSONS TURBINES AND NEW BOILERS, RANDFONTEIN CENTRAL POWER STATION

So far little development has been done on the south reef, but as this reef has been one of the main ore producers in the outcrop mines, it will probably also be found to contain payable ore. The main reef lies under the main reef leader, separated by 18 in. of quartzite. This reef where driven on for over 100 ft. showed 4.4 dwt. over 22.8 in., so that in places it also will be worked.

ANOTHER LARGE MILL

The foundations have already been begun for a plant designed to treat 60,000 tons per month, which is expected to start work in twelve months. This plant will later be increased to a capacity of 90,000 and finally to 120,000 tons. There will first be installed 200 stamps of 2000 lb. falling weight and the design of this battery will introduce several novel features. The stamps are estimated to crush 11 tons per day; but as lighter stamps on the Cinderella Deep already approach

long on the summit and capped by 12x14 x48-in. timber blocks to give resilence. A single steel casting is laid between the concrete king posts in front of the stamp stems and parallel to them. This casting is held down by six 1¾-in. bolts, 14 ft. long.

The casting carries the lower guides for the stems and takes the shape of a girder with a curved lower member designed to support the cam shaft over its whole length by means of 5-in. bearings set between the cam bosses. The stamp heads will be 46 in. long and 9½ in. in diameter, with shoes 14 in. long.

NUMBER OF TUBE MILLS INCREASED

The coarse pulp from the stamps is classified and goes direct to 7 tube mills, another mill being kept as reserve; one tube mill is thus installed to 25 stamps. Eckstein's engineers, being evidently satisfied with the tube mill's efficiency as a secondary grinder, have thus nearly

with mechanical or electric haulage will be installed, as it is estimated that there are 7,000,000 tons of main reef leader lying on the dip of the reef above this level. Bins to hold 1000 tons will be placed at the loading station. To haul the ore to the battery two 50-ton electric locomotives drawing 40-ton side-discharge trucks will be employed. The mill will be driven by electricity from the new central power station.

THE RANDFONTEIN CENTRAL

The Randfontein Central is one of the largest consolidations of unworked claims on the western Rand and is formed by the amalgamation of several unworked mines of this group. Owing to the steepness of the reef, claims here contain a large tonnage though the reefs are somewhat narrower than on the central Rand. The mine will be developed from 5 main shafts, one being inclined and the other vertical to 700 ft., and then inclined on

the plane of reef which in this portion of the Rand is about 38 degrees. The curve at the turn will be laid out as a modified hyperbola.

Electric winches will be installed on these shafts, taking their power from a central power station. The motors for these hoists will be supplied by the German Allgemeine Electricitäts Gesellschaft and will have plain rheostat control of the Ward-Leonard type. One 350-h.p. motor using direct current will be directly coupled to each end of the drum shafts of each winder. These two motors take current at 250 volts from a single 800-h.p. motor-generator set worked by 3-phase current transmitted from the central station at 6600 volts and transformed down to 2200 volts. This motor-generator is capable of carrying a large overload.

The two drums have separate clutches and are of plain cylindrical design, 10 ft. in diameter. They carry 3000 ft. of rope designed to haul two 3½-ton skips at a winding speed of 2000 ft. per minute. This speed is somewhat low owing to the curve in the shafts. The central station should have no difficulty in supplying current to start all five hoists at once. It is expected that in about two years 3,000,000 to 4,000,000 tons of ore will be developed ready for milling.

Central Power Station

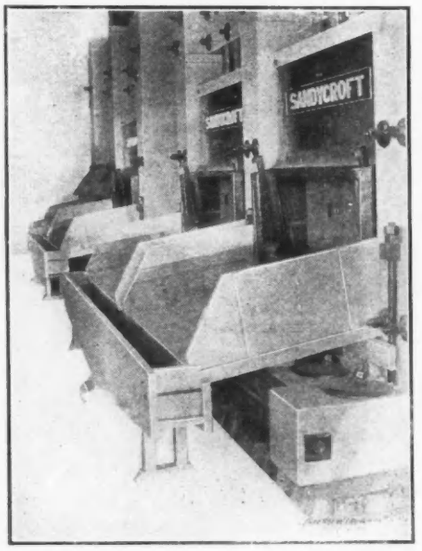
The central station for electric supply at present consists of two 1000-kw. Parsons turbines of the parallel-flow type. These furnish about 1,200,000 units at a cost of under 0.5d. per unit. They are supplied by four 700-h.p. Babcock & Wilcox water-tube boilers equipped with mechanical stokers and forced fan draft. This station is being enlarged by the addition of three 2000-kw. generators and two 6000-kw. generators, also with Parsons type turbines. Twenty more boilers are also being added. Photographs accompanying this article show a view of the turbines in the central station, and also the new battery of boilers.

The mine will be equipped with a central reduction plant of 600 stamps weighing 1650 lb., designed with 16 tube mills to crush 150,000 tons per month. Steam traction will convey ore from the various shafts to a central crushing station where the fines will be taken out and sent direct by belt conveyer to the mill. The mechanical engineers of the Randfontein do not believe that belt conveyers, owing to high first cost and cost of upkeep, show any superiority over mechanical haulage by trucks which can be adapted to use old mine haulage ropes, and this is the only conveyer belt in the plant.

The excavations for 600 stamps are being dug and the spoil is deposited to make mounds on which to place feed-water tanks. Stamps are driven in groups of 10 by a 40-45-h.p. motor. These stamps are driven by a pulley set in the middle of the cam shaft to reduce torsional stresses. To render broken cam shafts available for further service some sets of 5 stamps are provided, driven by separate motors. From the stamps the pulp goes direct to classifiers. Fines and the discharge from tube mills go direct to amalgamating tables. The battery is in one building and amalgamating plates in a second with the extractor boxes of the cyanide plant. Centrifugal pumps driven by separate motors are used to elevate tailings to 12 collecting vats set over 24 steel treatment vats, 60 ft. in diameter. The slimes plant consists of 6 collecting vats and 16 treatment vats, 70 ft. in diameter.

The Bantjes Mill

Another typical crushing plant is that being erected on the Bantjes mine. The sorted ore from the crusher station is stacked in a large ore dump designed by



Batteries at New Bantjes Mill

A. M. Robeson, and holding a week's supply for the battery. The dump is built up by a conveyer on a level space floored with concrete and with tunnels beneath it In the tunnels run belt conveyers fed by chutes at regular intervals. These belt conveyers discharge into a main line of belt conveyer which distributes the ore over the mill bins. These bins have a capacity of only 400 tons and can be filled in a few hours; thus large storage accommodation is provided at a reduced capital cost.

The first section of the mill consists of forty 1650-lb. stamps. The boxes are laid on a rubber sheet on a layer of timber laid in bitumen on a concrete mortar block. These blocks are wider at the base and the hold-down bolts are laid in deep grooves on the surface, thus being easily replaced if broken.

The mortar boxes are lined to a hight of 3 in. above the discharge level with 1-in. hardened steel plate. A jet of feed water discharges behind each die. The automatic feed is of the roller type. The pulp from the stampers goes direct to a concrete launder and is elevated to a 23x5-ft. tube mill. More of these will be added. All amalgamating is done in a separate extractor house on 7 shaking tables, shown in illustration.

In the extractor house are the precipitation boxes and sludge filter press. From here the pulp is elevated again to classifiers, the coarse product returned to the tube mill and the overflow to sand and slime classifier. The sands go to 2 sands and 2 slimes settlers and thence by duplicate belt to a bin from whence they are fed by trucks to 4 sand vats, 40 ft. in diameter, fitted with vacuum suction. In this plant the 40 stamps are driven in sets of 10 by belts and band friction clutches from a main line of shafting operated by a 3-phase motor of about 200 h.p. working at 2000 volts. Two separate direct-current motors drive the crushers.

Plates Removed from Batteries

The Vogel Deep mill of 40 stamps is just completed but it shows few departures from the usual practice. Conveyer belts are largely employed. The mill is steam driven and amalgamating plates are placed as usual in front of the stamps. Where plates are left in front of stamps it is now a common practice, in order to avoid loss of time caused by stopping the battery to clean plates, to adopt one of the two following methods of procedure: (1) To clean the plates at 12-hour instead of 8-hour intervals. (It has been found by experiment that on most ores here this can safely be done without reducing the percentage recovered by amalgamation); or (2) to deflect the pulp from the top of the plates into a launder and send it over a spare table without stopping the stamps.

With the coarse mesh now used in mill screens it was found that the large quantity of coarse sand and water passing over the plates tended to scour them, and also, as shown by H. Denny, that the finer crushing of the tube mill rendered additional gold free for amalgamation; hence shaking amalgamating plates were put in behind the tube mills, causing unnecessary complication.

It was also felt that all gold-recovery operations should be in one building apart from other machinery, having one exit only in order to reduce the chance of theft of amalgam or slimes, which is said to be still prevalent on the Rand. These considerations have led to the abolition of tables in the mill in newer plants in favor of shaking amalgamating tables placed below the tube mills.

Partial Amalgamation Advisable

It has, however, long been a debatable question if it were economical to spend

much effort over the amalgamation of the finer gold particles when cyanidation methods have become so perfect. It is easy to argue that any gold so fine that its specific gravity will not render it easily arrested in some simple concentration, will be rapidly dissolved in the cyanide plant and recovered without expense, as it will evidently cost little more to precipitate and smelt rich slimes than poor slimes. On the other hand, advocates of careful amalgamation have held that gold should be recovered as soon as possible and that amalgamation is a cheap process.

Having for many years been aware of the fact that on the Ballarat goldfield at least one mill has been run successfully without the use of amalgamated copper plates at all, I have long held the opinion that they were unnecessary here; but that it was not unnecessary, as argued by some, to make any attempt to separate the bulk of the fine and coarse gold before entering the cyanide works. The gold in the ore in Ballarat East is mostly coarse and free milling, but there is quite a percentage of fine gold.

The manager of the mine referred to installed a cast-iron tipping table of his own invention, having a peculiar arrangement of staggered riffles followed by blankets; he always contended that much gold was lost in the neighboring mills owing to the flouring of mercury. The concentrates were amalgamated in a barrel. A somewhat similar system is, I believe, in use at the Giant mines, Rhodesia. On many ores there is no doubt that amalgamating plates would show a much better saving of very fine gold than any such device; but on the Rand such gold could be left for the cyanide plant, and all the attention such concentrators would require would be tipping up and transferring their contents to amalgamation barrels at stated times.

Sands Filter at Simmer Deep

The Simmer Deep mill has already been described in the technical press and I take only the following description of the Caldecott continuous sands filter furnished to the members of the Chemical, Metallurgical and Mining Society during their recent visit to the plant. The pulp coming from 300 stamps when entering the cyanide plant is run to twelve cone classifiers in parallel. These are 6 ft. in diameter and 6½ ft. deep, with a 2½-in. nozzle regulated by an internal cone plug.

The overflow goes to the slimes plant; the underflow, carrying sands with 4 per cent. slimes, is elevated by a 6-in. centrifugal pump with some make-up water to the Caldecott plant, which consists of two rotary filter tables, 20 ft. in diameter, with a filter bed, 2 ft. 6 in. wide, having a filtering surface of 137 sq.ft. each.

These tables revolve once every three minutes. The filter is of strong screening placed on wooden slats, 4½ in. center to center. On this is laid cocoa matting covered by strips of unbleached cotton cloth. These tables are fed from the underflow of 8 cones placed directly over them, the overflow going to the slimes plant. By means of these cones the proportion of slimes is reduced to 1 per cent. and moisture reduced to 30 per cent. in the underflow.

The undersides of the filter beds are connected to a vacuum pump through a receiver from which the filtrate is removed by a plunger pump. The vacuum is from 5 to 10 in. of mercury and if a higher reading is shown it indicates that the filter beds require cleaning, usually done every 24 hours and requiring 25 minutes per table. The sands, containing 15 per cent. of moisture, are removed from the tables by a scraper and fall into a launder where they are mixed with 0.03 per cent. KCN solution.

The four feed cones for each table are each 8 ft. in diameter and 8 ft. deep, 3 cones being in use for each table except when one is being cleaned. One table working with 4 cones can handle 60 tons of sand per hour for 4 or 5 hours. All cones have a diaphragm placed about 2 ft. above the underflow. By the use of these filters cleaner sand is sent to the sand plant and the collecting vats can be used as treatment vats without getting cyanide into the mill water, thus largely reducing the initial cost of the plant owing to fewer number of tanks required for treatment.

Iron and Steel in Foreign Countries in 1909

In nearly all the chief iron-producing countries 1908 was a year of depression and 1909 one of gradual recovery. In all of them, however, both depression and recovery were less sharp than in the United States. A few notes on foreign production follow:

Germany—The German Iron and Steel Union reports the make of pig iron in the German Empire for the 11 months ended Nov. 30 as follows, in metric tons:

	1908.	1909.	Changes.
Foundry iron	1,978,775	2,260,743	I. 281,968
Forge iron	585,537	600,394	I. 14,857
Steel pig	836,840	1,002,075	I. 165,235
Bessemer pig	339,285	374,085	I. 34,800
Thomas(basic)pig	6,976,548	7,504,554	I. 528,006
Total	10,716,985	11,741,851	I. 1,024,866

Steel pig includes spiegeleisen, ferromanganese, ferrosilicon and all similar alloys. The total increase was 9.6 per cent.

The Stahlwerks Verband reports deliveries for the 11 months ended Nov. 30 as follows: Blooms, billets and other half-finished material, 1,350,779; railroad material, 1,691,125; plates, shapes and rolled material, 1,513,850; total, 4,555,754 metric tons; an increase of 140,855 tons over 1908 deliveries.

Foreign trade showed comparatively little change. Exports and imports of iron and steel and of machinery, 10 months ended Oct. 31, were, in metric tons:

	Exports.	Imports.	Excess.
Iron and steel	3,219,169	377,000	Exp.2,842,169
Machinery	269,829	59,004	Exp. 210,825
Total	3,488,998	436,004	Exp.3,052,994
Total, 1908	3,447,286	544,204	Exp.2,903,082

Imports of iron ore this year, 6,943,000 tons; exports, 2,345,079 tons. Imports of manganese ore, 330,928 tons; exports, 3704 tons.

France—The production of pig iron for the first half of the year was 1,713,461 metric tons, a decrease of 33,173 tons from 1908. Steel production, however, showed an increase of 141,350 tons, the total for the half-year being 1,506,329 tons; of which 46,143 tons were acid converter steel; 909,995, basic converter; 541,598, open hearth; 7973 crucible, and 620 tons electric steel.

Great Britain—The British Iron Trade Association reports the make of pig iron in Great Britain in the first half of 1909 at 4,715,679 long tons; which compares with 4,635,851 tons in the first half of 1908 and 4,653,989 tons in the second half. The average number of furnaces in blast during the half year was 313, showing an average make of 15,066 tons per furnace. The estimated output of pig iron for the year was 9,525,000 long tons. The steel production showed little change. The foreign trade showed a decrease, chiefly in new ships. Exports and imports of iron and steel and their manufactures, 11 months ended Nov. 30, as valued by Board of Trade returns were:

	Exports.	Imports.	Excess.
Iron and steel	£34,780,368	£ 7,250,034	Ex. £27,530,334
Machinery	25,925,063	4,099,017	Ex. 21,826,046
New ships	5,660,509	.....	Ex. 5,660,509
Total	£66,365,940	£11,349,051	Ex. £55,016,889
Total, 1908	73,310,614	11,227,453	Ex. 62,083,164

Decrease in exports, £6,944,674, chiefly in new ships; increase in imports, £121,598. The quantities of iron and steel were, in long tons:

	1908.	1909.	Changes.
Exports	3,786,699	3,850,559	I. 63,860
Imports	1,017,201	1,085,925	I. 68,724

Exports of scrap iron and steel, 117,362 tons in 1908, and 146,063 in 1909; increase, 28,701 tons.

Imports of iron ore into Great Britain, 11 months ended Nov. 30, were 5,521,199 long tons in 1908, and 5,712,220 in 1909; increase, 191,021 tons. Of the imports this year 4,288,795 tons were from Spain.

The Pumping Problems at the Tombstone Mine

Mine Flooded to 800-ft. Level June 1, 1909; Average Flow at That Time 6,659,401 Gallons Daily. New Equipment to Handle 12,000,000 Gallons

BY W. F. STAUNTON*

The flooding of the mines of the Tombstone Consolidated Mines Company, at Tombstone, Ariz., was caused by a sudden reduction of steam pressure at 2:30 a.m., June 1, 1909, on account of water entering the fuel-oil supply pipe feeding the burners on the boilers. The recording gage shows that the steam pressure was down to 50 lb. until 5:15 a.m., or a total time of 2 hr. and 45 min. The men on duty were unable to find and correct the difficulty as promptly as they should, or to summon assistance promptly owing to the failure of the local telephone service, and by the time steam was again up to normal pressure the pumps on the 1000-ft. level of the pump shaft, on the Flora Morrison claim, were submerged and could not be started. Sinking pumps were put in at once, but it was found that the station-pump capacity above the 1000-ft. level was inadequate to handle the water and it was allowed to rise to the 800-ft. level, where it now stands.

Pumping Equipment

The principal pumps on the 1000-ft. level are two 22 and 42x6½x36-in., Prescott corliss cross-compound, condensing, crank-and-flywheel engines, and one 15 and 23 and 39x13x24-in. Prescott duplex, triple-expansion, condensing pump, the latter relaying with a duplicate on the 600-ft. level. There is also a 10 and 16x10½x12-in. Dow duplex pump on the 1000-ft. level.

During the effort to get down to the 1000-ft. level after the flooding, there were in the shaft 6 Prescott duplex 14x8x12-in. sinking pumps, operated by steam, and it was found that the heat developed made the conditions almost prohibitive of work. As it will be necessary to use 8 of these sinking pumps in unwatering the 1000-ft. level, some plan for reducing the temperature during the time the work is in progress had to be adopted and it was decided to accomplish the result by operating some of the sinking pumps by compressed air. During the early stages of the work it will probably be practicable to operate them all by air and substitute steam one by one as it becomes necessary, but keeping as many as possible on air to the end. We had available compressor capacity of about 1250 cu.ft. per min. and have added 4000 cu.ft., making a total of 5250. The operation of sinking pumps with air under the conditions proposed will be uneconomical, but seems to be the most feasible way to secure the necessary reductions of temperature.

The new equipment ordered to effect the unwatering consisted of two Prescott pumping engines (duplicates of those now on the 1000-ft. level except that they will have 7-in. plungers while on the 800-ft. level, this dimension to be reduced to 6½ in. when the pumps are later placed on the 1000-ft. level) and a Nordberg corliss, cross-compound, condensing air compressor giving 4000 cu.ft. per minute.

Pumping Records

The day before the accident the amount of water pumped was 6,706,080 gal. and the average daily amount for the ten days previous was 6,659,401 gal., equivalent to a rate of 4624 gal. per min. The maximum daily amount during this time was 6,969,840 and the minimum 6,454,711 gal. There is no doubt that at times the inflow exceeded a rate of 5000 gal. per min. At the present time, while holding the water at the 800-ft. level, the daily amount is about 3,300,000 gal. and is showing a daily increase of about 12,000 gallons.

WATER HANDLED AT THE TOMBSTONE MINES.

	Total Gal.	Gal. per Day.
Jan. 1, 1902, to Mar. 31, 1903	108,630,607	1,207,465
Apr. 1, 1903, to Mar. 31, 1904	795,824,622	2,180,341
Apr. 1, 1904, to Mar. 31, 1905	1,221,100,021	3,345,477
Apr. 1, 1905, to Mar. 31, 1906	1,319,138,819	3,164,079
Apr. 1, 1906, to Mar. 31, 1907	1,541,595,663	4,223,550
Apr. 1, 1907, to Mar. 31, 1908	1,760,994,113	4,824,642
Apr. 1, 1908, to Sept. 30, 1908	899,609,748	4,915,900
Oct. 1, 1908, to Sept. 30, 1909	1,828,215,012	5,008,808

Considering the time which has elapsed since operations began, a resumé of the principal facts in regard to the work, in so far as the water is concerned, is of interest. Pumping commenced in December, 1902, at 570 ft., and the 700-ft. level was reached in April, 1903, the water being held at that point for 11 months against an average flow of 1528 gal. per min. while crosscutting. It was found necessary to go deeper and the 800-ft. level was reached in October, 1904, where the water was held 12 months with an average flow of 2430 gal. per min. The 1000-ft. level was reached in December, 1906, and held 27 months with an average flow of 3509 gal. per min., but during the last ten days, owing to cutting the dike in the west crosscut, this had increased to 4624 gal. per min., as stated above. Considering the fact that the water is now back at the 800-ft. level, it is evident that in unwatering the 1000-ft. level pumping capacity largely in excess of the maximum flow found on that level should be provided if the work is to be done in a reasonable time. When the new pumps are in operation there will be station-pump capacity above the water of about 6750 gal. per min. as against the maximum observed flow of about 5000 gal. per min., so that there will be an excess of 1750 gal. per min. to apply against the accumulation, provided the sinking pumps can be made to supply the water, which there is no reason to doubt.

It would seem to be certain, therefore, that with the equipment provided the 1000-ft. level can be recovered, as the capacity will be fully 50 per cent. greater than the average rate of inflow encountered in getting down at first. The uncertain factor is the time required, which would appear dependent upon the quantity of water which has accumulated and which there is no way of estimating with any degree of accuracy. When the pumps at the 1000-ft. level are recovered the maximum total station-pump capacity will be about 12,000,000 gal. daily or 8500 gal. per minute.

Drainage Hastened

The large amount of water we have had to handle, as shown by the above figures and the accompanying table, explains the slowness with which operations at Tombstone have seemed to proceed. The conditions have also made great caution necessary to avoid jeopardizing the entire situation by sudden inrushes beyond the pumping capacity. It should be understood that notwithstanding the apparent steady increase shown by the figures, there were, at the time of the flooding, strong indications that the worst was over, as shown by the rapid decline in the pressure and by the winzes sunk from the 800-ft. level, one of which, at a distance of 300 ft. from the shaft, was down 100 ft. and perfectly dry. Furthermore, we were intentionally pursuing the policy of letting in all the water that could be conveniently handled so as to hasten the drainage. These explanations are necessary to a proper understanding of the situation, for, taken by themselves, the figures indicate a rate of increase which, if continued, would soon have exceeded the pumping capacity.

It may not be out of place to state

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here that the work so far done fully confirms the expectations formed at the beginning as to geological conditions, including the positions of the various ore-bearing strata. It has been conclusively proved that the same conditions which accompanied and apparently gave rise to the great orebodies above the original water level persist below, and furthermore, the work done during the last year on the 700- and 800-ft. levels has shown the grade and character of the ore to be little, if at all, affected by the water, so that there is still every reason to believe that with the obstacle of the water once overcome so as to permit unrestricted exploration of the ground, the results originally anticipated will be realized.

The Fluorspar Industry in 1909

BY F. JULIUS FOHS *

I estimate the total amount of American fluorspar marketed in 1909 at 50,774 short tons. Illinois leads with about 41,000 tons; Kentucky second, with 8774 tons; Colorado and New Mexico produced jointly about 1000 tons. The official statistics for 1909 are not yet all at hand but from returns received there is indicated an increase of about 11,000 tons over 1908. The production in 1909 exceeded that of any previous year and as the production of fluorspar was kept pretty well within the demand heretofore, it shows the wholesome effect of the tariff, although not yet in force six months. Of the total amount shipped about 20 per cent. was ground, 15 per cent. lump, and the remainder was marketed as gravel.

The number of firms active in marketing fluorspar in 1909 was as follows: New Mexico, 1; Colorado, 4; Kentucky, 7, and Illinois 4. The following were the largest shippers: Albany Mining and Investment Company, Kentucky Fluorspar Company and Geo. P. Roberts in Kentucky; the Fairview Fluorspar and Lead Company and Rogers, Brown & Co., (Rosiclare mines,) and the Marion Lead and Fluorspar Company in Illinois.

Markets

The range in prices for 1909 was: Unwashed gravel at $4.50 @ 5.00; washed gravel, $4.75 @ 5.50; No. 2 lump, $5.50 @ 6.50; ground in bulk, as low as $8; No. 1 and No. 2 ground sold at $10 @ 11, barrelled, white extra No. 1 sold at $11.40 @ 12.50. Fluorspar, usually barrelled, retails in quantities from 50 lb. to ton lots, as follows: Crude, from $10 @ 20 per ton; ground, $20 @ 32 per ton.

According to Burchard, the price of fluorspar in Colorado varies, depending upon the calcium fluoride and silica contained. The spar is hand-cobbed gravel. The prices for 80 per cent. calcium fluoride and not exceeding 15 per cent. silica, is $5; for each per cent. of calcium fluoride an additional 20c., so that 85 per cent. brings $6 and 90 per cent. $7 per short ton.

Effect of the Tariff

The imposition of a $3 tariff on fluorspar has resulted in broadening the market for American fluorspar, without permitting an increase in prices. The latter are still regulated by foreign importations at Atlantic coast ports, and not at Pittsburg as was formerly the case. The present cost of English fluorspar, including tariff, at Baltimore, is $6.10 per short ton, as against a minimum sale price of $8 for domestic unwashed fluxing gravel, leaving a good margin in favor of the English. At Pittsburg, however, the conditions are now reversed. The present minimum cost of English fluorspar at Pittsburg would be $7.44, whereas domestic unwashed gravel can be sold there for about $7. This gives American producers the advantage of trade at practically all the openhearth steel furnaces, since few, if any, are situated at coast ports, or sufficiently near them to take advantage of English importations. The effect of English fluorspar competitors will be felt at Pittsburg and vicinity until the large stock of fluorspar imported prior to the tariff is exhausted and until such time as the American mines are in a position to meet the demand. Some of the producing companies refuse to meet the cut prices of other companies. The Kentucky companies, which are in a position to turn out large quantities, are still handicapped by a difference of 20 to 80c. in freight rates. This accounts for the poor showing both in shipments and amount marketed in 1908 and 1909.

Plants are being enlarged to meet increased demand. It is hoped that the new Foust jig will solve the unusual problem presented by fluorspar concentration.

New Developments

No developments were reported from Arizona, but New Mexico was a producer for the first time. In southwestern New Mexico fluorspar veins traverse limestone and shale and the American Fireman's Mining Company opened one of these at Mirage, Luna county, near Deming. This is more accessible to market than the Arizona deposits.

Kentucky has been rather inactive for two years or more, the companies awaiting better conditions. The imposition of the tariff has caused renewed activity to some extent. The Albany Mining and Investment Company sunk the Nancy Hanks mine to a depth of 340 ft. and report the fluorspar to be 6 ft. wide at that depth with a 9-ft. shoot at the 330-ft. level. The Kentucky Fluorspar Company opened the Beck vein and found excellent fluorspar near the surface. At the Memphis incline development work was vigorously carried on to open new shoots. The Kentucky and Indiana Mining Company recently began the development of properties on the Kentucky and Yandell veins. The Franklin Mining Company cut a 7-ft. vein on the Ada Florence vein. James Persons developed a vein of fluorspar varying from 6 to 20 ft. in width on the Ebbie Hodge property.

In Illinois, the Fairview Fluorspar and Lead Company sunk the Fairview incline to a depth of 520 ft. and intend continuing at the rate of 20 ft. per month. At the 460-ft. level a 20-ft. fluorspar shoot was opened. The new shaft 1200 ft. north is down 240 ft. and still sinking, and good spar is being mined from the 200-ft. level. The old No. 1 shaft was reopened and a 20-ft. shoot is being mined. The Rosiclare mine was developed materially so that it is ready for a large production in 1910. The Marion Lead and Fluorspar Company continued mining near Shelterville. The Fairview mill is being rebuilt with a view of increasing its capacity to 300 tons per day, installing three of the new pattern double-plunger Foust jigs, and conveying belts for handling finished products. The Rosiclare has two new Foust jigs, and adequate additional power equipment.

Uses

The use of fluorspar is on the increase in the manufacture of glass, enamel and sanitary ware, electrolytic refining of antimony and lead, the production of aluminum and in the iron and steel industries. In the latter, the value of fluorspar in small amounts in conjunction with limestone flux is becoming more and more appreciated. The increase in the number of openhearth furnaces, and hence the increased production of basic-openhearth steel, is especially encouraging. Only in the manufacture of hydrofluoric acid (aside from that used in electrolysis) was there an apparent falling off in demand.

NOTE—Prepared with permission of the director of the Kentucky Geological Survey.

*Lexington, Kentucky.

Mine and Mill of Le Roi No. 2, Ltd., Rossland

Coarse and Medium Ore Sorted Separately; One or More Diamond Drills Constantly Employed; Mill System Simple and Economical

BY ROY HUTCHINS ALLEN*

The property of the Le Roi No. 2, Ltd., includes the Josie mine and several claims upon which little or no work is being done at the present time. The property is immediately west of the Le Roi and War Eagle mines and is the most westerly of the large producers in the Rossland camp.

Mine Plant and Equipment

The Josie mine has a three-compartment shaft 1200 ft. deep, having two hoisting compartments and a manway, each 4 ft. 3 in. by 5 ft. in the clear. The shaft was sunk on the Josie vein and has an inclination of 73 deg. 52 min. toward the north. The wall- and end-plates are of 10x10-in. timbers, with 8x10-in. dividers. The shaft is closely lagged on three sides.

Cages are used in the shaft and the ore is handled in end-dumping cars of 11 to 12 cu.ft. capacity, holding 1600 to 1800 lb. of ore. The hoisting engine was made by the Denver Engineering Works Company, and is driven by a 150-h.p. alternating-current motor taking current at 220 volts. It has two conical drums, each 6 ft. in diameter at the larger end and 4½ ft. at the smaller, with a capacity of 1000 ft. of 1-in. hoisting cable. The speed of hoisting is slow, 500 ft. per minute, and as the capacity has already been exceeded the hoist is to be replaced by a larger one with cylindrical drums, to be operated by compressed air.

The cars are hoisted to near the top of the headframe and are there run out to the sorting house where the ore is dumped on a double set of grizzlies. The first and second classes of ore are hoisted separately and there is a double set of grizzlies for each class. Three sized products are made; coarse ore (4 in. and larger), medium (4 in. to 1½ in.), and fines (through 1½-in. openings). The two coarser sizes go to sorting tables where the ore is sorted by five men, one of whom works on the coarse and four on the medium sized ore. Two products are made; the first-class or smelting ore, and the second-class, which is sent to the mill. The fines of the first-class ore go to the smeltery, those of the second-class to the mill. The fines are not sorted, the classification being made underground in the stopes.

The ore from the sorting house is trammed by hand a distance of 375 ft. and dumped into bins. From these bins the smelting grade of ore goes by an inclined three-rail tram, 1100 ft. long, to the ore bins at the railroad, about 250 ft. lower; the low-grade ore is trammed by hand a distance of 400 ft. to the mill and dumped into a small bin. The monthly output is about 2600 tons of smelting ore and 1600 tons of milling ore.

Air for the drills and mine pump is furnished by a Canadian Rand compressor leased from the Nickel Plate mine and situated about three-quarters of a mile distant. The compressor has cylinders 36 and 22x48-in. stroke. The low-pressure air cylinder is provided with Corliss valves for both inlet and exhaust. The compressor is driven by rope drive from a 660-kw. synchronous motor taking current at 2200 volts, and having a speed of 257 r.p.m. The compressor is run at 61 r.p.m., and at that speed has a capacity of about 2800 cu.ft. of free air per min., compressed to 100 lb. per square inch.

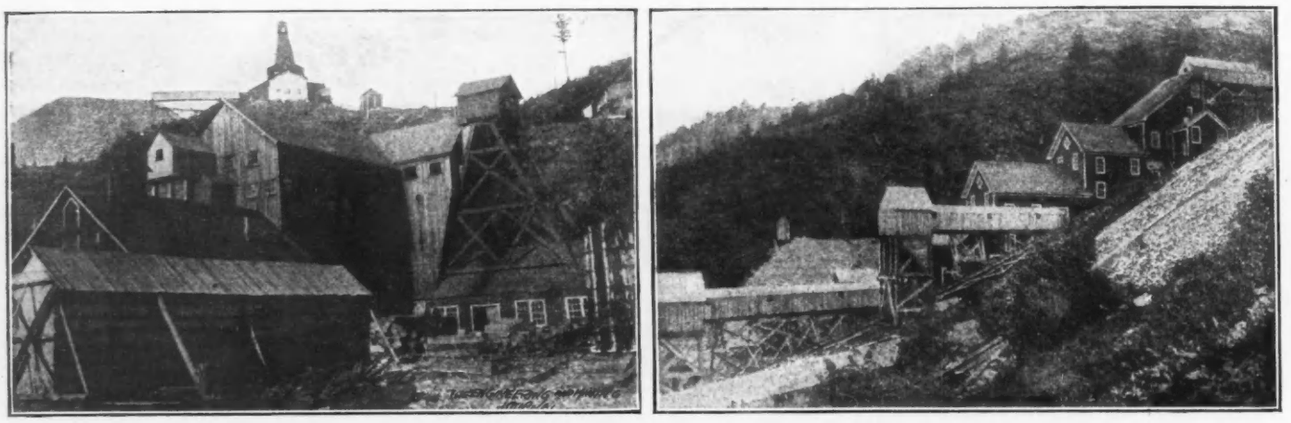
The mine has a blacksmith shop well equipped with the usual tools and a Word Brothers drill sharpener. The carpenter shop contains a circular saw, but all the mine timbers are framed by hand. In spite of the fact that the region surrounding Rossland is well wooded, the cost of lumber is high, that which is suitable for mine timbers costing $18 per thousand board feet.

Vein System

The Josie mine has three veins upon which work is now being done. These have a strike a little north of east and are cut by dikes of "mica trap" running north and south. The dikes sometimes cut off the ore completely; in other cases the vein is found on the other side with little or no displacement. A number of faults, having a strike a little west of north also cut the veins, and in most places produce considerable displacement.

The veins vary from 6 in to 16 ft. in width, and often pinch out entirely. The ore, which consists of pyrrhotite, chalcopyrite and pyrite in a gangue of altered country rock, occurs in shoots or lenticular masses having an average length not exceeding 100 ft. The ore minerals occur as masses of the mixed sulphides and as disseminations through the vein rock. No banded structure is exhibited and the veins are to be regarded chiefly as metasomatic replacements of the diorite porphyrite along planes of fracture.

The ore averages about 1.5 per cent. copper, but as in the other mines of the district, the most important mineral is the gold associated with the sulphides. The smaller size of the orebodies is counterbalanced by the fact that the value of the ore is several dollars per ton above the average for the Rossland district.



THE JOSIE MINE AND CONCENTRATOR OF THE LE ROI NO. 2 LTD.

*Mining engineer, Lunenburg, Mass.

Shrinkage Stopes Used

The mine is opened by levels at 100-ft. intervals, the lowest level at present being 900 ft. below the collar of the shaft. The crosscuts and drifts are 5x7 ft. to 6x8 ft. in the clear and the latter are usually driven at least the length of the orebody before any stoping is commenced. In stoping the drift is widened to the full width of the ore and the back broken down as high as can be reached with the drills set on columns. The broken ore is then cleaned up and the timbers placed.

Where the vein is less than 12 ft. in width, stulls 12 to 18 in. in diameter are placed about 9 ft. above the bottom of the level and lagged with 6-in. poles. If the vein is more than 12 ft. wide square sets are used. Formerly these sets were made of 10x10-in. sawed timbers, the set being 10 ft. in hight, giving a clear headroom of 9 ft. 2 in., but at present all are of round timbers, 12 to 16 in. in diameter, with posts 8 ft. in hight. The sets are 5 ft. 4 in. by 5 ft., the caps being 5 ft. 4 in. in length and the girts 4 ft. 4 in. Above the sill set, or single row of stulls, the stoping is carried on without further timbering. The broken ore is allowed to accumulate in the stope, only enough being drawn off to give the miners room for drilling.

Few of the ore shoots are over 100 ft. in length, and barren ground furnishes the pillars necessary to support the workings when the stopes have been emptied. Rand 3⅝-in. machine drills are used for stoping. These machines drill on an average five 7-ft. holes per 8-hour shift. Seven machines furnish the output of about 165 tons of ore per day. The drilling is done in two shifts, and all of the holes are loaded and fired by the blasting crew during the "graveyard" shift.

The mine chutes have openings 24 in. wide by 20 in. high furnished for the most part with arc gates. In the square sets they are placed in every third set, while in the narrow stopes where stulls are used, they are from 25 to 30 ft. apart. The sides of the chutes are made of 10x10-in. timbers to withstand the effects of bulldozing, and the bottoms are made of a double thickness of 3-in. planks. The ore is trammed by hand to the shaft in cars of 11 to 12 cu.ft. capacty, holding 1600 to 1800 lb. of ore, and hoisted to the surface in single-deck cages.

Shaft Sinking

With the exception of shaft sinking all development work is done by company men on company time. Drifts 5x7 ft. to 6x8 ft. in the clear cost about $16 per foot. A round of ten 5-ft. holes is drilled in two shifts and blasted in the third, or graveyard, shift.

The shaft is now being sunk from the 900-ft. to the 1300-ft. level, and has already attained a depth of 1200 ft. The work is being done by contract and two drills are kept at work three shifts per day, every day in the month. The shaft is 18 ft. by 7 ft. 6 in. in the clear, and has been sunk 97½ ft. in a month with 13 rounds of holes. A round consists of 18 to 20 holes, usually nine 8-ft. holes on each side, the cut being in the center of the shaft. Almost no water is encountered in sinking. The rock is hoisted in a bucket by a compressed-air hoist to a pocket just above the 900-ft. level from which the cars are loaded and taken to the surface.

During the sinking the timbering is kept within about 25 ft. of the bottom of the shaft. In placing the timbers a staging is hung by chains and hooks from the sets already in place. No built-up staging is used, and by this method the work of the drill-men is not interfered with. Prospecting is done for the most part with diamond drills. One machine is kept constantly at work, and two for the greater part of the time. Each machine averages 20 ft. of hole per day, at a cost of about $2 per foot.

The Mill

The Le Roi No. 2 mill was widely mentioned in the mining press a few years ago when extensive experiments were made with the Elmore oil process, and the idle mixing cylinders and centrifugal separators still in place in the lower portion of the mill building are a monument to the economic failure of that process at this mine. The present system of milling is far simpler, and though the extraction is not high, ores as low as $1 per ton can be treated at a profit and the mill is considered a reasonable success.

The ore is received in a bin having a capacity of about 50 tons. From this it is fed to a Blake crusher where it is broken to pass a 3-in. ring. The product of this crusher is divided and goes to two smaller crushers having jaws set with a 1-in. to 1¼-in. opening, and yielding a product whose maximum size is not over 1½ in. in diameter. This broken ore goes to storage bins, from which it is fed by a Challenge feeder to a chilean mill where it is crushed to pass a 30-mesh screen. The wear on the screens is severe and they have to be renewed every two days. The pulp from the chilean mill flows to a 4-spigot, rising-current cone classifier, of which only three spigots are used. The product from each spigot is fed to a Wilfley table. The middlings product from these three tables is combined and treated on a fourth Wilfley.

The chalcopyrite in the ore slimes badly and strips of canvas are suspended over the Wilfleys in such manner that they sweep the table and deflect the slimes into the concentrates settling box. These strips interfere with the action of the wash-water and give rise to a large middlings product, but this is considered to be warranted by the increased extraction. The tailings all go to waste though it seems that the installation of canvas tables or vanners would be justified by the increased saving.

The crushing plant is operated only during the day shift. The mill treats, on an average, 60 tons per 24 hours and is run by one man on each of the three 8-hour shifts. Throughout both the mine and mill economy of labor and careful attention to details are observed, with the result that this mine is one of the most profitable of the Kossland district.

Equipment at the Clara Consolidated

The Clara Consolidated Gold and Copper Mining Company owns about 200 claims situated at the new town of Swansea, Yuma county, Ariz., 22 miles from the station of Bouse on the Arizona & California railroad. About 19 miles of the grading on the Arizona & Swansea railroad to the mines has been completed and part of the tracks and ties are laid. This railroad was expected to be completed in December, 1909.

The smelting plant comprises one Mitchell furnace complete with Mitchell dust-collecting chambers, the furnace dimensions 44x293 in. at the tuyeres. The blast is supplied by two Connersville blowers, which have a capacity of about 15,000 cu.ft. of air per min. The furnace will be fed by the gravity dump-car system. Slag from the smeltery will be handled by Jeffrey electric motors. The converter building is a structural-steel building throughout, including the relining plant. There are two converter stands of the latest electrically operated type. One 45-ton overhead traveling crane handles converter shells to and from the relining floor to the converter stands.

The ores will be handled from the shaft of the mines by cars hauled by Jeffrey electric locomotive. The collar of the mine shaft is on a level with the top of the smeltery bins. The ores will be handled as direct as possible from the mine to the smeltery, storage bins being placed at the smeltery. Another new feature in the production of steam power in the plant will be a battery of the latest type of Mitchell slag steam generators, as perfected by George Mitchell. This device is for the production of power from the heat of slags, and it is claimed to produce steam pressure of any degree wanted.

The mines department of the Victorian government maintains prospecting parties in the field in search of new auriferous deposits.

Progress and Developments in Cyanide Practice

Drag Classifiers and Coarser Feed for Tube Mills; Ribbed Linings Used. New Slime Thickeners Devised. Vacuum Filters in General Use

BY MARK R. LAMB*

Improvements in the cyanide process appeared constantly during 1909 though not with such spectacular strides as did vacuum filters, air agitation tanks and ribbed tube-mill liners during 1908.

Sorting of ore before milling was not adopted by any plant of size built in America during 1909. Some plants in Mexico, where low-grade ores absolutely require it, have picking belts and this should be as a great light to such companies as are milling high-grade ores. Even at Goldfield it is cheaper to sort out ore which will not pay for milling than to mill it. In Mexico with 35c. labor the omission of sorting is nothing short of a waste of natural resources and should have the attention of the conservation cohorts.

The phenomenal results attained in the preliminary test runs with 1900-lb. stamps on the Rand came just at the end of the year. A capacity of 15 tons per stamp is something unheard of in America. However, the results attained at the Mexico mill at El Oro justify the belief that a variation in tube-mill feed of from 20 mesh to 3/16 in. has little effect on tonnage or fineness of output, and would indicate that the field of the stamp mill will be narrowed shortly by the return to favor of rolls, and the intrusion of the steam stamp of the copper miner. Where no concentration or amalgamation is necessary, the gravity stamp will have a hard time holding its own.

To concentrate high-grade ores is still considered necessary. With silver, while concentration facilities were not omitted except at the Mexico mill, the majority of metallurgists look upon the wages of the concentrator men and upon the first cost of the concentrating plant as an unnecessary expense. It is even proposed to conduct the concentrate from tables and vanners direct to the tube mill, returning the tube-mill discharge to the tables. This would result in grinding the concentrate so fine that it could not be caught on the tables, whereupon it would certainly yield its gold and silver to cyanide in slime-agitation tanks. This method, so far as the actual grinding is concerned, is better than providing a special tube to grind the concentrate, as a certain amount of sand is required for the fine grinding of the concentrate in any case.

Drag Classifiers Favored

For separating sand and slime some form of drag classifier is preferred, though a few plants obtain excellent results in feeding tube mills with the underflow from cones. However, the success of these latter depends much more upon the attention given them. Under the title drag classifier may be included the Dorr, the Empson, the one in use at El Oro and the ordinary shovel-wheel as used in dewatering during coarse concentration. The value of the latter as a tube-mill feeder for all ores has not been demonstrated, though neither has the machine failed where tried. It is small and inexpensive, requires little power and has few wearing parts.

Tube-Mill Practice

Various tube-mill linings have been invented, with attached patents of incidental details of construction. The original El Oro lining invented by Brown has held its position in El Oro. The Tonopah ribbed lining invented by Rotherham, which differs in that no holes in the shell of the mill are required, is becoming quite as popular with those who see it. Except in isolated cases the silex lining is *passé*. Even silex pebbles have lost their former dignified position and are now used only to start a new plant, the wear being met by the addition of lumps of ore. As this ore wears out much more rapidly than the silex pebbles (the ratio of wear is about 10 to 1) provision must be made for feeding in some way other than through the manholes. Spiral feeders are made large enough to pass rock of suitable size while with tube mills which are provided with cone-shaped end liners, discharge gratings can be omitted, so that pebbles can be fed to the mill directly through the trunnion. This shape of liner prevents the discharge of pebbles from the mill and, at the same time, allows pebbles to be fed while the mill is in operation. Such features together with the long life of the lining itself permit of the operation of a tube mill almost 100 per cent. of the possible operating time. Only a short while ago it was considered necessary to provide two mills to do the work of one, on account of the time lost in adding pebbles, replacing loosened silex bricks and in the frequent replacing of worn linings, with the attendant loss of two weeks' time necessary for the setting of the cement binder.

New Zealand has outdone America in its appreciation of the tube mill. In the former country it is considered advisable with gold ore to have a tube mill for each 10 stamps, increasing the capacity of the latter by using coarser screens until a suitable tonnage of tube-mill feed is secured. Africans seem to lean toward heavier stamps rather than toward more tube mills, probably on account of the difficulty they experience in breaking away from the practice of amalgamation after the battery, and in adopting milling in solution. To be sure, these changes are not always advisable in old plants, with their leaky tanks and light stamps, but would seem to be entirely feasible in new plants, if New Zealand and American practice can be used as a guide. Two strong advocates of all-sliming and vacuum filtration recently invaded Africa from America: C. G. Patterson, chief engineer for Chas. Butters, and Dr. F. L. Bosqui. Both have had wide experience in slime treatment and filtration and undoubtedly will have a notable influence on Rand practice.

Handling of Slime

Slime thickening is one of the operations about a plant which requires constant attention. Until recently the practice was to settle in cone-bottomed tanks or else in flat-bottomed tanks in which the slime was allowed to form its own cone. The latest development, put out by J. V. N. Dorr, and consisting of a settling tank provided with a slow-moving discharge, was favored in the new plants and during 1909 replaced cones in some of the older ones. It has numerous advantages over the cone, but like the latter, is not entirely automatic since the discharge of the settler must be regulated to the tonnage of the inflowing pulp. However, it is so vastly better than cones for cyaniding plants that to all intents and purposes it may be considered perfect. The appearance, late in December, of the new method of slime treatment evolved by Mr. Nichols after an extended study of the problem, can be credited to 1909 though the process was not put into operation far enough away from the inventor for one to pass upon its practical merits.

The Frenier sand pump holds its own, though quite a number of plants using tall tanks or requiring to lift tailing over 50 ft. built or are building bucket elevators for the work. For a 55-ft. tank, three or four Freniers in series would be required. As noted in last year's review, there is a crying need for a sand pump at least as dependable as a water pump. It was attempted to build a plunger

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pump with parts so hard that they could not wear out. This pump is under test but so far has not proven entirely satisfactory. The ideal pump will be built with a flexible but impervious partition or diaphragm between the plunger and the pulp, as in acid pumps of German manufacture and in grout pumps used where cement must be forced under heavy pressures.

Filters maintained about the same position as during 1908. Prices and royalties demanded were much lower. The Oliver had numerous partisans. The Moore filter is doing good work at Pachuca and the Butters holds its own, having just been ordered for the 1000-ton plant of the Dos Estrellas company. The first type of Burt filter, the cylinder set on an incline, was not exploited so vigorously as formerly on account, probably, of the rather better results attained with the new revolving model. It seems that the much discussed filter-patent litigation made little headway, but all patent litigation is notoriously slow.

The tall air agitation tanks are as popular as ever, and no plant is complete without them. Some users have decided that the central tube is not necessary for good and economical extraction, although with equal certainty the central tube is of advantage in starting a tightly settled tank or one having a goodly proportion of sand.

Acid treatment of precipitates, whether on zinc dust or shavings, fell into disrepute, and deservedly so, and the manager of even the smallest plant now insists upon a precipitate filter press. Zinc-dust precipitation was provided for several plants during 1909. It has the advantage of preventing theft, which is deserving of consideration. This method of precipitation is being considered by Manager Shanks for the Rio Plata plant and was built into the Yoquivo mill, both to treat high-grade ores.

A recent open letter written by President Haigh of the Moore Filter Company to the *Pacific Miner* indicates that the Clancy process was described in the technical press. The paper by Mr. Crowe, in which the Moore company claims its process was described without due credit being given to the inventor, attracted attention on the Rand and the process as there described will undoubtedly be tried out by many independent investigators.

Notes on Equipment of Plants

Power equipments of plants built during 1909 followed the usual lines—electrical and hydraulic power where available, otherwise steam or gas engines. The Alvarado Milling Company of Parral contracted for a steam-power plant for the new 60-stamp mill, with the results of the gas-power plant of the Tecolotes mill before them, and as the directors are men with much experience with mills and plants, there seems to be room yet for argument on the power question. A very impressive small plant was contracted for by the Tehuantepec Silver Mines Company of Oaxaca during December. This plant included gas-engine power. Direct connection to motors is favored for all such machines as compressors, tube mills and pumps. The Yoquivo mill and plant, designed by A. H. Kennedy, is an example of a plant with all motors direct connected.

Following are a few recently completed plants with special features which merit mention. The Butters plant at Copala obtained a capacity of six tons per day per stamp and operated successfully on $8 silver ore. Slime treatment was by mechanical agitation. The mill of the Lluvia de Oro mine is steam-turbine driven, and treats an all-slime product by mechanical agitation and Burt filters. Concentrates are reground and amalgamated before transportation to the railway. San Rafael at Pachuca has the largest Moore filter in the Republic. La Union, also at Pachuca, is a remodeled amalgamation mill in which crushing to slime was done in one operation in heavy, slow chilean mills. El Bote at Zacatecas has air-agitation tanks with outside air lifts which give practically the same results as the inside tube. This plant also uses heavy chilean mills. Esperanza has a battery of air-agitation tanks, tube mills and Merrill filter presses, and successfully treated tailings which would not be touched in Africa. Goldfield Consolidated is placing high-speed chilean mills with the expectation of greatly increasing capacity at a less expense than by adding stamps and tubes.

The majority of the plants completed or begun in America during the year followed, with slight variations, the same lines. Crushing in breakers was followed by crushing in stamps (finely for concentration or coarsely if this is omitted.) This was followed by drag classification, tube milling, air agitation and filtration of the entire pulp. The Eagle Mining Company and R. P. Chattin, of Idaho, and Dr. S. B. Smith, of Sonora, adopted the Rhodesian practice of using steam stamps for small concentrating and cyanide plants.

The mill which is destined to hold the record for low cost of installation and maintenance in America for a long time was the one designed by Geo. L. Kaeding, of the Eureka Windfall Mining Company, of Eureka, Nev. The plant consisted of gyratory breaker, 24x24-in. rolls and leaching tanks, the power being supplied by a 40-h.p. gas engine. Including road building and mill construction the cost of the plant complete was under $30,000, only two men per shift were required, extraction was well above 95 per cent, and the plant showed a capacity 140 tons per day. These results are are due to the nature of the ore, a soft, easily leached sandstone.

The Conservation Engineer

The regents of the University of Michigan have just taken a step which may end by doing away with the old reproach that since Aristotle the field of human knowledge has grown too wide for any one man to embrace. The regents have established a six years' course of study leading to the degree of master of conservation engineering. The argument, as advanced in the *Michigan Alumnus*, may be summed up as follows: It was the surveyor and civil engineer, following in the footsteps of the pioneer, that blazed the way for our lavish exploitation of those magnificent natural resources, the end of which is now coming into sight. "What more natural than to call on the man who started the machine to slow it down, to regulate its speed? The engineer has been the one great factor in making possible the creation of the conditions of our modern civilization. His great work in the future must be to serve mankind in an even more important capacity—to prolong the life of the things which he has helped create." Now a man capable of doing such work must be something more than a narrow expert; he "must prepare himself to live his life along conservation lines."

Hence our future master of conservation engineering will have to pass through a following curriculum: In mineralogy and lithology, geology, biological sciences (general biology, economic botany, economic zoölogy and general forestry), astronomy, drawing, surveying, civil engineering (structural mechanics, strength and resistance of materials, hydraulics, municipal and sanitary engineering, water supply and waterpower), mechanical engineering, electrical engineering, chemical engineering (general metallurgy and mineral and botanical technology), political economy, law (elementary law, contracts, constitutional law, and conveyancing).

Even if such a course should fail to make a good conservation engineer, says the *Evening Post*, it will supply the republic with a set of desirably educated citizens.

Bromine

During 1909 the price for commercial bromine remained steady at 10c. per lb. at place of production. Potassium bromide was quoted at New York at 18c. per lb. in January, after which the price rose to 20c. at which figure it remained steady during the remainder of the year. The advance was due to the withdrawal of the German producers from this market, which took place Dec. 31, 1908. So far as we are aware no bromine or bromides were exported from the United States in 1909. The domestic bromide production was about the same as in 1908.

Condition of Phosphate Industry in Tennessee

Production below Normal. Prices Low. Ground Phosphate Output to Be Increased; International Agricultural Corporation Organized

BY H. D. RUHM*

Actual statistics of phosphate shipments are not available as yet but there is little doubt that in 1909 production and shipments continued to be somewhat below the normal of the Tennessee field, although quite a stimulus was felt after Aug. 1, and 1910 bids fair to again show a normal production. R. A. Shiplett, State mine inspector, estimates production of phosphate rock in Tennessee for 1909 to have been 436,000 tons.

During the stagnation period the manufacturers of fertilizers took advantage of the opportunity to thoroughly fortify themselves with supplies of rock in the ground, so that for a long time to come, the chances are that values as shown by sale prices, will consist merely of the nominal figures at which the phosphate-mining departments charged up the rock to the fertilizing departments.

Company Organization

The Independent Fertilizer Company, organized last year by T. C. Meadows with the aid of J. P. Morgan & Co., was finally dissolved by the manufacturers who were in it, at a time when Mr. Meadows was on the other side of the ocean. On his return he organized the International Agricultural Corporation, which was composed of the Buffalo Fertilizer Company and its affiliated concerns, the National Fertilizer Company of Nashville, Tenn., the Tennessee Valley Fertilizer Company of Florence, Ala., the Germo-Fert Company of Atlanta, Ga., and Montgomery, Ala., the Blue Grass Phosphate Company, the Jackson Phosphate Company, Middle Tennessee Phosphate Company, Brown Rock Phosphate Company, Maury Phosphate Company, Little Bigby Phosphate Company, T. C. Meadows & Co., Richland Phosphate Company, France & Co., Ruhm & Barrow, Ruhm & Gregory, Sterling Phosphate Company, all of Mt. Pleasant, the American Phosphate Company at Wales, Tenn., and the Kaliwerke Sollstedt, of Sollstedt, Germany.

With their already strong position augmented by the recent purchase of the Prairie Pebble Phosphate Company's holdings in Florida, and with the expected increase in the sulphuric acid production at Ducktown, Tenn., which it has the contract to consume, the International Agricutural Corporation stands without a rival in the world today. Its possessions of raw material for the manufacture of fertilizer and facilities for its manufacture and distribution are ample and ideally located, and the organization is successfully at work.

The organization of this company marks a new era in the formation of such concerns, in that not a dollar was paid out for good will or business or bonus of any kind, everything going into the company having been appraised at cash valuation and paid for in equal amounts of preferred and common stock at par. The company has no bonded debt of any kind.

The officers of the new company are: Waldemar Schmidtman, president; W. N. Shaw, vice-president; John W. Fry, secretary; E. M. Rounds, treasurer; A. C. Floyd, assistant treasurer; T. C. Meadows, general manager; H. C. Sickler, assistant general manager; W. D. Huntingdon, manager Buffalo Department; Lee Ashcraft, manager Southern Fertilizer Department; G. W. Killebrew, manager Phosphate-Rock Department.

Operations

The American Agricultural Chemical Company continued to operate its plants at Wales and Centerville, but with a reduced output. The Virginia-Carolina Chemical Company greatly increased the capacity and efficiency of its washing and drying plant at its Arrow mine, and is now transporting the waste product from the Howard and Ridley mines to Arrow for washing and drying. Its blue-rock mines at Mayfield were operated regularly and it greatly increased the drying capacity there. The Independent Phosphate Company operated at Satterfield and Solita, and is rapidly pushing ahead the development of its blue-rock mines at Leatherwood. The latter mine and Mayfield mines of the Virginia-Carolina Company are the best blue-rock mines in the field.

The Middle Tennessee Railroad Company was about completed from Nashville to the Leatherwood mines and contract was signed for its completion on to Mt. Pleasant during 1910. This will give the phosphate field of Tennessee the much-needed competition in railroad facilities and should go far toward relieving car-shortage troubles.

In the Centerville district only the Volunteer State Phosphate Company and the Meridian Fertilizer Factory ran to any extent during 1909. The Virginia-Carolina operations at the Fogg mines are reported to have about worked out the Duck River Phosphate Company's holdings. At the Bear Creek mines, owned by the Tennessee Chemical Company, recently absorbed by Armour & Co., considerable activity was manifested and plans are now in preparation for installing an uptodate washer and dryer. The Federal Chemical Company at Century and Ridley operated continuously, having the largest and best equipped washing and drying plants in the field.

The Independent Phosphate Company had one washing plant. The International Phosphate Company one, Federal Chemical Company two, Ruhm Phosphate Mining Company one, International Agricultural Corporation four in operation in the Maury County field.

General Conditions and Prices

The prices of rock for the few outside sales that were made, were in sympathy with general conditions at $3@3.40 for 72 per cent. rock with 6½ per cent. Fe + Al, and $3.50@4 for 75 per cent., 5½. Blue rock was quoted around $2.65 @3.25 for 60 to 65 per cent. rock with 3 per cent. Fe + Al.

The ground-rock business continued to increase and the following firms are now engaged in grinding: Ruhm Phosphate Mining Company, Farmers' Ground Rock Phosphate Company, Mt. Pleasant Fertilizer Company, International Agricultural Corporation, Central Phosphate Company, and Cooper & Jackson.

The western freight association having recently decided to give the same rate on ground phosphate in bulk that is given on lump rock, the use of ground rock directly, without acidulation, will greatly increase, the discrimination in rates heretofore, having prevented much of it from being used.

The new process of washing and saving all the phosphate granules about trebled the supposed available tonnage of brown rock of 72 per cent. or higher.

On the whole conditions in phosphate circles seem to be healthy and the prospects for owners of phosphate property to make reasonable sales of their holdings will doubtles remain favorable for some time to come.

According to telegraphic despatches, the Chilean government has contracted with a London syndicate for the construction of that section of the Longitudinal railway, which will lie between Copiapo and Iquique. The price is $15,250,000. When completed the road will extend from the frontier of Peru to the Strait of Magellan.

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Report of the Coniagas Mines, Ltd., Cobalt

Mined Nearly 25,000 Tons During Year; Total Costs, $8.61 per Ton Mined. Stamp Mill to Be Doubled. Output to Date 4,863,323 oz. Silver

DIVIDENDS TO DATE $1,160,000

The directors' report of the Coniagas Mines, Ltd., recently published, gives a resumé of the work of this important Cobalt property during the year ended Oct. 31, 1909. On account of the present interest in Cobalt mining properties the yearly report of the company is here treated at considerable length. The claims of the Coniagas Mines, Ltd., are situated in the town of Cobalt, adjoining the Right-of-Way and Nipissing holdings. Since its incorporation in November of 1906 the Coniagas company has paid $1,040,000 in dividends on its capitalization of $4,000,000.

In the annual report John Redington, superintendent, states the amount of rock removed during the past 12 months as 24,889 tons, of which 1130 tons were barren rock removed in cross cutting; 3760, pay rock from drifting; 19,472, pay rock stoped; 380, pay rock from winzes and 147 tons barren rock from shaft sinking. Since the beginning of operations of the Coniagas mines 60,229 tons of rock have been removed, or about 40 per cent. during the past year.

In the accompanying illustrations, Fig. 1 is a surface plan of the Coniagas property and shows the situation of the different veins proved. Fig. 2 shows the development of these veins, the cross-hatched portion of the stopes representing the material removed during the year ending Sept. 30, 1909. Of the 60,229 tons mined from the time operations were started to Oct. 31, 1909, 33,229 tons were put through the concentrating mill and of this 19,038 tons were milled during the past year. During the year 51 ft. of shaft sinking were accomplished, 1254 ft. of drifting, 376 ft. of crosscutting and 80 ft. sunk in winzes.

The No. 4 shaft shown in Fig. 1 to the south of the property, near the corner of Silver street and Prospect avenue, has been sunk to a depth of 55 ft.; it will be sunk to connect with the extension of the 150-ft. level. In winze No. 6D ore was followed for 68 ft. below the 150-ft. level. The No. 3 shaft is down 70 ft. in barren material, but the Fourth of July shaft on the Nipissing property to the east is 164 ft. deep in good ore. The total development of the property to date is 473 ft. of shaft, 5010 ft. of drift, 1017 ft. of crosscut and 174 feet of winze. The ore reserves actually developed on three sides are estimated at 106,000 tons of high-grade ore, carrying 12,500,000 oz. of silver: The estimate is based on the silver contents of the ore removed to date.

Mill to be Enlarged

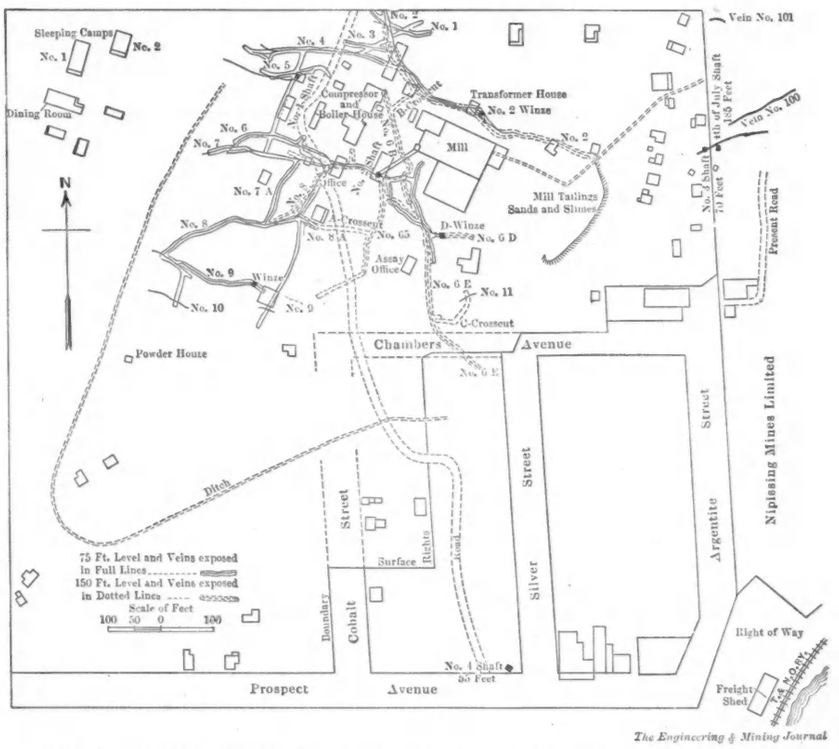
During the past year the output of the mine has been restricted by the inefficiency of the gas-engine plant installed to run the concentrating mill. The present mill comprises 30 stamps with a capacity of about 70 tons per day and on June 12 the directors authorized the addition of 30 more stamps and the installation of electric equipment, power to be furnished by one of the hydro-electric companies now constructing plants to supply the Cobalt camp. In this connection it is interesting to note that a contract has been made with the Cobalt Hydraulic Company for supplying compressed air for mining operations.

The Coniagas Mines, Ltd., began concentrating ore Sept. 24, 1907. From Nov. 1, 1905 to Oct. 31, 1906, 289 tons of ore containing 657,513 oz. of silver were shipped; during the next year 2655 tons carrying 1,341,372 oz.; during 1907-08, 627½ tons of mine ore and concentrates carrying 1,457,210 oz.; 350 tons of mine ore carrying 807,253 oz. of silver and 426 tons of concentrates carrying 599,975 oz. were shipped during the last year. The total shipment from the Coniagas mine has therefore been 4347½ tons carrying 4,863,323 oz. of silver.

Troubles at Cobalt

A controversy has arisen between the town of Cobalt and the Coniagas company in the delimiting surface rights acquired by some citizens on the southeast portion of the company's property, since mining rights on the same property were acquired by the company's predecessors. To date the company's contention has been upheld in the courts. There are also some minor legal disputes pending in the courts with the town of Cobalt regarding assessments.

Recently Cobalt has been afflicted with a severe epidemic of typhoid fever, the result of a badly located townsite and inadequate government in a rapidly growing mining camp. The epidemic spread to adjacent camps and resulted in much loss of life, health and wages to hundreds of families, and a large expense to the whole camp. The Red Cross hospital, suported by the mines and managed by a board of directors presided over by R. C.



The Engineering & Mining Journal

FIG. 1. PLAN SHOWING BUILDINGS AND UNDERGROUND WORKINGS OF THE CONIAGAS MINES, LTD.

Rogers, assistant to the president of the Coniagas company, contained at one time 188 fever patients. It is proposed that the Coniagas company acquire 1500 shares at par of $1 in the proposed company which is being formed to acquire this hospital.

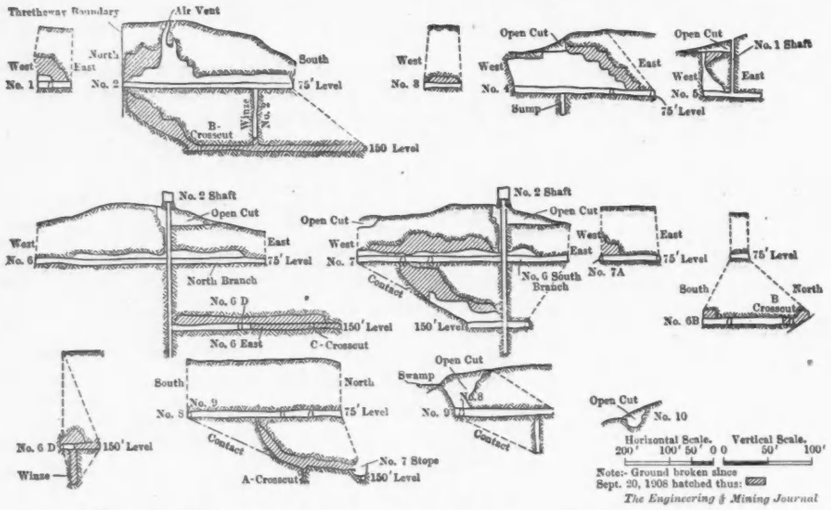


FIG. 2. SECTIONS ALONG VEINS ON CONIAGAS PROPERTY

At the cost of the experiments performed and the patents, the Coniagas company has obtained a 55 per cent. interest in the Redington rock drill, invented by John Redington, superintendent of the Coniagas mine. These drills have been manufactured at the mine machine shop and have proved efficient and cheap in first cost and maintenance. In order to take up a portion of the floating debt of the Coniagas Reduction Company and provide working capital and cash reserve it is also proposed that the directors of the Coniagas Mines, Ltd., subscribe to 1494 more shares in the reduction company in preference to the immediate payments of dividends. The Coniagas Reduction Company has a floating debt of $164,000, incurred in the construction of the plant and for providing working capital. The extensions to the reduction plant, now under way, were to be completed in about three months. Heretofore this plant has only marketed silver and arsenic and has accumulated a large stock of cobalt and nickel in various stages of refining.

COSTS AND PROFIT FOR THE YEAR

As shown by the statement accompanying the report the average cost of mining for the year was $3.14 per ton of ore and waste removed; the cost of milling was $2.05 per ton of ore milled or $1.57 per ton of rock mined. The expense of administration, supervision, camp maintenance, lands and roads, fuel, oil and waste, sale of ore, legal advice, taxes and royalties, and transportation figures at $3.90 per ton of rock mined. This gives a total expense of $8.61 per ton of ore and waste removed during the year under review.

The average silver content of the rock mined during this same period was about $27, thus leaving a profit of almost $19 per ton on all material broken. The total year's profit is credited in the report as $477,410, of which $360,000 was paid in dividends, $1500 as a directors' fund and $2475 as an employees' bonus—4 per cent. of each man's yearly salary as a Christmas distribution. The balance on hand Oct. 31, 1908, was $326,480, and $440,014, at the close of the last fiscal year.

Ammonia Production in 1909

BY C. G. ATWATER*

In 1907 the production, or perhaps more accurately, the recovery, of ammonia reached its high-water mark in this country. Reckoned as sulphate of ammonia the output for that year was 99,300 net tons, as closely as can be estimated. In 1908, owing to business stagnation, the output was but 83,400 net tons of sulphate equivalent according to the figures recently given out by the U. S. Geological Survey and with due allowance for production from sources other than bituminous coal. This was a loss of nearly 16,000 tons, and was due principally to the smaller number of by-product coke ovens in operation and the consequent drop in by-products recovered, though the production from coal-gas works also fell off to some extent.

As the drop in the recovery from the last-mentioned source was due to the increased favor manifested for carbureted water gas and oil gas rather than to business conditions, there is little reason to expect much increase in output from the coal-gas works for 1909 or for the year to come. This is not the case, however, with the by-product coke ovens. Their number was augmented early in 1909 by the 280 new ovens built at Joilet, Ill., the 50-oven addition to the Hamilton, Ohio, plant, the 50-oven plant at Indianapolis, Ind., and 15 additional ovens at Geneva, N. Y., and the ammonia production was increased as well by the resumption of operations at a number of other plants that had been wholly or partly idle for a time. There is, therefore, good reason to estimate the 1909 production of ammonium sulphate and equivalent at as much if not more than was made in 1907. Furthermore, the probable completion and placing in operation during the coming year of the 500-oven plant now building at Gary, Ind., and the possible completion of other plants, and additions to existing ones, as well as the prospect of business conditions that will require the operation of all at full capacity, point to a continuous increase in production. However, in ammonia recovery we do not as yet approach the development that has taken place in Germany and England where increases of from 12,000 to 50,000 tons yearly have regularly occurred for years. It is also worthy of note that these large increases have not been followed by a glutted market nor by notable price reductions.

The United States imports for the fiscal year ended June 30, 1909, amounted to 40,192 net tons, as compared with 34,274 tons in 1908 and 32,669 tons in 1907, showing that the consumption has held its own better than production.

The price fluctuations during 1909 were considerable, due to the revision of the tariff. The price ranged between $2.89 and $3.01 per 100 lb. for the first half of the year, the maximum being reached during February. At the beginning of August the price was still $2.87, but on Aug. 6 the new tariff bill, which removed the existing rate of 30c. per 100 lb., went into effect, and this, aided by the fact that it was the quiet season for fertilizer materials, resulted in a drop of the price to $2.65. Since then the market has stiffened some and the prospect is that a part of the loss will be recovered. The former imports were in the nature of dumping surplus stock into this country for what it would bring, and, as is shown by the fact that the whole reduction of the duty was not reflected in the lowering of the price, the future foreign business seems likely to partake of the same character, with the difference that the door is now a little wider open.

There is not, however, any large surplus of sulphate of ammonia available to bring in here from any source. In spite of the fact that the world's production has now increased to nearly 900,000 tons per year, there is a market for it all, and for any considerable increase in our imports a price must be paid that will divert it from other consumers. The real prospects of the sulphate of am-

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monia market in this country lie rather in the direction of developing our own supply from our enormous consumption of bituminous coal, less than 3 per cent. of which is now treated for the recovery of this valuable by-product, and in the increase that is bound to come in the use of commercial fertilizers in the agriculture of the nation.

Magnesite in 1909

The mining of magnesite on a commercial scale in the United States was conducted during 1909 in the State of California only. Even there but few of the known deposits are being utilized, for the reason that the Pacific coast demand is comparatively light and the substance will not profitably bear transportation charges across the continent to points of greatest consumption. Large quantities are therefore annually imported from Greece and Austria.

In California the principal use to which the mineral is put is, in a calcined form, as a digester of wood pulp in paper manufacture. Some is also used for manufacturing carbonic-acid gas and smaller quantities in making tiling, wainscoting, flooring and other building materials. The normal annual demand from the California mines is from 6000 to 8000 tons of crude material but a much larger output could be made did consumption warrant. The spot price at the principal mines in the San Joaquin valley was $3 per ton for the crude. The calcined was sold at $14@16 per ton, according to the roast given. It takes 2.6 tons crude to make one ton of calcined magnesite. Nearly all that is mined is calcined at the mines before shipment, there being little or no demand for the crude mineral. The only crude magnesite shipped from the mines is that used in the manufacture of carbonic-acid gas. In this process the mineral is calcined, the gas saved, and the calcine sold to the paper makers. For building material only the calcine is utilized.

Conditions in California in 1909

During 1909 there was an increase in the amount of building material made, though most of the manufacturers conducted their business on a small scale no extensive plants having been erected since the destruction of the works of the American Magnesite Company at East Oakland by the earthquake of 1906. That company has since virtually gone out of business and its mines at Red mountain were relocated by others.

The first attempts to manufacture flooring and kindred substances in California were not successful owing to lack of knowledge of the proper "binder." These difficulties having been overcome to a great extent, the products now turned out are quite satisfactory. The first failures did some harm to the industry and it is still difficult to get architects and contractors to name this substance as a building material. Although of late large quantities are being put in use in prominent and expensive buildings, it will be necessary for a large company with extensive capital to establish a plant where the work can be conducted upon a scientific basis and thus insure uniform products which will stand the necessary tests.

More interest was manifested in magnesite in 1909 than ever before but this did not lead to the opening of any new deposits of magnitude. Several companies were organized to manufacture building materials, etc., and to mine the substance, but their efforts were mainly directed toward selling stock and they did not open new mines or build plants. Of the factories that operated, all were small and each man seemed to be working on some plan or "secret process" of his own, making just enough to fill immediate contracts and extending the business but slowly.

Operating Mines

The most productive mines in the State were operated in the interest of the manufacturers of paper from wood pulp, who utilized almost the entire output. These mines are at South Tule and Porterville, Tulare county, and are provided with their own calcining furnaces. Another mine which is equipped with furnaces is in Fresno county, near Sanger, but it was not in operation during 1909, owing to cost of the long haul to the railroad. The deposit at Winchester, in Riverside county, was also worked in a small way. Small quantities were also taken from the Red mountain deposits in Santa Clara and Stanislaus counties but the distance from rail connection prevented mining these deposits on a large scale. A 21-mile railroad must be built before it will pay to work these mines extensively. There is quite a group of them and more or less development work has been done, showing, on the surface at least, apparently large bodies of mineral.

Although there are several known deposits of some extent in both Sonoma and Napa counties there was little or no production from these sources; formerly the Napa county mines were the most productive in the State. Those near railroad facilities have been worked out, and those where long hauls are necessary cannot compete with mines in other counties where shipping facilities are better.

One of the difficulties in the mining of magnesite is that of knowing with anything like exactness the extent and continuity of the deposits. They may give out at any time or intrusions of serpentine may unexpectedly cut them off. Often there are immense croppings with not very much below them. On account of this uncertainty as to the extent of the deposits and the small local demand few deposits have been exploited. A very complete description of the magnesite deposits of California was published in *Bull.* No. 355 of the U. S. Geological Survey, by Frank L. Hess. A map accompanies this bulletin and shows the situation of all known mines or deposits.

The Dutoitspan Diamond Mine

The Dutoitspan diamond mine, one of the larger producers in South Africa, was closed down early in 1908, on account of the sudden decrease in the buying of diamonds which began late in 1907. With the revival of business the De Beers Company has decided to reopen the mine and preparations are being made to resume production in January.

The reports of the company give the following results from the Dutoitspan mine during four full years of its operation. The statements are for the years ended June 30; the loads of blue ground are of 16 cu.ft. each:

	1903-'04.	1904-'05.	1905-'06.	1906-'07
Blue hoisted, loads.	39,914	311,499	1,685,714	2,481,987
Blue washed, loads.	24,359	65,784	617,028	1,539,327
Loads on floor, June 30.	15,555	261,270	1,329,956	2,272,616
Diamonds, carats.	3,032	17,122	151,335	365,822
Diamonds, value	£6,457	£59,847	£612,608	£1,455,330
Value, per carat	.....	$16.78	$19.43	$19.10
Carats, per load	0.12	0.26	0.25	0.24
Value, per load	.....	$4.37	$4.77	$4.54
Cost per load	.....	2.95	1.71	1.56

In 1903-4 the blue ground reported was taken out in development work, no regular production being attempted. In 1904-5 also there was a large amount of development work, and heavy production did not begin till the following year. The decrease in cost per load with the increase in production is noticeable.

Tungsten

In the United States in 1909, about 2500 tons of tungsten ore, averaging 60 per cent. WO_3, were used, of which about one-half was produced in this country and the other half was imported. The price for ore averaged about $6 per unit of WO_3 on the basis of the short ton—2000 lb. During the last quarter of the year the price for ore rose to $7 per unit and the market became very delicate, consumption having increased. On the other hand, the miners are preparing for a much larger production. With the present 10 per cent. duty on foreign ore, the domestic production in 1910 is likely to be considerably larger than in 1909. The domestic production in 1908 was 497 short tons, compared to 1468 tons in 1907. The production in 1909 consequently was close to the maximum.

Developments in the Florida Phosphate Industry

Great Depression in 1909. Hard-rock Producers Curtailed Output; Pebble-Phosphate Market Better and Mines Run at Full Capacity

BY C. G. MEMMINGER*

Almost unprecedented depression prevailed during 1909 in the Florida phosphate industry. There appeared to be an absolute lack of demand for phosphate, in both domestic and foreign markets. The prices during the first half of the year continued to decline, and sales of Florida high-grade hard rock were reported to have been made at $5 f.o.b. mines, and Florida land pebble was reported to have been sold at $2.60 f.o.b. mines.

These conditions are largely to be attributed to the fact that during the period of high prices of phosphate, some three years back, heavy contracts covering long periods were entered into by the consumers, who, fearing a shortage, covered their requirements fully under these contracts. As a consequence the offerings for new business were extremely restricted, and at the same time, there being no coöperation or unity on the part of the miners in disposing of their product, the result was a general struggle to secure what little new business there was, and subsequently cutting and lowering of prices. During the second half of the year these conditions became somewhat mitigated; conditions steadily improved during the last quarter of the year, and indications are that 1910 will bring an active demand, with a marked increase in prices.

Hard-Rock District

The policy of the producers in the hard-rock district was an extremely wise one, they having restricted their output to meet only current contracts. Stocks were reduced, fully 60 per cent. of the mines in the hard-rock district closed down, and it is evidently the intention of the producers of this grade of rock to keep their mines closed until the market improves and rock can be disposed of at profitable figures. This action will unquestionably bring about the desired results in a short period. There were no new mines opened in the hard-rock district, and the producers of this class of phosphate fully realize the necessity of conserving their deposits, knowing that the quantities of high-grade, Florida hard rock are by no means unlimited. There is therefore every evidence that there will not be an increase in the production of hard rock, but rather a decrease, from year to year.

In the hard-rock district transportation facilities were largely increased by extension of the Seaboard Air Line tracks into various portions of the field where hitherto the Atlantic Coast Line exclusively handled the product from the mines. The rivalry between these two traffic lines will unquestionably be of great benefit to the producer, giving betterment of service and added facilities.

There are two marked changes in the methods of handling hard rock, which were successfully exploited by the Cummer Phosphate Company and the Dutton Phosphate Company. These two companies, instead of following the former method of drying the rock at their mining stations by a crude method previous to making shipment, adopted plans whereby the phosphate, after being washed, is transported to terminals at Jacksonville. Here the rock is dried by rotary driers of an improved type, and stored in bins adjacent to the ship's side. This method proved extremely successful and economical, especially in the case of the Cummer Phosphate Company, where fuel was obtained as a by-product from its saw mills. The rock is stored in quantities at the terminals, which gives the added advantage of permitting prompt loading. There has always been a prejudice in connection with the use of the rotary driers in the handling of hard rock, but the method adopted by these companies fully demonstrated that driers of this type can be successfully and economically employed. The port of Jacksonville, owing to the establishment of these drying and storage plants, became one of the chief export terminals in Florida.

Pebble-Phosphate District

In the pebble-phosphate section the miners, through lack of coöperation, did not adopt the plan pursued by the hard-rock people in restricting their output, and practically all of the mines were run up to their maximum capacity. The market for pebble phosphate, however, fortunately increased so largely that the results were not as disastrous as might have been expected, though a heavy restriction in the output in this district would have been extremely advantageous under the circumstances.

There were no new plants constructed during 1909, the only new plant going into operation being that of the Coronet Phosphate Company, construction on which was begun about June, 1908. The Coronet and Medulla phosphate companies are producers of practically a new class of pebble, which is sold on an absolute minimum guarantee of 74 per cent. phosphate of lime. Cargo shipments from both of these plants showed analyses running from 76 to 77 per cent. phosphate of lime, which is practically in the same class as the Florida, high-grade, hard-rock phosphate. The demand for this class of phosphate is practically restricted to foreign consumption.

A feature of interest in 1909 was the completion of the Seaboard export terminals, at Tampa, Fla. These terminals are designed along the most approved engineering lines, and excellent facilities are afforded for the prompt handling and despatch of phosphate. The elevators are constructed with storage bins of 3000 tons capacity, so that a cargo for an ordinary vessel can be held ready for its arrival. The Seaboard Air Line also had constructed about 200 steel, hopper-bottom cars, of 100,000 tons capacity, especially designed for handling pebble phosphate, the cars being arranged so that the phosphate may be directly loaded into the top. This is a decided improvement over the old type of car, where the phosphate was loaded from the sides, and a considerable amount of hand manipulation was necessary. The Seaboard is also extending its lines further into the pebble district, and will unquestionably become an active competitor with the Atlantic Coast Line in the handling of this class of phosphate.

Sale was reported of the holdings of the Prairie Pebble Phosphate Company, the largest producer in the pebble district, to the recently organized International Agricultural Corporation, which is the reported owner of one of the largest potash mines in Germany, and which also, it is claimed, controls the sulphuric-acid output of the Tennessee Copper Company at Copperhill, Tennessee.

There were no marked changes in the general method for the mining and handling of pebble phosphate, except that the more modern and uptodate plants introduced greater refinement in the preparation, and also installed the most approved and economical types of prime movers. In both the hard-rock and pebble districts every effort was made to lower production cost, but owing to the constantly increasing depth of overburden to be handled, the exhaustion of the most economically handled and richest deposits, higher fuel costs and increased distances for transportation to central plants, the cost of production must of necessity constantly increase.

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The New York Curb Market in 1909

The trading in mining stocks on the New York Curb increased during 1909. According to official tables the total sales in 1909 were 51,358,428 shares; in 1908, 41,946,351; in 1907, 32,420,517 shares.

The number of shares traded in during 1909 and the price on the first trading day and the high and low during the year and the price on the last trading day are given in accompanying table. †Means cents per share.

NEW YORK CURB STOCKS IN 1909.

		Open.	High.	Low.	Close.
100	Adams	5	5	5	5
776200	Alaska	3/8	†73	9	14
2250	Alpha Copper	5 1/2	6 3/8	5 1/8	6 3/8
25	Arcadian	3 7/8	3 7/8	3 7/8	3 7/8
393400	Argentum	†24 7/8	28	10 1/2	12
88250	Atlanta Goldfield	†18 1/2	18 1/2	10	10
10	Atlanta Copper	16 3/8	16 3/8	16 3/8	16 3/8
11800	Banner Mining	†9	11	9	10
26850	Barnes-King Devel	13-16	1 1/8		
2325	Beaver Cobalt	†22 1/2	43	20	43
202220	Big Vein Copper	5 1/8	11	5 1/8	9 1/8
31300	Bingham Central	1/2	7-16	1/4	3/8
181430	Blue Bell	†6	6	3	3 1/4
1500	Blue Bull	†15	15	10	12
2700	Bonanza Creek	3 1/4	3 1/2	2 3/8	3
600	Boston Ely	2 3/4	4 5/8	2 3/4	4 5/8
367324	Boston Copper	17	23 1/2	10 1/2	22 1/4
37100	Boston Copper rights	5	8	3	8
1600	Boston Goldville	†84	100	84	100
519300	Bovard Cons	†10	12	4 1/2	5
109280	Braden Copper	4 5/8	5 7-16	3 1/4	4 13-16
66705	Bradshaw M	†42	42	24	24
23000	Branch Mont. M. & M	†3	3	3	3
233956	Brit. Col. Copper	8 1/2	9	5 7/8	8 1/8
75241	Buffalo Mines	3 1/2	3 1/2	2 3/4	3 1/2
219696	Butte Coalition	26 3/4	33 3/4	21 1/2	28 3/4
100	Butte & London	†35	35	35	35
56955	Butte & New York	2 1/4	2 1/4	1/2	1 3/4
250	Butte & Balaklala	15 1/2	15 1/2	15	15 1/4
160	Calumet & Ariz	101	101 3/8	98	98
321730	Canadian Mines	3 1/4	9 1/4	3 1/4	8 1/4
461985	Carisa	†95	1.20	50	50
2500	Chambers Ferland	†84	84	49	55
201635	Chino Copper	8	13	6 1/2	12 1/2
4882400	Cobalt Central	†56	59 1/2	23 1/2	24 1/2
39400	Colonial Silver	1/2	1 1-16	1/4	3/8
41400	Colorado Dredging	†26	28	24	26
298200	Combined M. & L	3	5 1/2	2	3
119450	Combination Frac	1.35	1.35	.37	.37
27010	Commercial Mining	†47	53	47	51
57400	Commodore G. M	†12	16	11	16
558300	Con. Ariz. Smelt	†9	10	1	4 1/2
881125	Con. Ariz. Smelt., new	† 3/4	3 1/4	3/4	3 1/4
900	Consolidate Va	1.65	1.80	1.65	1.80
439365	C. O. D. Cons	†38	42	7	7 1/2
40	Copper Range	78	81	78	81
1100	Cracker Jack	†6	6	4	4
45668	Crown Reserve	2.70	4.00	2.65	4.00
676711	Cumberland-Ely	8 3/8	10	6	9
200	Daly West	10	10	8 1/2	8 1/2
373900	Davis-Daly Copper	3 1/4	7 1/2	2 5/8	4 3/4
2500	Diamonfield B. B	†9	9	7 1/2	7 1/2
35122	Dolores Limited	7	8	4 1/2	6 1/4
49175	Dominion Copper	9-16	9-16	7	7
137010	Douglas Copper	3	4 1/4	1	1 3/8
435	East Butte	10 3/8	16	10 3/8	13 1/2
59075	El Rayo	3 3/8	4	2	3
2419160	Ely Central	1/2	4 1/2	7-16	2
1665170	Ely Consolidated	†17	1.06 1/4	9	79
97700	Ely Verdi	†25	28	24	25
17150	Ely Witch	1/4	3/8	1/4	1/4
315400	Eureka Copper	5	9	2 1/2	3
13100	Eureka Copper pfd	37	38	34	35
169050	First Nat. Copper	7 3/4	9 3/8	4 1/8	6 7-16
22580	Florence	4 9-16	4 3/8	2 3/8	2 3/8
200	Florence Ext	†9	9	9	9
4600	Foster Cobalt	†51	56	32	32
1000	French Am. Mining	1 1/8	1 1/8	1	1 1/8
76800	Furnace Creek Copper	†12	12	5	5
263565	Gila Copper	6	11 1/8	4	11
295750	Giroux Mining	6 1/4	12 1/4	6 1/4	11
28400	Gold Bar	1	1 1/2	1/4	1 1/2
3850	Gold Hill Con. w. i	1 3/4	2 3/8	1 1/4	2
7650	Gold Hill Copper	3/8	1/2	3-16	1/4
230700	Gold Reef M	†15	19	14	14
1000	Golden Sceptre	1 1/4	1 1/4	1 1/4	1 1/4
10090	Golden Star	6	6 1/4	4 1/2	4 3/4
1390067	Goldfield Cons	9	9 3-16	5 3/8	7 3/8
1565810	Goldfield Daisy	†70	84	18	23
778150	Goldfield Daisy Lease	†5	10	1	3
100	Gould & Curry	37	37	37	37
100	Gowganda Cop. Cent	†19	19	19	19
169150	Gowganda Exp	†28	60	24	60
632250	Greene Cananea, new	12 1/2	14 3/8	8 7/8	11 3/8
897814	Greenw. Cop. M. & S	6 1/2	14 1/2	3 1/2	12 1/2
12660	Guanajuato Con	2	2 1/4	1 3/8	2
7919	Guggenheim Exp	181	255	175	250
418900	Harcuvar	†28	50	25	50
214600	Hargraves	†61	63	35	50
40110	Imperial Gold	3 1/2	3 3/8	3	3
15780	Ind. Valley Consol	3 3/8	3 3/8	2 1/4	3 3/8
17200	Inter. Smelt. & Ref	130	170	120	150
379244	Inspiration Copper	5	9 9-16	5	9 9-16
26050	Jim Butler	†17	21	10	11
10400	Jumbo Extension	23	24	11 1/2	13
100	Justice	†17	17	17	17
34200	Kewanas	†25	25	14	18
679625	Kerr Lake	7 3/8	9 5-16	7 1/2	9 1/8
117755	King Edward	15-16	1 1/8	3/8	3/8
100	Lake Copper	35 1/2	36 3/8	35 1/2	36 3/8

		Open.	High.	Low.	Close.
1549021	La Rose Com	6 1/4	8 1/2	4 3-16	2 11-16
456800	Little Florence	†11	13	1	2
9800	Majestic Copper	†98	1 3-16	3/4	1
67659	Mason Valley	2 1/2	3 5-16	1 7/8	2 5-16
410	Mass. Con	9 3/8	9 7/8	9 1/8	9 1/4
1000	Mex. Exp. & Min	7 1/4	7 1/4	5 1/2	5 3/4
500	Mex. Gold & Silver	2	2	2	2
811920	Miami Copper	15 1/4	28	12 3/8	28
89500	Miami Copper rights	9-16	1	1/4	3/4
74480	Micmac Gold Min	2 1/4	2 1/8	1/2	1/2
283500	Mines Co. of Amer	15-16	1	3/8	1/2
182040	McKinley-Darragh	1.01	1.09	.80	.89
4200	Moose Horn M	50	52	49	49
250	Mohawk Min	63	63	62 1/2	62 1/2
4600	Mont. Mt	8	12	8	11
1365315	Montezuma of C. R	†17	40	2	7
400	Montana Tonopah	†73	73	71	71
12405	Montana Corbin	3 3/4	4 1/4	3 1/2	3 7/8
48040	Mont. Shoshone, new	1 5-16	2 5-16	15-16	1 1/8
10800	Mountain Flower	†13	18	13	18
13720	National Ore	6	7 1/2	6	7
972635	Nevada Cons	19 1/4	30	16 3/8	27
775	Nevada Hills	1 1/2	1 9-16	1 1/8	1 1/8
7200	Nevada National	8	17	8	17
159575	Nevada Smelting	15-16	1 1/8	3/4	1 1/4
65350	Nevada Victor	1 1/2	2 1/4	1 1/2	1 3/8
495340	Nev. Utah M. & S	3	3 3/8	1	1 9-16
51165	Newhouse	2 1/2	4 1/4	2 3/8	3 1/4
4400	Nickel Gold	†10	10	10	10
347530	Nipissing Mines	10	13 1/4	9 1/2	10 1/4
2000	North Cobalt	†15	15	15	15
48310	North Butte Exp	†6	14 1/4	4	5
6765	North Butte Copper	78	78	51	51
4100	Nova Scotia	59	74 1/2	52	62 3/8
5500	N. Y. Gold Leasing	†9	9	7	9
1449286	Ohio Copper	5 5/8	8 1/4	4	5 7/8
10125	Old Hundred	11-16	11-16	3/8	1/2
1400	Ophir	1.80	2.30	1.80	2.30
28925	Orphan Copper	1 3-16	1 1/2	1/2	1/2
842600	Otisse	†54	57	19	20 1/2
146600	Pacific Smelters	1	2	1	1 1/2
80	Parrot Mining	34 3/4	34 3/4	33 3/8	33 3/8
600	Peterson Lake	†31	27	27	27
2000	Penn Wyoming	†12	12	12	12
16900	Poldavia M. Co	†61	66	36	65
100	Potosi	†82	82	82	82
180735	Precious Metals	2 3/4	3	1 1/4	1 3/8
43800	Rawhide Mining	†23	25	15	18
5311720	Rawhide Coalition	†47	73	17	19
491330	Rawhide Queen	†30	46	20	28
449120	Ray Con	7 3/8	27 3/8	7 1/2	26 1/8
9300	Ray Con. rights	1 1/4	1 1/4	3/4	1
1019700	Ray Central	2 3/8	4	2	3 7-16
23800	Red Hill	†18 1/2	18 1/4	8	8
7450	Red Top Ex	†12	12	11	11
366200	Red Top Leasing	†12	13 1/2	1 1/2	1 1/4
84700	San Carlo	1.42	1.42	1.30	1.35
45000	San Toy	†33	52	22	41
164700	Searchlight	1.22	.10 1/2	1.22	.10 1/2
60	Shannon Copper	14	14	14	14
20	Shannon Copper	14	14	14	14
1100	Siera Con	5 1/4	5 1/4	5 1/8	5 1/8
350400	Silver Leaf	†13	21 1/2	12	13 1/2
18575	Silver Limited	†60	60	40	20
383300	Silver Queen	1.00	1.00	.20	.21
15000	Southwestern Dev	†50	90	23	38
32650	South Utah M. & S	3 5/8	4 9-16	3 1/8	4 1/4
10350	Starlight M. & S. D	1.00	1.03	1.00	1.01
100520	Stewart Mining	1/2	1 1/2	7-16	1/2
50	Superior & Boston	16 3/4	16 3/4	16 3/4	16 3/4
32906	Superior & Pittsburg	17 1/4	18 1/2	12 3/4	16 1/8
11100	Temiskaming	1.76	1.76	.87 1/2	.90
106960	Tenabo M. & S	1	2 3/8	1	1 15-16
111860	The R. Exploration	1 5/8	2 1/4	1/4	2/8
2750	Tintic	4 1/4	4 1/2	2 1/8	2 3/8
11974	Tonopah Belmont	†76	1 1/2	76	13-16
132445	Tonopah Ex	†55	80	45	72
72357	Tonopah M. of Nev	6 3/8	8	5 1/4	7 9-16
467100	Tramps Cons	9 1/2 †	11	4	4 1/2
167055	Tri-Bullion	7/8	1 1/4	9-16	1
6126	Trinity Copper	16 1/2	16 1/2	9 3/4	9 3/4
35800	Tularosa	1 1/4	1 5/8	1 1/4	1 1/2
119225	Tuolumne Copper	1 13-16	4 1/8	1 1/8	3 3/8
2090380	Union Mines	3/8	4 1/8	5-16	2
397922	Union Pacific Cobalt	†17	21	9	12
693796	United Copper	14 3/4	16 1/4	7	8 1/4
8308	United Copper pfd	30	37	21	21
486886	United Rico	†18	32	10	25
2804	Utah Apex	6	6 1/2	4 1/2	5 1/2
323665	Utah C. & G. S	.93	1.27	.92	1.06 1/2
320	Utah Con	39 1/2	42 3/8	38 1/2	42 3/4
5600	Utah Copper rights	5/8	1	3/4	7/8
44700	Venture	†27	27	24	24
1400	White Knob	23	24	12	14
2305	White Knob prd	1/2	1	1/2	1
301900	Willets Silver Mine	†30	38	11 1/2	12 1/2
317560	W. Va. Wyo. Cop	1 3/8	2 1/4	1	2 3-16
3350	Yankee Girl	3 3/4	4 1/2	3 1/2	4
168700	Yucca Cyan. M. & M	†23	23	6	16
303282	Yukon Gold	4 9-16	6	4	4 15-16

Personal

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

John S. Oglesby, of Dallas, Texas, has been recently in Yerington, Nev., and San Francisco.

Leo Von Rosenberg, of New York, has gone on an examination trip to Peru, South America.

Harry F. Lefevre has just finished an examination of the Abengarez goldfields of Costa Rica.

Elton W. Walker, of Detroit, Mich., is examining some mines in the Joplin district in Missouri.

R. S. Burdette is examining the mines of the Utah Lead Mining Company at Montello, Nevada.

Albert J. Bone is assistant smelter superintendent for the Tennessee Copper Company at Copperhill, Tennessee.

W. D. Healy, formerly of Detroit, Mich., has been engaged as manager by the Union Pacific Cobalt Company.

I. Wayne Von Leer, of New York, has become manager of the Arizona United Mining Company at Johnson, Arizona.

George E. Sanders has been appointed receiver of the Golden Drift Mining Company in Josephine county, Oregon.

W. B. Murdock, of Mexico City, is in New York on his way to Europe in connection with a Mexican mining-tunnel deal.

A. J. Anderson has been appointed superintendent of the Santa Barbara mine of the American Smelters' Security Company.

Quincy A. Shaw, vice-president of the Calumet & Hecla Company, has returned to Boston from a visit to the Lake Superior district.

Andrew McFarland, of Colorado, has taken charge as general superintendent of the Lucia Mining Company, Gabriel, Durango, Mexico.

A. A. Hassan, consulting engineer, Cobalt, Ont., has been in New York conferring with some capitalists regarding the new Porcupine goldfields north of Cobalt.

Martin J. Heller has returned to New York, having made a visit to the Consolidated Arizona Smelting Company plant, Humboldt, Ariz., the affairs of which he is managing.

Rowland Feilding has been taken into partnership by Hooper & Speak, of London. The firm is now Hooper, Speak & Feilding, and the offices have been removed to London Wall building, London.

Selwyn Goldstein, an Australian mining engineer, for some time engaged in consulting work in Mexico, has been appointed general manager of the English-owned Tominil mine in Durango, near Guadalupe de las Reyes.

Dr. Henry M. Payne recently resigned his position as professor of mining engineering at the University of West Virginia, and has been appointed field manager of the Hydraulic Mining Cartridge Company, of 42 Broadway, New York.

M. E. MacDonald, president of the Zacatecas Mining and Metallurgical Company, left New York Jan. 6 for an extended business trip to Mexico, where he is now engaged in the erection of a 150-ton cyanide plant at the mines of the company at Zacatecas.

S. F. Bretherton has just returned to San Francisco from Mazatlan, Mexico. While in Mexico he examined several mining properties and made a successful smelting campaign for the recovery of bismuth, gold and silver for the Rey del Bismuto Company, near Culiacan.

Dr. J. W. Robertson has resigned his position as president of Macdonald College, McGill University, Montreal, and leaves to visit Europe, Australia, South Africa and India in connection with the work of the Canadian commission for the conservation of natural resources.

George G. Vivian has severed his Utah mining connections, and has returned to Colorado, where on Jan. 1 he took charge as manager of the Golden smelter of the North American Smelter and Mines Company. He is now engaged in supervising improvements and repairs at the plant.

C. M. Eye has resigned as manager of the Benguet Consolidated Mining Company at Baguio, Philippine islands, to take charge of the Colorado Mining Company at Aroroy, in the island of Masbate. His successor with the Benguet company is Amos W. Cole, recently with the Oriental Mining Company in Korea.

A. B. Emery has been appointed assistant general manager of the Southern Division of Mexico mines of the American Smelters' Securities Company. R. E. Adams succeeds Mr. Emery as superintendent of the Velardeña district. W. M. Drury has been appointed assistant general manager of the Northern Division of Mexico mines of the company.

John B. Farish, widely known as a mining engineer of the highest standing, has resumed the general practice of his profession and is prepared to examine and report on gold, silver, copper, lead and zinc mines and metallurgical processes; also to supervise the development and operation of properties of that class. He has associated with him his son, George E. Farish, a graduate of Columbia University, of some years' experience in the field, who is also prepared to contract for his personal services along the above lines. Their offices are at 25 Broad street, New York, and Colorado building, Denver, Colorado.

Obituary

B. W. Clair, of Douglas, Ariz., president of the Pawnee Mining Company, was shot and killed Jan. 2, while at the mine in the Chircahua mountains, by the owner of an adjoining claim.

Thomas G. McCutcheon, a member of the old firm of Lindsay & McCutcheon, operating the Star Iron and Steel Works at Pittsburg, now owned and operated by the Carnegie Steel Company, died on Dec. 26, aged 46 years.

Frank H. Jermyn, of Scranton, Penn., was run over and killed by a street car in San Francisco, Jan. 3. He was 53 years old, and was a large owner of anthracite mining property, being a son of the late John B. Jermyn.

Frank B. Smith, president of the Crucible Steel Company of America, dropped dead at his home at Pittsburg, on Dec. 30. He was 50 years old and had lived in Pittsburg all his life, and had been engaged in the steel business from an early age.

Arthur Brock died at Philadelphia, Dec. 24. Mr. Brock, who was prominent in the iron and steel industries, was a director of the Pennsylvania Steel Company and chairman of the board of directors of the American Iron and Steel Manufacturing Company. He was 59 years old.

Henry Curtiss Elliott, of Chicago, and H. Y. Greer, of Seattle, Wash., were killed by a snowslide at the mines of the Hubbard-Elliott Copper Mines Development Company, near Tonsina, Alaska, Dec. 31. Mr. Elliott had been for years largely interested in copper mines in the Lake Superior district and in the West. Mr. Greer was a mining engineer and well known in Washington and Oregon.

Ottokar Hofmann, the eminent metallurgist, whose work is known all over the world, died at Kansas City, Mo., Dec. 24, aged 66 years. His last work was done in Mexico, in 1907-8, and the hardships he encountered there injured his health seriously. About six months ago he broke down completely, and had since been confined to his house. We hope to publish a fitting account of his life and work in our next issue.

Societies and Technical Schools

Mining Institute of Scranton—This institute wound up a successful year on the evening of Dec. 23 by holding its annual banquet at Scranton, Penn., with a large attendance. The speakers were Superintendent Phillips, of the Lackawanna, Superintendent Jennings, of the Pennsylvania Coal Company, Prof. A. H. Welles, a chemist who is interested in mine gases and Superintendent William H. Allen, of the Scranton Coal Company.

EDITORIAL CORRESPONDENCE

REPORTS FROM OUR OWN REPRESENTATIVES ON IMPORTANT EVENTS FROM MANY IMPORTANT MINING CENTERS OF THE WORLD

San Francisco

Jan. 8—In so far as indicated by the bank clearings, California shows a remarkable recovery from fire and panic. The San Francisco bank clearings for 1909 amount to $1,970,248,000, only $162,535,000 less than in the banner year of 1907.

According to the California Stock and Oil Exchange, the dividends of the California oil companies listed on that exchange amounted to about $500,000 in December, 1909, and this is said to be the record monthly showing for these companies. Unprecedented activity for 1910 in the oilfields is anticipated. The requirements of the Standard, Associated and Union companies for the coming year are estimated at 65,000,000 bbl. In the Coalinga field, the Valley Oil Company is reported to have struck oil at 3270 ft. on the flat, a mile from the nearest proved well. This if true means a considerable extension of the oilfields in that direction. In the North Midway, the new Santa Fé well is producing 2000 bbl. daily. The Monte Cristo Company, operating in the Kern and Midway fields, is having domestic troubles over the high salary ($20,000) paid to Henry Ach, an attorney, for his services as president. The governing board claim that this also covers legal services, but as there is no litigation, some of the stockholders think the amount excessive. Of the 3,621,062 acres of supposed oil land withdrawn by the Government, pending the passage of suitable laws by Congress for acquiring oil lands, on Dec. 31, 1909, 378,456 acres were restored to the public domain by order of the Secretary of the Interior.

The main coal supply of San Francisco comes from Australia. As there is now a shortage from that source, due to a strike, a fleet of vessels has been despatched to Moji, Japan, for an additional supply. One of these steamers, the River Clyde, consigned to J. J. Moore & Co., is *en route* here. The Japan coal is a semi-bituminous steam coal with 50 per cent. of slack and inferior to the Australian coal. With the greater local demand in British Columbia, only about 8000 tons of Nanaimo coal of the Western Fuel Company per month now arrives at this harbor. The opening up of the Alaskan coalfields should mean much for California, as this coal is of superior grade and the distance not so great as to Australia.

The Plumas-Eureka gold quartz mine is reported sold to W. S. Prosky and George Wendell of Nevada for $225,000 cash. This famous mine was acquired by an incorporated company (The Sierra Buttes Company) about 1851, and this company was the first mining incorporation in California. Since that date, the mine was worked nearly continuously for 40 years, through tunnels, and the production is reported to have been in excess of $12,000,000. It is believed that much ore exists below the old tunnel levels. An interesting event in the history of this mine, was the discovery many years ago under the floor of the assay office of a number of small bars of bullion (to the value of $26,000), marked with a stamp that was used only in the early days of its operation, and presumably secreted there by one of the officials of that time. The road along Jamison creek to this property exhibited an interesting sight in its palmy days, when a long series of arrastras were working over the slimes. At one time, it is recorded that 30 arrastras were in operation.

In the cañon of the north fork of the Yuba river in Sierra county, there are many quartz veins that deserve prospecting, but this region is practically cut off from sources of mining supplies for four months of the year. There is now a movement on foot to build a road with an all-water grade along the Yuba river from Downieville, which has an altitude of only 2900 ft., to Marysville. The building of this road should rejuvenate the mining industries of the county, as it would result in cheaper freight rates and could be kept open during the entire year.

Denver

Jan. 11—Just outside the town of Ouray is a remarkable blanket deposit of ore known as the Mineral Farm, discovered in 1875 by Gus Begole, one of the most successful prospectors in the early days of the San Juan region, and who also located the great Veta Madre vein at Howardsville, near Silverton. The Mineral Farm was so rich that the first ore mined by Begole was shipped to Alamosa by bull teams 150 miles, and thence by the Denver & Rio Grande to a Denver smeltery, the cost of transportation being from $40 to $50 per ton, but the ore was worth from $300 to $600 per ton at the then high price of silver, which was the chief metal in the ore. This property ultimately passed into the hands of R. J. Lucas, of St. Louis, who stopped work when the price of the metals dropped two years ago, after having built a mill on it and operated it with varying success. Although the vein is continuous and in places 20 ft. thick, one of the chief troubles has been that the richest ore is gray copper in a barite gange, difficult to handle and requiring skilful and scientific management, which up to date the mine has not had. The whole property, generally speaking, is a replacement of limestone with ore, the matrix of which is barite and silica and the contained minerals argentiferous gray copper associated with galena and some chalcopyrite. Some mining men of Ouray have now taken up 17 claims on the southwest trend of the Mineral Farm deposit and are putting down a two-compartment shaft 4½x9 ft. in the clear to reach the ore stratum. It is down 140 ft., and it is believed 100 ft. more will reach the deposit. The projectors of this enterprise are five residents of Ouray, who are putting in their own time and money, and showing the kind of mining faith and pluck that makes for success. The name of the group is the Legal Tender mines, and the manager and part owner is I. A. Martin, for years superintendent of the revenue and later of the American Nettie.

The San Antonio mine of Red mountain, between Ouray and Silverton, a promising copper mine of that once famous region, has shipped 266 cars of ore of an average of 11 per cent. copper, 8 per cent. lead, 7 oz. silver and $2 gold per ton. The ore is enargite and the width of this grade is from 4 to 8 ft.; it is now developed at a depth of 500 ft. below the surface by a tunnel which reached the ore in July, 1909. Operations were suspended Dec. 10 owing to the fact that the Silverton railway was snowed in for the winter and the ore could not be sent to the Durango smeltery. The mine is fully equipped and will be a heavy shipper as soon as the railway is opened in the spring. M. T. Chestnut, of Denver, is manager.

Leadville, having thoroughly explored the blue limestone, has recently been paying more attention to the white limestone. The immense ore deposits discovered in this lower limestone on Iron hill have created widespread attention. There is now persistent rumor that fissures are being worked in the quartzite with highly

profitable results and from various quarters one hears of the development of fissure veins.

The gold output of the Cripple Creek district for December is estimated at $1,365,000, and it is said that there are more leasers at work there today than at any previous time in the history of the camp. With the greatly reduced treatment charges, approaching completion of the deep drainage tunnel and steady production of rich ore from the lowest levels of many of the deep mines a very optimistic feeling exists and this is increasing daily, with the outlook for 1910 exceptionally favorable.

It is pleasing to note that a Leadville judge has decided in favor of the lessees on the War Dance mine of Central City, in which a sensational strike of gold ore was made last year. It was a case where the owners had utterly neglected the mine since 1881, but when, under a bond and lease to some adventurous spirits it developed rich ore, some surviving original owners promptly bobbed up and tried to take it away from the lessees. The court properly ruled that the stockholders who had failed to pay any attention to the property or the company's affairs since '81, and made no move until the lessees had found ore in paying quantities, had been guilty of negligence, and had no redress. Their complaint was dismissed, and the costs assessed against them.

News comes from Burlington that a gold-bearing sand has been found on the farm of M. B. Hendricks, of Seibert, a station on the Rock Island railway. Samples are stated to carry $14 to $100 per ton in gold, and the owner, with nine other men, have put up $10,000 to work it under the supervision of three practical miners who have been engaged for that purpose. It is a red sand, and there is said to be an immense deposit of it.

Butte

The JOURNAL's correspondent at Butte, under date of Jan. 10 sends the following telegram concerning the North Butte situation:

"Management refuses information. Best obtainable is as follows: Edith May vein, waste on 2200 and under 6 per cent. on 2000 level. Jessie vein on 2200, waste in east drift and under 6 per cent. in West drift. Jessie vein not cut on 2000 level."

Jan. 7—To an outsider it is a natural inference in view of the continued silence from the responsible heads of the North Butte Mining Company, that there is something in the allegations made by the Tuolumne company in regard to the Jessie vein, on which the North Butte Company has developed most of its ore and from which it has extracted considerable ore in the past few years. This Jessie vein outcrops on the Jessie claim and has been opened up by the Speculator shaft and by a tunnel to 2200 ft. from the apex, vertically, and ore has been taken out in the upper stopes. It has been claimed that good ore has been proved at 1400 ft. and at 1600 ft., and that considerable development has been done on the vein. At 2200 ft. it is rumored that the vein is lean and that the conditions there do not look promising. The Tuolumne company has opened from its shaft by a short crosscut drive a vein at 1400 ft. in its shaft, and has been taking ore from it. It is now claimed that this vein opened on the Tuolumne is the Jessie vein, which at the 1200-ft. point divides, and one branch extends to the surface, forming the South Jessie vein, which apexes, throughout most of its course in the length of a claim in territory belonging to the Tuolumne company. Inasmuch as the Tuolumne location is prior to the Jessie location this, under well substantiated decisions will give the Tuolumne the right to the branch apexing in its property and also to the part of the vein which is below the split or juncture and which is supposed to be a continuation of the dip of the Jessie vein proper, which is being worked by the North Butte company. These statements come from the Tuolumne company, and consequently should not be given weight as if they were from an independent source or from the North Butte company. Presumably there are other facts related to the condition which are not available now. But the facts as far as presented tend to excite the suspicion that the future of the North Butte company is doubtful, and if the facts presented are not true then the North Butte company ought to deny them.

The critical situation involving a threatened sympathetic strike of the miners' and smeltermen's unions growing out of the failure to adjust the switchmen's strike on the railroads seems to have passed. The Butte unions faced by the ultimatum of complete suspension took an attitude of hands off and the smeltermen's union asked for the suspension of the order to give them time to try to adjust the local questions involved in the railroad strike. All of the plants were planning to resume and continue in full activity when the extreme weather complicated the situation by endangering the coal supply for the smelteries. The critical state of affairs involved in this seems to have passed with the slight improvement in the weather.

The official announcement of the purchase by the Butte & Superior company of the property of the Butte-Milwaukee company follows continued rumors that such purchase was contemplated. The purchase was consummated by the Butte & Superior acquiring control of a majority of the Butte-Milwaukee stock. The claims acquired are the Colonel Sellers, Bird, Florence and Pollock, all of which are a short distance north of the Butte & Superior group. On the Colonel Sellers claim there is a 730-ft. shaft. It is thought that a crosscut will be run from the Butte & Superior's Black Rock shaft to the Colonel Sellers shaft, a distance of about 1200 ft. and a raise then run to the Colonel Sellers shaft, making it 1600 ft. deep. Since the Colonel Sellers is one of the best shafts in the camp and in solid ground it is possible that it may finally be used as the main hoisting shaft for the company.

During 1909 year on the Butte Mining Stock exchange 1,497,950 shares of stock were traded in, having a total value of $1,332,733.56. The stock of 45 different companies was traded in, Tuolumne leading with 194,122 shares.

Scranton, Penn.

Jan. 8—Employees of the Delaware & Hudson Company learned when they received their last pay envelops, that in future they must consider themselves not as employees of the coal department of the Delaware & Hudson Company, but of the Delaware & Hudson Coal Company. The change has in itself no practical import to the men engaged in the mines. The Delaware, Lackawanna & Western railroad some time ago adopted the same plan in order to meet the requirements of the Elkins law. The change, however, from the public standpoint is of considerable importance, for it means that the mining company and the carrying company are two distinct corporations for legal and administrative purposes.

The neglect of the Delaware & Hudson Coal Company to pay its taxes on its coal lands in Carbondale township, involved the company in a peculiar lawsuit, which might under easily conceivable circumstances have brought about serious consequences. When taxes are not paid, it is the custom of the county commissioners in Lackawanna county to sell the property on which the unpaid taxes have accumulated. After the sale a deed for the land or other property is handed to the purchaser and he becomes the legal owner. In this case, the taxes not being paid on this land, it was sold in the ordinary course by the county commissioners and two men living in the locality bought it in. A number of men in this city, hearing of the sale and purchase of coal land, worth, it is estimated, millions of dollars, purchased the land from the two men who bought it in at the county commissioners' sale. Having done so, they proceeded to mine the coal which lay beneath. The Delaware & Hudson officials then became alive to the situation and brought suit against the men who were mining the coal, on the ground that the coal beneath the land belonged

to the company, and that it formed no part of the property which was assessed. The court took this view of the case, and a jury awarded the company the nominal damages of $2. A motion to grant a new trial was denied by the court. The surface land is of little or no value in itself.

Last week President Benjamin McEnnaney, of the miners' union, made an application to the Luzerne county court, that all the officers of the mine examining boards included in their jurisdiction should be superseded on the ground that they were corrupt and incompetent, partial and ignorant of the elementary rudiments of mining; and furthermore, that they have flooded the county with false miners' certificates. He also made another application to the effect that the examining boards that examine candidates for inspectorships be also dismissed or superseded, because, he alleged, these examiners only pass as competent a certain number of men for each district, and that once these men receive the nomination of their respective political parties they encounter and can encounter, no opposition at the polls. The judges listened to the complaint and promised that it should receive their earnest attention. President McEnnaney has followed this step by having warrants sworn out for a few of the examiners, whom he alleges were instrumental in issuing false certificates. It is understood that a number of operators sympathize with this complaint.

Birmingham

Jan. 11—The old rolling mills in Birmingham, property of the Republic Iron and Steel Company, are being dismantled; much of the material will be used in equipping some smaller mills and much will find its way to the scrap pile. The dismantling of these mills removes the oldest mills in the Birmingham district, an industry that attracted much attention. Not until later years when the steel plant came into existence did an institution have such an important connection with the transactions of a community. The plant was erected in 1880. There were additions made from time to time. Finally this, as well as other properties in this district, fell into the hands of the Republic company. When the depression came on in 1907 it became certain that Birmingham mills would never be reopened. The site of the mills is valuable. The Republic company also owns the Gate City rolling mills in a suburb of Birmingham, but these mills are in good shape and can be operated profitably.

In making contracts for the new development in the Birmingham district by the Tennessee Coal, Iron and Railroad Company, time stipulations are being attached to every contract. This means that the plants must be erected at the earliest possible moment.

Cobalt

Jan. 12—The developments for December are only second to those of June, which holds the record for 1909. For the last month of the year 21 mines shipped 2859.22 tons. It is interesting to note that in spite of the fact that the shipments for 1909 were only about 4000 tons in advance of the previous year, the silver production increased about 4,000,000 oz. Up to date the shipments for the years are as follows: Previous to 1908, 23,182 tons; for 1908, 25,362; for 1909, 29,865 tons. Regarding the outside districts, South Lorraine is the only one to have made any important representation. The output for these districts for 1909 is: South Lorraine, 157 tons; Maple Mountain, 6; Gowganda, 6. For the year 1910 South Lorraine will play a much more important part than it has formerly, as this very promising field has not, until lately, come in for the attention it deserves. Now, however, every day men are going in to look over properties, and several important deals have been made. A new road is being built into this section that will shorten the distance by about 10 miles and will materially reduce the cost of freighting. Formerly the road went round by Lake Temiskaming and was available only in the winter time, but the new road can be traveled all the year round.

Toronto

Jan. 11—Mining interest is at present largely centered in the Porcupine Lake gold area, where in spite of the season considerable assessment work is being carried on and many heavy transactions in claims are reported. A. M. Bilsky has purchased three claims in the southwest corner of Tisdale township, adjoining the Hallinger and Miller claims recently bought by M. J. O'Brien. The Timmins interests are stated to have bought four other claims in this neighborhood for $300,000.

Although interest is being diverted from Gowganda to Porcupine, there will be considerable work done in the former district during the winter, and with better roads and lower freight rates, the prospects of the properties should be considerably improved. It is unfortunate, however, at this time that the Bartlett mine should have made such a poor showing. The wide publicity given to this company last year is responsible to a large extent for the unfortunate boom that resulted. Although the property had good surface showings the way it was handled could hardly fail to place it in a poor financial position. Before even a shaft was started a plant that cost altogether about $125,000 was installed, and money was spent like water. The underground development uptodate has not been productive of good results and now it is said that the company is financially embarrassed and if more money is not forthcoming the property will probably be closed.

The amendments to the Quebec mining law recently enacted have been officially declared in force from Jan. 1, all outstanding prospecting licenses issued under the old law expiring Dec. 31. The new law provides for free prospecting on all lands where the mines belong to the Crown. When a discovery is made all that is necessary is to have it registered at the Bureau of Mines, Quebec, provided the prospector has previously taken out a miner's certificate. It is anticipated that this change in the law will do much to stimulate the mining industry in Quebec.

Mexico

Jan. 11—The zinc miners of northern Mexico are confronted with more difficulty. On Dec. 23 the National Railways announced a new freight rate, by which the freight to El Paso from Chihuahua points over the National lines was raised 2.16 pesos per metric ton, making the total rate 5.94 pesos for ore worth under 25 pesos per ton, and at the same time the railroad lowered the rate to Tampico 1.08 pesos per ton, making the rate from Chihuahua points to Tampico 9.21 pesos. There has been a general raise of the rates on zinc ores on the National lines going north and a slight reduction on the same lines going south. It looks as though this action would affect the restoration of shipment of zinc ore to the United States, which has followed from the increased spelter prices offered in the United States since the enactment of the new tariff. The zinc mines of northern Mexico have recently resumed shipments to the United States to an extent almost equal to that prior to the tariff. It is said that unless the steamship companies can make special rates the shipment of ore, particularly from interior points at Chihuahua, will not be possible, even with the reduced railroad rates to the gulf ports. This adjustment of the railroad rates apparently adverse to the zinc-mining interests of northern Mexico has caused considerable complaint.

A prominent authority on mining law in Mexico says that any criticisms at the present time on the new law are untimely as nobody knows how the law will really work, until the mining regulations and the police regulations for mining have been issued as provided in the law. The law throws a great deal of power into the hands of the Secretary of Fomento and the tenor of the regulations which will come from this source must be determined before the scope and effect of the law can be discussed.

THE MINING NEWS

REPORTS OF NEW ENTERPRISES NEW MACHINERY· INSTALLATIONS· DEVELOPMENT WORK AND PROPERTY TRANSFERS THE CURRENT HISTORY OF MINING

Alaska

Construction of a power plant, opening up of jade and copper mines on the Kobuk river, and development of bituminous coalbeds at Cape Lisburn, are plans which will be carried into effect next summer in Alaska by a syndicate of English capitalists headed by Colonel L. Stuart-Weatherley and Lord Fox Ramsay. The electrical plant at Nome will be enlarged at an initial cost of about $500,000.

Bonanza—This mine, at Cordova, is being worked and will ship ore as soon as the railroad is ready. R. F. McClellan has charge.

Arizona

Cochise County

Copper Queen—The Douglas smeltery produced in December 9,504,500 lb. of copper.

Gila County

Miami—The No. 4 shaft will be sunk 700 ft. from the present depth of 450 ft. This work will be started as soon as the double-drum hoist has been installed, and then one compartment will be used continuously for the shaft sinking, while the other is being used for the hoisting of material from the levels. Three Star churn drills have arrived at the property, but only one has started drilling, as the tools for the work have not been received yet. B. Britton Gottsberger is general manager.

New Keystone—This company, under management of the General Development Company, is said now to show about 2,000,000 tons of ore averaging about 2¼ per cent. copper. The mine is near the Miami, is on the same formation of schist, and like the Miami is being developed by drifts rather than by drill holes.

Old Dominion—The December output was 2,400,000 lb. of blister copper.

Arizona Commercial—The smeltery is turning out 20 tons of 50 per cent. matte daily. The ore supply comes from the fifth and sixth levels. Two Prescott pumps on the sixth level of the Eureka shaft are handling about 2,200,000 gal. each 24 hours. A third 1000-gal. Prescott pump is being installed on the seventh level where crosscutting to the Black Hawk vein will soon be commenced.

Superior & Boston—The McGaw shaft, down to the sixth level, will soon be sunk deeper. The management plans to begin crosscutting from the drift from the Great Eastern winze to connect with the crosscut now driven 125 ft. southwest from the McGaw on the sixth level, thus hastening the connection of the McGaw and Great Eastern workings at a depth of 600 ft. This connection will make it possible to take out all ore and waste from the mine through the McGaw shaft. Work in the Gardner shaft is also progressing on the 400-ft. level.

Graham County

Detroit—The December output was 1,831,700 lb. of copper. The company reports output for December as 1,498,000 lb. blister copper.

Morenci-Missabe—This company is sinking on the Campbell and Surprise claims, and has now reached 120 ft. in depth with good ore showing.

Shannon—Important underground developments have taken place in the mine below what has been considered the lowest level of the main orebody. A winze has opened up 22 ft. of sulphide ore of good grade, and at 60 ft. a crosscut from the bottom has opened up a large body of high-grade ore.

Pima County

Imperial—The December output was 800,000 lb. of copper.

Santa Cruz County

A number of strikes are reported in the Tumacacori, Atascosa, San Cayetano ranges and extreme western edge of the Santa Rita range. Prospecting is being actively done by the building of the new railroad known locally as the Twin Buttes extension from Tucson up the Santa Cruz river to Nogales. The road has about 25 miles yet to construct and on account of bridges over tributaries of the river this may take three months. The road will form part of the through route to Mexico, and will be the main line of the Southern Pacific south. It is believed that the opening of this line will stimulate mining work in a large tract of country which has not been inviting hitherto owing to difficulties of transportation.

Madera—This company, working claims in the Madera cañon, north of the Old Baldy, in the Santa Rita mountains, in doing development work, has crosscut a huge vein, 105 ft. of which assays $6 to $20 gold. There is an iron-stained streak 2 ft. in width of higher grade than the rest. This company has been working 15 or 20 men for a year or more, but made this crosscut in the vein at about 50 ft. under ground. The company is composed of Los Angeles men. The property is not far from the old placer camp of Greaterville.

Arizona-Anaconda—The company will sink a shaft on its claims in Temporal gulch, three miles south of Old Baldy; P. Bruner, manager. The company is erecting buildings and hauling in machinery.

Augusta—The company has caught up the surplus of ore on the dump and has suspended shipments for the present. The plan is to sink the main shaft 200 ft. farther and drift under the ore on the 400-ft. level for additional stoping ground. This is sometimes referred to as the Hosey or Pinal camp. William Kemp is manager.

Arizona - Pittsburg — This company, working on the same zone as above company is crosscutting to strike underneath a known orebody and when the vein is reached will drift toward the shaft which is now down 175 ft. Charles R. Reno, of Colorado, is in charge.

Flux—This mine, in the Patagonia mountains, owned by R. R. Richardson, is showing an important zinc deposit. In the latest work 11 ft. of ore has been exposed.

Ivanhoe—This mine, James Johnson, manager, is being financed by Eastern men, and $200,000 will be expended. A new road has been built connecting with the Salero road and machinery will be bought for the work. This group of claims has paid for all development work out of its shipped ore, which is copper carrying silver and some gold. The mine is in Temporal gulch.

California

Amador County

Garibaldi—Work on this placer property at Volcano has been resumed, but instead of hydraulicking, the ordinary sluicing process has been adopted.

Mitchell—Machinery has been shipped to this mine so as to develop it to greater depth.

Butte County

Double Eagle—This mine, at Berdan, has been put out of business for the present because someone put 76 sticks of giant powder on the boiler to thaw

out and the resultant explosion wrecked things badly.

CALAVERAS COUNTY

Around the old district of Mokelumne hill, mining affairs are reviving to some extent. The indebtedness of the Boston mine has been paid off and on the Ariel a contract has been let to run a 400-ft. tunnel. At the Kinross a ditch is being prepared to furnish water.

DEL NORTE COUNTY

Shipments of copper ore are again being made from the Low Divide mines to smelteries in Washington for testing purposes. These mines were the first ever worked in California, ore from them having been shipped to Swansea, Wales, in the early '50's. This was found to be unprofitable and the mines have been closed since. Not long ago a group of these mines was purchased by Utah men who have been prospecting them and making small shipments.

Monumental—This quartz mine is about to be operated again.

ELDORADO COUNTY

Deer Valley—H. N. Burger, of Placerville, has resumed operations on this mine with H. H. Fisk in charge; a small mill run by a gasolene engine will be built.

Golden Cup—Joy & Chester have arranged to open this mine at Greenwood and necessary repairs are being made.

INYO COUNTY

Bishop Creek—At this property, on Bishop creek, work has been stopped until spring, snowslides interfering with operations.

New Coso—This company is shipping ore from the Lucky Jim mine at Darwin.

KERN COUNTY

Blue Mountain—A carload of mining machinery has been shipped to this mine near Delano and it will be reopening under management of J. N. Waughaman.

MARIPOSA COUNTY

In Quartzburg district the Stoddard interests of New York have a bond on the Washington and all the Moses Rogers claims, and are preparing to begin operations.

Red Banks—These mines were recently purchased by a French syndicate and a large crew of men has been set at work.

D. E. Lutes Company—This new company is opening its property at Bear Valley. The mine was formerly called the Mahoney.

Mountain King—At this mine eight miles from Bagby, plans are being made to enlarge the 10-stamp mill.

Champion—Wagner, Mentzer & Ray have commenced work on this mine at Coulterville.

Tyro—McClure Gregory is opening the old works in this mine at Coulterville and the mill is running on ore from the dump.

Number Five—At this company's mine near Hornitos, C. T. Latourneau, superintendent, there is installed an electric hoist and other machinery. The shaft is to be sunk deeper and orebodies crosscut.

Panoche—At this mine on Panoche mountain there is some activity as men are preparing to work it during this winter.

Hite Cove—At this mine near El Portal, John Mason, superintendent, a large force of miners is employed. An aërial tramway is taking ore for 20 stamps. The water-power plant will be enlarged and the capacity of the mill doubled. The shaft will be sunk from the 1200 to the 1500 level.

MODOC COUNTY

There are now about eight leasing crews at work in the Hoag district getting out ore ready for the mill in the spring. A strike of importance has been made in the Evening Star group owned by Broadas, Dunnuvan & Shartwell but under lease for two years.

MONO COUNTY

Crystal Lake—This mining company at Lundy has suspended operations for a time for reasons not made public.

Masonic Mountain—A 4-ft. vein carrying gold and copper has been found in property at Masonic.

Parrott—This mine at Lundy has been purchased by J. C. McCormick. The property adjoins the May Lundy mine and there are ten known veins running through the 200 acres. There is a good water-power site and plenty of timber.

NEVADA COUNTY

Grover-Murphy—At this mine, new machinery has been installed in order to carry on sinking.

Golden State—This mine at Chicago Park has been sold to San Francisco men represented by Pownall & Olds and development work has been commenced.

Yuba Consolidated—This company, operating the Eagle Bird, Yuba and Gray Eagle mines at Maybert, with D. J. McFall as superintendent, is draining the old Yuba and has rehabilitated the mill.

Niagara—After a long idleness work has been resumed on this mine on Deer creek near Nevada City, and the shaft has been pumped out.

Norambagua—After 16 months' prospecting work, it has been decided to abandon this mine near Grass valley.

Mooney Flat—This company has been organized by N. F. Kerr of San Francisco to mine at Mooney flat near Smartsville.

Red Cross—The Huntington mills at this property at Omega will be started as soon as the tramway is ready.

Colorado

CLEAR CREEK AND GILPIN COUNTIES

Local capital is interested in a new mill to handle custom ores and dumps of local mines. The machinery will be put in by the Denver Quartz Mill and Crusher Company, with Card and Wilfley tables for concentration. Pearl Skelton, Central City, is the manager.

Golden Sheaf—Totman & Co., of Black Hawk, have taken an option on this property, Vermilion district, and have made a payment.

Golden Sun—Good ore is reported in a drift from the main tunnel. E. T. Butler, 203 Kittredge building, Denver, is manager. The company is figuring on a mill and electrical equipment.

LAKE COUNTY—LEADVILLE

Hopemore—Lessees on this mine have now made arrangements which will enable them to market their ore at a profit, and will hoist 100 tons daily. It is said to be an immense body of iron sulphide, of an average value of $14 per ton.

Iron—T. Trevarthen, lessee on this old mine, is shipping 400 tons per month of good-grade silver-lead ore.

Adelaide—By a lateral from the Yak tunnel, lessees on this mine have caught their shoot of zinc and silver ore, and are starting to ship.

SAN JUAN REGION

In this rugged section of Colorado, snowslides have been running during the last week. At Ouray a snowslide on the Camp Bird road has taken out the Telluride Power Company's line from Telluride, and the Ouray Light and Power Company had its water shut off by a snowslide in Uncompahgre cañon. Several telephone lines have also been carried away. From Silverton word comes that 40 slides ran on the Denver & Rio Grande railroad between Silverton and Needleton, six miles below, and railroad traffic to Durango is completely blocked, and Silverton is likely to suffer from a fuel famine and from scarcity of feed for cattle and horses.

Tomboy—December returns: Mill ran 27 days, crushed 8500 tons, yielding bullion, $31,500; concentrates shipped, $41,500; expenses, $47,000; profit, $26,000.

TELLER COUNTY—CRIPPLE CEREK

The dispute between the Portland and Strong companies regarding apex rights has been settled out of court.

Portland—The new mill of this company, at the mine in Victor, will be started in 90 days. The regular quarterly dividend of 2c. per share was declared at a directors' meeting Jan. 5, payable on Jan. 15, the amount being $60,000, and making the total of $8,497,080 paid in dividends to date.

Stratton's Independence—Results for

November: Production, 2006 tons averaging 23½ dwt. per ton; dump ore milled 5000 tons; net working profit from the mining department $7250; from the milling department, $1600; expenditure on new mine development account, $1100.

Vindicator—At a directors' meeting on Jan. 5, a quarterly dividend of 3c. per share was declared, amounting to $45,000; total dividends to date, $2,092,500.

Isabella—The annual meeting is scheduled for Feb. 7, at Cheyenne, Wyo., and the report is being circulated in Denver that a fight is to be made for the control by parties who are dissatisfied with the present management. The Isabella mine was for many years the leader of the Colorado Springs and Cripple Creek markets, and a check was once received from a smeltery for $315,000 for two carloads of the ore.

Dante—The lower levels at No. 2 shaft are being developed on company account, while the upper workings are being leased.

Union Leasing—This company, operating the Mabel M. and Husted shafts on the Gold Dollar Consolidated property, on Beacon hill, has mined and marketed 16,768 tons of ore of a gross value of $387,550.

Maggie—An odd occurrence has taken place at this mine, inasmuch as its shaft 200 ft. deep is now making 20,000 gal. every 24 hours, notwithstanding the fact that there are four other shafts, each over 1000 ft. deep, in close proximity and all of them dry.

Granite—The output from the Granite, Dillon, Monument and Gold Coin for December is about 2000 tons of gold ore, with a total value of about $60,000. These properties are being worked from the old main working shaft of the Gold Coin mine, which is credited with an early-day production of over $6,000,000, and from a vein (or rather a mineralized shearage zone) in the granite entirely outside the breccia area—the only one of the kind in the district that made a record as a mine.

Idaho

Cœur d'Alene Ditrict

The dividends from the Cœur d' Alene mines for 1909 amounted to $2,300,000. The Federal company, owning three lead producers, paid $930,000; the Bunker Hill & Sullivan, $615,000; the Hercules, lead-silver, $250,000; the Snowstorm, the only copper producer, $225,000; the Hecla, a lead property, $220,000.

Reindeer—East drift has concentrating copper ore 50 ft. long and eight ft. wide and milling ore exposed 300 ft. long and 15 ft. wide.

Alice—Lead-silver concentrates are being shipped regularly to Carnegie, Penn. Extra vanners and tables are being placed in the mill, which will have a capacity of 200 tons daily. A large electric hoist has been installed.

Federal—The ore bins and sorting plant at Mace were destroyed by fire causing a $10,000 loss. The sorting plant will be rebuilt at once.

Kansas

The year 1909 showed a great gain in the Kansas camps, the monthly production being nearly doubled. The production for December was 4,395,020 lb. of blende, 41,540 lb. calamine, and 288,600 lb. of lead with a total value of $115,364. This month, the Clermont started production from the deep ore level. The Playter camp has started again and will soon be in the producing column.

The Foster land has been the scene of several rich strikes and 17 drill holes have already been put down since this land was thrown open for prospecting.

Michigan

Copper

Lake—Drifting on the lode exposed in the shaft at the 6th level continues with the formation well charged with copper in the form of epidote. The drifts are following the hanging wall and the width of the formation is not known. A second drill hole is being put down to expose the northern extension of the lode, the first hole being suspended after sinking to considerable depth without encountering anything. The rock house will soon be in shape and shipments to the Franklin mill will be maintained.

New Baltic Copper Company—This company has been organized to take over the Baltic Exploration Company with Robert H. Shields and James P. Edwards, of Houghton, as president and general manager, respectively. Several trenches exposed an amygdaloid formation believed to be the Baltic lode and a core from 400 ft. showed it well charged with copper. Drilling is underway to cut the formation at a greater depth and to ascertain its strike and pitch and when these data have been secured shaft shinking will be started.

Minnesota

The Vermilion iron range is undergoing more development than since the early days and its rejuvenation promises to make this region one of great activity for many years. Shaft No. 5 of the old Chandler mine, Ely, is being put into shape for further mining. Machinery will be installed and another 100 men employed. There is greater activity on Section 30 and 300 men will be added in the spring.

Alberta—This iron mine, at Virginia, has been leased to the Elk Mining Company and will be developed.

Missouri

December was the worst month in years in weather conditions, the thermometer being below the freezing point almost the entire month. This greatly curtailed the production. The production for the month was 42,463,300 lb. of blende, 4,445,145 lb. of calamine and 6,922,925 lb. of lead with a total value of $1,277,673. With good weather the output will average close to $1,400,000 per month for the entire district.

The Gas company has finally enforced its ruling that no fuel gas should be used, but great hopes are entertained that the Quapaw Gas Company, now building a 16-in. line into the district, will relieve this condition. This company will take over several of the camps now supplied by the Kansas Natural Gas Company and this will give a larger supply for the others.

Montana

Butte District

Coalition—The Rarus has been closed for some time owing to lack of timber due to defective car service. The Tramway is cutting a station on the 2000-ft. level. A wreck in the shaft, together with occasional car shortages, have caused production to be irregular recently, but the average has been between 1300 and 1400 tons.

British Butte—The annual meeting will be held Jan. 19, at which time it is thought that a definite plan of future action will be decided upon. The dredge has not been in operation for several months, but the diamond drill is still being used for prospecting purposes.

East Butte—The management states that a 4-ft. vein of ore assaying better than 6 per cent. copper has recently been struck on the 800-ft. level of the Pittsmont at a point about 1000 ft. north of the main workings. Mining is now being done on the 600,- 800,- 1000- and 1200-ft. levels. About 150 tons of first-class and the same amount of second-class ore is being produced daily. A sampling mill will be installed and another blast furnace put in operation after Jan. 1.

Beaverhead County

Dillon-Argenta—The company's nine claims together with the machinery were recently sold at sheriff's sale for $3782.

Fergus County

Barnes-King—It is rumored that the company has under consideration the purchase of a property in Idaho on the line of the new Pittsburg & Gilmore railway.

Jefferson County

Boston & Alta—The shaft is down 355 ft. An electric plant consisting of a hoist for 1200 ft. and a 10-drill air compressor is being installed. The power

will be supplied by the company's plant at Prickley Pear creek.

Comet—The mine is being sampled and examined in the interests of Eastern capitalists.

LEWIS & CLARK COUNTY

Bald Mountain—The shaft is down 600 ft. and five levels are being worked. The 20-stamp mill near the mine is now operating and also a cyanide plant.

Northwestern Metals Company—The management states that the erection of a 100-ton unit of an electrolytic plant at Helena will be begun as soon as weather permits. The plant will use the Baker-Burwell patents. The experiments at Elkhorn last year are said to have demonstrated the success of this method. The plant will ultimately be enlarged to 500 tons and will treat custom zinc ores.

MISSOULA COUNTY

Fox—A 5-ft. body of galena ore has recently been encountered at the bottom of the winze on this property.

Nevada

ESMERALDA COUNTY

Nevada Eagles—This property, three miles west of Goldfield, is the scene of a new discovery. At 250 ft. the management reports assays running from $30 to $35 from a vein 30 in. wide. The shaft has been sunk to the 450-ft. point and a crosscut is now being run to intersect the vein at that depth.

Pittsburg-Silver Peak—The foundations for the 20 additional stamps to be added to the mill of this company at Blair are completed. The 10-stamp mill of the Mohawk-Alpine and the 3-stamp mill of the Valcalda are being dismantled and these will be the stamps to be installed at the Silver Peak mill. The present cyanide department of the mill is of sufficient capacity to handle the increased product from the stamps. Manager Edmund Juissen expects to have the additions completed and in running order by Feb. 15. With the installation of these stamps the mill will have a battery of 120 stamps.

LINCOLN COUNTY

The Horseshoe mill at Fay has just finished a short run on ores of the Little Buck and Snowflake properties, both under lease to E. E. Fuller, as is also the mill.

Gold Chief—This company, near Panaca, has purchased equipment which is being transported to the mine.

Centennial-Pioche—This mine has sunk its shaft to 340 ft. and has sufficient funds to sink to 800 ft., at which depth it is thought all the bedded veins of the Prince Consolidated territory will be cut. Charles P. Brooks is president.

Atlanta—The second payment has been made by the company, thus assuring the continuance of operations in the district, not only by this company, but others, and on a much larger scale. Large bodies of low-grade ore have been exposed by the developments carried on under the direction of F. Nugent Crosby, and it is expected that a mill will be erected as soon as possible.

NYE COUNTY

Mayflower-Bullfrog Consolidated—The anunal report, made to the stockholders for the year ended Nov. 1, 1909, shows the following result of operations: Tons milled 3849; assay value per ton $25.11; losses in milling per ton $7.32; cost of mining per ton $9.30; cost of milling per ton $6.98; profit per ton $1.51; mill saving 0.708 per cent.; gross value of ore $68,459. The company mined 1043 tons of ore having a gross value of $12.89 which has been placed upon the dump.

Keane Wonder—The production from this property for November was $25,000.

Tonopah-Belmont—Upon the 1100-ft. level, after drifting through good mill ore for about 500 ft., the breast of the drift broke into a new shoot of ore having a width of 8 ft. and assaying about $100.

WHITE PINE COUNTY—ELY

Giroux Consolidated—The new 5-compartment shaft was connected to the surface Dec. 30. The shaft was started 1000 ft. below surface and made an exact connection with the surface work. The shaft will now be sunk to 1200 feet.

New York

Dover Furnace Ore Company—This new company has leased the old Dover Furnace tract situated on the line of the Harlem division of the New York Central & Hudson River railroad and near the Connecticut line. The lease provides for a minimum of 100,000 tons yearly. The officers of the new company are John M. Coleman, president; S. H. Begeut, treasurer; C. F. Preston, superintendent. The offices are at 115 Broadway, New York. Ore was mined there for many years and supplied the old charcoal furnaces at Dover Furnace and Copake.

Kelly Iron Ore Corporation—This new company has leased from the estate of Eugene Kelly the iron-ore mine at Boston Corners. The ore was mined for some 30 years prior to 1890, most of it going to Salisbury furnace. It is a brown hematite, about 50 per cent. iron, and generally free from sulphur and phosphorus. The new company has its office at 45 Exchange place, New York. Its officers are Robert D. McKay, president and manager; Charles H. McIntyre, secretary and treasurer. This corporation has taken a 20 years' lease of the Kelly property and agrees to mine a minimum of 24,000 tons a year, at the outset, later increasing this to 100,000 tons.

Oklahoma

Oklahoma nearly equaled Kansas in December with a production of 3,518,065 lb. of blende and 702,040 lb. of lead with a total value of $95,327. Baxter Springs has greatly increased its output since the first of the year, while Miami has hardly held its own. With the new 500-ton mill in commission at the Mission mine at Quapaw this camp will equal if not pass Miami.

Pennsylvania

The H. C. Frick Coke Company has bought from the Clairton Iron Company a tract including 2644 acres of coking coal and 296 acres of surface land, situated along the Monongahela river near Uniontown. The price paid was $850 per acre for the coal and $125 per acre for the surface. This is the highest price yet paid for coking coal.

Wilkes-Barre & Scranton Coal and Iron Company—The mining property of this company has been sold at receiver's sale at Wilkes-Barre. It includes 100 acres of anthracite coal with a shaft and breaker. It was bought by Marcus Mayer, of New York, for $128,000, subject to debts for royalty and other claims amounting to $82,000; also subject to a claim to the ownership of part of the land by W. P. Boland, of Scranton.

South Dakota

Homestake—The labor troubles have settled down to a question of endurance between the company and the miners. No dividends are looked for at present.

Utah

A company drilling in the bed of Salt lake reports the discovery of an asphalt-deposit, which will be extensively exploited. L. R. Palmer is in charge of the work.

BEAVER COUNTY

In the Star district the Red Warrior and the Moscow are active. The Wild Bill is expected soon to ship. The Jim Bartlett has 2 ft. of high-grade lead-silver ore developed and the St. Mary's is developing satisfactorily, as is also the Progressive, now down 150 feet.

JUAB COUNTY

Copper Jack—Churn drilling will be done on this West Tintic property under control of J. H. Weber with the expectation of developing a low-grade copper deposit.

Tintic Standard—Copper indications are reported in the quartz at 700 ft. which is considered important as tend-

ing to correlate the mines on the west side of the district.

Eureka City—This company has purchased the ore rights of the public streets, etc., from Eureka City and the territory will be developed from the Chief Consolidated deep levels. Both companies are in the same hands.

SALT LAKE COUNTY

Utah Apex—This mine has opened a body of lead-silver ore at 1680 ft. on the dip of the Parnell vein. The company has reconstructed the Phœnix mill at the mouth of Parvenue tunnel and is treating 120 tons daily.

Canada

BRITISH COLUMBIA

Granby Consolidated—A circular dated Jan. 4 offers to shareholders of record Jan. 20 the right to subscribe at $85 per share (par $100) on or before Feb. 21 for $1,350,000 new stock to the extent of 10 per cent. of their respective holdings. The circular further says: "During the past five years this company has expended for mining properties, new plant, an interest in the Crows' Nest Pass Coal Company, and other items properly chargeable to capital account, upward of $2,750,000, and there is a balance now unpaid upon obligations incurred for these objects amounting to $875,000. In resuming the payment of dividends, the directors deem it desirable that the company should be free from debt and that at least the portion of this expenditure still remaining unpaid should be capitalized."

ONTARIO

Cobalt Lake—About 25 tons of high-grade ore have been extracted from the vein encountered at the 190-ft. level of No. 6 shaft. Fifty feet of drifting has been done on this vein showing 4 ft. of vein matter carrying high-grade stringers. The winze sunk from the 150-ft. level will be continued 70 ft. farther, giving a 10-ft. sump and a station at 230 ft. from the surface, from which crosscuts will be driven to the veins proved above.

Blackburn—This mine, at Miller lake, has made the first shipment of ore from the Gowganda region, consisting of a carload of 36 tons of high-grade, which has been sent for treatment to the Copper Cliff smeltery. The Blackburn is a close corporation controlled by International Nickel Company interests. The main shaft is down 100 ft. and 50 men are at work.

Nova Scotia Steel and Coal Company—The company's output for 1909 was as follows: Coal, 813,447 tons; steel, 66,700; pig iron, 58,000; coke, 87,000; showing a considerable increase over 1908. The finished materials comprising bars, plates and forgings shipped from New Glasgow amounted to 53,000 tons.

NOVA SCOTIA

Dominion Coal Company—The reported election of Sir Henry Pellatt as president was an error on the part of our correspondent. J. H. Plummer is the president of the company.

Mexico

BAJA CALIFORNIA

The secretary of fomento has granted Flavio Gonzalez a concession for the exploration and exploitation of oil and coal in Baja California. The concenssion comprises 40,000 acres.

DURANGO

Lucia—This company is operating two mines near Avino, 15 miles from Gabriel. Andrew McFarlane of Colorado took charge in December and is introducing the contract system. These mines have been shipping 1000 tons of copper and silver ore per month to Torreon. The output is being increased and 1500 tons will be shipped in January besides putting on the dump a large tonnage of milling on which will be worked later when the mill is built sometime before the end of this year.

GUANAJUATO

Plans involving the expenditure of more than $1,000,000 were ratified at a meeting of the Guanajuato Power and Electric Company, at Colorado Springs, on Dec. 23, when it was voted to increase the capital stock of the company from $3,500,000 to $5,000,000. Offiers announce that the increase will be used in taking over numerous electric power and light concerns in Mexico and in enlarging the present system in the State of Guanajuato. It is planned to acquire the property of companies in several Mexican cities which have a total population of 300,000, giving the company control of a rich mineral and agricultural country embracing 11,260 square miles.

JALISCO

Cinco Minas—The Marcus Daly estate, represented by H. E. Crawford, has closed the deal for the Cinco Minas, Hostotipaquillo district, a check for about 500,000 pesos having been paid Jose Martinez and Jose G. Montero, of Guadalajara mines. It is planned to sink the shaft, put down last year 200 ft. below the old tunnel level, to 2000 ft. The tunnel is the lowest of the old workings, and is 500 ft. below the outcrop. A reduction plant with an initial daily capacity of 250 tons will be erected, and $25,000 will be used in building a wagon road from the mines to the Southern Pacific at Magdelena. A contract for electric current up to 1000 h.p. will be made.

Bramador—Paul de Vilaine, who recently acquired the old Refugio and adjoining ground in the Bramador district, has taken an option on the principal old mines of Bramador.

Boca Ancha—This mine in the Autlan district is developing and has a 50-ton cyanide plant. Charles E. Lee is manager.

MEXICO

The transmission line of the Toluca Light and Power Company from Temascaltepec to the Seguranza company's, mine near Zacualpam, has been completed.

Rincon—The Mexican Rincon Mining Company, of Philadelphia, of which Cassius E. Gillette, U. S. A., is a large stockholder, has made the final payment for the property to Hugh McDonnell and will continue the operation of the mine at Temascaltepec. There is a cyanide mill on the property.

Seguranza—The company is preparing to operate on a large scale. Two electric air drills have been installed and more will be put in operation soon. The mill will receive custom ores.

Carboncillo—The mine is shipping steadily both to the mill and to the smelteries. It has produced about three million pesos during the last three years.

Bella Vista y Anexas—The Madroño tunnel is now in about 600 ft. A crosscut from this tunnel cut the Santiago vein, which is about 3 ft. wide and shows ruby silver. A. J. Hunter is manager.

Chontalpan—This mine under the management of J. F. Berry, is shipping high-grade ore and the exploration work below the old Spanish workings is proving that the ore continues in depth.

Argentina—The mine is idle pending the erection of a mill. This company reports 35,000 tons of ore blocked.

SONORA

Juarez—This mine, near El Plomo, is running a 5-stamp mill with satisfactory results.

Rio Yaqui Copper Company—Absolute titles have been given to this company for its properties and work will be inaugurated.

Tijata—Ten stamps comprise the capacity of this company's mill near Caborca. Until lately a low average of product was realized, but recent runs have shown improved content.

El Moro—A company, capitalized at $600,000, has been organized to operate this group. Robert Hilburn is manager.

Noche Buena—This mine has started a 5-stamp mill. It is 20 miles from the gulf of California.

El Temblor—New York men have bonded this property for $50,000 and have put 30 men to work.

Asia

KOREA

Oriental Consolidated—The cabled December cleanup was $116,500.

$ · THE MARKETS · $

CURRENT PRICES OF METAL · MINERALS · COAL AND STOCKS · CONDITIONS AND COMMERCIAL STATISTICS

Coal Trade Review

New York, Jan. 12—The coal trade in the West is very active, owing to the cold weather, which has brought in heavy domestic demand on top of the steady call for steam coal. Mines are all busy, but deliveries are interrupted by bad weather and snow. In several of the consuming centers premium prices are being asked for early deliveries.

In the East the bituminous coal trade is under very much the same conditions as in the West. There is an increasing demand but difficulty in securing the needed deliveries.

The anthracite trade is steady, and December production did not fall very much below the high level reached in November. Business is on a good basis everywhere.

National Coal Operators' Association—The movement to organize a national association of coal operators, started in Chicago recently, has progressed so far that a provisional constitution has been drafted, and a meeting called to be held in Chicago, Jan. 25, to organize the association. The movement so far has the support of the operators' associations of Illinois, Indiana, Iowa, Michigan, Montana, Washington and Wyoming.

Coal Traffic Notes

Coal tonnage originating on the Southern railway, 10 months ended Oct. 31 was: Tennessee district, 1,052,377; Alabama district, 1,991,342; total, 3,043,719 short tons. This is an increase of 646,079 tons, or 26.9 per cent., over the previous year.

Anthracite shipments from Buffalo by Lake were 3,538,098 tons in 1908, and 3,052,706 in 1909; a decrease of 485,392 tons, or 13.7 per cent. The larger shipments in 1909 were 1,245,000 tons to Chicago; 918,350 to Superior and Duluth; 389,150 tons to Milwaukee.

Anthracite shipments in December were 5,775,438 long tons, being 252,362 tons less than in November. For the 12 months ended Dec. 31 the total shipments by companies were as follows, in long tons:

	1908.	1909.	Changes.
Reading	12,578,883	11,920,757	D. 658,126
Lehigh Valley	10,772,040	10,296,627	D. 475,413
N. J. Central	8,495,425	7,938,370	D. 557,055
Lackawanna	10,088,697	9,531,695	D. 557,002
Del. & Hudson	6,461,666	6,136,946	D. 324,720
Pennsylvania	6,019,457	5,966,543	D. 52,914
Erie	7,450,175	7,461,121	I. 10,946
N. Y., Ont. & West.	2,798,671	2,717,826	D. 89,845
Total	64,665,014	61,969,885	D. 2,695,129

The total decrease in 1909 was 4.2 per cent. Adding the usual allowance for coal used and sold at mines, the total anthracite mined in 1909 was 68,786,500 long tons; equal to 77,040,880 short tons.

New York

Anthracite

Jan. 12—Anthracite, as is usual at this time of year, is essentially a weather market. Trade has been good, in fact rather pressing, and local dealers are contending with icy streets and other difficulties in delivery.

Schedule prices for large sizes are $4.75 for lump and $5 for egg, stove and chestnut, f.o.b. New York harbor. For steam sizes quotations are f.o.b. New York harbor points: Pea, $3.10@3.25; buckwheat, $2.35@2.50; No. 2 buckwheat or rice, $1.75@2; barley, $1.35@1.50. Some small lots are reported sold at special prices, but not in important quantity.

Bituminous

The bituminous coal market is in rather a disturbed condition, and dealers are not busying themselves so much in getting new orders as in trying to fill those they already have on hand. The Far East is not doing much, as is to be expected in January. The Sound is rather pressing for coal and New York harbor is rushing orders faster than they can be filled, although the total volume of business is not extraordinary.

Snow and cold have interfered with operations at the mines, while transportation has been bad, owing to the weather obstructing the railroads, to a very general scarcity of cars, and on some roads to a short supply of motive power. Under existing conditions a locomotive cannot move as many cars as when the weather is good and this adds to the delay in deliveries.

The coastwise vessel market is entirely demoralized, and it is difficult to quote prices. The loss of a number of schooners and barges in the Christmas blizzard and the high winds which have prevailed for most of the time since have upset the market for the time being.

Birmingham

Jan. 11—Coal operations in Alabama are back again to the activity that attracted attention a few years ago. The start is being made on a 15,000,000-ton output for the year. Local consumption is heavy while there is a healthy movement of the product into other southern States. The closing up of river transportation from Pennsylvania and Ohio gave an impetus to the movement of Alabama coal into Louisiana and other States. There is a steady increase to the labor in and around the coad mines in Alabama.

Chicago

Jan. 10—Weather conditions support the market, though the stress has passed and deliveries are more free. Illinois screenings sell for $2@2.25. These prices are not normal; they are due to transportation delays and to the growing use of fine coal. Present quotations on Illinois and Indiana coals are: Lump and egg, $3@3.25; run-of-mine, $2.25@2.50 per ton.

Eastern coals have benefitted by weather conditions and are quoted: Pocahontas and New River smokeless, $3.55@3.80 for lump and egg, and $3.05@3.15 for run-of-mine. Hocking Valley brings the full list price of $3.15 for 1¼-in. lump, and Youghiogheny gas brings $3.30, the list price, both being scarce. Anthracite has been an active seller with chestnut still scarce.

Cleveland

Jan. 11—Cold weather, a shortage of natural gas and obstruction to railroad traffic by snow have combined to make the local coal trade extremely active.

Nominally there is little change in prices. For Middle district quotations are, f.o.b. Cleveland, $2 for 1¼-in., $1.85 for ¾-in., $1.75 for run-of-mine and $1.60 for slack. No. 8 district brings 10 or 15c. more on all grades. Pittsburg is $2.15 for 1¼-in., $1.95 for ¾-in., $1.85 for run-of-mine and $1.65 for slack. Premiums are being paid for prompt deliveries, especially on slack. For domestic coals $2.95 Cleveland is quoted for Massillon lump.

Indianapolis

Jan. 11—The last month of 1909 brought about a steady growth in mine operation and they are now being worked overtime to get out sufficient coal to fill orders.

The freezing over of the Ohio river has tied up many coal barges from the Pennsylvania fields and in consequence an unexpected demand is being made on the Indiana mines.

Pittsburg

Jan. 11—The car supply is fairly adequate, but the movement is poor after cars are loaded. The market shows a quiet tone except for such demand as is caused by the continued cold weather. Prices are firm, but not quotably higher, standing at $1.15 for mine-run and nut, $1.25 for ¾-in., and 80@90c. for slack.

Connellsville Coke—Early Monday morning the H. C. Frick Coke Company, the coke subsidiary of the United States Steel Corporation, posted notices in the Connellsville and lower Connellsville region announcing a new wage scale, to become effective Jan. 16. The new scale is substantially a restoration of the highest scale ever paid, being based on $1.35 per 100 bu. for mining and loading room and rib coal. Such a scale was in force Jan. 1, 1903, to Dec. 15, 1903, also from Mar. 1, 1907, to Dec. 1, 1907. The 1908 scale was based on $1.20 per 100 bu. The new scale averages just a trifle higher than the old scale based on $1.35, several minor jobs being slightly higher, while very few are lower. The advance was generally expected to be made effective Jan. 1, and considerable surprise was manifested that none was announced at that time.

The coke trade has been very quiet since the first of the year. There is considerable uncovered consumption among furnaces, the furnacemen having played a waiting game in expectation of lower prices. There was little open buying of prompt coke, but it is suspected that in December a considerable tonnage of prompt coke was bought quietly. The market is really nominal this week at $2.65@2.75 for prompt furnace, $2.75 asked for furnace coke on contract, $3.10 @3.25 on prompt foundry and $3.25@ 3.40 on contract foundry.

The *Courier* reports the production in the Connellsville and lower Connellsville region in the week ended Jan. 1 at 449,-082 tons, and shipments at 4967 cars to Pittsburg, 7809 cars to points west of Pittsburg and 967 cars to points east of Connellsville, a total of 13,743 cars.

St Louis

Jan. 10—This week the highest prices in recent years were obtained for coal in this market. Coal has continued to advance and spot coal is at a premium. Standard 2-in. lump has been quoted at $1.75 per ton f.o.b. mines. Of course, this price was only for spot coal. Everybody is looking for coal. Steam plants and consumers alike have their stocks entirely depleted and have been unable to replenish them. Steam plants are having a hard time to buy enough coal for their requirements from day to day.

Chicago is in practically the same position as St. Louis and all the coal that can be shipped to that point on advantageous freight rates is going north. This, of course, is taking a large tonnage off the St. Louis market which helps to boost prices still further. The car shortage on the Illinois Central is the worst ever known. Today there is scarcely a mine running on the road anywhere. All other roads are short of cars and have been unabla to move coal on hand.

Last Tuesday the worst blizzard of recent years swept over this part of the country leaving a coating of ice everywhere, which hampered the movements of railroads as well as the mines. This with the extreme cold wave which followed made a combination of circumstances which was sure to make coal scarce.

Today the weather has eased off but another cold wave is predicted and indications are that the top has not been reached yet. Railroads and all the large manufacturers are buying coal on the open market. Firms having large contracts are unable to give the full tonnage required.

The terminals all around St. Louis and Chicago are in terrible shape. Thousands of cars are on sidings and it seems impossible to get prompt delivery. Demands from the West and the country are extremely urgent and almost any price is being offered for coal.

Standard 6-in. lump is held at $1.80 per ton mine or $2.32 St. Louis; 2-in. lump is worth $1.75 at mine or $2.27 St. Louis; mine-run coal is $1.35 at mine or $1.87 St. Louis; 3-in. nut is quoted at $1.10 at mine or $1.62 St. Louis; while 1½-in. steam nut and pea bring $1 at mine of $1.52 St. Louis. Screenings bring 70c. at mine of $1.22 St. Louis; ¾-in. pea and slack, 50c. at mines, or $1.02 St. Louis. Most of the activity is still confined to Standard coal as this is the only coal that can be delivered even in tight times like these.

Staunton, Mt. Olive and Springfield district 6-in. lump is worth $2 per ton mines, or $2.52 St. Louis; 2-in. lump, $1.70 at mine, or $2.22 St. Louis; mine-run, $1.50 at mine, or $2.02 St. Louis.

Carterville coal is now quoted at $2 per ton, or $2.67 St. Louis for 6-in. lump or egg. Nut is bringing $1.90 at mine, or $2.57 St. Louis, while 2-in. screenings are 90c. at mines, or $1.57 St. Louis. A premium over the above prices is being obtained for spot coal. However, none of this coal seems to be moving to Chicago.

Franklin county 6-in. lump is held at $2.25@2.50 at mines, or $2.92@3.17 St. Louis; 3-in. nut is $2 at mine, or $2.67 St. Louis. Little of this coal is coming into this market and nearly all of it is moving to the Northwest where nearly any price can be obtained for it.

Anthracite is exceedingly strong and all sizes are scarce. Chestnut is nearly impossible to get and stove coal is being substituted for it in a great many instances.

Foreign Coal Trade

United States Coal Exports—Exports of coal and coke from the United States, 11 months ended Nov. 30, long tons:

	1908.	1909.	Changes.
Anthracite	2,579,865	2,644,783	I. 64,918
Bituminous	8,371,046	9,009,704	I. 638,658
Total coal	10,950,911	11,654,487	I. 703,576
Coke	546,019	810,296	I. 264,277

Canada took in 1909, 9,158,058 tons, or 78.6 per cent. of the coal. The coke went chiefly to Mexico and Canada. The total increase in coal exports was 6.4 per cent.

United States Coal Imports—Imports of coal and coke into the United States, 11 months ended Nov. 30, long tons:

	1908.	1909.	Changes
Anthracite	16,483	4,703	D. 11,780
Bituminous	1,378,211	1,118,794	D. 259,417
Total coal	1,394,694	1,123,497	D. 271,197
Coke	119,647	157,550	I. 37,903

Canada furnished in 1909 a total of 927,702 tons of coal and nearly all the coke; Australia, 162,987 tons coal; Japan, 14,327 tons coal. Imports are chiefly on the Pacific coast and in the northwestern border States.

Iron Trade Review

New York, Jan. 12—The opening week of the year has been a rather quiet one in the iron and steel trades, but enough has been done to indicate some improvement in business further on.

In pig iron, there has been some buying of foundry and basic, but not enough to make an active market. Southern iron has been rather a disturbing element, owing to offers of considerable quantities of speculative iron for resale at prices below those the furnaces are asking. In finished material buying of bars is reported, with some business in plates, but other branches of the trade have been rather quiet.

Pig Iron Production—The reports of the blast furnaces on Jan. 1, as collected by the *Iron Age,* show 313 stacks in blast, having a total weekly capacity of 595,200 tons. This is 3000 tons less than on Dec. 1. The decrease was caused mainly by the banking of several furnaces in Alabama on account of short ore supply.

Lake Iron Ore Deliveries—Deliveries of Lake Superior iron ore to Lake Michigan ports in 1909 were: South Chicago, 4,673,810 tons; Gary, 1,927,818; Milwaukee, 178,720; minor Michigan ports for local furnaces, 155,483; total, 6,929,-831 tons.

Lake Ore Prices—Prices of Lake Superior iron ore fo.b. docks at Lake Erie ports are now fixed as follows: Old Range bessemers, $5 per ton; Mesabi bessemers, 4.75; Old Range nonbessemers, $4.20; Mesabi bessemers, $4. The guarantee is the same as last season, 55 per cent. iron for bessemer ore and 51.5 for nonbessemers.

Baltimore

Jan. 11—Exports for the week included 2363 tons steel rails to Tampico, Mexico. Imports included 853 tons ferromanganese and 300 tons manganese ore from Liverpool; 32,355 tons iron ore from Cuba.

Birmingham

Jan. 11—A few sales of pig iron have been made already this year by Southern furnace companies and a strong line of inquiries are coming in. The companies are holding their product firmly at $14.50 per ton, No. 2 foundry basis. Iron selling below that price is resale iron and there is not so much of it being sold and not much to be had now. The larger companies in the South appear to be in a position to hold off from the market until the quotations improve. Deliveries are being made promptly. The railroads are giving very good service, everything considered. The cast-iron pipe makers, foundries and machine-shop people and others look forward to a continuation of steady operations.

Chicago

Jan. 11—The iron market has hardly recovered from the holidays and is still waiting developments. Northern iron remains firm at $19@19.50; Southern No. 2 foundry is on a basis of $14@14.50 Birmingham. No special developments are looked for before the end of the month.

Sales of iron and steel products are quiet, but there is a firm tone to the market. Coke is firm and steady at $5.50, Chicago, for Connellsville.

Cleveland

Jan. 11—Buying of iron ore is very active. Those furnaces which do not mine their own ore seem anxious to close as soon as possible at the 50c. advance and only a few are holding back.

Pig Iron—Some sales of basic are reported. Iron under contract is being taken closely. Quotations are steady at $18.75@19, Cleveland, for bessemer pig; $18.25@18.75 for basic; $17.75@18 for No. 2 foundry; $17@17.50 for forge.

Finished Material—Contracts expiring Jan. 1 were, as a rule, fully specified. Most sales this year have been for fixed lots, including some heavy orders for plates at 1.60c. for first quarter. Bars are quoted 1.50c. for first quarter.

Philadelphia

Jan. 12—While the pig-iron market is not characterized by any special activity in demand, it is even stronger than last week in two or three particulars, chief of which is the unwillingness of makers to encourage the placing of orders for the second quarter. With scarcely any exception, eastern Pennsylvania furnaces are sold up about as far as the companies are anxious to sell. Ore quotations and prices are firm and contracts for coke can be placed only at the high market price. The larger consumers are inclined to let things drift, and even where their contracts secure them supplies for only a short time, they are disposed to wait further developments. Foundry iron is quieter than any other kind. No. 2X is quoted today at $19.25. Some options have been secured on forge iron which are good for 30 days at $18 per ton. Two or three conditional contracts have been made for southern gray forge at $17. The entire market is strong but there will be no haste on the part of buyers.

Pittsburg

Jan. 11—The finished-steel trade shows pronounced dullness, but mills profess to be well content with the condition, and indeed state that it is favorable. Evidently the rapid advance in prices and the heavy buying had given rise to fears that a serious reaction would follow. It is commonly said that the mills are well sold and need not book any additional tonnage. This is fairly true of many lines, but in wire and pipe, on the other hand, the business actually on books is not heavy.

Pig Iron—There is considerable quiet inquiry and it is not improbable that a number of sales have been put through, particularly in foundry iron, on private terms, which, of course, means at concessions from open prices. On the surface the market is very quiet, with foundry iron unchanged at $17@17.25, Valley, and bessemer unchanged at $19, Valley. In basic a decidedly stronger tone has existed for a fortnight, due to the absorption of several lots both of speculative and of furnace iron. Basic is roundly quotable at $17.25, Valley, for ordinary delivery. In December some sales were made at less than $17.

Steel—The supply of unfinished steel is better, the recent slight easing up in billets having been followed by a similar movement in sheet-bars. The market is quotable, depending on delivery, at $27@27.50 for bessemer and $27.50@28 for open-hearth billets, with sheet-bars at $28.50@29. Plates and shapes remain at 1.55@1.60c., and steel bars at 1.45@1.50c., the lower prices being practically for delivery at mills' convenience and the higher prices for prompt delivery or delivery over four to six months.

Ferromanganese—The market has been easier by about 50c. a ton, at $44@44.50 for prompt and $44.50@45 for forward delivery, f.o.b. Baltimore. Jan. 1 the freight, Baltimore to Pittsburg, on ferromanganese advanced from $1.95@2.30 per ton.

Sheets—Prices are strong and might possibly show an advancing tendency did not the trade remain so fully committed to the idea of the leading interest making the price. The building of independent mills has been so rapid that the "leading interest" is entitled to the designation only on the ground that it is the largest single producer. Prices are 2.40c. on black and 3.50c. on galvanized, 28 gage; $1.70 per square for painted and $3 for galvanized corrugated. Blue annealed sheets are 1.75@1.80c., the higher price being for early delivery.

St. Louis

Jan. 10—The market on pig iron this week shows a slight improvement. A number of inquiries were received and a little business closed. Prospects are that the market will be in normal condition very shortly. Furnaces need very little additional business to finish out the quarter's run and consequently no concession in price has been made. The prevailing quotation is $15 per ton f.o.b. Birmingham, or $18.75 per ton St. Louis for No. 2 foundry.

Iron Ore—Missouri iron ore, 50 per cent. iron, is being eagerly sought for at $3.75 per ton St. Louis.

Metal Markets

New York, Jan. 12—The metal markets have been generally steady. The copper report for December shows a considerable decrease in the unsold stocks of the metal.

Gold, Silver and Platinum

UNITED STATES GOLD AND SILVER MOVEMENT

Metal.	Exports.	Imports.	Excess.
Gold:			
Nov. 1909..	$15,649,281	$ 3,863,637	Exp. $11,785,644
" 1908..	2,967,795	2,909,883	" 57,912
Year 1909..	122,301,517	42,003,194	" 80,298,323
" 1908..	73,857,749	45,123,561	" 28,732,188
Silver:			
Nov. 1909..	4,951,483	4,691,807	Exp. 259,676
" 1908..	3,951,987	3,275,609	" 676,378
Year 1909..	52,294,344	41,981,006	" 10,313,338
" 1908..	47,111,382	37,814,676	" 9,296,706

Exports from the port of New York, week ended Jan. 5: Gold, $1,064,000, to Argentina and Brazil; silver, $1,360,248, chiefly to London. Imports: Gold, $63,236; silver, $13,888, both from Central and South America.

Transvaal gold production in December reported by cable at 604,987 oz. fine. Total production for the year, 7,052,617 oz. in 1908 and 7,280,542 oz.—or $150,488,803—in 1909; an increase of 227,925 oz., or $4,711,122, last year.

Gold—No special demand arose for gold and the price on the open market in London continued at 77s. 9d. per oz. for bars and 76s. 5d. per oz. for American coin. The Bank of England took most of the gold offered. In New York some gold continues to go to South America.

Platinum—The market is easing off a little, though business continues good.

Dealers ask this week 50c. less, $29 per oz. for refined platinum, and $34.50 for hard metal.

Silver—The price of 24¼d. seems to have been top for silver in the recent rise. From the best advices, the impression gains that the market fluctuations are likely for the present to be confined within a narrow range.

SILVER AND STERLING EXCHANGE

Jan.	6	7	8	10	11	12
New York....	52½	52⅝	52⅝	52½	52⅛	52⅜
London.....	24 3/16	24 3/16	24⅛	24 3/16	24 1/16	24⅛
Sterling Ex..	4.8700	4.8690	4.8685	4.8685	4.8675	4.8680

New oYrk quotations, cents per ounce troy, fine silver; London, pence per ounce sterling silver, 0.925 fine.

Exports of silver from London to the East, Jan. 1 to Dec. 30, as reported by Messrs. Pixley & Abell:

	1908.	1909.	Changes.
India.....	£ 9,247,390	£6,667,600	D. £2,579,790
China.....	741,400	1,950,000	I. 1,208,600
Straits.....	164,885	114,600	D. 50,285
Total.....	£10,153,675	£8,732,200	D. £1,421,475

India Council bills in London sold at an average of 16.125d. per rupee.

Copper, Tin, Lead and Zinc

Jan.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. New York, Cts. per lb.	Lead. St. Louis, Cts. per lb.	Zinc. St. Louis, Cts. per lb.
6	13⅞ @14	13⅝ @13¾	61 3/16	33¼	4.70	4.60 @4.65	6.02½ @6.05
7	13⅞ @14	13⅝ @13¾	61⅛	33	4.70	4.60 @4.65	6.02½ @6.05
8	13⅞ @14	13⅝ @13¾	....	33	4.70	4.60 @4.65	6.02½ @6.05
10	13⅞ @14	13⅝ @13¾	61⅛	33	4.70	4.60 @4.65	6.00 @6.05
11	13⅞ @14	13⅝ @13¾	61⅛	32¾	4.70	4.60 @4 65	6.00 @6.05
12	13⅞ @14	13⅝ @13¾	61 7/16	32⅞	4.70	4.60 @4.65	6.00 @6.05

London quotations are per long ton (2240 lb.) standard copper. The New York quotations for electrolytic copper are for cakes, ingots and wirebars, and represent the bulk of the transactions made with consumers, basis New York, cash. The prices of casting copper and of electrolytic cathodes are usually 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary Western brands; special brands command a premium.

Copper—The level which the market reached at the close of last week has been fully maintained. A good-sized business has been done with domestic manufacturers at current prices. Business with Europe is at a standstill because the price of standard copper is below parity and foreign buyers can do better by taking copper out of public warehouse to supply their wants. The close is steady and unchanged at 13⅞@14c. for Lake copper, and 13⅝@13¾c. for electrolytic copper in cakes, wirebars and ingots. Casting copper is quoted nominally at 13⅜@13½ cents.

Copper sheets are 18@19c. base for large lots. Full extras are charged, and higher prices for small quantities. Copper wire is 15¼c. base, carload lots at mill. Business is fair.

The market in London for standard copper has fluctuated within narrow limits throughout the week, and the close is slightly lower at £61 8s. 9d. for spot and £62 7s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £65; best selected, £65@65 10s.; strong sheets, £75@76 per ton.

Copper Producers' Association—The report issued Jan. 10 gives the following statement for December and the year ended Dec. 31, in pounds of fine copper:

	December.	Year.
Stocks, Dec. 1 and Jan. 1.....	153,003,527	122,357,266
U. S. production...	117,828,655	1,405,403,056
Total supplies...	270,832,182	1,527,760,322
Deliveries, domestic	69,519,501	705,051,591
Deliveries, for export.....	59,546,570	680,942,620
Total deliveries..	129,066,071	1,385,994,211
Stocks, Dec. 31..	141,766,111	141,766,111
Increase or decrease in stocks.....D.	11,237,416	I. 19,408,845

United States production includes all copper refined and put in marketable form in this country, whether from domestic or foreign material.

Tin—The London market has quieted down considerably. Transactions which up to last week averaged over 1000 tons daily have, at this time, fallen off to about 300 tons. The tendency is for lower quotations, and the close is cabled as steady at £149 5s. for spot and £150 12s. 6d. for three months.

The middle of last week witnessed a little more activity in the domestic market, brought about by rumors of heavy purchases in the foreign market on the part of the largest consumers in this country. When the expected improvement on the London Exchange failed to materialize, business resumed its former dullness, and at the close tin is quoted at 32⅞ cents.

Lead—The market is somewhat quieter and prices are about the same at 4.60@4.65c. St. Louis, and 4.70c. New York.

The advance in London has made further progress, the close being cabled at £13 17s. 6d. for Spanish and £14 for English lead.

Spelter—In view of the more liberal supplies of ore, there has been a greater desire on the part of smelters to realize. As the consumptive demand is still up to the maximum, all offerings have been readily absorbed and prices have only suffered slightly. The close, however, is rather weak at 6.15@6.20c. New York, and 6@6.05c. St. Louis.

New York prices for spelter Jan. 6-8, inclusive, were 6.17½@6.20c.; Jan. 10-12, inclusive, 6.15@6.20 cents.

The London market closes somewhat higher at £23 7s. 6d. for good ordinaries, and £23 12s. 6d. for specials.

Base price of sheet zinc is now 8c. per lb., f.o.b. La Salle-Peru, Ill., less 8 per cent. discount.

Other Metals

Antimony—The market has a stronger tone, but there is little change in prices yet. Cookson's may be quoted at 8½c. per lb., and U. S. 8c., with 7⅞@7⅞c. named for outside brands.

Aluminum—The price of aluminum is unchanged at 20@23c. per lb. for ingots. The higher price is that asked by the American producer.

Quicksilver—Business remains good. New York quotations are unchanged at $52.50 per flask of 75 lb. Jobbers ask 72@75c. per lb. for small lots. San Francisco price is $50.50@51.50 for domestic orders; $2 less for export. The London official price is £9 15s. per flask, with the same figures asked by jobbers.

Nickel—Large lots, contract business, 40@45c. per lb. Retail spot, from 50c. for 200-lb. lots, up to 55c. for 500-lb. lots. The price for electrolytic is 5c. higher.

Magnesium—The price of pure metal is $1.50 per lb. for 100-lb. lots f.o.b. New York.

Cadmium—Current quotations are 65@70c. per lb. in 100-lb. lots at Cleveland, Ohio. In Germany 450@475 marks per 100 kg., at factory in Silesia.

Imports and Exports of Metals

Exports and imports of metals in the United States, 11 months ended Nov. 30, are reported as follows, in the measures usual in the trade:

Metals:	Exports.	Imports.	Excess.
Copper, long tons	282,532	128,687	Exp. 153,845
Copper, 1908....	279,561	84,775	Exp. 194,786
Tin, long tons....	396	38,929	Imp. 38,533
Tin, 1908.....	206	33,105	Imp. 32,899
Lead, short tons.	82,852	104,205	Imp. 21,353
Lead, 1908.....	68,424	99,874	Imp. 31,450
Spelter, sh. tons.	2,438	9,402	Imp. 6,964
Spelter, 1908....	2,471	842	Exp. 1,629
Nickel, lb.....	10,712,669	19,282,172	Imp. 8,569,503
Nickel, 1908....	9,057,506	15,780,499	Imp. 6,722,993
Antimony, lb.....	6,648	6,272,943	Imp. 6,266,295
Antimony, 1908.		7,542,997	Imp. 7,542,997
Platinum, oz.....	... .	105,340	Imp. 105,340
Platinum, 1908.		38,857	Imp. 38,857
Quicksilver, lb	502,326	.....	Exp. 502,326
Quicksilver, '08	224,494	.....	Exp. 224,494
Aluminum, value	$513,398	.....	Exp. $513,398
Aluminum, 1908	309,738	.....	Exp. 309,738
Ores, etc.:			
Zinc oxide, lb.	26,475,398	.....	Exp. 26,475,398
Zinc oxide, '08..	22,056,313	.....	Exp. 22,056,313
Zinc dross, lb....	14,011,622	.....	Exp. 14,011,622
Zinc dross, '08..	15,966,311	.....	Exp. 15,966,311
Zinc ores, lg. tons	11,121	95,726	Imp. 84,605
Zinc ores, 1908.	23,311	44,734	Imp. 21,423
Antim'y ores, lb.	504	3,386,708	Imp. 3,386,204
Ant. ores, 1908.	5,586	3,033,196	Imp. 3,027,610
Chrome ore, tons	.....	38,863	Imp. 38,863
Chrome ore, '08	.....	.....	.....

Copper, lead and nickel include the metal contents of ores, matte, bullion, etc. The exports given include reëxports of foreign material. Chrome ore was not reported separately last year. Zinc contents of ore imported, August-November, 1909, were 12,876,814 lb.; not reported prior to date of new tariff.

Zinc and Lead Ore Markets

Platteville, Wis., Jan. 1—Zinc ore closes at $48@49 base; lead ore, $58@61 per ton. Shipments were interrupted by snow. Stock of zinc ore in bins at end of year was about 6000 tons.

SHIPMENTS, WEEK ENDED JAN. 1.

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Mineral Point	360,000	.....	.....
Cuba City	236,750	.....	139,200
Harker	206,300	.....	.....
Days Siding	163,100	.....	.....
Benton	158,800	.....	.....
Shullsburg	150,000	.....	.....
Platteville	88,000	.....	120,000
Galena	88,000	.....	.....
Montfort	80,000	.....	.....
Highland	51,600	.....	.....
Rewey	.....	63,000	.....
Total	1,582,550	63,000	259,200
Year	136,443,180	9,754,528	15,939,566

In addition to the above there was shipped to the separating plants 1,162,115 lb. zinc concentrates for the week.

Joplin, Mo., Jan. 8—The highest price paid for zinc sulphide ore was $52 per ton, the base being $47@49.50 per ton of 60 per cent. zinc. Zinc silicate sold on a base of $26@27 per ton of 40 per cent. zinc, selling as high as $30 per ton. The average price, all grades, was $45.26 per ton. Lead ore generally sold at $58 per ton in the bin, with a few sales at $58.50 f.o.b. Some of the large bins of this mineral are being sold on these offerings. The average price, all grades, was $57.76 per ton.

SHIPMENTS, WEEK ENDED JAN. 8.

	Zinc, lb.	Lead, lb.	Value.
Webb City	2,567,870	796,110	$ 84,715
Joplin	1,280,230	128,900	35,104
Prosperity	275,790	380,590	17,654
Miami	296,990	207,010	12,187
Alba-Neck	483,530	.....	12,090
Galena	343,440	25,280	8,975
Granby	450,000	5,300	7,445
Oronogo	236,620	35,930	6,075
Duenweg	190,190	43,440	5,823
Badger	178,130	7,510	4,663
Cave Springs	194,210	.....	4,661
Carthage	168,820	.....	4,220
Aurora	207,370	.....	4,085
Quapaw	129,270	.....	2,972
Saginaw	107,530	12,740	2,525
Carl Junction	74,240	.....	1,893
Spurgeon	50,280	37,100	1,760
Seneca	.....	53,700	1,450
Sarcoxie	43,870	.....	1,051
Totals	7,478,380	1,733,610	$219,348
2 weeks	17,708,640	3,664,380	$510,683
Zinc value, the week, $169,275; 2 weeks,			$404,692
Lead value, the week, 50,073; 2 weeks,			105,991

MONTHLY AVERAGE PRICES

Month.	Zinc Ore. Base Price.		Zinc Ore. All Ores.		Lead Ore. All Ores.	
	1908.	1909.	1908.	1909.	1908.	1909.
January	$37.60	$41.25	$35.56	$38.46	$46.88	$52.17
February	36.63	36.94	34.92	34.37	49.72	50.50
March	36.19	37.40	34.19	34.71	49.90	50.82
April	35.40	38.63	34.08	37.01	52.47	55.63
May	34.19	40.06	33.39	37.42	56.05	56.59
June	33.06	44.15	32.07	40.35	60.48	57.52
July	34.55	43.06	31.67	41.11	59.90	53.74
August	36.53	48.25	33.42	44.54	60.34	57.60
September	37.63	47.70	34.44	44.87	54.59	56.11
October	35.95	49.50	33.28	45.75	52.63	55.02
November	39.13	51.31	35.02	48.29	54.53	53.94
December	42.75	49.45	39.63	47.57	49.68	55.26
Year	$36.63	43.98	$34.31	41.20	$53.93	54.60

NOTE—Under zinc ore the first two columns give base prices for 60 per cent. zinc ore; the second two the average for all ores sold. Lead ore prices are the average for all ores sold.

Petroleum

The Standard Oil purchasing agency on Jan. 7 reduced the price of Pennsylvania crude oil 3c., to $1.40 per bbl. This is the result of increased production and smaller exports, and a further drop is expected.

Chemicals

New York, Jan. 12—The new year has brought no special change to the market; sales are moderate and there is little change in prices.

Copper Sulphate—Business is fair only, but prices are firm at $4.10 per 100 lb. for carload lots and $4.35 per 100 lb. for smaller parcels.

Arsenic—The market is flat, consuming demand being light. There is some pressure to sell, chiefly from Mexican producers, who have been holding stocks for almost a year. White arsenic is quoted at $2.70@2.75 per 100 lb., for both spot and futures.

Nitrate of Soda—There is only a moderate interest in this article. Spot sells at 2.10c. per lb., and futures are held at the same price.

Statistics of nitrate of soda in the United States on Jan. 1, reported by Messrs. Mortimer & Wisner, New York, in long tons:

	1908.	1909.	Changes.
Stocks, Jan. 1	5,900	9,140	I. 3,240
Imports 12 months	278,650	364,158	I. 85,508
Total supplies	284,550	373,298	I. 88,748
Deliveries 12 months	275,410	359,298	I. 83,888
Stocks, Dec. 31	9,140	14,000	I. 4,860
Afloat for U. S.	83,200	100,000	I. 16,800

Quantities afloat include all cargoes due to arive at United States ports before April 15 next.

Imports and Exports—Imports and exports of chemicals and raw materials in the United States, 11 months ended Nov. 30.

	Imports.	Exports.	Excess.
Copper sulph. lb.	.....	2,226,840 E.	2,226,840
Copper sul., '08	.....	7,360,870 E.	7,360,870
Bleach, lb.	82,838,721	13,964 I.	82,824,757
Bleach, 1908	66,622,981	121,511 I.	66,501,470
Potash salts, lb.	378,038,947	2,301,710 I.	375,737,237
Potash salts, '08	245,455,927	993,072 I.	244,462,855
Soda salts, lb.	14 447,295	670,784 I.	13,776,511
Soda salts, 1908	10,388,752	772,147 I.	9,616,605
Acetate lime, lb.	.....	65,718,107 E.	65,718,107
Acetate, 1908	.....	52,666,154 E.	52,666,154
Nit. of soda, tons	373,414	7,544 I.	365,870
Nitrate, 1908	293,424	9,526 I.	273,898
Phosphates, tons	11,379	1,003,504 E.	992,125
Phosphates, '08	24,255	1,174,987 E.	1,150,732
Sulphur, tons	25,014	31,921 E.	6,907
Sulphur, 1908	18,884	23,073 E.	4,189
Pyrites, tons	630,438	..... I.	630,468
Pyrites, 1908	621,315	..... I.	621,315
Magnesite, lb.	68,791,144	794,295 I.	67,996,849
Magnesite, 1908	.....	.....	.....

Exports include reëxports of foreign material. Figures for magnesite are for five months, July-November; not reported separately prior to July 1, 1909. Estimating sulphur contents of pyrites, the total imports of sulphur in 1909 were 277,189 tons.

Mining Stocks

New York, Jan. 12—The general stock market has again been uncertain with spells of weakness and an occasional rally. The market shows no definite tendency and nothing is seen yet of the bull movement which was prophesied for the new year.

Some sales of Homestake of South Dakota are reported, 500 shares changing hands at $81 per share.

On the Curb there was likewise some uncertainty and varying movements. In the copper stocks Miami and one or two others was strong throughout the week, but there was depression in several of the issues dealt in. The Cobalt stocks are attracting more attention but do not appear to gain much. The Nevada gold stocks were rather neglected.

In Philadelphia there was a strong upward movement in Cambria Steel. There was heavy buying of the stock, the origin of which is uncertain.

Boston, Jan. 11—The copper-share market has been somewhat disappointing, as the January rise has failed to make its appearance. Lake Copper and North Butte have been the two market features. The former rose almost $20 gross for the week and touched $90 today. Word was received Monday that diamond-drill operations had encountered the vein at the sixth level, which caused a $6 advance during that day's Stock Exchange session. In today's market Lake opened at $80 per share and finished the day at $90. In the last 10 minutes of the market the price jumped from $86 to $90. Trading has been fast and furious and prices have been wide apart at times. The truth of the situation is that inside interests have sold their stock and control is held by other interests. The stock is scarce and as there are but 85,000 shares outstanding the bulls have a comparatively easy matter in marking the price up.

North Butte pursued a downward course the greater part of the week and had a $7 break to $41.25. Recovery to $45.50 followed this break, but the market is very uncertain.

Other strong stocks have been in the properties contiguous to the Lake mine. North Lake, Ojibway, Hancock and New Arcadian have been the conspicuous ones. New Arcadian rose $10.50 today.

The capitalizing of the Cliff lands belonging to the Tamarack mining company has given Tamarack stockholders a right which sold as high as $4 last week.

Curb trading has been active and prices generally strong. Inspiration, South

Lake and a few others have been active and strong features. A better market is also noted for Calaveras. Oneco took a sharp jump upward. Rhode Island Coal is likely to go on the Stock Exchange at no remote day, as is Cactus Mining.

STATISTICS OF COPPER.

Month.	United States Product'n.	Deliveries, Domestic.	Deliveries for Export.
I	112,135,200	51,862,624	38,499,797
II	103,700,817	43,578,118	30,968,496
III	117,058,661	48,871,964	59,191,043
IV	113,574,292	47,546,010	65,110,111
V	118,356,146	61,163,325	70,542,753
VI	116,567,493	60,591,116	70,966,457
VII	118,277,603	75,520,083	75,018,974
VIII	120,597,234	59,614,207	48,382,704
IX	118,023,139	52,105,955	50,077,777
X	124,657,709	66,359,617	56,261,238
XI	121,618,369	66,857,873	55,266,595
XII	117,828,655	69,519,501	59,546,570
Totals	1,405,403,056	705,051,591	680,942,620

VISIBLE STOCKS.

	United States.	Europe.	Total.
I	122,357,266	124,716,480	247,073,746
II	144,130,045	118,574,400	262,704,445
III	173,284,248	117,140,800	290,425,048
IV	182,279,902	115,024,000	297,303,902
V	183,198,073	114,050,320	297,248,393
VI	169,848,141	127,352,960	297,201,101
VII	154,858,061	150,928,960	305,787,021
VIII	122,596,607	171,492,160	294,088,767
IX	135,196,930	197,993,600	333,190,530
X	151,472,772	210,224,000	361,696,772
XI	153,509,626	222,566,400	376,076,026
XII	153,003,527	236,857,600	389,861,127
I	141,766,111	244,204,800	385,970,911

Figures are in pounds of fine copper. U. S. production includes all copper refined in this country, both from domestic and imported material. Visible stocks are those reported on the first day of each month, as brought over from the preceding month.

Monthly Average Prices of Metals

SILVER

Month.	New York.		London.	
	1908.	1909.	1908.	1909.
January	55.678	51.750	25.738	23.834
February	56.000	51.472	25.855	23.706
March	55.365	50.468	25.570	23.227
April	55.505	51.428	25.133	23.708
May	52.795	52.905	24.377	24.343
June	53.663	52.538	24.760	24.166
July	53.115	51.043	24.514	23.519
August	51.683	51.125	23.858	23.588
September	51.720	51.449	23.877	23.743
October	51.431	50.923	23.725	23.502
November	49.647	50.703	22.933	23.351
December	48.766	52.226	22.493	24.030
Total	52.864	51.503	24.402	23.726

New York, cents per fine ounce; London, pence per standard ounce.

COPPER

	NEW YORK. Electrolytic		NEW YORK. Lake.		LONDON.	
	1908.	1909.	1908.	1909.	1908.	1909.
January	13.726	13.893	13.901	14.280	62.386	57.688
February	12.905	12.949	13.098	13.295	58.786	61.198
March	12.704	12.387	12.875	12.826	58.761	56.231
April	12.743	12.56⅛	12.928	12.93⅜	58.331	57.363
May	12.598	12.893	12.788	13.238	57.387	59.338
June	12.675	13.214	12.877	13.548	57.842	59.627
July	12.702	12.880	12.933	13.363	57.989	58.556
August	13.462	13.007	13.639	13.296	60.500	59.393
September	13.388	12.870	13.600	13.210	60.338	59.021
October	13.354	12.700	13.646	13.030	60.139	57.551
November	14.130	13.125	14.386	13.354	63.417	58.917
December	14.111	13.298	14.411	13.647	62.943	59.906
Year	13.208	12.982	13.424	13.335	59.902	58.732

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling per long ton, standard copper.

TIN AT NEW YORK

Month.	1908.	1909.	Month.	1908.	1909.
January	27.380	28.060	July	29.207	29.125
February	28.978	28.290	August	29.942	29.966
March	30.577	28.727	September	28.815	30.293
April	31.702	29.445	October	29.444	30.475
May	30.015	29.225	November	30.348	30.859
June	28.024	29.322	December	29.154	32.913
			Av. year.	29.465	29.725

Prices are in cents per pound.

LEAD

Month.	New York.		St. Louis	London.	
	1908.	1909.	1909.	1908.	1909.
January	3.691	4.175	4.025	14.469	13.113
February	3.725	4.018	3.868	14.250	13.313
March	3.838	3.986	3.835	13.975	13.438
April	3.993	4.168	4.051	13.469	13.297
May	4.253	4.287	4.214	12.938	13.225
June	4.466	4.350	4.291	12.600	13.031
July	4.744	4.321	4.188	13.000	12.563
August	4.580	4.363	4.227	13.375	12.475
September	4.515	4.342	4.215	13.125	12.781
October	4.351	4.341	4.215	13.375	13.175
November	4.330	4.370	4.252	13.538	13.047
December	4.213	4.560	4.459	13.166	13.125
Year	4.200	4.273	4.153	13.439	13.049

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

SPELTER

Month.	New York.		St. Louis.		London.	
	1908.	1909.	1908.	1909.	1908.	1909.
January	4.518	5.141	4.363	4.991	20.563	21.225
February	4.788	4.889	4.638	4.739	20.875	21.563
March	4.665	4.757	4.527	4.607	21.075	21.438
April	4.645	4.965	4.495	4.815	21.344	21.531
May	4.608	5.124	4.458	4.974	19.906	21.975
June	4.543	5.402	4.393	5.252	19.000	22.000
July	4.485	5.402	4.338	5.252	19.031	21.969
August	4.702	5.729	4.556	5.579	19.350	22.125
September	4.769	5.796	4.619	5.646	19.563	22.906
October	4.801	6.199	4.651	6.043	19.750	23.200
November	5.059	6.381	4.909	6.231	20.875	23.188
December	5.137	6.249	4.987	6.099	20.625	23.094
Year	4.726	5.503	4.578	5.352	20.163	22.185

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

STOCK QUOTATIONS

COLO. SPRINGS Jan. 11

Name of Comp.	Clg.
Acacia	.05⅞
C. C. Con	.03
Dante	.07½
Doctor Jack Pot	.08
Elkton	.70
El Paso	.65
Findlay	.10½
Gold Dollar	.11
Gold Sovereign	.04⅛
Isabella	.17⅛
Jennie Sample	‡.08
Jerry Johnson	.09⅛
Lexington	‡.48½
Mary McKinney	.47
Old Gold	‡.04
Pharmacist	.04⅜
Portland	.87
U. G. M.	.10
Vindicator	.75
Work	.06¼

S. LAKE CITY Jan. 11

Name of Comp.	Clg.
Carisa	.50
Colorado Mining	.74
Columbus Con	1.20
Daly Judge	4.85
Grand Central	2.20
Iron Blossom	.72
Little Bell	1.60
Little Chief	‡.45
Lower Mammoth	‡.50
Mason Valley	‡.90
Maj. Mines	2.32½
May Day	‡.19½
Nevada Hills	.65
New York	‡.13
Prince Con	.70
Red Warrior	‡6.00
Silver King Coal'n	3.65
Sioux Con	.29
Uncle Sam	.42½
Victoria	1.50

SAN FRANCISCO Jan. 11

Name of Comp.	Clg.	Name of Comp.	Clg.
COMSTOCK STOCKS		MISC. NEVADA	
Atlanta	‡.11	Belmont	.90
Belcher	1.30	Jim Butler	.09
Best & Belcher	.90	MacNamara	.26
Caledonia	.65	Midway	.17
Challenge Con	.37	North Star	.01
Chollar	.34	West End Con	.23
Confidence	1.45	Atlanta	.10
Con. Cal. & Va	1.80	Booth	‡.09
Crown Point	‡1.20	C.O.D. Con	‡.06
Exchequer	‡.37	Columbia Mt.	‡.05
Gould & Curry	.46	Comb. Frac.	.40
Hale & Norcross	.64	Goldfield Belmont	.90
Mexican	1.92	Goldfield Daisy	.98
Ophir	2.17	Jumbo Extension	.12
Overman	.72	Oro	.03
Potosi	.70	Red Hill	.02
Savage	.58	Sandstorm	‡.05
Sierra Nevada	.84	Silver Pick	.08
Union	.99	St. Ives	.07
Yellow Jacket	1.42		

N. Y. EXCH. Jan. 12

Name of Comp.	Clg.
Amalgamated	87⅜
Am. Agri. Chem.	47½
Am.Sm.&Ref.,com	100
Am. Sm. & Ref., pf.	111¼
Anaconda	52⅛
Bethlehem Steel	63⅛
Col. & Hock. I. & S.	91¾
Colo. Fuel & Iron	47⅝
Du Pont P'd'r, pf.	87
Federal M. & S.	70
Great Nor., ore ctf.	78½
Nat'nalLead,com.	87⅛
National Lead, pf.	110
Pittsburg Coal	26⅛
RepublicI&S,com.	43¾
Republic I & S, pf.	103¼
SlossSheffi'd,com.	85
Sloss Sheffield, pf.	118½
Tennessee Copper	38¾
Utah Copper	58
U. S. Steel, com	87
U. S. Steel, pf	123¼
Va. Car. Chem	56½

N. Y. CURB Jan. 12

Name of Comp.	Clg.
Big Vein Copper	8⅞
Bonanza Creek	3
Boston Copper	21
Braden Copper	4¾
B. C. Copper	8⅝
Buffalo Mines	3½
Butte Coalition	27⅛
Cobalt Central	.21½
Combination Fra.	.38
Con. Ariz. Sm.	3⅛
Cumberland Ely	9
Davis-Daly	4
Dominion Cop.	7
Ely Con	.85
Ely Central	2⅛
El Rayo	2 13/16
Florence	2⅜
Giroux	12
Gold Hill	1⅝
Goldfield Con	7 3/16
Greene Cananea	11
Guanajuato	2
Guggen. Exp.	241½
Kerr Lake	10 5/16
La Rose	5
McKinley-Dar-Sa.	.79
Miami Copper	27⅜
Mines Co. of Am.	50
Montezu. of C. R.	6
Mont. Shoshone	1⅜
Mont.-Tonopah	.70
Nev. Utah M. & S.	1 1/8
Newhouse M. & S.	3½
Nipissing Mines	10¼
Ohio Copper	5 5/16
Pacific Sm. & M.	1½
Silver Queen	.20
Standard Oil	660
Stewart	11/16
Tintic	2⅜
Tonopah	6¾
Tonopah Ex	.71
Tri-Bullion	1
Utah Apex	5⅛
Yukon Gold	4 1/8

LONDON Jan 12

Name of Com.	Clg.
Dolores	£1 10s 0d
Stratton'sInd.	0 3 3
Camp Bird	1 9 0
Esperanza	3 0 0
Tomboy	0 18 6
El Oro	1 9 0
Oroville	0 10 6

‡Last quotation.

BOSTON EX. Jan. 12

Name of Comp.	Clg.
Adventure	6¼
Allouez	55
Am. Zinc	38½
Arcadian	10¼
Arizona Com	48
Atlantic	11
Boston Con	22
Calumet & Ariz.	100¼
Calumet & Hecla	670
Centennial	36½
Con. Mercur	.11
Copper Range	84
Daly-West	8⅞
East Butte	12
Franklin	17⅝
Greene—Can.	11
Hancock	33
Isle Royal	27½
Keweenaw	5⅛
La Salle	17
Mass.	6¾
Michigan	7
Mohawk	67
Nevada	26¾
North Butte	43⅛
Ojibway	11½
Old Dominion	52⅛
Osceola	163
Parrot	20⅛
Quincy	89
Shannon	17
Superior	64
Superior & Bost.	16⅛
Superior & Pitts.	16
Tamarack	70½
Trinity	11¼
U. S. Smg. & Ref.	53¼
U.S.Sm. & Re., pd.	51⅞
Utah Con	44
Victoria	4½
Winona	12
Wolverine	148
Wyandotte	2½

BOSTON CURB

Name of Comp.	Clg.
Ariz. Mich	.37⅛
Ahmeek	225
Bingham Mines	..
Boston Ely	4⅝
Calaveras	5⅛
Champion	.13
Chemung	14
Chino	12⅝
Corbin	8⅜
Cactus	6⅜
Crown Reserve	5⅛
First Nat. Cop.	5⅛
Gila Copper	10¼
Indiana	9⅝
Majestic	.96
Ray Central	4
Ray Con	26¼
Rawhide Coal	.19
Rhode Island Coal	11⅞
San Antonio	8½
South Lake	9½
Trethewey	..
Vulture	8⅜
Yuma	1¾

ST. LOUIS Jan. 8

N. of Com.	High.	Low.
Adams	.40	.30
Am. Nettie	.08	.07
Center Cr'k	2.00	1.75
Cent.C.&C.	86.00	84.00
C.C. & C. pf.	85.00	84.00
Cent. Oil	110.00	100.00
Columbia	9.00	7.00
Con. Coal	19.00	17.00
Doe Run	110.00	105.00
Gra. Bimet.	.33	.30
St. Joe	12.50	11.00

Assessments

Company.	Delinq.	Sale.	Amt.
Adventure Con. Cop., Mich.		Feb. 1	$1.00
Arcadian Copper, Mich.		Mar. 1	0.50
Con. Imperial, Nev.	Jan. 11	Feb. 3	0.01
Con. Virginia, Nev.	Dec. 20	Jan. 10	0.25
Exchequer, Nev.	Dec. 15	Jan. 5	0.05
Gordon M. & M., Utah	Jan. 15	Feb. 4	0.002
Hancock Min., Mich.		Feb. 1	1.00
Maxfield, Utah	Jan. 31	Feb. 19	0.00½
Mountain Dell Con., Utah	Dec. 21	Jan. 10	0.01
Palmyra G. & C., Utah	Dec. 29	Jan. 19	0.002
Precious Metals M. & M., Cal.	Dec. 27	Jan. 31	0.01
Reindeer C. & G., Ida.	Dec. 31	Jan. 19	0.003
Seven Bros.-Pioche, Nev.	Jan. 15	Feb. 4	0.002
Sheba Gold & Silver, Utah	Jan. 19	Feb. 23	0.05
Sierra Nevada, Nev.	Jan. 11	Feb. 3	0.10
Silver Hill, Nev.	Dec. 23	Jan. 14	0.05
Silver King Con., Utah	Jan. 17	Feb. 5	0.10
Union Con., Nev	Dec. 22	Jan. 13	0.10
Utah Ideal, Utah	Feb. 1	Feb. 20	0.00½
Western Monitor, Utah	Feb. 1	Mar. 1	0.00½
Winona, Mich.	Dec. 1	Jan. 1	1.00