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According to the tables published on another page, the dividends paid by American mining companies in August amounted to \$3,066,154, and for the seven months ending August 31st to \$27,195,530. Although we have taken great pains to extend our dividend list and to obtain information wherever possible with regard to such payments, and although many officers of companies have aided us by furnishing the necessary reports, the total given in our table falls very far below the actual profits paid by our mines to their owners. There are many mines held by private owners, and many more which are close corporations and will not give information as to their operations and payments. Our lists are much larger than any ever published before, but we believe that they represent less than half the real mining profits distributed.

In Great Britain pig iron is just now selling at somewhat above our prices here, recent quotations showing \$20 to \$20.25 for West Coast hematite or Bessemer pig; \$17.75 to \$18 for Scotch foundry pig, and \$15.75 to \$16 for Middlesboro pig. The speculation in warrants shows a general tendency to operate for a decline, and evidently lower rather than higher prices are anticipated in the trade. This is not a favorable condition, as the cost of raw materials has increased more in England than on this side of the water, and furnace owners are not in good shape to meet a declining market. The cost of fuel is the most important question, and the Welsh furnaces especially are threatening a stoppage if prices cannot be kept at a level corresponding with the current cost of coal.

The report of the Republic Iron and Steel Company, an abstract of which is given on another page, is notable chiefly for two points, the first of which is the absence of all figures as to the actual production of the company's plants, and its gross receipts for the sale of those products. The other is the fact that while there was a large surplus shown after paying dividends on the preferred stock, nothing was paid during the year on the common stock. It is, of course, necessary for such a company to carry a large working capital which would appear as surplus; but if there was really nothing to spare for the common stockholders in a year of unexampled prosperity in the iron trade, what can they look for hereafter? Quite possibly the promoters of the organization did not expect that dividends on anything outside of the preferred shares would ever be possible; but they did not express this belief to the public which invested in the shares. This report should set buyers to thinking, if not to demanding fuller information about their property.

Some three years ago we referred to the reorganization of the Dolcoath Tin Mining Company in Cornwall, with a view of introducing modern methods into a Cornish mine, and thus arresting the decline of the ancient mining industry of that region. The new company was formed on a basis entirely different from that which had been for centuries customary in Cornwall, and its work has been watched with much interest. The company has just issued its report for the year ending June 30th last, which shows that the experiment has thus far been satisfactory, and a fair result has been obtained. A dividend at the rate of 13 1/3 per cent. has been paid, and suitable sums written off to provide for extra development work. The plant has been increased so that the present rate of treatment is 100 tons of ore a day. The average content was slightly lower than previously, being 54 pounds of tin per ton of 2,240 pounds, and the price per ton of tin received from the purchasers was slightly greater than in 1899, being £82 15s. The exploring work continues to disclose new bodies of ore. With an increase in the plant larger quantities of ore are being treated, which compensates for the slightly lower contents. There does not appear to be any prospect of a serious decline in the price of tin, so that the prospects of the mine are quite hopeful.

We are advised that the Batopilas Mining Company—whose mines and works in Chihuahua, Mexico, were described in the "Engineering and Mining Journal," April 14th, 1900—is about to be reorganized, preparatory to a sale. This reorganization became necessary on account of the provision of the New York law, which requires the unanimous consent of all the stockholders in the event of a sale of the property. As the number of stockholders is very large, and many have been lost sight of, in fact, as it is not known where some of the stock is held, it is impossible to obtain this unanimous consent.

The plan prepared by the legal advisers of the company in Mexico and New York is to have the courts of Chihuahua sell the property at the request of the creditors by public sale to a number of trustees named by the stockholders, the bondholders and other interested parties, and to let these trustees organize a new company under the laws of a State

which offers greater facilities to companies for commercial transactions. This, it is understood, will soon be done, the trustees being Ex-Governor Alex. R. Shepherd, the manager of the company; Mr. E. C. Creel of Chihuahua, and Mr. L. H. Stevens of New York. The interests of present stockholders will be fully protected. The mines are now doing very well and their future seems bright and will bring the reward the persistent devotion of Governor Shepherd has so well earned.

Some time ago we had occasion to comment unfavorably upon the Stephens process for leaching ores basing our criticism upon the extravagant claims for cheapness made by interested parties. A contemporary of ours, published at Los Angeles, Cal., took our criticism to heart and was deeply offended. We have not heard much of the Stephens process lately, but we are pained to see that our Los Angeles contemporary is now giving a page of its valuable space to a wonderful electrical ore finder sold by the Electro-Geodetic Mining Company. However, the belief in divining rods is a very old one, and is possibly still shared by our contemporary so we withhold criticism. We have no hesitation, however, against warning all miners and prospectors against all divining rods, whether worked by electricity or hand power. The magnetic needle has long been a recognized friend of the iron miner and can be used to locate rock horizons or veins carrying magnetic minerals. No one has yet devised a successful method of applying it to non-magnetic ore bodies, which include about all those carrying gold, silver, copper or lead. A good working knowledge of the geology of a district, followed by the local use of dynamite and shovel, will give a man an exact knowledge of the rocks there, something that all divining rods or electrical ore finders yet invented will not give him.

Coal exports from the United States for the 7 months ending with July showed a considerable relative increase over last year, but the totals were still small as compared with our production. These exports are reported by the Treasury Department as below, in tons:

	1899.	1900.	Increase.	P. ct.
Anthracite .....	887,431	992,481	105,050	11.8
Bituminous .....	2,118,651	3,609,274	1,490,623	70.4
Total .....	3,006,082	4,601,755	1,595,673	53.1
Coke .....	150,989	240,253	89,264	59.1

This year's foreign trade represented only about 3.7 per cent. of our total production, a comparatively insignificant figure. A large part of the gain also was in the direction of our established trade, as is shown by the following table, which gives the distribution of the exports in both years:

	1899.	1900.	Increase.
British North America.....	2,149,654	3,253,803	1,104,149
Mexico, West Indies and South America.....	786,031	976,376	190,345
Pacific Islands .....	54,582	93,004	38,422
European countries .....	15,815	278,572	262,757
Totals .....	3,006,082	4,601,755	1,595,673

The prominent point in this table is, of course, the fact that our shipments of coal to Europe, which were insignificant in quantity last year, have this year grown to an extent which makes them at least worth recording. The notes of sales made and cargoes shipped, which will be found in our news columns, show that since the end of July there has been a further gain, and the closing months of the year will probably show a movement of considerable proportions. The causes and possibilities of this movement we hope to show hereafter.

By far the most important question connected with mining in Great Britain at the present time is the extraordinary demand for coal. As is already well known, the amount of coal going from England to Russia, France and Germany, both for warlike and industrial purposes, is unprecedented, and it is not to be wondered at that Englishmen are anxiously watching the course of events for both commercial and patriotic reasons. As Great Britain is a free-trade country, her traders are always able to obtain their goods from abroad when the home producers have proved unreasonable, and on more than one occasion has the relief come from America. Hitherto the imports into England from America have been chiefly food-stuffs. To some extent iron, steel and machinery have also followed, but it is not until now that coal is being imported in any large quantity. The chief importer in England at present is the South Metropolitan Gas Company, which supplies gas to the southern part of London. This company has always been noted as the most enlightened and businesslike of its sort in England, and the manager, Mr. Livesey, is one of the leading commercial men in the country. Such a move against the home coal trade is just what could be expected of him, and with a few more up-to-date men like him the English coal owners might be forced to modify their present policy of pitting the foreign buyer against the home consumer.

The rise of England as a commercial nation has been due to her supplies of coal and iron ore, but for some years her iron ore has been mainly obtained from abroad, and now she is not solely dependent on her internal production for her coal supply. All this tends to show that in the future the greatness of England will depend not so much on her resources of coal and iron, or on her manufactures, as on her accumulated capital, which will help to develop the riches of the world in countries where progress is at present prevented by ignorance, bad government or poverty.

It must be noted, however, that the coal production of Great Britain is still far in advance of the consumption, and the alternative now presented is the importation of coal from this country or the abandonment of some of the foreign markets now supplied with fuel from British mines.

#### THE HANS A. FRASCH ELECTROLYTIC PROCESS FOR EXTRACTING METALS, AS APPLIED TO COPPER-NICKEL MATTE.

It is not often that we have occasion to announce the invention of a metallurgical process that promises to reduce so radically the cost of producing the useful metals as does that of Mr. Hans A. Frasch for the extraction of nickel, copper and other metals from their ores and at the same time for the production of caustic soda and chlorine. For some time past we have been advised of the progress of Mr. Frasch's investigations, and on the invitation of those interested in the works, we sent Mr. Joseph Struthers, of the staff of "The Mineral Industry," a thoroughly competent expert, to Hamilton, Ontario, to witness Mr. Frasch's demonstration of his invention and to describe it. The readers of the "Engineering and Mining Journal" can therefore accept with entire confidence the following description of the process and Mr. Struthers' conclusions drawn from full personal investigation of the same.

This process bids fair to revolutionize the present methods of extracting not only copper and nickel from their ores and metallurgical products, but appears adaptable as well to the winning of silver, mercury and other metals that have heretofore offered almost insurmountable difficulties to their economical extraction in the wet way.

The Nickel-Copper Company of Ontario, Limited, under whose auspices the process was shown, is controlled by the following officers: A. T. Wood, president; John Moodie, treasurer; John Patterson, secretary. The company was originally organized to mine and smelt the nickel-copper ores of Sudbury, bringing them to the condition of nickel-copper matte, and it held a contract with the Hoepfner Refining Company, Limited, of Ontario, for the treatment of this matte to produce eventually therefrom the copper and nickel contents in a metallic state. Unfortunately, however, the Hoepfner Refining Company was unable to develop its process of refining economically, and, to facilitate the solution of the entire problem, the Nickel-Copper Company took up the matter and secured the services of Mr. Hans A. Frasch for the development of a satisfactory refining process. So successful were the results obtained by him that it was decided to give a public exhibition of the process to prove its great value and as a mark of simple justice to Mr. Frasch, in whose name the patents now stand, it should be mentioned that the success attained was due entirely to his individual effort.

The process as applied to the Sudbury copper-nickel matte is simplicity itself in idea and arrangement. Briefly outlined it consists of the electrolysis of a brine solution in such a manner that while the sodium ions are set free at the cathodes with the immediate formation there of caustic soda, the chlorine ions are liberated in the anode section containing the matte and immediately form a chloride solution of the metals present. In this way brine is electrolyzed to form caustic soda at even a less expense than with the insoluble anodes in the Catsner-Kellner or Rhodin processes and at the same time the chlorine instead of being made into bleach is directly utilized for the formation of the chlorides of copper, nickel, iron and other metals that are in combination in the matte at the anode poles. In other words, in the ordinary caustic manufacture, to produce it economically requires the combination of the chlorine set free to form the by-product, bleach, while in the present Frasch process the caustic itself becomes a by-product and the chlorine combines with the metals in the matte, practically at the instant it is set free and produces a solution of metallic chlorides, that can be directly treated for the contained metals by electrolysis or chemical methods, or after being electrolyzed of half its content of copper (corresponding to the conversion of the cuprous salt to the cupric salt), it may be used for the lixiviation of the metals in the raw matte, the copper chloride solution being in the cupric condition acts chemically as a solvent for the metals in the matte and reforms the electrolyte solution suitable for further electrolysis. Eventually the metals in the solution are recovered by electrolytic deposition, or, in the case of nickel and cobalt, the nickel is separated from the

cobalt as a chemical salt by a method which Mr. Frasch prefers not to disclose at this time.

The electrical and chemical principles involved are perfectly sound and under easy control, and the mechanical side of the process calls for very simple treatment. The matte is submitted to a coarse crushing and is then conveyed to the vats, where it is charged directly on a layer of carbonaceous material that forms the anode section at the bottom. On this layer of matte is placed a thin layer of sand which gives a very satisfactory diaphragm for the separation of the resultant solutions of caustic soda and the chlorides of the metals. The anode section of the vat is then filled to the sand layer with a saline or a weak chloride solution from a previous operation and the balance of the vat is filled with water or with a weak caustic solution. The passing of the two solutions from the reservoirs to and through their respective anode and cathode sections of the vats and thence to receiving tanks is accomplished mainly by gravity. The subsequent handling of the solid material which remains in the anode section after treatment, consists of the removal of the upper layer of sand, which can be washed and used again, followed by the removal of the leached material, from which perhaps it might prove economical to extract the sulphur. From this outline it is readily seen how cheaply the material can be handled.

This condensed description of the process embraces its important salient points and is all that can be given to the public at the present moment of writing. As soon as a few minor details have been more thoroughly protected and the patent rights for foreign countries, already applied for, are duly obtained, a complete description in detail will appear in *The Engineering and Mining Journal*.

As a matter of record the following facts may be stated: The matte under treatment was of the composition, copper, 31.8 per cent.; nickel, 14.8 per cent.; iron, 25 per cent.; sulphur, 24 per cent. The first solution from the anode section contained, in grams per liter, copper 50, nickel 43 and iron 26.6, and after the removal from this solution by direct electrolytic deposition of one-half the copper content, a second percolation through the anode section gave a solution that contained, in grams per liter, copper 50, nickel 60 and iron 35. By a further intermediate removal of the copper from the chloride solution with intermediate percolation through the anode section or sections, the percentage of nickel can be raised to any desired degree. In the tests that were carried out at the works of the Nickel-Copper Company the results obtained fully reached the theoretical quantities; in fact, they somewhat exceeded them as often occurs in electrolytic work where soluble anodes are employed. It is claimed that the entire cost of the process will be fully met by the value of the caustic soda and other by-products.

After the exhibition the visitors, numbering about 100 in all, proceeded by a special car to the Brant Hotel on the lake, where they were entertained at dinner by the officers of the company. Mr. A. T. Wood, president of the company, presided, and among the prominent speakers were the Hon. J. M. Gibson, Attorney-General of Ontario; Capt. W. H. Jaques, of Boston; Mr. S. J. Ritchie, Mr. John Patterson, secretary of the company, and Mr. Thomas W. Gibson. The "*Engineering and Mining Journal*" was represented by Mr. Joseph Struthers.

The metallurgical and chemical professions have been so deluged in recent years by patents innumerable for the extraction, refining and, one might almost say, for the creation of metals by electrolytic methods, that they are prone to view experimental results with doubting eyes and even when claims are substantiated in a trial, not merely by laboratory experiments but on a scale sufficiently large to give results that are reasonably comparable with actual practice, even then they are still inclined to be skeptical. The exhibition of the Hans A. Frasch process in the present case, however, leaves nothing at which the public can cavil, and, like many other processes, its principal value lies in the simplicity of the reactions involved and in the plain means employed to accomplish the mechanical treatment necessary.

The position of nickel in the metallic arts has become so important in the past few years for the manufacture of nickel-steel, that the effect of this new process which can produce the metal at a figure much below the present cost of extraction and refining, bids fair to revolutionize the present method of treatment. With nickel at a price of 20 or even 25 cents per pound, its use would be largely expanded and the practical results obtainable would open up a field of utility of much value. With regard to the present status of the production and refining of nickel matte very nearly one-half of the world's supply of nickel is derived from the Sudbury deposits which are smelted to matte in Ontario and subsequently refined in the United States. At present the United States tariff imposes an import duty of \$120 per short ton of refined nickel, while the matte is admitted free, and, as a self-protective measure, the present Legislature of Canada has enacted tariff laws which place an export duty of 6 cents per pound of nickel contained on all copper-nickel matte shipped from that country to the United States. The law will

become operative as soon as refined nickel is produced in merchant quantities in the Dominion of Canada. At first sight this measure of export taxation seems a policy almost suicidal to the welfare of the Canadian nickel companies, inasmuch as the nickel refining companies of the United States would of necessity seek the development of nickel deposits in other countries in order to overcome this additional expense to them in the cost of producing metallic nickel. On further consideration, however, the development of the Hans A. Frasch process, which if successful, can produce nickel at a cost much below that involved in other methods, and the control of this process by a Canadian company, rather turns the scale in favor of Canadian interests, as it places in their hands the means which will affect most seriously the nickel refiners in the United States, at least so far as their nickel production is concerned, and, while it is rather hazardous to forecast the future, instead of jeopardizing Canadian interests the new laws will doubtless be of great value to the Canadian industry unless retaliatory measures are subsequently enacted by nickel-consuming countries.

The production of nickel as given in "*The Mineral Industry*," Volume VIII., was 3,239 tons in 1898 in the United States, all but 5 tons from imported ores or matte. The production from New Caledonian ores, refined in Europe, was 3,608 tons. In 1899 the production in the United States was 3,661 tons, of which only 10 tons was won from native ores. The production of New Caledonia has not been reported yet for last year.

#### NEW PUBLICATIONS.

"*The Cyanide Process of Gold Extraction*." First English Edition, revised and enlarged from the third New Zealand edition. By James Park, London, England; Charles Griffin & Company, Limited. Pages, 128; illustrated. Price, \$2.

Professor Park has made a very careful study of the application of the cyanide process to the extraction of gold from the ores of New Zealand mines. Many of these ores, as is well-known, are complex and difficult, and some puzzling problems had to be solved in working them to advantage. For this reason the New Zealand metallurgists have been able to give some valuable hints to their brethren elsewhere. This book is interesting from this point of view, and is worth study by those who are interested in the process or are using it elsewhere. It is hardly a general treatise on the use of cyanide, however, as practice with the process in the United States is very briefly treated; and even its use in the Witwatersrand, the field where it has found greatest success and most general adoption, receives comparatively little attention. The author has wisely confined himself for the most part to the field of which he has personal and practical knowledge, and is thus able to give much that is new and interesting.

"*American Foundry Practice*." Tenth Edition. By Thomas D. West, New York; John Wiley & Sons, and London; Chapman & Hall, Limited. Pages, 408; illustrated. Price, \$2.50.

Since this work was first issued, in 1882, it has had a position as a standard on the practical work of the foundry. Practice in making castings, however, does not stand still, and the author has found it necessary to make various revisions. The present edition has been practically rewritten and many additions made, bringing it fully up to date. The book is divided into five parts, the first treating of the moulder's work generally and the requirements to be met in building and equipping a foundry. The second part relates to green sand moulding; the third to loam and dry sand moulding, and the fourth to the handling of castings. The fifth part gives a number of notes on foundry work, on patterns and other similar matters.

Mr. West treats his subject from the working or practical side, and his long experience enables him to give many useful and valuable directions both to the moulder and the foundry manager. In some other writings he has taken up theory and has put forward views which have met with much criticism. In practical work, however, he is a very safe guide, and in this book he shows his best side. Experience and observation have made him master of his subject, and he writes without hesitation and generally with clearness. On the question of iron mixtures for different classes of work there is sometimes a lack of definiteness and a tendency to adhere to old rule-of-thumb methods; though he does not hesitate to admit the advantages of analysis and the good work a chemist can do in connection with a foundry. This subject is a difficult one in itself, however, and also one in which it is hard to give exact instructions. Moreover, experience has shown us that it is one on which men are generally reluctant to be taught; almost every foundry foreman has his own views on mixing iron, and believes that he can give points instead of taking them.

Mr. West's book, on the whole, is a good and practical one, and can safely be accepted as a guide and assistant in all kinds of foundry work.

#### BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review on another page of the Journal.

"*The Statistical Year-Book of Canada for 1899*." Ottawa, Can.: Government Printing Office. Pages, 625.

"*New Zealand Mines Statement for 1900*." Hon. James McGowan, Minister of Mines. Wellington: Government Printer. Pages, 249; illustrated.

"*Analyses of Pig Iron*." By Seymour R. Church. San Francisco, Cal.: Published by the author. Pages, 173; illustrated. Price, \$2.50.

## CORRESPONDENCE.

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

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

## Consulting Chemists' and Engineers' Fees.

Sir: When a business man consults a lawyer or a physician he expects, of course, to pay for the advice he gets and in proportion to the services rendered, but it is really amusing to see how far from the thoughts of the average business man is proper compensation to a chemist or consulting engineer. This arises oftener from ignorance or thoughtlessness than from any attempt to obtain valuable advice for nothing. My thoughts were led in this direction by a letter on my desk from a gentleman of high standing and great business ability, in a distant city, who sends us a sample to be assayed for copper, and, in addition, writes:

"Would you kindly give me all the information you can with reference to — (a mineral), its general uses, present market value and whether the supply at present is limited or not? If the — property which I have in hand is as large as it looks, I want your advice as to what is best for me to do; sell it outright or work it on my own account. If not too much trouble, I should like to know the method of treating this mineral and what kind of a plant would be required. I thank you in advance for the trouble I am asking you to take."

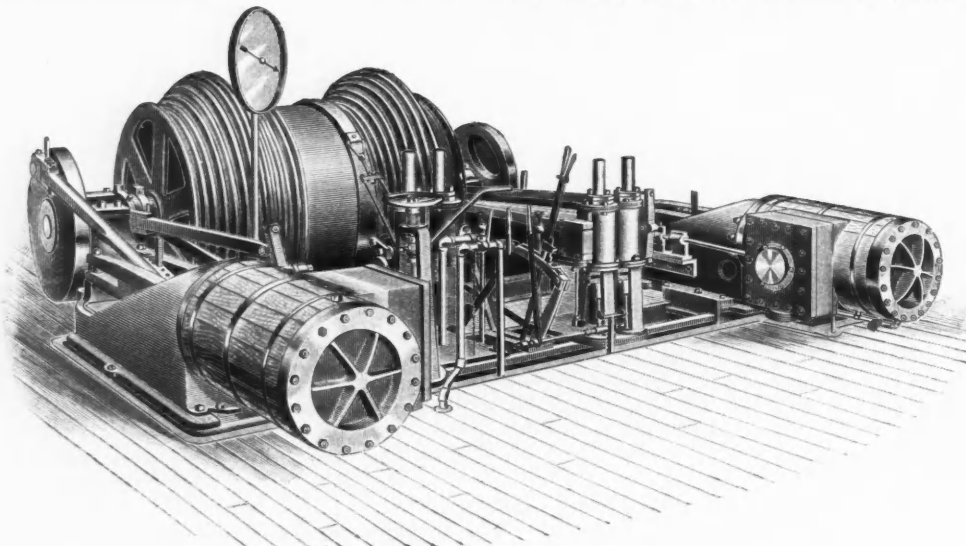
This gentleman would be much astonished were he to be sent a bill for the time spent in looking up and sending him the information he needs.

arsenic or antimony which have not been entirely removed. As a result, these metals exist in the commercial product as oxides, and not as metals, which would form an alloy with the copper and so injure its quality. In making copper bars for the manufacture of wire of high electrical conductivity, and cakes to be rolled into sheet, this practice is, without doubt, beneficial; but it does not improve the copper for the manufacture of brass or other alloys. Zinc is a strong reducing agent; and the study of its thermo-chemical reactions has shown that it will reduce not only the oxide of copper but the oxides of bismuth, antimony and arsenic also.

The paper then gives a description of a large number of experiments made to determine the influence of suboxide of copper on brass, and, incidentally, the effects of suboxide on copper itself. The general conclusions drawn are as follows:

"It is believed that the experiments demonstrate that oxygen in copper, unless present in abnormally large amounts, does not exert a deleterious influence on the quality of brass intended for rolling into sheet. If oxygen is present in excessive amounts (quantities seldom occurring in practice unless the melter is lax in his methods), salamanders are apt to form. If it is present in less amount, salamanders may not form, but the brass manifests a tendency to crack in rolling. This is due, no doubt, to the zinc oxide present, which prevents perfect cohesion. From still smaller quantities of oxygen, practically no injury is noticed. The proportion may even be as high as 0.55 per cent., and no adverse results happen; but more than ordinary care must be exercised to keep the metal thoroughly covered with charcoal. The amount of oxygen in commercial copper is more or less variable, depending upon the caprices of the refiner; but in the best brands great care is taken to keep within as narrow limits as possible. The pitch, of course, determines this point.

"According to advices received in personal communications from



THE CRAWFORD & MCCRIMMON HOISTING ENGINE.

Some years ago a baking powder manufacturer sent a sample to be analyzed, then stated that he had an unusual difficulty with his works; that the powder all caked on his hands and was being returned by his customers. It was suggested to him that some of his ingredients must have become damp, although he thought they were the same as all his previous stock. He made a test and found that his starch contained considerable moisture. He was profuse in his thanks to the chemist, stating that he had been saved "thousands of dollars," but he took offense at a bill of \$25 for consultation, in addition to the charge for analyzing his sample.

Electricians, civil and mining engineers, hydraulic engineers and all technical men must have this same difficulty. Is there any remedy short of the slow education of the public? A. R. Ledoux.

New York, Aug. 31, 1900.

## OBSERVATIONS OF THE EFFECT OF OXYGEN ON COPPER.\*

By Erwin S. Sperry.

The oxidation of metals melted in contact with air takes place with dissimilar results. Tin, lead or zinc are examples of a class, the oxides of which float on the surface of the melted metal. First a film is produced, which covers the surface; then, if agitation from any cause exposes new metal to the action of the air, additional oxidation takes place, and the film is increased in volume. This change goes on until a considerable quantity of oxide (or "dross," as it is technically called) is formed; depending, of course, upon the duration of the exposure of the metal to the atmosphere. When such metals are poured, the dross may be skimmed off; and clean metal will be left underneath. The removal of such oxides is, therefore, merely a mechanical process. In the case of copper, however, the result is quite different. The suboxide of copper (Cu<sub>2</sub>O) is readily soluble in molten copper; and, therefore, instead of the formation of a film of oxide, to be finally removed as dross, the surface of the metal remains bright and clear, because the oxide has been dissolved as soon as it was produced.

It is customary in the process of copper-refining to leave a small quantity of oxide in the metal, in order to oxidize any traces of bismuth.

\*Abstract of paper read at the Canadian Meeting of the American Institute of Mining Engineers.

chemists representing two leading brands of copper on the market (one Lake and the other Electrolytic), the amount of oxygen which exists in these brands of copper may be taken as follows: Lake, 0.012 per cent.; Electrolytic, 0.010 per cent.

"By the results of the various experiments enumerated above, it may be readily seen that no injurious influence can possibly be exerted by such a small proportion of oxygen as 0.01 per cent. Good sheet-brass was made from copper containing over 50 times this quantity. Although the initial amount of oxygen in copper may be quite minute, and not sufficient to exert any influence on brass, yet if the caster is not cautious, and neglects the frequent additions of charcoal, this small percentage may be increased many times by the oxidizing influence of the atmosphere. In conclusion, it may be said that, unless the amount of oxygen in commercial copper exceeds the figure given above, it cannot, by itself, be called an injurious impurity."

## A STANDARD HOISTING ENGINE.

The accompanying illustration shows the standard hoisting engine built by the Crawford & McCrimmon Company of Brazil, Indiana. A number of engines of this type are in use at coal mines in the Western fields. The engine shown is double cylinder and direct acting with grooved drum. They are made also geared, and solid drums are used in some cases. The engine is of compact and powerful design and is well adapted for its special purpose. All hoists made by this company are equipped with its toggle grip foot brake, which, it is claimed, applies the braking power to better advantage than any other device in use.

**PROTECTING POWDER MAGAZINES.**—The French Minister of War has invited the Paris Academy of Sciences to advise as to the precautions to be adopted in selecting and planting trees in the neighborhood of powder magazines, in order to secure the best protection from lightning.

**SIBERIAN PLACER MINING.**—A recent report says that in the last season the Amgoun Mining Company treated 10,834 cubic sagens of gravel, from which about 55 poods of gold were extracted, giving an average of 7.83 grams to a cubic meter. The Amoo Mining Company took out of its placers 20 1/3 poods, showing an average of 17.06 grams to a cubic meter.

## STEEL HEAD GEAR AT AN AUSTRALIAN MINE.

The accompanying illustration shows steel head-gear recently erected at the Garden Gully Mine in the Bendigo District in Victoria. The illustration and description are from the report of the Mines Department of Victoria.

The frame is made of steel tubes; the height from the ground is 71 ft. 3 in. to the center of the hoisting pulleys, 50 ft. 6 in. to the top of the safety brace, and 25 ft. to the working brace. The six steel tubes forming the main frame are 20 in. in diameter at the bottom and 12 in. at the top. There are two sets of stays, each set consisting of 2 flat bars, each 3 by 3/8 in.; these bars cross in the center and are there fixed to a shield 30 in. in diameter. The top is 11 ft. 6 in. wide between centers of tubes in the front elevation, and 14 ft. 6 in. in the side elevation. The tubes are connected at the top by steel girders. On top of this frame are I-beams, with wood on top of them, and these carry the bearings for the large pulleys. The bearings for the pulley shafts are of wood.

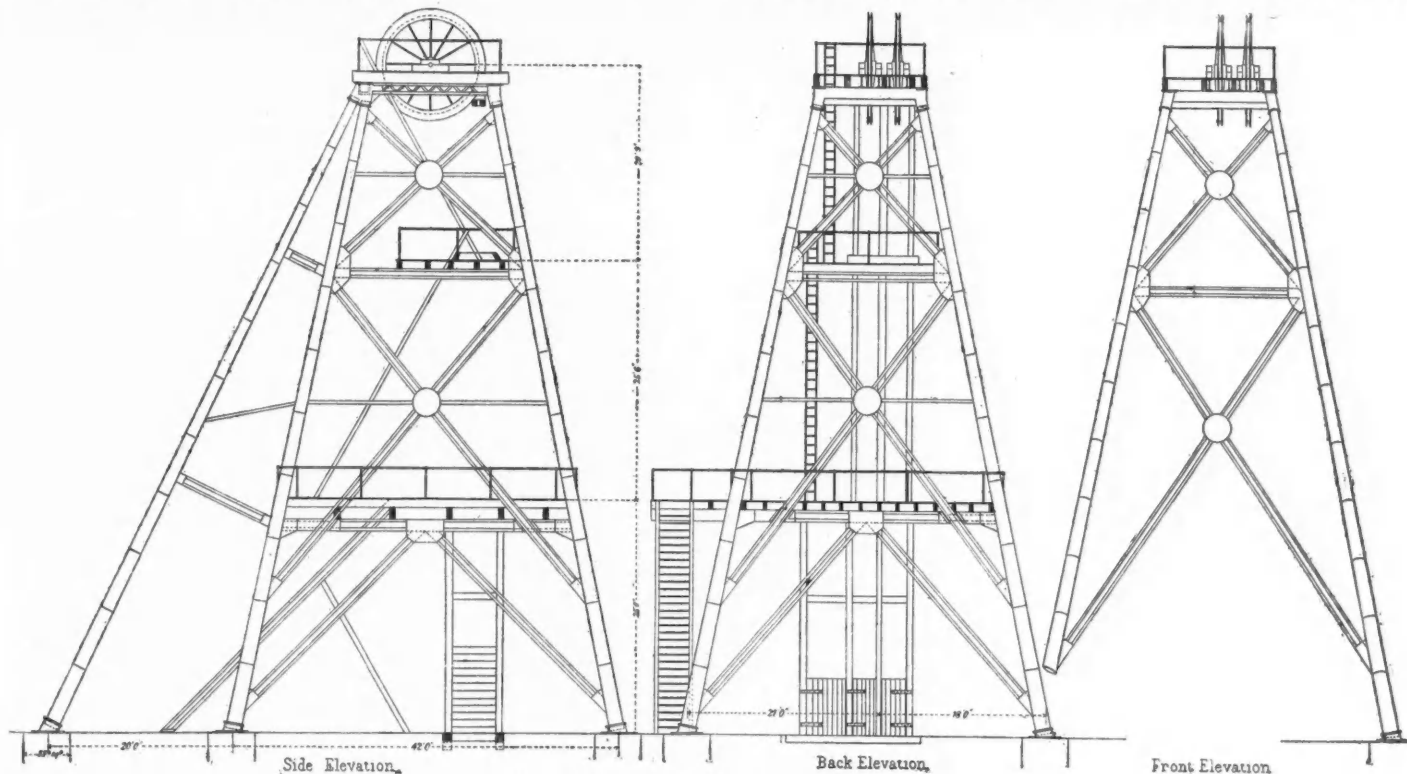
The top platform is floored with 2-in. planks and provided with a light railing. A similar floor and railing are made on the upper or safety braces; also on the working braces. Access is given to the upper floors by iron ladders, and to the working floor by a stairway. The guides for the hoisting cages extend up to the working floor, and are enclosed on the ground level by a wooden fence and doors. At the ground level the distance between the centers of the main supporting tubes is 39 ft. in front and 42 ft. at the sides. The distance from the rear supporting tube to the stay tube is 20 ft. between centers.

The reason for this rapid expansion is not hard to find. Malleable cast iron has a unique position in the iron industry. Softer than cast iron, it can be battered out of shape before it breaks. It surpasses steel in shock-resisting qualities, for while a piece of steel may be strained within its elastic limit many times over without harm, if the strains extend beyond this range the piece is ruined. Not so with malleable cast iron. Take two couplers with their heads battered up in service, one a malleable cast iron, the other cast steel. A test piece cut from the tail of the former will show good sound material, while the latter has been so fatigued, lines of crystallization opened, etc., that it may pull at one-third of the strength it should have shown.

Malleable cast iron may be twisted, bent, machined, polished, threaded and, in fact, treated just as cast iron and cast steel without detriment. It has eight times the shock-resisting qualities of the best cast iron, and is about one-half as strong as the best cast steel. It is, therefore, used where cast steel would be too expensive, and replaces cast iron, dollar for dollar, where strength is wanted, and castings of half the weight will answer.

The analysis of a piece of good malleable cast iron would be about as follows: Carbon (weighed as graphitic) 3.20 to 4.00 per cent.; combined carbon, 0.10 to 0.60; manganese, about 0.25; sulphur, not over 0.07; phosphorus, not over 0.250 per cent. Its physical strength should be about as follows: Ultimate strength, 37,000 to 45,000 lbs. per sq. in.; elongation in 2 in., 3 to 5 per cent.

The materials used in the manufacture of malleable iron castings are pig irons running low in silicon. Charcoal irons seem to give the best



STEEL HEAD GEAR, BENDIGO, AUSTRALIA.

The general arrangement and design are very well shown in the drawings. The design shows a strong and compact frame. This head-gear was made and erected by A. Roberts & Sons, of Bendigo.

## MALLEABLE CAST IRON.

Written for the Engineering and Mining Journal.

The process of rendering cast iron malleable has been known for nearly two centuries; its perfection, in the present sense of the word, has been the work of the last five years. Originally dependence was placed upon the removal of as much of the carbon in the thin castings subjected to the annealing process as possible; now it has been found that substituting sand or fire clay for the oxidizing scale gives equally good results, and the main value of the process lies in the change from combined carbon to temper carbon in work which may be up to 2 in. thick.

The remarkable extension of the malleable iron process from light harness and agricultural work to heavy railroad castings, couplers, and the like, is the result of American enterprise. We find the original description of the process by Reaumeur in 1722. It seems to have been specially developed in England, where, as well as in Germany and France, many malleable castings are still produced by the old crucible process. The contrast between 500 lbs. a day, cast from crucibles in Europe and a modern malleable iron works in this country of 50 to 75 ton capacity, is one of the many things in the iron and steel industries that redound to the credit of the United States.

In this country the first record we have of malleable cast iron dates back to the early twenties, Seth Boyden being the pioneer, and Newark, N. J., the seat of the industry. By this time, however, the material was a widely-known article of commerce on the other side of the water, and to-day the world's product may be roughly estimated at half a million tons per annum,

results, but only because they are much cleaner and more uniform than the general run of coke iron. A heat of good coke iron, however, especially when steel scrap has been added, leaves nothing to be desired. There are used in this country to-day about equal proportions of coke malleable iron and warm-blast charcoal iron for malleable work. Charcoal iron goes to the account of the small companies and some unprogressive or favorably situated large ones; the coke iron forms the staple of most of the heavy producers.

Malleable castings may be made either in the cupola or in open-hearth furnaces. Owing to the closeness of the grain, a cupola iron is difficult to anneal properly, and this class of malleable cast iron is, therefore, restricted entirely to very thin sections. Cupola iron can, however, be made very hot by the use of plenty of coke (occasionally as much as 1 lb. coke to 5 lbs. of iron). This enables the founder to run it into the thinnest kind of castings, such as shoe buckles, harness work, scissors, etc. Furnace iron, unless special precautions are taken, is apt to be somewhat dull at the first of the tap, and should, therefore, go into very plain work, otherwise misruns are likely to occur.

On the other hand, during the melting process the oxidation of the silicon means an increase in the internal heat of the bath, hence more fluid iron, and the temptation is to cast light intricate work at the end of the heat. Unfortunately, however, burning out silicon means introducing oxygen into the bath; pin holes will appear in the surface of the castings, and if aggravated there will be a burning of the iron in the annealing process, hence the danger of casting light work at the end of the heat.

The difficulties attending the preparation of malleable cast iron are so great that the whole process has remained a mystery to outsiders, and consequently we find only those who have become thoroughly familiar with every phase of the process going into business on their own account.

The furnace processes are two-fold; the plain hearth with or without top blast, and the regular Siemens-Martin furnace. The capacity of the

hearth furnaces is usually from 6 to 12 tons. They are fired from the end, the blast being admitted under the grate. Usually a branch pipe is placed to blow additional air downward at the bridge wall, thus throwing the flame upon the bath, and at the same time promoting a better combustion. It takes about an hour to charge a 10-ton furnace, and after this the heat lasts from 4 to 6 hours.

With the open-hearth furnace the operation is somewhat different; the hearth being hot, a 10-ton heat can be gotten out an hour earlier. There are but two works in the world now using the open-hearth furnace, but the indications are that many more will follow suit in the near future.

The castings, after knocking off the gates, are rolled up clean, sorted, and then packed in puddle scale in large iron boxes, called saggars or pots. These pots are introduced into large ovens which are closed up carefully and fired up to a red heat for from 4 to 7 days.

The remarkable change in the state of carbon takes place here; a perfectly white hard casting turning to one with a rich black velvety fracture. In England they call this a black-heart casting. In this country the name is not heard now; in fact anyone receiving a casting which is not a characteristic black in the interior would soon return it. The English name would, however, seem to indicate that other than black castings get into their market as malleable cast iron.

After the anneal, the castings, now malleableized, are rolled up again, the fins ground off, an occasional warped piece straightened, and finally shipped as they are, or first dipped into asphaltum diluted with benzine.

The process as above roughly outlined has to be carried out in all cases, the labor-saving methods used in malleable works varying in accordance with the means and the degree of enlightenment available.

The question of cost is one of some delicacy just now, prices being very high. The average selling price of a plain casting with few or no cores, and a weight not less than 10 lbs., is about 4c. per lb. for fair orders, and is shaded down to 3.25c. in carload lots. As to the cost of production, no figures can be had beyond the fact that in the hard times just passed quotations were made as low as 2c., which can be taken to be just a little below cost, for the works in question found it better to lose a little on that particular job in order to hold the customer and keep the organization of the working force intact. It is a question if to-day the plainest malleable castings can be made for less than 2.5 to 2.75c. a pound.

With intricate work prices rapidly increase. Thus, for castings to be used for scissors, harness work and the like, 12c. a lb. was often paid, even in the hard times. As everything at the present time runs into tonnage, this small work is no longer desirable from the foundryman's standpoint, but it must be said that some of the best products of the molder's art and that of the expert annealer are found exemplified in this class of castings.

Reviewing the field covered by malleable cast iron we see the following varieties which appear on the market:

Hardware.—Hinges, locks, scissors, pistols, rakes, gas and oil stoves, vises, ice cream freezers, wash wringers, washing machines, safes, wrenches, monkey wrenches, awning pulleys, etc.

Agricultural Machinery.—Mowers, reapers, binders, are almost completely made up of malleable castings.

Machinery.—Crank shafts for smaller sized engines, gear wheels, connecting rods. Cutters for wood-working machinery are best made of case-hardened malleable cast iron. Sewing machines, boiler nuts, conveyor chains, etc.

Pipe Fittings.—For steam, gas, air and railings in endless variety of shapes and sizes.

Railroad Castings.—Hundreds of different castings from the car coupler and journal boxes down to lamp wick trimmers—all freight cars are now equipped with malleable castings. Track supplies, rail joints, "S" wrenches, locomotive castings, water scoops, etc.

Electrical Castings.—Wire clamps and supports, motor gears and cases.

Harness.—Saddle, carriage and wagon castings. These are often plated with nickel, silver and gold. Horseshoes.

Besides the above standard castings, there are numberless others which are made as wanted, showing that the industry embraces a wide and varied field.

The outlook for the business in malleable iron casting is exceedingly bright, so much so that only the comparatively large capital and the unusual skill required deter the general foundry trade from rushing into it. While it is not so very difficult to make small malleable castings which will pass muster before the general public, it takes a long experience and bright men to make heavy work acceptable to the great railroad interests. The capital required is a serious question. An ordinary jobbing foundry can be started for about \$10,000. No one, however, could think of erecting even the most modest malleable works with less than \$40,000. If successful with this amount, the capitalization is soon doubled, but if only the ordinary amount of intelligence is available, the works will quietly drag on year after year catering to the special lines that called them into existence. Witness some 60 plants of this kind in the United States alone. The more progressive works soon make a reputation for themselves, and many are household names, so to speak, among prominent consumers of malleable castings.

It is almost impossible to obtain any information regarding the output of a malleable iron plant. Only an intimate touch with the business, coupled with an intelligence department, consisting of tramp molders, whose reports must be carefully sifted to get down to the actual facts, will accomplish this. The figures given below are intended to present a general idea of the condition of the trade as shown by the larger well-known works. The individual output of each concern as given may be approximate only, for it is not usually possible to get a man who manufactures malleable cast iron to tell anything about his business, or to get into his works if one is known to be connected with the iron industry. The figures are, however, very close, and may be relied upon as representing the average tonnage of castings shipped daily. Practically all the works were in existence 10 years ago, and many have only been enlarged quite recently. The hard times of the past few years were excep-

tionally severe on the malleable iron business; many a surplus was wiped out, works were shut down and prices were cut so low that profits were out of the question. The new works now being built will take care of the legitimate growth of the business for the next decade and there will be no room for new ventures until that period of time has elapsed. The most notable enterprise in this connection is the Pennsylvania Malleable Company, of Pittsburg, Pa., with works at a suburb called McKee's Rocks. With a capital of \$600,000, a modern foundry on advanced lines for malleable castings has been erected. The output provided for is 100 tons a day, or 25 per cent. greater than the largest single works in existence. There are no less than eight other works in course of erection, the output ranging from 5 to 35 tons a day each.

The following list embraces the principal works in the United States, and states their special line of product and daily output:

Connecticut.—Malleable Iron Fittings Company, Brantford, 15 tons; specialty, pipe fittings. Naugatuck Malleable Iron Company, Naugatuck, 20 tons; custom work. Bridgeport Malleable Iron Company, Bridgeport, 30 tons; custom work. The last two works, with the Vulcan Malleable Company, of New Britain, 12 tons, belong to the circuit of the National Malleable Castings Company, headquarters in Cleveland, O. Other works in Connecticut bring the total output per day of malleable castings in the State up to 100 tons.

Delaware.—Wilmington Malleable Iron Company, Wilmington, 15 tons; custom work.

Illinois.—Chicago Malleable Iron Works, a branch of the National Malleable Castings Company, 50 tons; custom work. Missouri Malleable Iron Works, East St. Louis, 50 tons; couplers and custom work. Crane Company, Chicago, specialty, fittings; 15 tons. Union Malleable Iron Company, Moline, custom work; 15 tons. The State has a total output of 275 tons a day.

Indiana.—Indianapolis Malleable Iron Works, a branch of the National Malleable Castings Company, custom work, couplers, etc.; 60 tons. Whiteley Malleable Castings Company, Muncie, make miscellaneous couplers and custom work; 50 tons.

Maryland.—Baltimore Iron and Steel Castings Company, 10 tons; custom work.

Massachusetts produces 9 tons daily.

Michigan.—Michigan Malleable Iron Company, Detroit, agricultural and other light work; 50 tons. Standard Malleable Iron Company, Muskegon, oil stoves and custom work; 15 tons.

Minnesota.—Interstate Malleable Iron Company, Duluth, 15 tons; railroad work. The State produces 37 tons daily.

Missouri.—Missouri Car and Foundry Company, St. Louis, railroad castings; 25 tons.

New Hampshire produces 6 tons daily.

New Jersey produces 15 tons daily.

New York.—Pratt & Letchworth, Buffalo, custom work, malleable castings; 20 tons. Gould Coupler Company, Depew, specialty, couplers; 60 tons. Isaac G. Johnson & Co., Spuyten Duyvil, 10 tons; custom work. Troy Malleable Company, branch of the National Malleable Castings Company, custom work; 25 tons. The State produces daily 225 tons of malleable castings.

Ohio.—Buckeye Malleable Iron and Coupler Company, Columbus, specialty, couplers; 60 tons. Dayton Malleable Iron Company, railroad castings; 40 tons. Springfield Malleable Iron Company, railroad castings; 40 tons. National Malleable Castings Company, Cleveland, couplers and custom work; 75 tons. National Malleable Castings Company, Toledo, custom work; 50 tons. Eberhard Manufacturing Company, a branch of the National Malleable Castings Company, also of Cleveland; specialty, harness work; 25 tons. The State produces 355 tons daily.

Pennsylvania.—Stanley G. Flagg & Co., Philadelphia and Pottstown; specialty, pipe fittings; 20 tons. Erie Malleable Iron Works, Erie; custom work; 50 tons. The McConway & Torley Company, Pittsburg; specialty, couplers; 75 tons. Pittsburg Malleable Company, specialty, air-brake castings; 25 tons. Jarecki Manufacturing Company, specialty, pipe fittings; 10 tons. The State produces 220 tons of malleable castings daily.

The South is represented by the Southern Malleable Iron Works, Chattanooga, Tenn., 15 tons; custom work.

Wisconsin.—Wisconsin Malleable Iron Company, Milwaukee, custom work; 40 tons. Northwestern Malleable Iron Company, Milwaukee, custom work; 40 tons. The State produces 130 tons daily.

Several other States have small amounts, the sum total for the United States amounting to a daily output of 1,688 tons of castings. This would indicate that we produce about 500,000 tons of malleable castings a year. There is little wonder, therefore, that the malleable casting industry is attracting world-wide attention at the present time.

Germany has about 35 malleable cast iron plants; France about half as many. England can boast of the oldest one in existence, at Derby. Russia has one probably in operation now. Austria-Hungary is beginning to investigate the merits of malleable cast iron seriously with a view of replacing the gray-iron railroad castings.

We can safely estimate the combined production of malleable castings in the old world at 75,000 tons a year, a sharp contrast with the figures for our own country.

The new development the coming times will bring us remains to be seen; there is no lack of talent aiming at an all-around improvement in the art of making malleable iron castings. When the next period of commercial depression occurs we will be in better position to value the state of the art. The rush of business to-day precludes any serious experimental work in the line of specific adaptation of the product for special lines of work.

PIG IRON PRODUCTION IN RUSSIA.—The output of pig iron in the Oural Region in Russia is showing a great advance this year. Over 280,000 tons were produced in the first four months of the year, January, February, March and April, and it is expected that the total output for the year will not be less than 806,000 tons, an increase of 106,000 tons over last year.

NOTES ON THE WHITE HORSE COPPER BELT,  
YUKON TERRITORY.

Written for the Engineering and Mining Journal by R. H. Stretch.

In Alaska the White Horse Copper Belt attracted a good deal of attention last autumn and the present spring, on account of the large size of some of the mineral outcrops, and the richness in copper of the specimens taken from a number of claims, of which more than 200 have been located, including quite a number of the so-called concessions, having an area of 160 acres each. Some account of the general surroundings and geological features may, therefore, interest the readers of the "Engineering and Mining Journal."

The writer visited the locality in May, 1899, and again in August and September, and made a more or less careful examination of some 40 locations, extending some 10 miles along the belt from north to south; and the views here expressed are a generalization of the information gathered at that time. It is evident that in many cases it would be unfair to the owners to specify the names of the claims on which certain facts were observed, so that such references will, as much as possible be avoided, as there is no intention to boom any particular property, or, on the other hand, to belittle merits.

These locations lie in the Yukon Territory, a few miles to the west of White Horse Rapids, in latitude 60° 40' north, and longitude 135° west; and are accessible by rail from Skagway to White Horse or Closeleigh, as the name appears on the earlier maps.

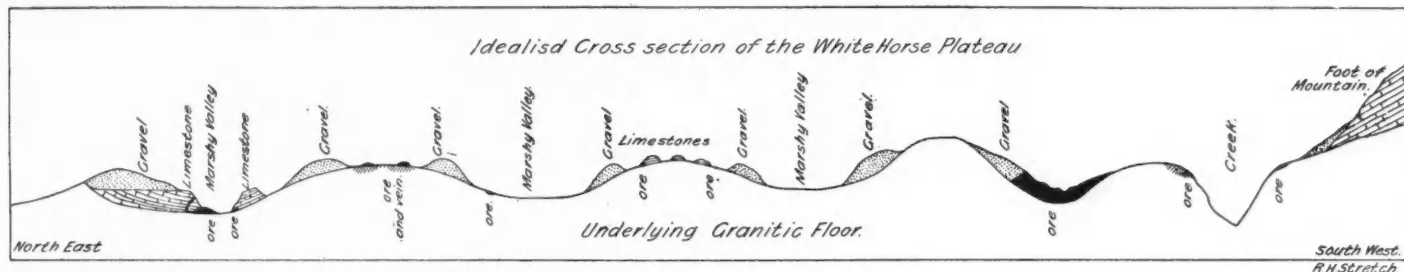
There is such widespread misconception of the true conditions surrounding mining in Alaska that it seems desirable to discuss the probabilities of successful mining.

First of all the mind must be disabused of the idea of perpetual snow and glacial cold, which has obtained through the wide distribution of pictures of the Chilkoot Pass, and those taken to show the difficulties of railroad construction in winter. The region is no further north than Stockholm and St. Petersburg in Europe, and the cold is no greater than in many portions of Canada and the Northern United States; or than in Siberia, where mining has been carried on for centuries.

At Skagway (lat. 59° 30' north) the snow line in February was 1,000 ft. above sea level. In the region of the White Horse Mines in 1899,

difficult, a second growth of small spruce and willow has frequently sprung up in the more ancient windfalls. The rock exposures are comparatively few, and to accurately trace and prove an outcrop of ore is a slow and tedious operation.

The topographical features are simple, a wide river and high mountain range running parallel to each other in a northwesterly direction, with a rolling plateau between them, ranging from 2,300 to 2,600 ft. above sea level. In this portion of its course, the Yukon River flows between abrupt banks of gravel, sand and silt, which rise to 150 to 250 or even 300 ft. with only occasional rock outcrops. The absence of heavy rainfall is shown by the smooth slopes of these bluffs, which stand at an angle of 40°. It is only the bedded silts which weather into castellated forms. On the river the rock outcrops consist chiefly of the old, reddish, coarse-grained basalts of the Miller Canyon and White Horse Rapids, and these are overlaid by the gravels. On reaching the crest of these bluffs the plateau, from 3 to 5 miles wide, extends to the base of the mountain, with a rolling surface and low hills, and a gentle gradient to the northward. This plateau is intersected by a number of small streams (connecting numerous shallow, marshy lakes) which have a general north-west trend, parallel to the mountains, and while traversing wide shallow valleys near their sources, enter the main river through deep V-shaped gorges. Long, low ridges of gravel, containing erratic boulders of the old basalts and other rocks found only to the southward have a similar general parallelism. All these features suggest an ice-worn surface where the general motion was to the north and west; a cross-section of which reveals a series of swampy valleys cut down to the underlying bedrock, with a moraine deposit along each side; while between each pair of moraines we find a somewhat higher backbone of rock. In the attached cross section an attempt is made to outline the various main features, several different types being brought into a common plane for the sake of simplicity and convenient comparison. The vertical scale is, of course, exaggerated to make the details more legible. In general terms it would seem that as the ice cap, which formed the immense gravel banks along the main river, gradually thinned, the higher rock ridges finally divided the cap into a number of parallel glacial streams, each one of which was employed in cutting its own channel deeper, and depositing lateral moraines; while the resultant streams continued the process, as the interior lakes were drained of their contents. The progress of the latter process is beautifully shown



while the upper lakes were yet more or less covered with ice, the country was almost entirely free from snow by May 20th. There is, in fact, in this latitude, no more difficulty, so far as climate is concerned, in operating a mine at White Horse, than in Northern Michigan or British Columbia; and fully seven months can be counted on as available for the necessary outdoor preparations, with the advantage that for several of these months operations can go forward night as well as day without artificial light.

It is true that much of the gravelly land is frozen to considerable depths, but this is not universally the case, and the laws governing the condition do not seem to be well understood; but this feature is ameliorated by the denudation of the forest and the influx of sunshine, and would have little weight or influence on rock work. The work on the railroad shows that in the open air and working on a large scale the cost of rock work, including explosives, ranged from \$1.40 to \$2.40 per cubic yard, or about 87c. to \$1.40 per ton. These rates are fairly applicable to mining at White Horse, and may serve as a basis for computation. Labor was 30c. an hour, and \$1 per diem was charged for board. The passenger rate from Skagway to White Horse is \$20, and the rate per ton on merchandise is 4c. a pound on lots of 5 tons or over, and 4½c. per pound on smaller quantities. To secure return freight, which is now practically nothing, the railroad offers a very liberal schedule on ore shipments. For ore in bulk under \$50 per ton gross value, \$8 per ton; under \$100, \$9; under \$150, \$10, and under \$200 per ton, \$11 per ton; with a reduction of \$1 per ton, when sacked. So far as known at present, there is no available coal in the region, and all supplies must be brought from the outside. To the above rates should be added a general average of about \$8 per ton from the ports of Puget Sound to Skagway, and about \$5 for the return voyage. Still further to foster the mining industry the railroad will, for the present, take charge of ore shipments to the outside smelters and collect transportation charges out of the returns, so that the prospector is at no expense, except those incident to mining, sacking and delivery to the nearest railroad station. So far as the writer knows no advantage has yet been taken of this offer.

It is not an easy country to explore. The entire inner country below the timber line may be described as forested, with the exception of some few open grassy slopes, which usually face the south and east and catch the maximum of sunshine. The timber is spruce and birch with cottonwoods on the swamper ground, or on deep gravel banks, through which the tree roots can easily penetrate in search of water. Much of the region is swampy and willow clad; and large forest areas are covered with thick moss, not unfrequently resting on frozen ground. Forest fires have devastated large areas, and though they have left the underlying rock surface visible, the resulting windfalls have made traveling very laborious. To make an examination of the rock structure still more

by the numerous terraces which extend from Bennett Lake to Selkirk, at altitudes up to 400 or 500 ft.

It is on this plateau that ore has been found in a narrow strip following the base of the mountain range and the western edge of the heavy gravel banks, which cover the rocks along the river. The mountains are essentially limestone, with bold escarpments, resting on a granitic foundation, which forms the floor of the plateau as far south as Mount Goldenhorn, which is principally composed of eruptive rocks, and appears to have been the source of the Miles Canyon basalt, as erratic blocks of this rock extend for some miles to the northward, gradually diminishing in size and frequency. The older granites in this floor are cut by many felsitic and porphyritic dikes, but the tangle of vegetation, moss and dead timber makes the tracing of them for any distance impossible. It would seem that many of them must be older than the limestones, as but few instances are found in which they cut the latter. The best instances are at the Little Chief Group, where dark blue limestones contrast strongly with a 2-ft. seam of felsite, and diabasic rocks are found interbedded in crystalline lime. On the plateau the limestones have been very largely removed, occurring now, as patches varying in size from a few feet across to 600 or 700 ft. in length. It will thus be seen that the geology is very simple. While there are obscure traces of faulting in the presence of sheeted lines, such dislocations are difficult to prove on account of the uniformity of rock structure, and the only evidence of recent volcanic or chemical activity observed is a small cold spring on the Miller Group, which furnishes an acidulated water, but makes no deposit of lime or gelatinous silica. In general terms, there is presented a wide area of lime granite contact, with nearly all the lime eroded from the plateau, and with but small evidence of the penetration of the limestones by intrusive dikes on a large scale. Probably the largest of such bodies is found on the Miller Group.

The ore occurs either at the line of contact of the two rocks or in seams of varying size, penetrating the underlying granites, and it is the extensive erosion of the limestones which has revealed it. Only in a very small number of cases, as at the Little Chief, was ore found penetrating the limestones, and then it accompanied an intrusive granitic tongue, which appeared to be the ore carrier, being largely replaced by magnetite.

Two distinctive classes of ore are present, and their occurrence is quite different. We have large masses of specular or magnetic iron, as at the Pueblo, where it is hematite, or at the Little Chief, where magnetite prevails, both carrying a moderate tenor of copper; or outcrops of much smaller dimensions in which the ore is essentially bornite, with occasional patches of chalcopyrite and green copper carbonates, in the condition of sand, or disintegrated granular limestone stained with copper. Azurite is rare; chalcocite and black oxide occur sparingly, but

native copper seems to be absent as well as the red oxide. The typical ore is bornite. These outcrops are scattered all over the plateau, and are probably the remains of much more extensive bodies, which were denuded in the general erosion. They are found resting on the granite with no lime in the vicinity, or associated with the patches of lime which still remain; and their discovery in the dense tangle is largely a matter of accident, even to the careful searcher.

Many of these outcrops prove to be connected with a series of more or less east and west seams, penetrating the granites, some of which may produce considerable ore when explored, but the writer saw no evidence of massive vein structure to support the popular theory of a great north and south lode. This idea has probably arisen from the fact that in some cases the stream has cut a deep gorge in the granite below the line of contact, which now shows, with its accompanying ore, as two slightly divergent lines, on either side of the stream gorge. At one or two points, where there are apparently dioritic intrusive masses, the lime contact stands much steeper than the usual angle, and these form desirable points for exploration.

From what can be seen it is, therefore, probable that at one time there existed a number of large masses of iron ore, occupying by replacement cavities in the limestone; that these ores were leached of a portion of their copper contents; the latter metal being precipitated on the lower granite contact, forming more or less extensive beds of high grade, oxidized ore; and that the percolation continued downward into the granites where the same had been sufficiently sheeted to allow of such a process. Traces of such percolation were seen fully 200 ft. below the general level of the plateau. All the phenomena presented can be thus explained. That the entire contact was not thus enriched is, however, evidenced by the occurrence of pockets of simple granular magnetite, lying directly on the granite; while in the same vicinity may be found little bunches and stringers of bornite in the magnetite, and not far away good bornite uncontaminated with the magnetic iron; but all such localities show the action of chemical agencies, by the modification of the granite surface, and the formation of epidote, lime-garnets and other lime-iron minerals in abundance, as well as the hydration of the micas. The granite seams show crystallized quartz penetrating the ore, a feature which is absent from the larger iron masses. For the reasons just set forth, the exploration of the contact beneath the large mass of the Pueblo (the outcrop of which has a visible area of 14,300 sq. ft. in the shape of a huge letter T) will be an interesting study. The writer started a shaft in the lowest depression of the outcrop in the hope of proving this probable enrichment with depth, but unfortunately there proved at this point to be a narrow gully filled with surface wash, although ore cropped within 10 ft. on either side, and as this was all frozen ground, the work was stopped at a depth of about 10 ft. Yet more interesting will be the discovery of some point where the contact can be followed by a tunnel into the mountains on the west, where the ore bodies have been protected from destruction, as, from the presence of extensive iron staining of the surface, at one or two points, which there was no time to examine, the presence of other iron masses is possible. In the portion of the belt known to the writer, the best locality for such exploration is on the Anaconda Claim, where the floor of the valley is granitic and massive limestones occur on the east, owing to the gradual depression of the granite floor of the plateau from south to north, and quite likely to the presence of faulting, as the ore at this point stands nearly vertical, an exception to the general rule.

While gold seems to be constantly present, and high assays are said to have been obtained, it was not the writer's good luck to obtain more than quite moderate amounts. A comparison of the bornite assays (from 100-lb. samples quartered down to 10 lbs.) seems to indicate the presence of silver to the extent of about  $\frac{1}{4}$  oz. to the unit of copper. Zinc, arsenic, lead and antimony are notably absent, the only other mineral present being occasional flakes of molybdenite, which is also a common accompaniment of granitic contact in the State of Washington. The iron ores show about 45 per cent. metallic iron in a gangue of lime and silica, and such ores should produce an excellent grade of copper.

The district is well watered. There is excellent mining timber in abundance, but fuel for reduction purposes must be brought from the outside or consist of domestic charcoal made from spruce timber. Labor for a time will probably be high, owing to the difficulty of keeping good men, but the actual cost of living, with freight rates of less than 5c. per lb., should not be more than 25c. per diem over Seattle prices. Good men on steady underground work will probably command from \$4 to \$5 per diem, and outside help from \$3 to \$3.50, as the rates paid on the railroad are about 30c. an hour for common laborers, ranging upward to 55c. for higher grades of service.

For some time at least but little mining machinery will be required, as much ore can be collected from the rich surface outcrops and the larger iron bodies are practically quarries, until the output has reached 100,000 tons. It is probable that these latter will require treatment on the ground; the cleaner bornite ores can be hand-sorted up to 30 per cent. and shipped, but the remainder will require dressing up to a fair grade to counterbalance the high cost of suitable fuel. The season of 1900 will probably decide most of the points at issue.

#### RECENT DECISIONS AFFECTING THE MINING INDUSTRIES.

Specially Reported for the Engineering and Mining Journal.

**WHAT CONSTITUTES LICENSE NOT TITLE.**—A quit-claim deed conveyed premises to be occupied and used for working and operating a mining claim, and provided that the grantees should erect and maintain gates and bars in grantor's fences necessary for entering such premises, and that such grantee should not suffer animals to enter on grantor's premises through such gates and bars. The granting clause had the addition "For the uses and purposes aforesaid, and upon the conditions hereinbefore specified." The grantee had located a mine, two years prior to such deed, within such premises, of which grantor held title and possession. The grantee wished to develop and work such mine, and in exchange for the right to do so purported to convey to the

grantor the same right to work other mines claimed by grantee. The court held that such deed was intended by the parties to be a conveyance or license to work and operate such mines, and did not convey a title to the land in fee.—*Baker vs. Clark* (60 Pacific Reporter, 677); Supreme Court of California.

#### THE ORIGIN OF THE NATIVE COPPER IN THE MICHIGAN DEPOSITS.

Written for the Engineering and Mining Journal by John F. Blandy.

I have just been reading a chapter in Kemp's "Ore Deposits" (Third Edition, page 209), on the origin of the copper in the Lake Superior deposits in which is collated the various opinions and theories written since Foster & Whitney's Report was issued. I do not purpose to discuss the sundry opinions to which the several authors have no doubt given much study, but will rather set forth my own, from which I have not varied from my first study of that interesting field. The opening sentence of the chapter is "The original source of the copper was thought by the earlier investigators to be in the eruptive rocks themselves." The remainder of the sentence is "and that with them it had come in some form to the surface, and had been subsequently concentrated in the cavities." This latter part we will dispense with for the present.

When the native copper was first found in the veins (fissures), the opinion was widely expressed that it would not extend to any depth and that in every copper district such pieces of metal had been found in the croppings of veins. As depth did not change the metal to ores other explanations had to be found. Among others I remember the ejection theory was started by some, that the molten metal had been forced up through the fissure, and some looked for an increase in the specific gravity of the metal in depth.

When Whitney was studying the field, the developments of the copper deposits were too new and limited, and the time of the exploration too short for him to devote as much time to that branch of the investigation as we all could have wished. At the time that Pumpelly's examinations were made the majority of the mining work was being done on the fissure veins of the region, and he was naturally attracted by the very interesting question of the "paragenesis of minerals."

Now, if we accept the thought of the earlier investigators as the correct idea, it does not cast off these later lines of study, but rather we accept them as an explanation of the methods of transmitting the metal into the fissure veins and cavities of the amygdaloids.

For my own part, I have never varied from the first proposition, and the more I have studied it, the more satisfied I become to hold to that idea, that the native metal was a component part of the original rock, just as much so as the magnetite was in the greenstone (diorite) of the Keweenaw Range. Why cannot we believe that the various successive flows of rock which took place—call them diabase, amygdaloids, melaphyrs, traces of various colors, basalts, etc., what you will—with the metal in them? They all had the same general origin. Some contained the metal in a greater or less degree. In some there were patches which we now say have great economic value, and large areas have no economic value but may be of equal interest to the student. The most conspicuous of the beds, from present knowledge, is the ash-bed of the Copper Falls Mine, which is traceable from the Atlantic Mine to the Clark Mine at Copper Harbor. I say most conspicuous, for the reason that it is the most persistent in its copper-bearing quality—not quantity. There is another to which I will refer later. The Pewabic Amygdaloid continues as an amygdaloid belt from Portage Lake to the Allouez, but its economic value changes from wealth to barrenness. Many other belts could be referred to in the same way. All my investigations of this subject more and more satisfied me, until I found one belt that thoughly convinced me that the idea of the origin of the copper in the original rock was the correct one. It was an accidental discovery and I do not know that any one is acquainted with it. As it had no economic value I made no reference to it, and besides I knew of no one in the copper region who was giving any thought to that subject.

One day I took a stroll up the gulch of Ripley Creek (it empties into Portage Lake a short distance east of the Franklin mill) until I came nearly up to the plateau, then, turning eastward, climbed out of the gulch on to the plateau. Wandering around there I came to an old prospecting pit not far from the rim of the gulch. There was quite a pile of rock (the pit was less than 10 ft. deep, but the rock had been blasted into for a depth, if I remember correctly, of 5 or 6 ft. in all). I stood and looked at it for some minutes, wondering what had ever induced anyone to sink that hole, as there was not a sign to indicate any mineral in the rock or in the sides of the hole; no seams, no quartz, spar or show of any crystallized material. In appearance the rock was as homogeneous in color and texture as rock could be. If I remember rightly, it was a very dark brown trap, medium texture or hardness. I then started to examine the rock by breaking a piece and inspecting it with a glass. To my surprise I saw many specks of bright copper shot like pin points. None were visible to the naked eye. I then broke many pieces and found all the same. I never made any investigation as to what percentage of copper was in the rock. I could decide by the eye that it had no economic value. I could not see what the width of the belt could be, but it was safely not less than 10 ft. wide and might be many more than that. Some months after I was on the trail, which was known as the Meadow Trail and led from Hancock to the road from the Fulton Mine to the Cliff. Just before reaching the road my attention was drawn to the pieces of rock along the trail. I picked up a piece and inspected it. It looked like the rock from the pit, and on breaking it found the same sprinkling of copper specks, and felt satisfied it was from the same belt. This point on the trail is from 10 to 12 miles distance from the pit and I judged about on the line of strike of the belt. Now, if anyone can explain to me how that pure shot copper could get scattered through that homogenous belt of rock, many feet in thickness, by any process of transmission, then I am



quite willing to give up the question. The Mining School at Houghton has many youthful explorers and I would suggest that they find that pit, get samples of the rock and assay them.

I have become satisfied that a very large majority of the placer gold comes from the grinding up of the rocks and very little comparatively from the destruction of vein quartz, and have found pin-head gold in solid granite and porphyry.

In my study of the fissure veins of Keweenaw Point, I found that they could be divided into at least three classes. In the first (and oldest) I place the Albion, North American, Cliff, Phoenix (Bay State), Eagle River, Winthrop, Central, Northwestern, Connecticut, Delaware and Stotenburg and some others which I have forgotten. In the second class the Amygdaloid (mine), Pennsylvania and Resolute; the only ones I now remember. The third class may be called cross-courses, although they hold much the same directions as those of the first and second class. They show heavy displacement in the belts; have a decided vein structure, but are comparatively soft and barren of metal. The first and second classes differ very much in composition and are well worthy of examination by those who are studying the deposition of the metal in them.

I have heard of the finding of some small amounts of sulphide ores at several points in the native copper field, but have never had the good fortune to see any of them. I have seen that from the Lac la Belle Mine in Bohemian Mountain, but as the geological features are so different I consider that as quite outside of the field under discussion. The occurrence of copper oxides and carbonates need not be referred to, as they are well understood.

Of arsenides (Whitneyite) I know of but one discovery, that at Houghton, if I remember rightly, some was reported found on the Pewabic hill which would be about in line of the course of the vein of the above mentioned. Some was at the same time of this discovery reported as having been found in a vein on the Old Albion (Keweenaw Point), but I never credited it.

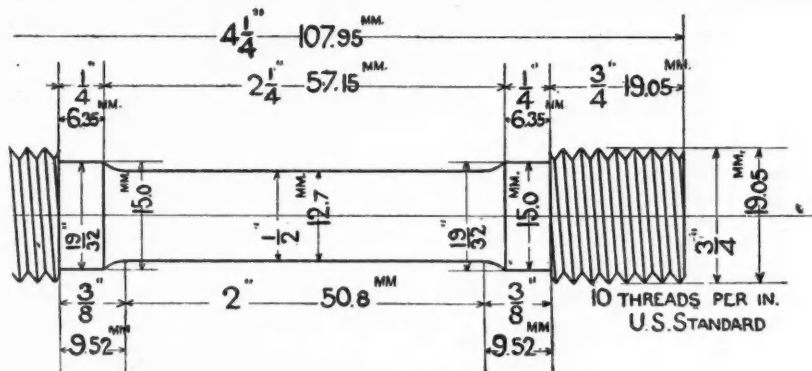
In a paper published in Volume I, page 75, of the "Transactions" of the American Institute of Mining Engineers, I endeavored to show that the vein at Houghton containing Whitneyite was formed subse-

each of these zones, as follows: No. 1, Datholite Zone; No. 2, Spar Zone; No. 3, Greenstone Zone, and to the Isle Royale, the Epidote Zone. If any justice exists in this nomenclature, then the question would arise whether in this manner the range in Ontonagon County can be similarly divided and so an identification established between the exploration there and those in Houghton and Keweenaw counties. I think it well worthy of consideration. I have never heard of any reference to this idea of zones having been made in any reports of explorations made since the publication of the paper above referred to. As suggested at the time, a zone may widen or diminish in its extension northeastward or southwestward, but still retain its relative position, and to this I will add that its division line need not be a belt of sandstone or conglomerate, but most likely is, there having been a period of rest previous to the subsequent flow of the eruptive rocks.

STANDARD TEST SPECIMEN FOR STEEL.

The advisability of distinctly specifying the physical qualities which it is desired that steel forgings for any purpose shall possess is self-evident. That manufacturers realize this is shown by the rapidly increasing number of manufacturing firms which draw up specifications of this sort when about to send out inquiries for steel. The American section of the International Association for Testing Materials has studied the matter of steel testing carefully and proposed a table stating the physical properties to be required in standard solid and hollow forgings, covering oil-tempered nickel-steel, annealed nickel-steel, oil-tempered carbon steel and annealed carbon steel. The table gives three grades for each class of steel and tensile strength, elastic limit, percentage of elongation, contraction of area, etc., required. To insure comparable results in such tests a standard test section is a prime necessity.

The subjoined cut is of a United States Navy standard tensile specimen as proposed for universal adoption by the above association and has been adopted as standard by the Bethlehem Steel Company of South Bethlehem, Pa. The company adopted this particular test speci-



STANDARD TEST-PIECES FOR STEEL.

quent to the lake terraces of Portage Lake. If I am correct in this statement, then the occurrences of these ores, sulphides and arsenides in the native copper region or fields, cannot be brought into the argument concerning the deposition of the native metal. If small amounts of sulphides have been found from time to time in the field, I consider it in the same light that I did once when I found some crystals of galena in a tunnel in sandstone driven between two coal veins in the anthracite region in Pennsylvania. It did not cause me to spend any time or thought in hunting for a lead mine.

In conclusion, I will call attention to another line of thought in the investigation of the copper formation of Lake Superior. In the winter of 1861-62 I prepared a paper in conjunction with the late Dr. C. P. Williams and published in "Silliman's Journal," in which I endeavored to divide the Mineral Range into a series of zones, and suggested that further explorations might enable us to make other divisions. In that paper I referred to only two; one taking the Pewabic Amygdaloid as an approximate center, and the second one the Isle Royale Belt as the approximate center. Since then I have been able to add two more. I take the conglomerate belt next, west of the Quincy and Pewabic mines, as the dividing line between the first and second zones; the rocks west of or on top of line being No. 1. This zone includes the rocks in which the Atlantic, Hancock, North Cliff, Old Phoenix, Humboldt, Copper Falls and other mines are situated. This belt of conglomerate continues as far as the Allouez. Beyond that it changed gradually to a sandstone and continues as a sandstone through the Phoenix, Copper Falls and on to the Clark Mine at Copper Harbor. It has also changed to a sandstone south of Portage Lake. The eastern limit of the second zone I place at the conglomerate belt next east of the Pewabic Mine. This zone contains several belts of amygdaloid; many of them can be traced, especially the Pewabic belt, as far as the Allouez, but at some distance northeast of that they have wedged out and do not appear again. This bottom conglomerate has also changed to a sandstone and the whole zone continues to wedge out to the northeastward. The next zone has the Allouez conglomerate as its base. It is visible near the eastern edge of the Mesnard location and can be traced as far east as Keweenaw Point. I have also found the southwest extension of this base line near the mouth of Dacotah Creek. Exploration had not been sufficiently close to be able to define a western boundary to the next, or Isle Royale, zone nor an eastern limit for it. Whether a zone can be determined as separating this zone from No. 3 has yet to be decided; also whether a zone can be found lying on top of No. 1.

For convenience I have felt disposed to apply an empiric name to

men, which has a gauged length of four diameters, after studying the results of some 75,000 specimens of this size tested during the past 12 years and after a careful comparison obtained with this size specimen and those from specimens of greater length. The advantages claimed for this standard test specimen as regards cost are: (1) The shorter prolongation of the forging required for a longitudinal specimen consigns much less metal to scrap; (2) less time and labor are expended in cutting out and machining this specimen; (3) at equal cost a much better idea of the quality of the metal can be obtained by taking several short specimens than one longer one. As regards location of the test specimen, the shorter test specimen can be taken from places in a forging where the longer specimen could not be obtained, as between the webs of crank shafts. While as to physical properties: (1) The determination of the tensile strength is not materially affected by the length of the specimen; (2) the elastic limit can be determined with equal accuracy, as apparatus reading to the one ten-thousandth of an inch (.0001 in.) can be easily attached to the shorter specimen and readings readily made; (3) the percentage of the contraction of area and the quality of the fracture, both very important factors in determining the quality of the metal, are shown with equal accuracy and distinctness with the shorter specimen, as with one of greater length; (4) the difference in percentage of elongation in short and long specimens cut from the same metal is approximately constant and can be determined by comparison, in case a specification calls for a longer test specimen than the above standard.

COAL IN PRUSSIA.—The total coal production of Prussia during the first half of the present year was 49,630,982 tons, being 3,739,062 tons, or 8.15 per cent. more than the quantity put out during the corresponding period of last year, while the number of hands has increased, by about 27,000, to 364,980. In the Breslau District of Silesia the increase of production is most marked, followed, however, very closely by that of Dortmund. While in the latter the output increased from 26,683,226 tons to 28,832,706 tons, or 8.06 per cent., the increase in Silesia was from 13,319,717 tons to 14,684,813 tons, or 9.22 per cent. for the two periods. In the Dortmund District the number of collieries has been reduced by amalgamations from 167 to 165, but the number of hands has increased from 201,951 to 220,125, or by about 9 per cent. The working of lignite has made comparatively more progress than that of coal, the mines having put out 16,025,246 tons during the first half of the present year, or more by 20.74 per cent. than during the first half of last year, while the number of lignite miners increased from 35,615 to 40,500 respectively.

THE COMPRESSED-AIR HAULAGE-PLANT AT NO. 6 COLLIERY, GLEN LYON, PENNSYLVANIA.\*

By J. H. Bowden.

The shaft-plant here described was put in operation at No. 6 colliery of the Susquehanna Coal Company, Glen Lyon, Pa., in September, 1895, and the No. 6 slope-motor was started in May, 1896. The plant comprises:

One Norwalk three-stage compressor, 12½, 9½ and 5 in. diameters of air- and 20 in. diameter of steam-cylinder, all 24 in. stroke; capacity at 100 revolutions, 296 cu. ft. of free air per minute, compressed to 600 lbs. per square inch. A main pipe, 5 in. diameter, 4,380 ft. long, with five charging-stations in No. 6 Shaft, and a branch of 3-in. pipe, 3,100 ft. long, with three charging stations, in No. 6 Slope. These pipes on each line charge a Porter compressed-air motor, with 7 by 14 in. cylinders, and four 24-in. drivers, weighing about 8 tons, with a tank capacity of 130 cu. ft. of air at 550 lbs. pressure in the main tank, reduced to 160 lbs. in the 8-in. auxiliary tank of 4.2 cu. ft. capacity, supplying the cylinders. The No. 6 shaft run averages 4,000 ft. each way on grades of ½ to 2¾ per cent., and averaging close to 1 per cent. in favor of the loaded cars. The No. 6 slope run averages 2,100 ft. with nearly the same grades. The mine cars weigh 2,800 lbs. empty, and about 9,800 lbs. loaded, and are hauled in trips of 12 to 20, averaging about 15 cars. The shaft-motor now hauls about 355, and the slope-motor 320 cars per day of 10 hours, replacing in the shaft 17 mules, and in the slope 15 mules, or, in all, 32 mules, against 27 replaced in 1896.

The average daily ton-mileage of each motor was as follows:

	Tons Hauled One Mile.		
	1896.	1897.	1898.
No. 6 Shaft Motor.	1896.	1897.	1898.
Empty, in	336	330	338
Loaded, out	1,180	1,155	1,183
Total	1,516	1,485	1,521
Net load	844	825	845
Tons Hauled One Mile.			
No. 6 Slope Motor.	1896.	1897.	1898.
Empty, in	143	144	160
Loaded, out	501	504	560
Total	644	648	720
Net load	358	360	400
Total for both motors, gross (including empty cars returned)	2,160	2,133	2,241
Net load	1,202	1,185	1,245

The steam in operating the compressor and motor was as follows:

Steam consumption per hour, including condensation in line	5,200 lbs.
Boiler horse-power required	174 B. H. P.
Coal required per day, 10 hours	10,400 lbs.; 4.65 tons.
Cost of fuel and firing per day, 10 hours, 4.65 tons, at 50c.	\$2.32

The free air compressed per revolution of compressor is 2.96 cu. ft. according to the calculation of the Norwalk Iron Works Company, no allowance being made for leakage.

The compressor works 12 hours per day; the motors 10 hours. The free air per minute at actual speed of 131 revolutions was 378.8 cu. ft., and per day, 12 hours, 279,216 cu. ft.

The capacity of the 5-in. air main, 4,380 ft. long, is 608 cu. ft.; and that of the 3-in. line, 3,100 ft. long, is 159 cu. ft., making the total for both lines 767 cu. ft. At 600 lbs. pressure these lines hold 32,505 cu. ft. of free air. The capacity of the main and auxiliary tanks is 134.6 cu. ft. At 508 lbs. pressure (at which they will equalize with the main, starting to charge at 600 lbs.), this is equivalent to 4,845 cu. ft. free air. In standing 12 hours the pressure falls from 550 to 350 lbs., and of free air, 11,688 cu. ft., or 974 cu. ft. per hour, are lost. The proportion of this leakage to the total air compressed is 4.18 per cent.

According to a test made March 29th, 1900, the amount of air used in making a round trip by the shaft-motor was 3,355 cu. ft. at No. 2 plane and 7,584 cu. ft. at No. 3 plane. The slope-motor required on an average 1,829 cu. ft. for a round trip.

In 1898, at shaft No. 6, 356 cars were hauled per day; namely, from No. 2 plane, 6 trips of 15 cars each, using 20,130 cu. ft. of free air, and from No. 3 plane, 20 trips, averaging 13.2 cars each, using 151,680 cu. ft. of free air. The work at Slope No. 6 was 320 cars per day in 28 trips, averaging 11.4 cars each, and using 51,212 cu. ft. of free air, making a total for 676 cars of 223,022 cu. ft. of free air. The amount of free air apparently compressed for this work was 279,216 cu. ft., of which 83.4 per cent. is accounted for, leaving 16.6 per cent. for leakage and slip in the compressor, leakage in air-lines, and changes in temperature.

The average volume of free air used per ton-mile is:

No. 6 shaft motor, gross	113 cu. ft. net 203 cu. ft.
No. 6 slope motor, gross	71 cu. ft. net 128 cu. ft.
Both motors, gross	100 cu. ft. net 180 cu. ft.

The greater quantity of air used by the shaft- as compared with the slope-motor is due to the heavier curves and the switching required.

The cost of plant, not including steam-boilers, but including compressor, motors, air and steam connections, labor and extras, was \$15,156.

The total actual cost, including fixed charges, in the two periods mentioned was therefore, for the two motors (one-half to each), in 1897, per day, \$22.23, and for the whole period, \$3,979; and in 1898, per day, \$24.01, and for the whole period, \$3,844. Taking the figures of 1897 as a basis, and assuming 300 days of work in a year (with consequent saving in certain items of fixed charges, superintendence, etc.), it is estimated that the total cost would be \$18.22 per day, or \$5,467 per year. A similar calculation, based upon the figures of 1898, gives \$18.83 per day, or \$56.50 per year.

\*Abstract of paper presented at Canadian meeting of the American Institute of Mining Engineers.

The total actual working costs in 1897, when the motor was in use 179 days, amounted to \$2,203, an average of \$12.30 per day. In 1898 the total costs for 160 days' work were \$2,067, or \$12.91 per day. These costs include the wages of two engineers and two brakemen, oil, repairs on compressor and motors and steam. The fixed charges amounted to \$1,777 in 1897, or \$9.93 per day, and \$1,777 in 1898, or \$11.10 per day. The fixed charges include interest, repairs and depreciation of boilers and interest and depreciation of plant.

For the same two periods the cost per ton-mile, with motors, was as follows:

	1897 (179 days).			1898 (160 days).		
	Daily Ton Mileage.	Daily Cost.	Cost per Ton Mile. Cents.	Daily Ton Mileage.	Daily Cost.	Per Ton Mile. Cents.
No. 6 shaft motor, gross	1,485	\$11.12	0.75	1,527	\$12.00	0.79
No. 6 shaft motor, net	825	11.12	1.35	845	12.00	1.42
No. 6 slope motor, gross	648	11.12	1.72	720	12.00	1.67
No. 6 slope motor, net	360	11.12	3.09	400	12.00	3.00
Both motors, gross	2,133	22.23	1.05	2,241	24.01	1.07
Both motors, net	1,185	22.23	1.89	1,245	24.01	1.93

This compares with the following ton-mile cost with mules:

	1897. Tonnage.		1898. Tonnage.		Cost per Ton Mile. Cents.
	Ton Mileage.	Cost.	Ton Mileage.	Cost.	
No. 6 shaft.					
Gross	1,485	\$33.94	1,527	\$35.88	2.35
Net	825	33.94	845	35.88	4.25
No. 6 slope.					
Gross	648	29.35	720	31.08	4.32
Net	360	29.35	400	31.08	7.77
Total, gross	2,133	63.29	2,241	66.96	2.93
Total, net	1,185	63.29	1,245	66.96	5.38

There were 32 mules displaced by this plant, 17 at shaft No. 6 and 15 at slope No. 6, costing, on an average, \$126.64 each, or \$4,052 for the two lots. The expense of operating with mules would be as follows:

	1897 (179 days).		1898 (160 days).	
	Per day.	Per year.	Per day.	Per year.
No. 6 shaft.				
Depreciation and interest on 17 mules, 25 per cent.	\$3.01	\$538.22	\$3.36	\$538.22
Feeding, attendance, harness and repairs, \$141.40 per mule	13.43	2,403.80	15.02	2,403.80
6 drivers	9.40	1,682.60	9.40	1,504.00
6 couplers and spragmen	8.10	1,449.90	8.10	1,296.00
Total cost by mules	\$33.94	\$6,074.52	\$35.88	\$5,742.00
Cost by motor	11.12	1,989.69	12.00	1,921.77
Saving by compressed air	\$22.82	\$4,084.83	\$23.88	\$3,820.25
No. 6 slope.				
Depreciation and interest on 15 mules, 25 per cent.	\$2.65	474.90	2.97	474.90
Feeding, attendance, harness and repairs, \$141.40 per mule	11.85	2,121.06	13.26	2,121.06
5 drivers	8.00	1,432.00	8.00	1,280.00
5 couplers and spragmen	6.85	1,226.15	6.85	1,096.00
Total cost by mules	\$29.35	\$5,254.11	\$31.08	\$4,971.96
Cost by motor	11.12	1,989.69	12.00	1,921.77
Saving by compressed air	\$18.23	\$3,264.42	\$19.08	\$3,050.19
Both No. 6 shaft and No. 6 slope.				
Total cost by mules	\$63.29	\$11,328.63	\$66.96	\$10,713.98
Total cost by motors	22.23	3,979.38	24.01	3,843.53
Saving by compressed air	\$41.06	\$7,348.25	\$42.95	\$6,870.45
Total saving in two years		\$14,218.70		\$14,218.70
Total cost of plant				15,156.00

At the average rate of saving for 1897 and 1898, the entire cost of the plant would be saved in 361 working-days.

The capacity of the shaft-motor is equal to fully double its present work, and the slope-motor is working at but about one-third of its capacity, while the compressor is doing all that it can. To operate the plant to the full capacity of two compressors, which, under the present conditions, would be about 4,500 ton-miles gross or 2,500 net per day, for 300 days per year, would bring the cost of operation, including fixed charges, to about \$24.60 per day, or 0.547 cent per ton-mile gross and 0.984 cent per ton-mile net load. If all the work could be done by one motor under the conditions of No. 6 shaft, up to the capacity of the compressor, for 300 days per year, using only one crew, the cost of plant would approximate \$11,000, and the operating expenses, including fixed charges, would be \$10.86 per day for 2,400 gross ton-miles, or 0.48 cent per gross ton-mile and 0.811 cent per net ton-mile.

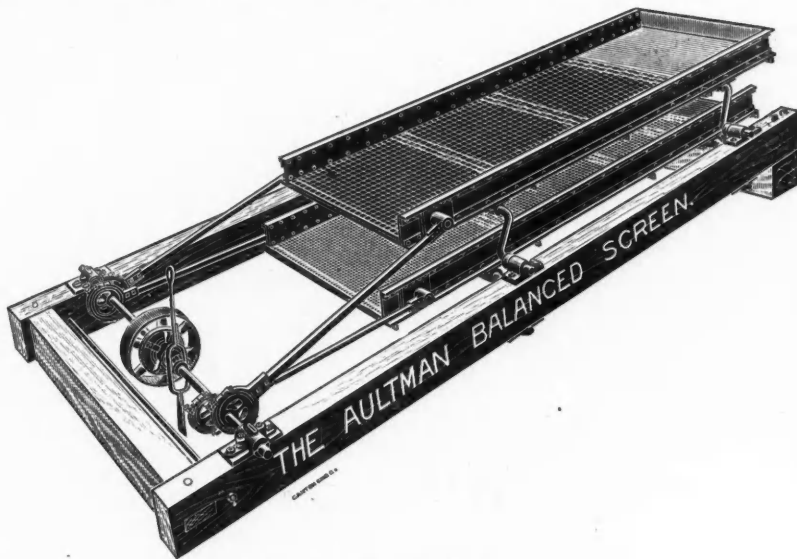
A further reduction of cost would result from re-heating the air at the motor, by passing it through water at the temperature of steam at 90 lbs. pressure, by which method tests have shown a gain of about 50 per cent. in air-economy. It is probable that by this means one motor could be run to its full capacity (about 3,000 gross ton-miles per day) with one compressor, at a total cost of \$10.80 per day, or 0.36 cent per gross ton-mile, for 300 days' work per year, the saving of 0.09 cent per gross ton-mile, or about 20 per cent. over the last-mentioned conditions being due only to the greater air-economy; the fixed charges and labor-cost remaining practically the same.

CANADIAN AWARDS AT PARIS.—The awards just made at the Paris Exposition are highly satisfactory to Canada. In class 63 the Geological Survey Department of Canada, the commission of the Bureau of Mines of Ontario, the Colonization Department of Quebec, the Department of Mines of British Columbia and the Public Works Department, Nova Scotia, secured grand prizes. The Canadian Copper Company, Dominion Coal Company, Montreal; the London Gold and Silver Development Company, the LeRoy Mine, the Nova Scotia Steel Company and the New Vancouver Coal Mining and Land Company were awarded gold medals. Collaborators A. Low, White, A. T. Gilpin and Robertson, of the Geological Survey Department, attained gold medals. A gold medal was awarded on class 64 to the Canadian Metal Ores Smelting Company.

THE AULTMAN BALANCED SHAKING SCREEN.

The accompanying illustration shows a new pattern of shaking screen, made by the Aultman Company, at Canton, Ohio. This screen, by reason of its construction, does not require any foundation, framework or bracing other than is needed to support the weight of the screen and resist the pull of the driving belt. The usual destructive shake or vibration, common to all ordinary screens, is in the case of this screen entirely prevented by a novel arrangement of the moving parts. The forward and backward movement of the upper screen is perfectly counterbalanced by the reverse movement of the lower screen, and all of the thrust of the moving parts is completely absorbed in the heavy countershaft. No shake or vibration whatever is communicated to the structure upon which the screen is placed. The screen frames are so placed on rocker arms, so that the screening surface always moves through a true arc. At each end of the stroke the material naturally raises slightly and is again forcibly caught by another portion of the screening surface. Great capacity and the most thorough separation is secured on any material whatever that is subject to the screening process. The frame carrying the wire cloth or perforated metal is in removable panels for convenience in renewing the wire cloth and to provide for changes in the fineness of separation.

All bearings that require oiling are so far removed from the material that no oil or grease could possibly come in contact with the screened material. Any material wet or dry that is subject to the process of screening can be rapidly and perfectly separated. Favorable materials such as sand, shale, fire clay, phosphate, cement and coal, when dry, are thoroughly screened at the rate of 15 to 20 tons per hour, and when damp at the rate of 10 to 15 tons per hour. The dimensions are as follows: Length of upper and lower screens, 14 ft.; width, 3 ft.; height over all, 26 in.; size of friction pulley, 24 by 6 in.; speed of counter-



THE AULTMAN SHAKING SCREEN.

shaft, 250 revolutions per minute; space required for screen complete on skids, 18 ft. by 4 ft. 6 in.

All who have seen the screens and observed their work have recognized the advantages of this screen. The Aultman Company is now prepared to make tests and submit results on any kind of material.

**GOLD MINING IN KOREA.**—A recent British Consular report says: "The American mines mentioned are now in full working order, and the German mines in process of development, and a British syndicate is now in possession of the Unsan Gold Mine, generally considered to be the richest mine in the country, it being known to Koreans as the 'Pearl of Korea.' The history of the concession is briefly as follows: In September, 1898, Messrs. Burn, Murdoch and Hay, acting as agents for Mr. Pritchard-Morgan, obtained, through the instrumentality of the British Charge d'Affaires at Seoul, a concession entitling them to locate a mining area of 60 by 40 li (20 by 13 1/3 English miles). In November last Mr. Pritchard-Morgan, accompanied by a staff of geologists under Dr. Jack, arrived in Seoul and proceeded to the Unsan District, in the Ping-an Province, to examine a gold mine which for many years had been worked in a primitive manner by the Koreans, and the district in which this mine is situated was finally selected as the site of the concession. Considerable opposition to the selection was shown by the Household Department, which has charge of all mines, and a keen controversy arose which did not cease until well on in March of the present year, when the Korean government admitted the validity of the title, and placed Mr. Pritchard-Morgan in full possession. The mines are now in full work, about 500 men in all, mostly Koreans, being employed thereon. Machinery is being ordered from England, and it is anticipated that in a year or so the sound of the stamp mill will be heard in the Unsan Valley. The district has been renamed Gwendoline, to prevent confusion with the American gold mines, which are situated at Woonan, the Korean pronunciation being very similar. The mines have the reputation of being the richest in the country, and the opinions of Dr. Jack and Mr. Gustav Braecke, the present manager of the mines, point to the conclusion that their value has not been overestimated. The gold-bearing stratum is a sedimentary deposit extending for a great distance, and is similar in many respects to the deposits on Witwatersrand in South Africa."

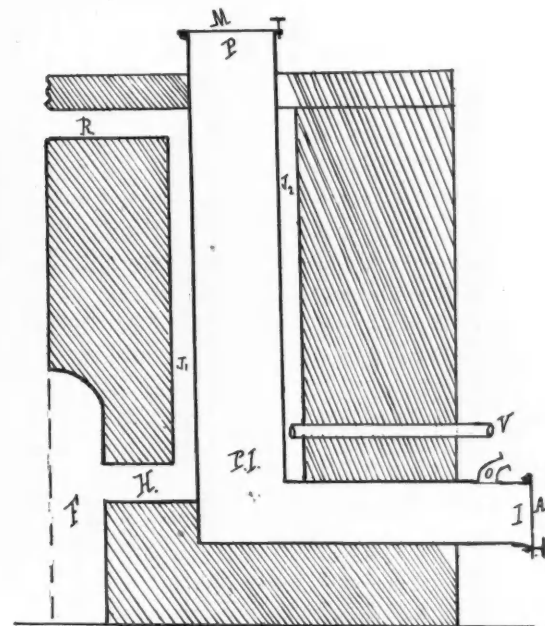
GENERATING GAS FROM WOOD.

Written for The Engineering and Mining Journal by James M. Neil.

The manufacture of gas from wood has been unsuccessfully tried since 1780; the product has been a bad smelling, impure, weak gas, not of any great practical use, and costly to make. It was not until 1894 that H. Riché, of Paris, invented his system of retort, which is now technically known as the re-inversed system of distillation. It is unnecessary to go over the many unsuccessful attempts that the inventor made. In the destructive distillation of wood, no matter what kind of apparatus was employed up to the present time, there has been obtained the following three kinds of products:

1. The permanent gases, composed of carbon monoxide, carbon dioxide and hydrocarbons, with a small quantity of nitrogen.
2. The vapors, which on being condensed, gave three distinct layers of liquid by-products. The top layer being composed of the light tarry oils, with benzol, toluene, etc., etc., and a small quantity of phenol and creosotic resins, with varying amounts of acetic acid. The intermediate layer is composed of a water in which is found several fatty liquids and the acids—acetic, butyric, formic, etc., etc.—also acetone, acetate of methyl, wood spirit and tarry compounds. The bottom layer composed of heavy oils and tars charged with acetic acid and a small quantity of phenol and creosotic compounds.
3. A residue of charcoal, the amount of which depended on the manner in which the operation had been conducted.

It is a well-known fact that if the distillation of wood was carried



RETORT FOR MAKING GAS FROM WOOD

on at a high temperature the resultant amount of permanent gas was increased in ratio to the heat at which the distillation took place, and that this was due to the chemical reactions that took place in the retort, between the volatile compounds of wood and the heated charcoal that was present in the retort; red-hot carbon having the power of reducing those unstable complex bodies into simple stable gases.

Upon the above chemical reduction power of carbon is based the principle of the Riché gas generator, and by its means all the volatile products of wood, or any other combustible organic matter, such as peat, lignite, etc., are reduced into stable simple compounds, producing at the same time three times as much of a rich, permanent gas as was formerly possible, without the necessity of any purifiers; the only other product being a good salable charcoal which often pays for the first cost of the wood.

An idea of the excellent properties of Riché's gas may be formed by glancing over the following table of analyses of the principal gases used in the industries:

Kind of Gas.	Composition in 100 per volume.					Calorific power in cal. (Kgr d) per met. cub.
	Hydrogen.	Carbon monoxide.	Carbon dioxide.	Nitrogen.	Carbures.	
Siemens Gas .....	25.7	4.5	69.8	...	...	773
Dawson Gas (anthracite).....	18.4	26.8	7.2	47.0	0.6	1,346
Dawson Gas (coke).....	21.9	15.9	11.4	50.1	0.7	1,018
Water Gas .....	49.2	43.8	2.7	4.0	0.3	2,884
Coal Gas (average) .....	49.6	9.6	1.6	3.8	35.4	5,259
Riché Gas .....	44.2	22.0	21.3	...	12.7	3,029

From the above table it may be seen that what was formerly the poorest of all gases—wood gas—can be made a rich gas, nearly approaching coal gas.

The Riché generator is composed of a kiln of ordinary red and fire bricks reinforced by an iron ring. Inside of this masonry are the beds for the retorts, which latter are heated by fire-boxes at the end of kiln. These fire-boxes are so arranged that the heating of the kiln can be shut off or started at a moment's notice by a series of dampers, and, although for the sake of economy, there is usually only one fire-box to each kiln, the construction of the kiln is such that any retort may be

taken out and replaced without hindering the usual work of the generator, and this changing of a retort takes only one hour. A general idea of the generator and its mode of working may be formed from the sketch of masonry and retort given herewith.

The firing of the retorts is regulated by a damper, which is placed at R, and is under the control of the gas man. The hot gases coming from the fire-box, F, pass through H and then play around the retort in its bed, J<sub>1</sub> and J<sub>2</sub>, and then through R away to the chimney. In order to commence operations, the retort is charged with charcoal up to the mark J<sub>1</sub>, by means of the hand-door M and the hot gases from F allowed to play about the retort until it assumes a cherry red color, which is ascertained by means of the spy hole V. It is then ready to produce gas, and it is filled with wood by means of the hand-door M up to where J<sub>2</sub> is marked. The wood is decomposed by the high temperature of the retort, into its volatile compounds, and the gases materially rise to the top of the retort P from which there is no outlet. By their own pressure they are forced to return and pass over the highly heated surface of charcoal, which exists in the retort below J<sub>1</sub>, where they are decomposed and forced into the permanent gas; this reaction being accomplished, the gas escapes through the opening O to the gasometer, ready to be used.

The retort is discharged by withdrawing the charcoal through the hand-door A; to keep the retort in continuous working order it only requires to be recharged with wood at M. One man looks after a generator of 6 retorts, and on a smaller plant he usually looks after the gas engine also.

Each single retort produces 180 cu. ft. of gas; 1 ton of wood produces over 25,000 cu. ft. of gas and about 400 lbs. good wood charcoal. The 1,000 cu. ft. of gas, with wood at \$3 per ton, and not taking into account the charcoal, costs 14c., and if selling price of charcoal is taken into consideration, it will be naturally less.

A horse-power hour can, it is claimed, be obtained at a cost of less than ½c., and at a consumption of nearly 6 lbs. of wood with a by-product of ¼ lb. of charcoal.

Riché gas is in France especially being adapted to many uses outside that of motive power, such as the drying of all kinds of chemicals, the smelting of glass, solder, brass, etc. This gas does not give a flame for illuminating purposes, but when used with the incandescent mantels it gives a light equal to 50 candles with a consumption of 5¼ cu. ft. of gas per hour.

To miners, smelters, etc., who have difficulty in obtaining coke and coal the Riché generators are useful, as the gas gives a powerful heat, its flame reaching 2,000°, and a good motive power besides being very simple to construct. All the pieces are easily transportable, and in working there is no need of skilled labor.

#### ABSTRACTS OF OFFICIAL REPORTS.

##### Republic Iron and Steel Company.

This company is a consolidation of a number of minor concerns, chiefly engaged in the making of bar and merchant iron. The list of properties owned includes 7 iron mines in the Lake Superior Region and 3 in Alabama; a coke plant in Pennsylvania and 1 in Alabama; coal properties in Pennsylvania, Illinois and Alabama; limestone quarries in Pennsylvania, Ohio and Alabama; 7 blast furnaces; 3 steel plants; 28 rolling mills; docks and railroad spurs. The stock capital is \$20,306,900 preferred and \$27,191,000 common, a total of \$47,497,900. Of this \$545,100 preferred and \$161,000 common are in the company's treasury.

The first annual report, which is for the year ending June 30th, 1900, gives no statements of production or gross earnings. The income account shows apparent net receipts of \$5,684,101, the payments from which were: Improvements and repairs, \$893,014; depreciation, \$1,097,358; reserve, \$50,000; dividends on preferred stock, \$1,421,679; total, \$3,462,051, leaving a balance of \$2,222,450.

The directors' report says: "The various plants taken over by this company have, with but few exceptions, been in full operation since the organization of this company. A great deal of money has been spent at many of our plants to improve their physical condition, and generally our plants have been greatly improved since they were taken over. These expenditures, however, have been charged to operating expenses. The Bessemer Steel Plant, which we have been erecting at our Brown-Bonnell Works, Youngstown, Ohio, has recently been completed. Its present capacity is 600 tons per day, but as soon as the new billet mill is completed this plant will have a daily capacity of 1,000 tons. We are now enabled to supply our mills with steel from this plant, and are placed in a much more independent position than we were during the past year. The plant is equipped with all modern labor-saving appliances to produce steel at the lowest possible cost.

"We have opened up coal mines on the Pioneer property, at Sayretton and Warner, and are also erecting an additional blast furnace on this property at Thomas, Ala., which will be completed toward the end of this year. This furnace, when completed, will be the most modern and best-equipped in the South. We are also erecting additional coke ovens at Thomas, Ala., to supply this furnace with coke. When these improvements are completed we will have a group of three well-equipped blast furnaces and 850 coke ovens at this point. Of the 26,000 acres of land comprising the Pioneer property in Alabama, 14,000 acres are underlaid with coal which makes an excellent quality of coke, and is also a first-class steam coal; 10,000 acres are underlaid with a fine quality of brown ore and red ore, and the balance of the property consist of limestone quarries, town site and adjacent ground. The Pioneer property has sufficient ore, coal and limestone to supply several furnaces for many years.

"We have acquired during the past year an interest in the Mahoning Ore and Steel Company's ore property on the Mesabi Range in Minnesota, and also a one-half interest in the Union Ore Company's property on this range (a high-grade Bessemer ore). This, in addition to the ore properties originally acquired by this company, insures us a full

supply of lake ores for our mixtures in making Bessemer pig iron at our northern furnaces. We have also purchased 550 acres of additional coal lands in the Connellsville region, and will be able to supply our northern furnaces with coke from our own ovens as soon as additional ovens are erected.

"The principal articles manufactured by the company are merchant bar iron and steel, Bessemer, foundry and mill pig iron. In addition thereto our output comprises a considerable tonnage of nuts, bolts, washers, rivets, cut nails, railroad and boat spikes, cold drawn shafting, turn buckles, car axles, forgings, angles, tees, harrow teeth, channels, hexagons, small T-rails, splice bars, frog fillings, rail fastenings, special shapes for bicycle makers and for builders of cars, implements, carriages, wagons and bridges. The annual capacity of finished material exceeds 1,000,000 tons.

"Owing to the large amount of finished material which had been contracted to be manufactured by the constituent companies at low prices for delivery during the last half of 1899, prior to the time the plants were turned over to this company, we did not receive the full benefit of the high prices ruling during the first 6 months after the organization of the company, nevertheless, the net profits of the company, after deducting all expenses and allowing for depreciation, were \$3,643,729. Of this amount \$1,421,679 has been paid by way of dividends on the preference shares of the company, leaving a net surplus of \$2,222,050. The current assets of the company on June 30th amounted to \$8,892,031, and the current liabilities to \$1,379,278, leaving (after payment of dividends) an excess current assets over current liabilities of \$7,512,752. The company has no bonds outstanding and no mortgages or liens of any description on any of its properties, except the deferred payments (\$214,000, payable in 6 annual installments) on the Connellsville coal lands acquired since its organization. The plants of the company are protected by fire insurance, the officers and employes occupying positions of trust are under surety bonds, and the company carries a safe line of accident policies.

"During the coming year the company will be in a position to concentrate its operations in the plants offering the most favorable conditions as to efficiency and cheapness of production, as well as to geographical location nearest the markets of consumption. It will also have the benefit of its new steel plant, new blast furnace and new coke ovens, as well as of the new mines opened."

**ELECTRIC MINE LAMPS.**—The London "Colliery Guardian" says that an electric safety lamp, patented in Germany by Herr Johann Glasmachers, of Essen-an-der-Ruhr, and Herr C. Müller, of Herten, Westphalia, consists of two cylindrical accumulators, that hold tightly between them an ordinary cylindrical lamp-glass containing an incandescent electric lamp, the uprights connecting the two accumulator cases being hollow for receiving the conductors. The accumulator electrodes consist of perforated lead pipes, wound with a slow spiral and fitted with the active substance.

**PREPARATION OF PURE TUNGSTEN.**—According to M. Marcel Delapine, in "Comptes Rendus" of the Paris Academie des Sciences, the reduction of tungstic anhydride by means of zinc allows of the easy preparation of pure tungsten at temperatures below that at which zinc distills. In physical properties, the metal thus prepared possesses the density and heat of combustion of crystalline or ordinary tungsten. It can also, by compression or trituration, be made to assume the brilliancy of metals. In fact, it can be positively asserted that this substance acts as an identical element, though prepared in a state of fine division due to the slight fusibility of tungsten.

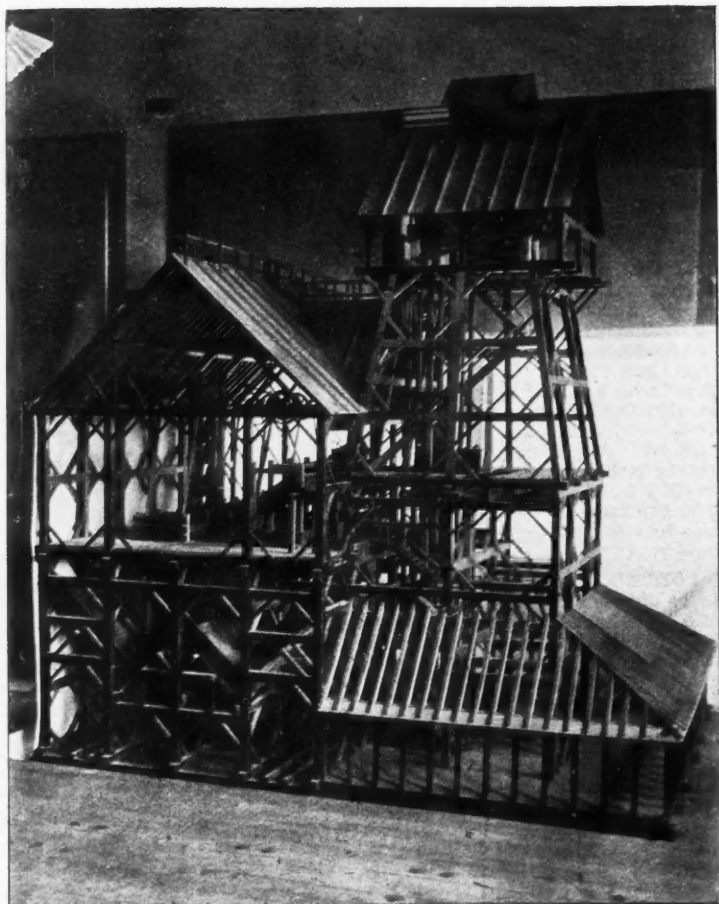
**EXPLORING FOR COAL NEAR DOVER, ENGLAND.**—Sinking to tap the coal seams found by bore holes has been suspended several months to allow heavy pumps being installed at 580 feet to handle the flow of water. The plant has a capacity of 1,000 gallons per minute from that depth. No. 3 pit, which is the one over the bore hole, is now 660 ft. deep—that is 80 ft. below the pumping chamber, and is 480 ft. from the first 2-ft. 6 in. seam of coal, 1,106 ft. from the 2-ft. 9 in. seam of alleged navy steam coal, and 1,521 ft. from the 4-ft. seam, which is regarded as the seam most likely to be profitable in working. With good luck the first seam may be reached in a year, but for the two deeper seams the time required is more indefinite.

**MECHANICAL DRAFT FOR BOILERS.**—Messrs. Mills & Rowan, in their exhaustive work on "Chemical Technology," make the following pertinent statements regarding the subject of "Mechanical Draft:" "The principles of what is now becoming well known under the name of 'forced combustion' have been repeatedly advocated during past years by those who have devoted thought and study to the subject. The position assumed by them—which is now finding favor among engineers—has been, in brief, that the air supply required for combustion in furnaces can be more economically furnished by mechanical power than by the action of chimneys; and that the mechanical method has other advantages, which enable it to be preferred to the one which is older, but more imperfect. One of these advantages is the higher temperature of combustion, which is equivalent, with a boiler of good design, to an increased evaporative power of the boiler, or to increased evaporative effect for the fuel. Another advantage, which has not been fully realized in any plan as yet introduced in practical work, is that the rate of travel and escape of flame, and hot products of combustion are under control. It is thus possible to cool them more completely than can be done when chimney draft is used, and this means a saving of heat which would otherwise be uselessly dissipated. Mechanical or artificial draft thus presents to us a method of economically furnishing the air supply to furnaces and producing a more efficient combustion temperature, while it also renders possible further economies due to retarding the movement and escape of hot gases, and to preliminary heating of the air supply by waste heat or otherwise."

## THE MICHIGAN COLLEGE OF MINES.

The Michigan College of Mines has had an unusually successful career among institutions of its kind. It was established by an act of the Michigan Legislature of 1885, and is therefore a comparatively young member of the State's educational system. Yet it publishes in its catalogue just issued a long list of alumni, members of which are successfully employed in the copper and iron districts of Michigan and in almost every other important mining district of North America. In looking over this list one may mark the noteworthy fact that of 134 men graduated up to this date, but three have left engineering for other pursuits. No literary courses are offered, the college limiting its work to the instruction which a mining engineer should have, and which by reason of its admirable location, it is exceptionally well fitted to give.

The instruction is given largely by means of well-equipped laboratories and field practice including the inspection of mines, mills and smelting works. It is just here that the location of the college gives it one of its most important advantages, situated as it is in the heart of vast mining operations. Those in control of these works are always willing to place their plants at the service of the college, thus putting in its possession equipment, the value of which in training students cannot be overestimated. Trips to the adjacent copper mines form a part of the regular work; practical work in mine surveying and mining



MODEL OF TAMARACK HOIST AND ORE HOUSE.

is also done among the iron mines not in the immediate vicinity. A knowledge of field geological and exploration methods is gained in the same experimental way, by field trips covering the various iron ranges and the copper range of the Upper Peninsula. In all of these trips students are under the direction of the professor in charge. The influence of the College of Mines in developing the mineral wealth of the State may be inferred from the fact that a considerable portion of the exploration work going on in the copper and iron districts is under the immediate charge of its graduates.

During the past spring, through the instrumentality of J. C. Reeder, clerk, and W. E. Parnall, superintendent, the Tamarack Mine officials presented the college with a model of the No. 2 Tamarack combined shaft and rock house, a cut of which is here shown. This model was exhibited at the World's Fair in 1893.

The thirteenth annual commencement of the college was held August 30th. As last year, the address was given by a practical mining man, Dr. Nelson P. Hulst, of the Oliver Iron Mining Company, being the speaker. The announcement shows 22 names of men who received the degree of "Engineer of Mines," and 16 names of those who received the "Bachelor of Science" degree. Some names occur in both lists, the young men having finished work for both degrees. The esteem in which the training of the college is held and the remarkable demand for its men are indicated by the fact that of the 27 different men who received degrees at this commencement, 17 are already employed.

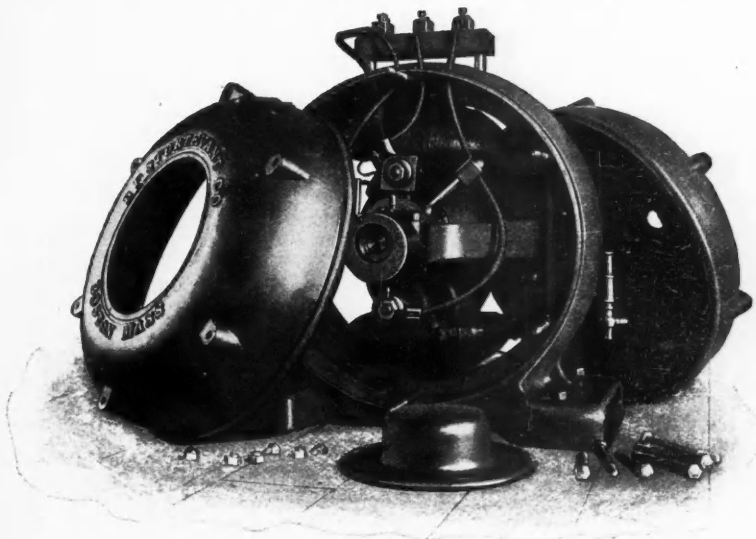
**PLATINUM IN RUSSIA.**—United States Consul Hanauer at Frankfurt, Germany, reports that the production of platinum from the Oural Region in Russia in 1899 was 13,242 lbs. in all.

## A NEW TYPE OF INCLOSED ELECTRIC MOTOR.

The type of motor shown in the accompanying cut is built by the B. F. Sturtevant Company, of Boston, Mass., and being inclosed and readily portable, in the small and medium sizes, is specially adapted for driving small machines, such as machine tools, blowers, etc. For certain classes of work, where the conditions are favorable, the motor may be direct-connected to the machine which is to be driven. Cased fans of the centrifugal type may be thus equipped, and if desired the fan-casing itself may be supported by the motor frame and made adjustable about it, so that any direction of air discharged may be provided.

In order to avoid the excessive temperature which is incident to the operation of most inclosed motors, this type has been very carefully designed, so that a low temperature rise can be maintained without greatly increasing the size and weight above that of the ordinary open type. This machine is capable of continuous operation for ten hours with a maximum temperature rise not exceeding 60° F. Yokes extending out from the field ring support the armature shaft. The end casings are entirely independent and can be instantly removed to give access to the entire interior. The bearings and brushes can be reached by simply removing the caps in the center of the casings. The brushes are of hard carbon, in holders of a modified reaction type, which allows of easy adjustment when it becomes necessary to reverse the direction of rotation of the motor. The bearings are self-oiling and self-aligning, and fitted with composition sleeves, which are removable from the outer ends of the boxes. These motors are built in this type in seven sizes ranging from 1/6 to 5 H. P.

**BRITISH COAL EXPORTS.**—In the month of July the British export coal trade was fairly well maintained, the total of 3,981,021 tons comparing with 4,169,724 tons in June last and 3,993,942 tons in July, 1899. As compared with July of last year the fuel exports for the month show



STURTEVANT ELECTRIC MOTOR.

a decline as regards Russia, Sweden and Norway, Denmark, Portugal, Azores and Madeira, Spain and Canaries, Italy, Turkey, Egypt, Brazil, Gibraltar, Malta and British East Indies, but an increase in the quantities dispatched to Germany, Holland and France. The trade in coal for the seven completed months of the present year amounts to 26,044,227 tons, as against 26,984,572 tons in the first seven months of 1899, and 19,671,129 tons in the corresponding period of 1898.

**COAL IN AUSTRALASIA.**—Apparently the influence of the boom in coal in Europe has been felt at last in the Antipodes. This has been brought about, it is thought, by the determination of the Japanese government to prohibit, or at any rate to curtail, the export of coal from the collieries under their jurisdiction. The exports of Japanese coal was 927,000 tons in 1888; last year the exportations reached a total of 2,487,614 tons. The result has been that Japanese coal has held complete ascendancy in Eastern markets for some time past. In Chinese ports, the Philippines, Java, the Straits Settlements, and many other centers which were previously supplied by Newcastle, Japan now fixes prices. But the consumption of coal by the home manufactures of Japan has increased so enormously of recent years that the government apparently entertains fears that the supply is being exhausted with too great a rapidity, and this fact, coupled with the elaborate preparations Japan is making to be ready for all eventualities that may possibly arise from the present state of things in the Far East, have induced the government, it is thought, to adopt measures that many regard as the solution of the coal question, provided the nationalization of the coal mines were an established fact. Whether this is so or not, a quickening in the demand for Australasian coal is present to a marked degree, according to recent advices from there, which state that ships offering for Eastern ports are eagerly taken up at firm and advancing rates of freight. A short time ago, says "The Colliery Guardian" of London, the current rate of freight to Manila was 17s. 6d. per ton. But the bark "Cambusdoon," which last month loaded at Newcastle for that port, was "fixed" in London at 23s. The natural consequence of this will be an advance in prices.

## MINERAL COLLECTORS' AND PROSPECTORS' COLUMN.

(We shall be pleased to receive specimens of ores and minerals, and to describe and classify them, as far as possible. We shall be pleased to receive descriptions of minerals and correspondence relating to them. Photographs of unusual specimens, crystals, nuggets and the like, will be reproduced whenever possible. Specimens should be of moderate size and should be sent prepaid. We cannot undertake to return them. If analyses are wanted we will turn specimens over to a competent assayer, should our correspondent instruct us to do so and send the necessary money.—Editor E. & M. J.)

201.—Fullers' Earth.—We have received several inquiries regarding fullers' earth recently, also a number of samples of clay for examination. We give herewith a summary of the characteristics, occurrence, composition and uses of this substance.

The peculiar characteristic of fullers' earth, as distinguished from ordinary clay, is its cleansing power. It was used in ancient times as a substitute for soap, later for removing grease spots from cloth, but at present its chief use is for clarifying oil. Fullers' earth does not owe its cleansing power to its chemical composition, but rather to some little understood physical quality. Consequently chemical analyses are of comparatively little value in determining whether a clay is or is not fullers' earth. If the clay clarifies oils, it is fullers' earth; if it will not, it is not fullers' earth. These tests must be made with care to have value.

The color of the crude earth varies greatly, ranging from gray to dark blue. Like other clays, it adheres to the tongue when dry, but lacks the plasticity of the clays used for pottery and brick making. A piece of pure fullers' earth when dropped in water quickly falls to pieces, much like a piece of lime in slaking. The resulting powder looks like fine sand, but is really flocculent, as may be seen by stirring the water. Ordinary clays fall to pieces much more slowly, and the resulting mud has a different look. All clays that fall to pieces as described, however, have not the cleansing power of fullers' earth, but any clay which does not slake quickly is probably not fullers' earth.

Fullers' earth has been found in this country at many places, but few of the localities have given earth of satisfactory cleansing power. The most extensive deposits so far worked are those about Quincy, in Florida. Other large deposits of good quality have been opened near Bakersfield, Cal. In England one of the principal sources of supply is near Reigate. The Reigate earth is a greenish yellow in color; that from Florida is greenish when first mined, but turns to a creamy white on drying.

Some of the combined water is removed by heating to a temperature above the boiling point. A typical fullers' earth from Quincy, Fla., averages about 63 per cent. lime, 3 per cent. alumina, 2.5 per cent. ferric oxide, 2.5 per cent. lime, 3 per cent. magnesia, potash and soda each 1 per cent., water 15 per cent. The English fullers' earth from Reigate contains about 53 per cent. silica, 10 per cent. alumina, 9.75 per cent. ferric oxide, 1.25 per cent. magnesia, 5 per cent. lime, a trace of potash, water 24 per cent.

These analyses and certain peculiarities of some deposits indicate that fullers' earth may have been formed from ordinary clay through which free silica percolated in solution—some of this silica combining with the aluminous silicate already present, and some being deposited as chert. At Quincy, in Florida, the earth is mined by simply stripping off the overlying sand and plastic clay from 3 to 10 ft. thick and digging out the moist earth, which occurs in beds 3 ft. thick. This is dried in the sun or by artificial heat. In England the clay is washed in launders to remove sand, etc., and the fine silt is caught in settling tanks and dried.

Although there have been many deposits of fullers' earth reported in this country, and the production in 1899 was 13,620 short tons, the imports in 1899 were 3,743 long tons. This is because the Florida clays, though well suited for clarifying mineral oils, are hardly as well adapted for vegetable oils. In clarifying petroleum the crude oil runs through filters filled with the earth and comes out colorless. In clarifying lard oil the earth, ground to 120 mesh, is added to the hot oil and stirred a short time. The oil is then passed through a filter press, which removes the earth and impurities present. For clarifying lubricating and other heavy oils fullers' earth has practically superseded bone black. In purifying and bleaching yellow cotton-seed oil from the first refining process from 2 to 3 per cent. of fullers' earth is used, ground to a fineness of 100 to 120 mesh. The fineness of the clay and its temperature during the time of treatment greatly affect its efficiency as a bleaching agent.

## QUESTIONS AND ANSWERS.

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

Fumes from Chloridizing Furnaces.—Can you tell me whether the fumes from a chloridizing furnace can be successfully condensed to recover the volatilized gold, silver and copper?—C. L. G.

Answer.—Theoretically we know of no reason why the fumes of a chloridizing furnace cannot be condensed so as to recover volatilized gold and silver; but whether such a device would pay is another question, the answer to which would be governed by the character of the ore. We know of no plant using such a device with success, and shall be glad to hear from any of our readers having information on the matter.

Magnesium.—Aluminum Alloys.—I have read of a new alloy of magnesium and aluminum, called "magnalium." Can you tell me who makes this alloy, or where it is sold?—J. S. W.

Answer.—"Magnalium," as the inventor calls it, an alloy of aluminum

and magnesium, was first made by Dr. L. Mach of Jena, Germany, who has patented the composition in Germany, England and the United States. Dr. Mach's American patents are No. 629,084, dated July 18th, 1899, and No. 646,442, dated April 3d, 1900. The alloy is made and sold by the Magnalium Company of Berlin, Germany. It is not made as yet in this country. You can doubtless secure information either from the Magnalium Company or Dr. Mach.

Copper Quotations.—Will you be kind enough and let me know where the large difference comes in between your quotations for casting copper and those of the Western Union, as published in the papers of this section (Arizona)? The latter have published casting lately at 15½ to 15¼, while you quote at 16¼ to 16¾c.—J. W.

Answer.—The question of copper quotations has been frequently discussed in the columns of the "Engineering and Mining Journal." We long ago ceased to concern ourselves with the so-called "Western Union" quotations, which are made by certain brokers, and have based our own quotations on actual sales as made in New York by responsible dealers. This course has been generally approved, both by sellers and buyers, and the "Engineering and Mining Journal" quotations are now the established standard used as a basis for contracts in a very large number of transactions. Great care is taken in collecting the information on which these prices are based, and we are sure of their correctness. Electrolytic copper is the brand commonly used as the basis for contracts. Under these circumstances we do not concern ourselves with figures made by irresponsible parties.

Graphite.—Can you inform us why there has been such a large reduction in the imports of Ceylon plumbago in the first six months of this year as compared with those of 1899 for the same period? The figures, we understand, are about 4,300 long tons against 7,500. Do you think the Spanish war had much influence upon the market; or do you think it is due to a reduced demand for ordinary commercial purposes?—R. S.

Answer.—The reduction in imports of graphite or plumbago has not been quite so great as you mention. The total imports for the seven months ending July 31st, this year, were 9,620 short tons, while in 1899 they were 10,324 tons, and in 1898 the total was 7,237 tons. The Spanish war caused an unusual demand for graphite crucibles, for making steel for projectiles, but this was not sufficient to cause a very large change in the imports. The more probable cause for the falling off in imports is the increase in the domestic production. This was—according to "The Mineral Industry," Volume VIII.—3,632,608 lbs. in 1899, as compared with 1,647,679 lbs. in 1898. There is reason to believe that thus far in 1900 the domestic production has been as great or greater than in 1899, so that the increase would make up for the decline in imports. Moreover this production does not include the artificial graphite made by the Acheson Graphite Company, at Niagara Falls, which amounted to 405,870 lbs. last year, and is expected to reach 1,000,000 lbs. this year. The extension of this process for converting coke into graphite promises to affect the import trade considerably.

FORCED DRAFT.—Viewed from the standpoint of economic results to be obtained by the introduction of air heaters, and the substitution of a blower for a chimney, the late J. C. Hoadley stated that "there can be no doubt that the heat to be returned to the furnace would several times exceed that necessary to make the power required to drive the exhausting fan, to the operation of which the final temperature of the gases presents no objection."

BELGIAN BLAST FURNACES.—The number of blast-furnaces in activity in Belgium at the commencement of July was 34, while 5 furnaces were idle at the same date. The total of 34, representing the active blast-furnaces of Belgium at the commencement of July, was made up as follows: Charleroi District, 14; Liège District, 14; Luxembourg, 6. The production of pig iron in Belgium in July was 99,820 tons, as compared with 106,780 tons in July, 1899. The output for the first 7 months of this year was 685,440 tons, as compared with 703,550 tons in the corresponding period of 1899. The total of 685,440 tons was made up as follows: Forge pig, 179,720 tons; foundry pig, 62,780 tons, and steel pig, 442,990 tons.

## PATENTS RELATING TO MINING AND METALLURGY.

## UNITED STATES.

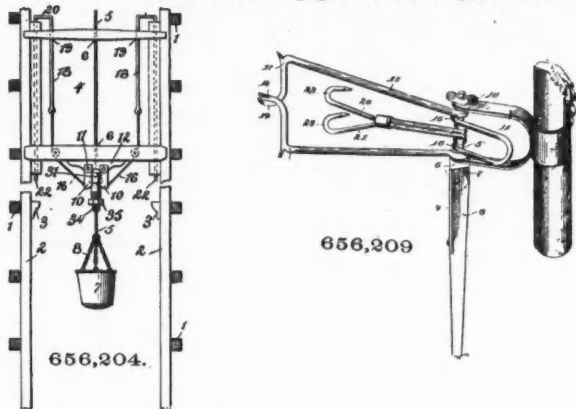
The following is a list of the patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

Week Ending August 21st, 1900.

- 656,221. METHOD OF PRODUCING ARTIFICIAL STONE. Edmund J. Seymour, Benton, La. The method consists of molding mortar of the composition required, permitting the mortar to partially dry, during which it will expand, striking off such expanded portion therefrom, permitting the mortar further to dry, and again striking off the expanded portion until the materials set and cease to expand.
- 656,268. PROCESS OF TREATING ORES FOR RECOVERY OF METALLIC INGREDIENTS. Benjamin Sadler, Denver, Colo., assignor to Albert G. Clark, Cincinnati, Ohio. The improvement in the process of treating ores wherein precious metals are combined with zinc and iron or other corrosive agents, consisting in distilling such ores in a retort adapted to resist the action of such corrosives, thereby extracting the zinc, and thereafter treating the residue in a smelting furnace for the recovery of the remaining metals.
- 656,279. SELF-ACTING MINING DOG. William A. Wilson, Murphysborough, Ill. The combination with a track of a horizontally-disposed oscillating dog pivoted between its ends and having its opposite ends alternately projected over said track, and means for oscillating said dog.
- 656,204. SAFETY DEVICE FOR MINES. Duncan McCowan, Nelhart, Mont. Combination with the guides, the cross-head moving thereon, the bucket rope passing loosely through the cross-head, and supports

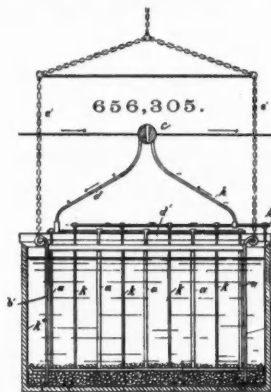
on the guides; of a clutch at the bottom of the cross-head, means for opening it when the cross-head engages the supports, a clamp below the clutch and adapted to be engaged by the same, the body of the clamp being tubular to receive the rope and notched at its lower end to produce fingers, and a nut surrounding these fingers for securing the clamp adjustably on the rope.

- 656,209. MINER'S CANDLESTICK. Christopher Peacock, Altman, Colo. A device comprising a spindle, a yoke having its arms slidably engaged with the spindle, a candle-holding clip connected with the yoke, an attaching device engaged with the spindle between the



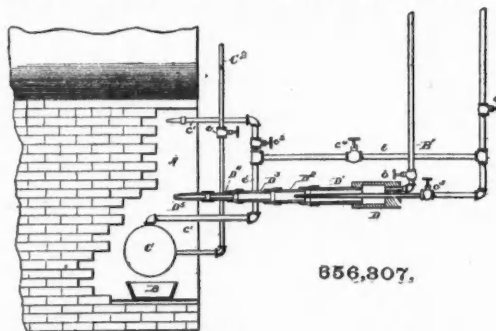
arms of the yoke, and a clamping nut engaged with the spindle for clamping the yoke arms against the attaching device to hold them against independent movement.

- 656,305. PROCESS OF ELECTROLYTICALLY EXTRACTING ZINC FROM ORES. Wilhelm Strzoda, Falenze, Germany. The process consists in placing the disintegrated ore in its natural state in an electroly-



tic vat containing an aqueous alkali-metal solution capable of dissolving the ore with the production of a zincate and in direct contact with the cathode, and closing the circuit through the vat, thereby precipitating zinc and the alkali metal at the cathode, the alkali metal reacting with the water to regenerate the solvent solution.

- 656,307. OIL AND GAS BURNER FOR FURNACES. Joseph Tyler, Pittsburgh, Pa., assignor of one-half, to Cornelius Collins, same place. A burner composed of a series of tubular sections, each section being of substantially uniform diameter throughout its length, and the successive sections being of gradually decreasing diameter,



the section entering the furnace being of least diameter and the outermost section of greatest diameter, the latter being closed at its outer end, reducing couplings connecting the several sections together, a steam-supply pipe extending through said closed end into the burner, and a fuel-supply pipe also extending through said closed end to deliver fuel to the rear end of the burner.

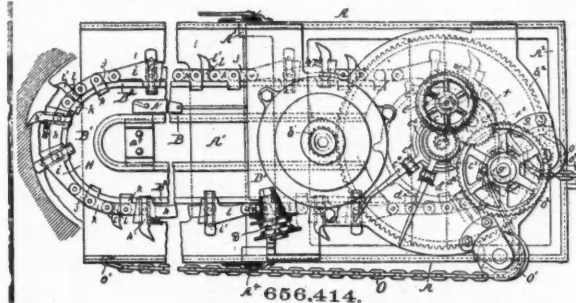
- 656,369. ANCHORING DEVICE FOR DREDGES. Ralph R. Osgood, Lansingburg, N. Y. Combination with a reciprocating spud; of a reciprocating spud reinforcing sleeve mounted upon the body of the dredge.

- 656,395. PROCESS OF LEACHING ORES OR TAILINGS. Edward H. Dickie, Bodie, Cal., assignor of one-third to James Kane, same place. The improvement consists in adding to the solution for dissolving precious metals, an acetate of an alkali metal or of alkali-earth metal which is capable of readily uniting with and forming acetates of the base metals, and which has little or no affinity for the precious metals, thereby enabling the solvent to act directly upon the latter, and then leaching the ores.

- 656,416. INGOT-EXTRACTING APPARATUS. William H. Morgan and Clarence L. Taylor, Alliance, Ohio; said Taylor assignor to the Morgan Engineering Company, same place. Combination with a rack bar, means for moving same longitudinally, a bracket carried by the lower end thereof, and an ingot-holding plunger depending from the lower end of the rack bar, of a cross-head sliding on

the plunger, rods connected to the cross-head, bell-crank levers depending from the cross-head by moving the latter vertically, lever-releasing rods carried by the bracket and engaging the levers and springs interposed between the bracket and upper end of the releasing rods.

- 656,414. MINING MACHINE. Jonas L. Mitchell, Galesburg, Ill., assignor to the Sullivan Machinery Company, Chicago, Ill. A cutter chain, cutters fitting in dovetailed seats formed on the upper and lower



faces on the links, a key having a groove therein coinciding with said seats, and means for tightening said key.

- 656,497. PROCESS OF TREATING ZINC-BEARING COMPLEX ORES FOR RECOVERY OF ZINC OR OTHER METALS THEREFROM. Guy de Bechi, Paris, France. The method consists in separately roasting the ore and an alkali chloride in the presence of air and steam, conveying the sulphurous and sulphuric vapors thus derived from the ore over and in contact with the said chloride during the roasting to obtain hydrochloric-acid fumes, condensing the acid fumes, lixiviating the roasted ore with the acid liquor thus obtained to produce a solution of metallic chloride, and successively precipitating the metals of the metallic chloride as hydrates by successive additions of alkali.

- 656,503. HYDRAULIC DREDGING APPARATUS. William J. Bradley, Philadelphia, Pa., assignor to the American Dredging Company, same place. The combination of the base plate, a turntable mounted on said base plate, said turntable having an open center and having a platform at the top, an engine or motor mounted on said platform, a suction pipe pivoted to the turntable and having a flexible extension passing through the open center of the turntable under the platform and connected to the suction pipe of the dredge, a cutter shaft, and a cutter on the end of said shaft, said cutter shaft being geared to the engine on the platform.

- 656,572. APPARATUS FOR RAISING WATER BY COMPRESSED AIR. Julius Petermann, Grimnitzschau, Germany. In combination, a water chamber, a discharge pipe, air inlet and outlet pipes, a combined inlet and outlet valve having a piston and controlling the passage of the air through both of said pipes; a second valve for controlling the position of the air inlet valve, an air pipe leading to the space between the piston of this valve and the other valve; an outlet leading from said space and controlled by this valve; said outlet connecting with the outlet pipe, and a pipe connecting the space between the air-inlet valve and the air-outlet pipe with the water chamber.

- 656,580. CALCINING OR ROASTING FURNACE. Alfred E. Johnson, Victor, Colo. Combination with a suitable hearth, of means for introducing air thereto intermittently at suitable points whereby the ore is caused to travel longitudinally over the hearth.

- 656,595. APPARATUS FOR MAKING FERTILIZERS. Josephus F. Brussels, Irvington, Va., assignor to the American Process Company. An apparatus comprising a plural number of cylinders, one above the other and communicating with each other so as to form a continuous passageway through the several cylinders; a revolvable agitator within each cylinder; a horizontal tapered feed neck having its small end entering the topmost cylinder; a tapered compressing screw in said horizontal feed neck, and a hopper or funnel attached to the large end of said horizontal neck.

- 656,617. HAULAGE CLIP. James W. Smallman, Camp Hill Grange, near Nuneaton, England. Combination of two side pieces, a transverse bolt and nut loosely connecting said side pieces, right-hand and left-hand screws and a hand wheel for causing the screws to act on the tops of the side pieces.

GREAT BRITAIN.

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

Week Ending July 21st, 1900.

- 15,062. PLATES FOR CHEMICAL APPARATUS. L. M. O. Dessaigne, Paris, France. Making plates and sheets of copper covered with silver and platinum, for use as substitutes for platinum plates and sheets, in chemical apparatus.

- 24,011 of 1899. CYANIDES. J. Grossman, Manchester, Eng. Method of manufacturing cyanides by passing ammonia over a mixture of carbon and alkaline sulphide.

Week Ending July 28th, 1900.

- 17,050 of 1899. MINE CAGE CHAIN. D. Davy, Sheffield, Eng. Method of relieving the chains of mine cages from their weight and the weight of the cages.

- 17,699 of 1899. CRUSHING ROLLS. The Edison Ore Milling Syndicate, London, Eng. Details in improvements in Edison's dry crushing rolls which have corrugated grooves fitting into each other.

- 9,562 of 1900. METALLURGICAL FURNACE. A. Reynolds, Sheffield, Eng. An improved metallurgical furnace for heating substances, either ores or metals, out of contact with air.

Week Ending August 4th, 1900.

- 14,077 of 1899. GOLD FROM SEA WATER. H. C. Bull and A. Watling, London, Eng. Plant for extracting gold from sea water, the process consisting of adding caustic lime to the water and so precipitating the gold from the iodide contained in the water.

- 14,278 of 1899. TREATING ZINC-LEAD SULPHIDE ORES. J. Swinburne and G. A. Ashcroft, London, Eng. Process consists in dissolving the ores in double chloride of zinc and alkali metal, injecting chlorine to form chlorides of zinc and lead, precipitating the lead by adding zinc and electrolyzing the remainder for zinc, and recovering the chlorine.

- 17,659 of 1899. COLLECTING FURNACE GASES. A. Spies, Siegen, Germany. Method of collecting the gases from cupola and blast furnaces, especially intended for quenching the burning of the gases.

- 8,665 of 1900. CHARGING METALLURGICAL FURNACES. The Wellman Seaver Company, Cleveland, Ohio, U. S. A. Detailed improvements in the inventor's plant for charging metallurgical furnaces.

## PERSONAL.

Mr. Victor M. Clement left Salt Lake City last week for Mexico to be absent a month or more.

We have letters at this office for E. P. Jones and George N. Joyce, whose present addresses are unknown to us.

Mr. Morris M. Green has resigned his position as superintendent of manufacture at the Solvay Process Company's soda-ash works in Detroit, Mich.

Mr. Wm. S. Wolle has been appointed sales agent of the Lehigh Valley Coal Company, at New York City, succeeding the late Mr. L. R. Barrett.

Mr. P. J. Donohue is examining mining properties in the vicinity of Flagstaff, Ariz. He will return to Salt Lake City about the middle of September.

Mr. T. C. Hopkins, formerly of State College, Pa., and afterward of the University of Chicago, has spent the summer in geological work for private parties in Canada.

Mr. Paul A. Fusz, president of the Granite-Bi-Metallic Mining Company, has returned to Butte from St. Louis, where he had been on business for some time.

Mr. George W. Maynard, returning from British Columbia, where he has been for several months, devoted a few days to Montana and Utah. He is now in New York.

Mr. D. T. Hughes, who has been for the past few years acting as consulting engineer for Mackenzie & Mann in British Columbia, has returned to his home in San Francisco.

Mr. Bernard Macdonald, general manager of the Le Roi Mine, has gone to the Klondike on a visit in the interests of the British American Corporation. He will be absent several weeks.

Mr. A. B. Call, late general manager for the Union Development Company, Nova Scotia, has been appointed consulting mining engineer for the United Mineral Company of Boston, Mass.

Mr. Joseph S. Schwab, superintendent of the Duquesne Steel Works and blast furnaces of the Carnegie Steel Company at Duquesne, Pa., is now in Europe and will remain abroad six weeks or two months.

Mr. T. S. Mathis is in British Columbia examining properties for the General Electric Company, of New York. Mr. Mathis is at present devoting most of his time to the coast of the main land of Texada and Vancouver islands.

Mr. David H. Lawrance has resigned his position of metallurgist to the Newton Copper Company, of Ranlett, Cal., and has proceeded to Oregon to fill the position of smelter superintendent for the Waldo Gold and Copper Smelting Company, of Waldo, Southern Oregon.

Mr. A. M. Moreland has resigned his position as secretary of the Carnegie Steel Company in order to be relieved of the large amount of detail work connected with that position. The resignation was entirely voluntary on the part of Mr. Moreland and he still retains his position as secretary of the Carnegie Company.

Mr. John Hays Hammond, the American mining engineer, has sailed for Boston from Liverpool. It is said he is the representative of a syndicate composed of Wernher, Beit & Company, and J. B. Robinson, the South African mining men, and J. Pierpont Morgan and others, and that he is to examine a group of mines in Colorado.

Mr. L. B. Stillwell has resigned his position as electrical director of the Niagara Falls Power Company, and his successor is to be Mr. Harold Winthrop Buck. Mr. Stillwell will remove to New York, where he will open an office as consulting electrical engineer. Mr. Buck for the past 5 years has held an important position on the engineering staff of the General Electric Company of Schenectady. Messrs. Philip P. Barton and Paul M. Lincoln, assistant superintendents of the Niagara Falls Power Company, have been promoted, Mr. Barton to superintendent of the operating department and Mr. Lincoln to resident electrician.

## SOCIETIES AND TECHNICAL SCHOOLS.

The Royal Technical High School of Aachen, Germany, has issued its programme for the school year 1900-1901. The school offers courses in architecture, civil engineering, mechanical engineering, electrical engineering, mining and metallurgical engineering, chemistry, electro-chemistry. The time required to complete any course is 4 years.

## INDUSTRIAL NOTES.

The Colorado Iron Works Company of Denver, Colo., has established a branch office at 136 Liberty Street in New York City.

The Bethlehem Steel Company has discontinued its office at St. Louis and the territory hitherto covered by it will be supplied through the company's Chicago office.

The Jeffrey Manufacturing Company, of Columbus, O., was awarded a gold medal at the Paris Exposition covering its line of elevating, conveying and mining machinery.

The Magnolia Metal Company, manufacturing anti-friction metal, to accommodate the constantly increasing volume of its business, has opened a branch office in the Hale Building, Philadelphia, Pa.

The Richmond Locomotive and Machine Works, of Richmond, Va., has booked an order from the Intercolonial Railway of Canada for 10 large consolidation locomotives, the contract price of which aggregates about \$150,000.

The Tennessee Coal, Iron and Railroad Company, which owns and operates the steel plant business rapidly on account of the desirable at Ensley, Ala., is constructing adjacent to the steel plant a large rail mill. It is intended to have this plant nearing construction by next spring. The foundations are being put in and the boilers being placed.

The Western Elaterite Roofing Company of Denver, Colo., states that it is extending its sales of the material produced. The company reports orders from smelteries, chemical plants, etc., where acid fumes escape into the air, and tin or other metallic roofing is corroded.

The engineering firm of Chas. C. Moore & Company, San Francisco, last week called in its entire force of salesmen from different points on the Pacific Coast, including Los Angeles, Seattle and Honolulu, to discuss the company's business in their respective territories. The company intends to make these meetings an annual affair.

The Standard Pneumatic Tool Company and the Chicago Pneumatic Tool Company state that in the patent litigation between the Chicago Pneumatic Tool Company, Joseph Boyer, the Standard Pneumatic Tool Company, and the Chouteau Manufacturing Company, all suits have been dismissed, and that they have purchased licenses from each other covering their present style of hammers.

The Wellman-Seaver Engineering Company of Cleveland, O., is now working upon plans for 3 large open-hearth furnaces of the Wellman type for Vicker's Sons & Maxim of Sheffield, Eng.; 2 large open-hearth furnaces for the Northeastern Steel Company of Middlesborough, Eng.; 2 furnaces for the Brymbo Steel Company, near Wrexham, Eng., and 2 furnaces for Lord Dudley's steel works at Round Oaks, Eng.

W. F. Wagner, general manager of the New York office of Wm. Jessop & Sons, Limited, of Sheffield, England, is informed that "Jessop's Steel" has been awarded a grand prize at the Paris Exposition. The firm's exhibit was much the same as that made at Chicago, and attracted much attention. The award is the highest grade, and is for excellence of material and perfection of workmanship. Mr. Wagner says that Jessop steel has taken over 20 highest exhibition awards.

The Pittsburg, Bessemer & Lake Erie Railroad recently placed an order for 800 steel cars with the Pressed Steel Car Company of Pittsburg. This is one of the largest car orders placed for some time, calling for about \$1,200,000. Four hundred will be flat-bottom gondolas and 400 will be of the hopper type. They will have a carrying capacity of 110,000 lbs. each. Work on the order has already been begun, and cars will be turned out at the rate of about 75 per day. The cars are to transport ore from the Conneaut docks to the Carnegie furnaces.

The Brown Hoisting Machinery Company has been incorporated in Delaware, to take the place of the Brown Hoisting and Conveying Machine Company and continue the business without any interruption or change in management. The new company will have an authorized capital stock of \$2,000,000, of which \$1,000,000 may be 7% non-cumulative preferred, to be issued for cash at par. The common stock will be issued in payment for all the property and assets of the present company, subject to any indebtedness. The present company is an Ohio corporation. Ohio laws prohibit the payment of more than 6% dividends on preferred stock. It was therefore necessary to incorporate a new company under the laws of another State.

The National Roofing and Corrugating Company has been formed under the laws of West Virginia, with an authorized capital of \$5,000,000. The following officers have been elected: President, C. E. Needham, Cleveland; vice-president, Edward Langenbach, Canton; second vice-president and general manager, Frank G. Caldwell, Wheeling; treasurer, R. J. Hyndman, Cincinnati; secretary, W. V. Wilson, Bridgeport, O. The concern is to consolidate certain firms, manufacturing iron and steel roofing, cornices, ceilings, etc., and it is stated that the following

are included: The Garry Iron and Steel Roofing Company of Cleveland, the Berger Manufacturing Company of Canton, the Hyndman Roofing Company of Cincinnati, the Cambridge Roofing Company of Cambridge, and the West Virginia Steel Company of Wheeling.

Two grand prizes and two silver medals were given to the Southern Railway at the Paris Exposition, one grand prize for its exhibit of Southern products in the United States Agricultural Department and one for the forestry annex, probably the most unique structure at the Exposition. This building is a log cabin, made of long, symmetrical yellow pine logs, as an advertisement of Southern timbers. Inside is the office of the Southern Railway, the front and sides of which consist of 8 Doric columns of polished Southern hard woods. The flooring is of Southern pine, the ceiling and sides, of more than 7 varieties of Southern woods, and the walls are hung with many fine photographs of mining, manufacturing, lumbering and landscape scenes. For this photographic display a silver medal was given, as well as another for a similar display in the department of social economy.

The International Emery and Corundum Company has been incorporated under New Jersey laws, with a capital of \$2,000,000, all in common stock. The incorporators are Charles R. Flint, Ohio C. Barber, president of the Diamond Match Company, Frank Rockefeller, Winfield S. Stern and Benjamin J. Downer. The company has acquired the plant and business of the Hempden Emery and Corundum Company, with works at Chester, Mass., and emery mines in Massachusetts and corundum mines in Georgia and North Carolina. The new company has also made contracts for the output of the Turkish mines for the United States, which, it is expected, will materially add to the earnings. An issue of \$500,000 6 per cent, 20-year gold bonds is authorized by the charter. Of this amount \$400,000 is to be issued at present to acquire property and to provide working capital. The remaining \$100,000 is to remain in the treasury of the company and can be sold only for cash at par or above. The bonds are redeemable at any time at 105. The \$2,000,000 of stock is to be issued against the foreign contracts above-mentioned. The Industrial Trust Company, of Providence, R. I., is trustee of the mortgage. The working capital, including raw material, is given at \$125,000. The directors of the new company are Ohio C. Barber, Charles R. Flint, Frank Rockefeller, Winfield S. Stern, Benjamin J. Downer, William M. Ivins and Frank M. Peet, of Warren, O.

## TRADE CATALOGUES.

Manganese and its uses in brick, tile and terracotta making form the theme of several little illustrated pamphlets issued by Kendall & Flick, of Washington, D. C. The pamphlet describes the pyrolusite mined in the Blue Ridge Mountains, Va., and its application to the faces of fancy brick, to give gray, speckled, brown and salmon effects after baking.

Supplement 42, issued by A. L. Ide & Sons of Springfield, Ill., describes the "Ideal" 4-ported engine for light and power service. This engine is of the high-speed, central station type, and is stated to possess all the "Ideal" features, including a simple and efficient valve gearing which gives minimum clearance and high economy.

Semibronze packing for engines and pumps, which is stated to combine all the advantages of fibrous packing with those of the best metallic packing, is described in circulars sent out by the manufacturers. It is stated to be made of loosely spun asbestos and wax saturated with graphite and cylinder oil and braided over with an open net of fine semibronze wire. Many testimonials from users are given.

Risdon tangential water wheels are described in Catalogue No. 4, a 50-page pamphlet published by the Risdon Iron Works of San Francisco, Cal. The catalogue contains descriptions of water wheels of various sizes and capacities, including one of 30 ft. diameter. As in all catalogues published by the Risdon Company, there is a large amount of material of general interest in the catalogue, including capacities of water wheels at different heads, various methods of determining a miner's inch, etc.

A very attractive pamphlet of 134 pages neatly illustrated and bound, is issued by the Westinghouse Electric and Manufacturing Company of Pittsburg, Pa. The pamphlet is entitled "Electric Power," and shows the construction of Westinghouse polyphase induction motors and direct-current multipolar and dust-proof motors, also their manifold applications at mines, mills and manufacturing establishments. The illustrations are well chosen and show the motors in actual use. The pamphlet is printed in English, French, German and Spanish.

Gold and silver amalgamating mills and ap-



pliances are described in section 1, 80 pages, of the comprehensive mining machinery catalogue sent out by the Edward P. Allis Company, of Milwaukee, Wis. The company states that it makes a specialty of sectional machinery adapted for transportation on pack animals. The devices described in Section 1 include grizzlies, "Reliance" Dodge and Gates crushers, "Reliance" ore feeders of several types, slump batteries, with mortars of different designs, cams, cam shafts, tappets, stamp shoes and dies, classifiers, "Reliance" vanners and concentrators, 3 stamp prospecting mills, amalgamating pans and barrels, settlers, agitators, amalgam safes, quicksilver retorts, conveyors, etc.

#### MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" what he needs he will be put in communication with the best manufacturers of the same.

We also offer our services to foreign correspondents who desire to purchase American goods of any kind, and shall be pleased to furnish them information, catalogues, etc.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, and have no pecuniary interest in buying and selling goods of any kind.

#### GENERAL MINING NEWS.

**Oil Production.**—A general decrease is recorded in the summaries for all Eastern fields for August. The total of the Pennsylvania and Trenton rock fields shows 1,302 wells completed, 19,494 bbls. new production and 251 dry holes. Compared with July this represents a decrease of 77 wells completed, 2,241 bbls. new production and 35 dry holes, says the Oil City "Derrick."

On August 31st there were 556 rigs and 1,152 wells drilling under way in the Pennsylvania and other oil fields. The total is an exact standoff for the amount of new operations in progress at the close of July. A gain of 21 in rigs is accompanied by a loss of 21 in wells drilling, so that 1,708 represents the aggregate amount of new work for both July and August. The increase of 37 in new operations in the Pennsylvania oil fields was counterbalanced by a decrease of 37 in the work under way in the Trenton rock oil fields of Ohio and Indiana. The record of new operations for the last day of July showed a decline of 33 rigs and 88 wells drilling from the June record.

#### ARIZONA.

##### Santa Cruz County.

(From Our Special Correspondent.)

**Flux.**—This mine, near the World's Fair, is being worked by R. R. Richardson and company. The ore is mined, sorted and shipped. Thousands of tons of low-grade silver-lead carbonates and galena are on the dump.

**Mowery.**—This mine is erecting a concentrator and improving the mine and machinery, under the able management of E. A. Wilson, formerly of the Ray Mines. The Mowery is owned by Albert Steinfeldt of Tucson, and is making daily shipments of high-grade ore to the El Paso Smelter, while the low-grade is accumulating on dump awaiting the completion of a concentrator.

**Patagonia Mining Company.**—R. R. Richardson of Patagonia is president of this company, which has purchased and is operating the Hardshell Mine. The main shaft is down 400 ft. on an immense deposit of silver-lead ore. The concentrator is in operation day and night. The concentrates are shipped to the El Paso Smelter.

**Pride of the West.**—This mine, owned and operated by Emerson Gee, formerly of Colorado, is shipping 10 tons of copper concentrates daily. A great deal of activity in the mines adjacent to Patagonia, which is the shipping point for the county.

**Rex.**—This claim has a shaft down 40 ft. on a ledge of copper glance that runs 50% copper and 50 oz. in silver. Richard Eames, Jr., manager for the Arizona Gold and Copper Company, is in charge.

**World's Fair.**—This mine continues to ship high-grade ore and at the same time developing with good results. This property is said to be under option at \$500,000, and is owned by Frank Powers of Patagonia.

#### CALIFORNIA.

##### Amador County.

(From Our Special Correspondent.)

**Onaida.**—The 60-stamp mill being installed at this mine by Fraser & Chalmers of Chicago, is almost ready to start. The mill building is 40 by 136 ft., the power room 40 by 80 ft. and the furnace rooms, etc., 12 by 32 ft. The stamps weigh 1,200 lbs. each. The buildings will be covered with galvanized iron. The 30 concentrators are in place and a double track tramway leads from the hoist to the ore bins. The plant is said to be one of the finest in the State.

Electric power is to be furnished by the Standard Electric Company. The old shaft at the mine has been cleaned out and retimbered 1,350 ft. down, and connection has been made with the new shaft, which is down over 2,000 ft. An upraise of 300 ft. has been made in the old shaft. The hoisting engines use flat steel cables.

##### Calaveras County.

(From Our Special Correspondent.)

**Lost Log.**—The machinery at this mine in the Jenny Lind District is being replaced with new machinery of larger capacity. The shaft of the Golden Eagle Mine, which adjoins the Lost Log, is down 50 ft. on pay quartz which shows free gold and sulphurets.

##### El Dorado County.

(From Our Special Correspondent.)

**Hart Consolidated.**—At this mine, near Garden Valley, a new tunnel is being driven which will cut 4 parallel ledges on the property to a depth of 160 ft. The upper tunnel shows these ledges to be from 6 to 30 ft. in width, prospecting well. A mill to be run by water power, obtained from the California Water Company's ditch, is to be erected.

##### Kern County.

(From Our Special Correspondent.)

**Butte Lode Mining Company.**—This company is still successfully working its property in Fiddler's Gulch, 1 mile north from Randsburg. The last run of 82 tons of ore milled at the Red Dog Mill in Johannesburg yielded about \$4,000. High-grade ore is still stoped and shipped.

**Randsburg District.**—Some of the mills have shut down on account of the lack of water, also the cyanide plant at the Blackhawk Mine. As soon as the new pump is in place, and pumping begins on the Yellow Aster wells at Garlock, they will start up again. The Santa Ana Mine is working 5 men on a 3-ft. ledge which is said to mill \$50 per ton. Several thousand dollars' worth of ore is taken from the Napoleon Mine per month.

##### Mariposa County.

(From Our Special Correspondent.)

**Mariposa.**—The result of the milling test of ore shipped from this mine at Mariposa to the Princeton Mill has not been made public, but it must have been favorable, as development work goes steadily on. The shaft is down 650 ft. and levels have been run on the 275, 475 and 600 ft. The vein in the east drift of No. 1 is 4 ft. in width, the west drift is in 350 ft. on a 2-ft. vein. In the east and west drifts of No. 3 both in about 30 ft., the vein averages over 2 ft.

##### Nevada County.

(From Our Special Correspondent.)

**Buckeye.**—This quartz mine, at Willow Valley, 3 miles northeast from Nevada City, is to be opened up under bond by Luke Voice. The 500 ft. tunnel has been cleaned out and will be extended to prospect the ground.

**Imperial Paint and Copper Company.**—This company has installed a new air compressor on its property at Spencerville. The new shaft is down 150 ft. This property comprises 214 acres.

**Jenny Lind Mining Company.**—The stockholders of this Grass Valley company have elected the following directors: W. M. Treloar, president; Dr. J. W. Brown, James Oliver, Jacob Burnhard, Charles Stocks, superintendent. During the past year 2 tunnels have been driven on the property, the upper one, in 1,150 ft., has about 200 ft. of backs. The ledges in both tunnels are good.

##### Placer County.

(From Our Special Correspondent.)

**Gleason.**—This mine, near Iowa Hill, is yielding some very rich gravel. The tunnel is in 600 ft., about 1/2 of it through bed rock. The channel is supposed to be a continuation of the Big Dipper Channel. Eight men are employed under Superintendent M. Gleason.

**South Yuba Water Company.**—About 100 ft. of this company's ditch, at a point between Dutch Flat and Gold Run, was carried away by a slide last week, and the water was turned into the other ditches until repairs could be made. W. F. Englebright, with a force of 37 men, hauled the logs and lumber and built a flume in 20 hours.

##### Sierra County.

(From Our Special Correspondent.)

**Ne Plus Ultra.**—This property, near Newark, owned by Gibsonville parties, has been bonded to Bullock & Company, who are driving the tunnel into the dividing ridge between Slate Creek and the south fork of the Feather River. This tunnel is now in 3,000 ft., and will be continued until the pay channel is reached, about 1,000 ft.

##### Trinity County.

(From Our Special Correspondent.)

It is reported that the Keystone driller being operated on Weaver Creek has developed good dredger ground, some of which has been found to go as high as \$2 per yard. Messrs. Galvin,

Fillius & King, who hold the bond on the property, will probably erect a dredger at once.

One of these drillers which has been prospecting ground on the Ballinger place on the river bank east of Redding, Shasta County, has not found pay dirt, and the machine will be shipped to Gold Hill, Oregon, to operate on Rogue River.

**Lappin.**—Development work still continues at this mine at Deadwood, about 1 mile from the Brown Bear Mine. The lower tunnel has followed the pay shoot for 150 ft. The ledge runs from 8 in. to 4 ft. in width. Some of the ore mills as high as \$60 per ton. Within the next 100 ft., rich veins developed on the upper levels will be cut. Ore is being stoped out and crushed in an arrastra operated by water power. A lot of free milling ore carrying sulphurets is to be shipped to the smelter. This lot, they think, will yield from \$400 to \$500 per ton.

##### Tuolumne County.

(From Our Special Correspondent.)

**Rawhide.**—The bond on this property at Rawhide has been extended for 60 days. Frank M. Bradshaw, of Los Angeles, holds the bond in the interests of a foreign syndicate.

**Santa Ysabel Gold Mining Company.**—This company has reorganized under the laws of Colorado, and the Miller & Holmes and Knox & Boyle Mill and mill site, Gray Eagle quartz mine and mill site, Wyman Consolidated Mine and 80 acres of land and all the property and works thereon, have been transferred to the new company for the consideration of \$70,000. The property is situated on the south end of Quartz Mountain and is developed by 3 shafts, already down to 600 ft.

#### COLORADO.

##### Lake County—Leadville.

(From Our Special Correspondent.)

**The Colorado & Southern,** in connection with the Midland Railroad, will extend the mineral belt lines to the Breeze Hill mines, making the extension from Oro in California Gulch. This will be in direct competition with the Ibox line of the Rio Grande.

**Leadville Output.**—The daily tonnage is over 2,200 tons, which is very heavy considering that there is so much developing and prospecting going on. The zinc tonnage from now on will average about 10,000 tons a month.

**A. M. W. Mining Company.**—This big combination under the direction of S. D. Nicholson has at last unwatered and retimbered the old Wolf-tone Shaft. A big station pump is being put in at 1,000 ft. and the shaft sunk 200 ft. to the lower ore zone.

**Banker Mining Company.**—This New York company expects to open ore any day. The shaft is down 1,100 ft. and the property is being explored on 4 levels. Some ore is coming from the first level.

**Fairview.**—On this shaft of the Chrysolite 30 tons a day of good iron are being taken out at the 128-ft. level.

**Fanchon Mining Company.**—A new shaft is being sunk to cut the Orinoco vein at 80 to 100 ft. A good surface plant is being built.

**Golden Curry.**—This Sugar Loaf property started up September 5th. The property is known to carry rich leads.

**Home Mining Company.**—Two hundred tons a day from the Starr and Bon Air shafts will be increased this week as the sinking of the Penrose shaft a further depth of 50 ft. is completed.

**Iron-Silver Mining Company.**—The Moyer is hoisting 200 tons of ore daily, of which the mill is handling 80 tons. The work of sinking the old Stevens Shaft 100 feet deeper is under way and some diamond drill explorations are being made.

**Maple Street Mining Company.**—The new shaft is down 200 ft. where a small water flow has been struck and machinery is being put in.

**Montgomery.**—This is a fraction of the Iron-Silver ground under lease to Geo. Linninger, who is sinking the Montgomery Shaft to the sulphide contact.

**Nubian Mining Company.**—Shipments are regular from the ore body recently opened. The ore body in the P. O. S. shaft continues to grow larger and richer, and a wonderful mine is promised.

**Rialto Leasing and Mining Company.**—The shaft is down 1,237 ft. and over 800 ft. of drifting were done before water stopped work. Recent exploration with the diamond drill shows that the big ore bodies of the Greenback and Mahala cross Rialto ground. At a special meeting of the stockholders this week the capital stock of the company was increased from 500,000 to 1,000,000 shares for the purpose of securing additional territory.

**Silver Moon.**—After cutting a good vein at 100 ft. the shaft is being sunk to 200 ft., where drifts will be run for the main ore body. The ore encountered assayed 40 oz. silver and \$3 to \$5 gold to the ton.

**Smasher.**—Work carried on in a small way for some years has resulted in a company being formed to work on a large scale. Manager Schlessinger of the Weldon Company is at the head of the new concern. A contract has been let to sink deeper and drive a number of drifts.

**Vanderbilt.**—Shipments have begun from the strike at the 400-ft. level. The vein averages 4 ft. thick of good carbonate ore.

**Weldon Mining Company.**—Fire caused by the explosion of a lamp set fire to the surface plant of Weldon No. 2 shaft and totally destroyed it. Damage, \$10,000, with \$5,000 insurance. The shaft was only slightly damaged. The plant will be replaced at once. Fireman Rapp, who was filling the lamp when it exploded, was fatally burned.

#### Summit County.

(From Our Special Correspondent.)

**Warriors Mark.**—This mining claim on Fletcher Mountain is shipping some high-grade ore. Some which shows native silver will be shipped. Fourteen men are employed under Chas. Lippert, the manager, who is doing considerable development work.

**Teller County—Cripple Creek.**  
(From Our Special Correspondent.)

**Acacia Gold Mining Company.**—This company has declared a dividend of 1c. per share, to be paid September 15th. This makes \$15,000 to be distributed and is the second dividend paid, the first having been declared 3 months ago. The funds for this dividend were derived from royalties on the Wrockloff and Brady Leases on the Burns Mine.

**Black Wonder.**—The option, recently granted on this property has been extended to September 10th. The price to be paid is \$100,000.

**Doctor.**—This mine has resumed work with a force of 100 men. Not much work has been done lately on account of a broken hoist.

**Estella Gold Mining Company.**—At the annual meeting at Colorado Springs the following directors were elected: L. J. Monnette, president; A. J. Newman, secretary; H. S. Sommers, Harg Brown and J. R. Newby, directors. It was voted to lease the property, which consists of the John R. and Ida May claims, patented, on Copper Mountain. The John R. has a 225-ft. shaft.

**Good Will Tunnel Company.**—The tunnel is now only 184 ft. away from its objective point, the Lexington, which it will cut at a depth of 700 ft. The company has a lease on the following properties through which the tunnel passes: Anchoria Leland, Lillian Leland, Missouri, Progress, Tom Gough and Lexington.

**Isabella Gold Mining Company.**—This company has granted Mercer & Finch a lease on the Jack Rabbit No. 2. This ground is thought by experts to be rich, yet it has never been successfully worked.

**Keystone Mining and Milling Company.**—This company has granted L. H. Todd, of Cripple Creek, a lease on the North end of the Sitting Bull Claim, situated between Battle Mountain and Bull Hill, near the town of Independence, close to the Battle Mountain property of the Moon Anchor Company. The property is well located, but not much shipping has been done.

**Nugget Gold Mining Company.**—Considerable work is being done on the Elizabeth Cooper Claim to prove the apex rights of the Jack Pot Vein; from all accounts the apex shows up well for the Elizabeth Cooper. Considerable ore is being shipped from this vein on territory not in dispute, and from the Smith & Riley Lease, operating another vein.

**Lexington Gold Mining Company.**—The Jones Lease on the Jeff Davis of this company is showing up better. For some time past the values were so scattered that the ore would hardly pay to ship, but now a shipment is being prepared which will run about \$80 to the ton. This is the same vein which was disclosed some time ago by the cut of the new electric railroad.

**Stratton's Cripple Creek Development Company.**—This company has purchased the Temomj holdings for \$250,000.

**Tenderfoot Hill Consolidated Mining Company.**—This company is developing its Altamont and Deadwood properties on Tenderfoot Hill, and as the claims are favorably located it is thought that large ore bodies will be opened up; \$50,000 will be expended in developing the ground.

**Work Mining Company.**—Water has been struck in the Morning Glory Shaft; work will be resumed as soon as a pump is installed.

#### IDAHO.

Owyhee County.

**De Lamar Mining Company.**—The detailed report of Manager Huntley states in July 4,171 tons of ore were treated, yielding 2,647 oz. gold and 14,112 oz. silver. The ore assayed \$9.87 gold and \$1.26 silver, the tailings \$4.58 gold and \$1.37 silver. The tailings plant treated tailings that averaged \$2.57 in gold and silver before treatment and \$1.42 after treatment. The total in-

come is estimated at \$60,960, and total expenses at \$39,825, leaving a profit of \$21,135.

#### Shoshone County.

**Empire State-Idaho.**—This company has started work on its new concentrating plant up Government Gulch from Wardner. The flume from Pine Creek, which is to furnish the water for washing the ore is already well along, it being 14 miles from the head of the flume to the concentrator site, and one part of the mill will be built this fall. The calculation is to build a mill with a capacity of 400 tons, completing it as soon as possible. The report is current that this company has recently acquired the old Sierra Nevada Mine, which will be conveniently situated to furnish ore for the new mill, and that it will be from that property that the mill will be supplied until the tunnel being driven from Government Gulch to the Last Chance gets into ore.

#### Washington County.

**Holter & Bullard vs. American Mining Company and Granville Stuart.**—This suit before the district court at Weiser involves 7/16 of the Peacock, Helena and White Monument mines in the Seven Devils, valued, it is said, at \$800,000. The remaining 9/16 of the property is under bond for \$1,000,000. The American Mining Company is controlled by the Kleinschmidts. Mr. Stuart has been very prominent in Montana as mining man and politician. He claims the 7/16 interest belongs to him instead of Holter & Bullard, who, it is charged, secured merely a security interest in the property during the panic of 1892-3, following the failure of the First National Bank of Helena. Mr. Fraser and M. G. Gage are the attorneys for the defense.

#### MICHIGAN.

Copper—Houghton County.

**Atlantic.**—The output for August was 125 tons of mineral, the largest month's output in the history of the mine. The output for 8 months was 496 tons.

**Baltic.**—The output for August was 282½ tons and for the 8 months 2,179½ tons mineral, compared with 279½ tons and 1,928½ tons in 1899.

**Franklin.**—The output for August was 210½ tons mineral.

**Wolverine.**—The output for August, 200 1/3 tons and for the 8 months 1,792½ tons, compared with 230 tons and 1,798 tons in 1899.

#### MINNESOTA.

(From Our Special Correspondent.)

Total Lake Superior shipments for the season to September 1st will probably show about 12,250,000 gross tons, to which must be added large all-rail shipments, making at least 13,000,000 tons to this time. This will leave but 7,000,000 tons for October, September and November, or 2,300,000 tons each month, to make the total of 20,000,000 tons predicted in this correspondence.

Freight rates are very weak. It is expected that they will improve and that more wild tonnage will be called for, both in ore and grain. The coal shippers have their season's traffic pretty well in hand already.

#### Iron—Mesabi Range.

(From Our Special Correspondent.)

**American Mining Company.**—This company's large mine, the Sauntry, is idle, all men having been taken off, and the opening of the new mine southwest of the stripped property has been deferred. This is in line with the policy of the American Steel and Wire Company on all ranges just now.

**Republic Iron and Steel Company.**—This company's Franklin Mine is shipping from 3 stockpiles as fast as possible, and those at Franklin No. 1 and Bessemer shafts are pretty well gone. The mine will be worked in all 4 shafts the coming winter, and a large output made. The company's explorations in 58-19 and 58-18 have resulted in the discovery of some large and fair ore bodies on state lands, which will be opened shortly. The company's Bessemer engine house, recently burned, has been replaced and the machinery overhauled. Victoria shaft has been idle most of the summer, but will go into commission later.

**Union Ore Company.**—This company has sunk its large inclined shaft, 4-compartment, 246 ft. and is developing its levels. This is the deepest shaft in the Virginia District, and the ore is splendid. The company is clearing a large stockpile ground, putting up machinery connections, etc. A railroad track has been built to the mine, which will be worked from the Franklin No. 1 shaft. A timber shaft house 75 ft. high has been finished. Trestles will be built over the stock dock at once. This mine is the property of the Republic Iron and Steel Company and the American Steel Hoop Company, jointly.

#### Iron—Vermilion Range.

(From Our Special Correspondent.)

**Chandler Iron Company.**—This mine will not complete its stockpile work before the end of

the season, and will mine and ship heavily till cold weather.

**Minnesota Iron Company.**—The company's Soudan mines will make the expected output. The company has been at work in the low ground near Tower and has been drilling underground to find new deposits.

**Oliver Iron Mining Company.**—This company's Savoy Mine has completed its stockpile loading, and will close for the year soon. The Pioneer will finish its stockpile work in about a month, and the Zenith soon. The mines will ship about as much as was expected.

#### MISSOURI.

Jasper County.

(From Our Special Correspondent.)

**Joplin Ore Market.**—There was a brisk demand for both zinc and lead ores and every pound produced was purchased. There was a general cut of 50c. per ton in the price of zinc ore and only 2 small lots of ore from the Pelican and King Jack mines in Chitwood Hollow, west of Joplin, sold for \$28 per ton. Most of the Oronogo ore brought \$27.50 per ton, but the average price throughout the district for top grade was \$27 per ton. Lead advanced 50c. per thousand, selling all the week at \$23. Following is the turn-in by camps of the Joplin District for the week ending September 1st:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin.....	2,017,220	399,170	\$35,900
Galena-Empire.....	1,736,210	170,980	25,121
Cartersville.....	1,387,070	297,400	27,472
Webb City.....	706,290	42,800	9,459
Belleville.....	352,820	4,000	4,850
Oronogo.....	992,660	8,970	12,850
Stotts City.....	83,340	.....	1,125
South Jackson.....	337,590	14,730	4,890
Cave Springs.....	159,810	4,800	2,188
Central City.....	27,500	3,740	3,430
Duenweg.....	130,850	19,980	1,719
Aurora.....	1,190,000	37,920	13,567
Carl Junction.....	151,000	.....	1,964
Granby.....	172,170	11,410	1,800
Carthage.....	87,870	.....	1,278
District total.....	10,024,010	1,015,900	\$146,756
Total 35 weeks.....	326,454,980	38,317,930	\$5,536,034

During the corresponding week last year top-grade zinc ore sold for \$45 per ton and lead for \$27 per 1,000 lbs., the zinc sales were less by 1,681,740, the lead sales greater by 283,510 lbs. and the value greater by \$48,403. For the 35 weeks of last year the lead sales were less than this year by 6,579,920 lbs., the zinc sales greater by 32,099,890 lbs. and the value greater by \$2,332,065. As compared with the previous week, the zinc sales were greater by 142,530 lbs., the lead sales less by 205,250 and the value less by \$4,961.

Seven new mining companies with headquarters in this district filed articles of incorporation last week with a combined capital of \$365,000. The rumor is again in circulation that the big zinc smelting concerns of the country are about to combine with a capital of \$60,000,000. Joseph Cappeau, of Philadelphia, who financed the deal for the Lanyon gas smelters at Iola and La Harpe, Kan., a couple of years ago, is said to be one of the moving spirits in the new combination and the concerns which, it is reported, may be consolidated are the New Jersey Zinc Company, the Cherokee-Lanyon Spelter Company, the Lanyon Zinc Company, of La Harpe, and 2 other independent smelters.

**International Zinc Company.**—Justice McAdam of the Supreme Court of New York, has appointed George F. Langbein temporary receiver of "the joint enterprise or partnership existing between Julius Leszynsky, Frederick H. Rogers, Alfred C. Foster and John B. Carmichael." The first names of Foster and Carmichael are said to be fictitious, but the two defendants are positively stated to be respectively president and treasurer of the International Zinc Company. Justice McAdam also made an order restraining the Knickerbocker Trust Company, with whom certain moneys of the zinc company have been deposited, from transferring or disposing of them until the court permits. The orders were made because Leszynsky has sued to recover his share of the profits arising from the consolidation of different mining concerns into the International Zinc Company, which was organized in 1899. It then developed, so it is alleged, that there were no profits to be divided, as all had been used to purchase properties. The International Zinc Company is the concern which a year ago was advertising in the Eastern States 1% per month dividends and has since sold stock in London and a very small amount in Paris. Officials of the International deny that the company itself is affected by the receivership.

#### MONTANA.

Deer Lodge County.

**Anaconda Copper Company.**—The framework for the roasting building is going up rapidly. Work has started on the foundations for the blast furnace plant.

**Elkhorn.**—This mine at Elkhorn last year was substantially abandoned and dismantled by the English company, the mine and mill building being sold to Geo. H. Platt, of Helena, for a practically nominal sum. Recently a deed was

recorded at Boulder, wherein George H. Platt and wife and J. H. Longmaid and wife, of Helena, transfer to the Elkhorn Silver Mining Company the mining property at Elkhorn, which they recently bought from the New Elkhorn Mining Company, Limited, of London. The transfer includes several quartz claims, mill and other buildings, town lots in Elkhorn with buildings thereon, ditches, water rights, etc. The consideration is \$20,000, or in lieu thereof 20,000 shares of the stock of the new company, which is capitalized at \$100,000, with shares at \$1 each. It is likely that the new company will soon begin work at Elkhorn, probably to get ore from some of the upper levels and perhaps to work over the tailings.

#### Fergus County.

**New Sapphire Mining Company.**—The last monthly clean-up of this company's mines at Yogo is said to have yielded \$10,000. The stones are all shipped to London, where they are cut.

#### Jefferson County.

(From Our Special Correspondent.)

**Basin & Bay State Mining Company.**—The Anaconda Copper Mining Company has begun suit against this company at Basin for \$4,997 for hardware and other supplies, and for \$5,320 for machinery, etc., with \$1,000 for attorney's fees. The defendants named include several parties who have claims against the company, and also the receiver, Mr. Berendes, of Boulder.

**Benjamin & Foster Iron Mine.**—The East Helena smelter has, it is reported, called for the deeds for this property. Price paid was \$15,000. It is situated on Crow Mountain, 3 miles above Elkhorn. The ore is iron oxide, with an average of 45% metallic iron and about \$4 gold. The smelter will use the ore as a flux and is arranging with the Northern Pacific Railway to ship 1,500 tons per month.

**Bell.**—C. W. Fleming, sole owner of this property, has recently refused to bond it at figures said to reach \$100,000, offered by Eastern parties. He will only deal on a cash basis and has offered to sell on the latter terms for \$75,000. It is claimed there is fully that amount or more in sight.

**Elkhorn Queen.**—This property at Elkhorn is shipping 1,000 tons per month to the East Helena works. It is under the management of W. H. Robinson and is operated under a lease and bond for \$60,000.

**Eva May.**—The following officers were recently elected by this Basin company for the following year: G. R. Best, president; John G. Miner, vice-president; George B. Drakenfeld, secretary; P. L. Pauly, treasurer; A. G. Poser, manager.

#### Madison County.

(From Our Special Correspondent.)

**Boss Tweed.**—H. H. Rogers and other men interested in the Butte & Boston Company, at Butte, have, it is said, acquired the Clipper and Boss Tweed group of mines, for which different Boston men have been negotiating. It is understood that extensive operations are to be started shortly. The price is not made public.

**Clipper Group.**—Parties identified with the Boston & Montana Company have secured this property, located at Pony, from Morris & Elling. The property is opened up quite extensively with an ore body 70 to 90 ft. wide, said to average \$12 in gold. W. P. Rodebush, of the Boston & Montana Company, engineered the deal for the Boston people. The supposition is that some kind of a modern plant will be built to work the ores.

**Madisonian.**—Some 70 miners are being employed by Manager Trerise. The 400 ft. station is finished and drifting on the lead at that level is going ahead. This property is about 8 miles from Norris and is equipped with a new cyanide mill put in by the Turners.

**Mammoth.**—The 10-stamp mill on this property is pounding out 25 tons per day. Reese Wampler, of Pony, is manager and chief owner.

**Strawberry.**—John F. Cowan, of Pony, has his new 10-stamp mill running. The ore reserves blocked out are ample to keep the mill going for a year or more ahead. At present the mill is treating a run of ore from the Old Joe. The mill is very complete, having 2 Cammett tables and electric lights. About 30 tons of ore are treated a day.

#### Park County.

**Montana Coal and Coke Company.**—Of the two hundred new ovens to be erected at Hoor by this company, 25 have already been completed. It is expected that by the first of November 75 will have been placed in position.

#### Silver Bow County.

(From Our Special Correspondent.)

Politics are the absorbing topic in this county at present. The various political conventions have declared for an 8-hour day, so probably there will be big effort made to pass such a law this coming legislature. A number of persons acquainted with the mining situation throughout the State question the utility of the movement, claiming that mines outside of this camp

cannot exist at the present wage scale of \$3.50 for 8 hours. On the other hand, the advocates claim that a miner can and would do as much in 8 hours as 10. Most everyone is willing to concede that, with copper at the present price, the majority of the Butte properties could stand it. It is the smaller mines outside of this camp who will oppose most.

**New Electric Power.**—A scheme to bring power from the Missouri River Dam to Butte, a distance of fully 80 miles, is considered.

**Brittania Mining Company.**—Several hundred tons of ore from this silver property have been sent for treatment to Tacoma under a charge for freight and treatment of \$7 per ton. The ore is very silicious.

**Gem.**—This property is north of what has been considered the copper belt. The shaft is now 500 ft. deep; 7 ft. of 20% copper rock has been struck on the 400 level.

**Parrot.**—A temporary gallows frame to take the place of the one destroyed by fire has been erected. A hoisting engine moved from the Diamond Mine, which had become too small for that property, is being put in place to be used until a new hoist can be built. So in less than 4 weeks it is thought this property will show its old activity.

**Snohomish.**—August shows the greatest profit of any month under Receiver Harris' management. About 60 miners are employed and the force will be gradually increased. The ore bodies are looking better now than ever, with an improvement in the copper contents.

**Tramway.**—Receiver Harris will start up this mine by September 10th. It has been idle since March last.

#### NEVADA.

##### Lincoln County.

(From Our Special Correspondent.)

**Horseshoe.**—The 100-ton cyaniding plant is going in commission. During the last days of August the machinery was put in motion and the crushers and rolls were given a try. Manager James Macfarlane plans to have the mill in full operation by September 10th. The ore to be treated has an average value of \$16 gold per ton, which will be about the battery. In the mine the 300-station is cut and sinking started below that horizon.

#### OHIO.

**Coal Production.**—The output of coal in 1899, according to the State mining inspector, was the greatest in the history of the State—15,908,934 tons. The number of persons employed was 28,028. There were 1,133 mines working and the average working time was 150½ days. There were 390 casualties, of which 59 were fatal.

#### PENNSYLVANIA.

##### Anthracite Coal.

A committee representing the anthracite mine owners and operators has agreed upon a reply to the demands of the representatives of the United Mine Workers. The reply is, in brief: "The United Mine Workers and their leaders are composed of soft coal men not familiar with the conditions of anthracite mining. The soft coal interests would reap the benefit of any trouble or strikes in the anthracite region and our judgment in refusing to confer with these foreign interests is shown by the methods they pursue and the misstatements they make.

"First: That wages have been reduced. The scale of wages paid anthracite miners has not been reduced in over 20 years, notwithstanding numerous periods of business depression, and repeated reductions in soft coal mining regions. Instead, advances have been made in many anthracite mines to meet changing conditions, and this year anthracite miners have been getting more days work and consequently larger earnings than in many years. In some collieries the miner is paid by the car, the price depending on the character of the vein and size of the car and consequently varying at different collieries. Other collieries pay by weight and the price is fixed on the basis of the amount required to make a ton of prepared coal. This takes as much as 3,200 lbs. in some cases. The full weight of prepared coal is seldom realized.

"Second: The statement that the market prices of coal are higher than in years is false. The average prices are not higher now than in recent years and are much lower than in 1892. Profits in mining have decreased, owing to increased cost of getting coal from deeper workings, and recently by higher costs of materials. We cannot increase the price of coal to the public in order to increase wages, owing to the competition of bituminous coal.

"Third: Regarding the price of powder, it is true that the price charged the miner is much above present costs, but the wages of the miner to-day are no less than was agreed when the price of powder was fixed. A miner paying \$2.75 per keg for powder gets net earnings as large as the miner in another district paying only \$1.50 per keg. Any reduction in the price of powder is equivalent to an advance in wages.

"Fourth: The statement that the necessities

of life have advanced 30% is also untrue. A careful comparison recently made in the mining region covering a period of 10 years shows prices are generally lower than they were and as low as they were 2 years ago.

"Fifth: As regards company stores, none of the large companies, such as the Delaware, Lackawanna & Western, Lehigh Valley, Reading, Lehigh & Wilkes-Barre, Coxe Brothers, Delaware & Hudson or Hillside Coal and Iron Company, have any connection with or collect for such stores. The men are paid in cash between the 1st and 20th of each month for the preceding month and no compulsory collections are made for stores or doctors from the miners. Some small companies having mines at isolated points maintain stores for the convenience of the men. The companies do not force men to employ doctors, but annually contribute to the support of hospitals and relief funds. Wages of miners average \$2 to \$4 per day, being as high as rates paid for the same class of labor by railroads and other industries.

"Sixth: Our investigations show that only about 10% of the laborers employed in the entire anthracite region are members of the United Mine Workers and the conservative element among our employees does not desire a strike. We should be pleased if conditions warranted a general advance in wages. Unfortunately they do not. We feel that the United Mine Workers is liable to precipitate an unfortunate and costly struggle between us and our employees who have in the past met and discussed and adjusted grievances without dictation from outside influence. Years of experience and practice have made the wages and basis in the different anthracite mines practically uniform in the net wages earned by the miners. We do not court a strike and would gladly avoid it and trust that our men will consider carefully before being led further along by promises that can never be realized. Our position is taken after due deliberation and we believe is for the best interests of the workman, his family, the business interests and ourselves."

**Neilson.**—Fire broke out in No. 10 vein of this shaft at Shamokin on September 4th, and it is feared the mine will have to be flooded. The origin of the fire is unknown; 1,200 men and boys are rendered idle. The shaft is owned by J. Langdon & Company of Elmira, N. Y.

#### SOUTH DAKOTA.

##### Lawrence County.

(From Our Special Correspondent.)

**Bear Gulch District.**—Victor Chapman has shipped 3 tons of stream tin to Bristol, England, for a trial run. The American Tin Mining Company, of Philadelphia, has informed its agents here that work will begin developing a vein of tin ore on Bear Gulch Creek. The organization of the company has been perfected.

**Colorado-Deadwood Mining and Milling Company.**—This Deadwood company, capital stock \$1,500,000, and incorporators, J. F. McLaughlin, A. Phimmer and O. E. Giddings, Deadwood, will develop ground in the Bald Mountain mining district.

**Iron Hill.**—This mine, in Carbonate Camp, is leased to W. A. Remer, of Deadwood, who has encountered a stringer of very rich silver ore. It is near an old stope from which \$250,000 was taken in earlier days.

**Jackson Group.**—George Jackson, of Deadwood, is sinking to quartzite on a group of claims in Bear Gulch Camp with a diamond drill. The Deadwood & Bear Gulch Mining Company is getting ready to sink the shaft to lower quartzite.

**May.**—It is stated that E. May, of Lead, will erect a 50-ton cyanide plant in Garden City District, at this group of claims. A shaft has been sunk 250 ft. and several hundred feet of drifts and cross-cuts have been run.

**Spanish R.**—The Connors Brothers, of Spearfish, will sink the shaft on this claim to lower quartzite. The old shaft has been retimbered to the bottom, 240 ft. A diamond drill hole has been put down to quartzite and it is stated that ore was encountered. The mine is in Carbonate District.

#### Pennington County.

(From Our Special Correspondent.)

**New Cyanide Plant.**—Howell Clevenger, a student of the State School of Mines, has nearly completed a 30-ton cyanide plant for the purpose of treating the tailings at the old chlorination works in Rapid City.

**Blue Lead.**—It is stated that John Harnan, of the Portland Mining Company, of Colorado Springs, Colo., has taken an interest with R. M. Maloney, of Deadwood, in this copper mine east of Hill City.

**Chilcoot.**—John Mattes and associates, of Keystone, have taken a lease on the Chilcoot Mine, northwest of Keystone. A vertical of free-milling ore is being followed, down which runs about \$40 per ton gold.

**Clare Belle.**—Frank Hebert, of Custer, has begun running on ore from his mine southeast of

Hill City. There is a shaft 125 ft. with considerable underground work. The ore is free milling. This mine joins the St. Elmo on the south.

Holy Terror.—The 10-stamp Holy Terror Mill has started up again on Holy Terror ore and the Keystone Mill and cyanide plant will soon be working. It is stated that the new superintendent of the company will keep sufficient ore blocked out in the Holy Terror Mine to furnish ore continuously. Test runs on the Keystone ore, treating the tailings with the cyanide process, are reported successful.

#### UTAH.

(From Our Special Correspondent.)

Bullion and Ore Shipments.—For the 2 weeks to September 1st the several smelters sent forward 27 cars, 1,196,547 lbs. lead-silver bullion; 6 cars, 505,948 lbs. copper bullion. In the same 2 weeks there were shipped from different camps for treatment at smelters outside of the State 274 cars, or 11,259,870 lbs., ore and concentrate products.

Copper Production.—It is estimated that in the first 8 months of the present year the copper production was about 30% greater than in same months of 1899. There is a strong likelihood of this increase being augmented during the last 4 months of the year.

Cyaniding Products.—For August the value of products from cyaniding mills marketed at Salt Lake was \$81,500. As first announced in the "Engineering and Mining Journal," the American Smelting and Refining Company has decided to close its cyaniding sampling quarters at this point and no consignments will be received after October 1st. Producers of cyaniding products will be put to but slight inconvenience, as there will be at least 2 concerns in this field to handle these consignments on equally favorable terms.

Ore and Bullion August Settlements.—In the local ore and bullion market the August settlements aggregated \$1,429,495. This does not include the products from cyaniding plants, or the Utah Consolidated copper smelter.

#### Juab County.

(From Our Special Correspondent.)

Tintic Shipments.—In the week ending September 1st there were sent forward from the 3 shipping points of the district 98 cars of ore, 8 cars of concentrates, contributed as follows: Centennial-Eureka, 33 cars; Mammoth, 23 cars ore, 3 cars concentrates; Gemini, 11 cars; Star Consolidated, 5 cars; Swansea, 6 cars; Uncle Sam and Humburg, 5 cars; Bullion-Beck, 3 cars; Godiva, 3 cars; May Day, 3 cars; Alaska, 1 car; Joe Bowers, 1 car; Showers Consolidated, 1 car. Eureka Hill shipped 5 cars of concentrates. August production was 491 cars ore, 30 cars concentrates and 1 bar of bullion; or in tons, 14,148 ore and 840 concentrates.

May Day.—A body of fine galena is cut on the 50-level south of the shaft. It is said that a face of 9 ft. of solid ore is shown.

Yankee Consolidated.—An ore uncovering is reported which promises to supply a large tonnage of good smelting products. The face of the drift, bottom and sides are all in ore for 20 ft. As a result of the annual meeting held Wednesday, Capt. Timothy Egan will serve as president-general manager, Mrs. T. D. Sullivan of Eureka, vice-president; W. H. Clark, treasurer; A. T. Moon, secretary, who, with J. W. Merrill of Eureka, make up the directorate.

#### Piute County.

Sevier.—W. F. Snyder has secured an option for a period of 13 months, which calls for a payment of \$75,000. Not less than \$10,000 will be expended in further exploration in the next few months. The anticipation is that this deal will be consummated on the same lines as the Annie Laurie.

#### Summit County.

(From Our Special Correspondent.)

Park City Shipments.—For the 2 weeks prior to September 1st the total smelter products marketed through the Mackintosh sampler were 5,599,760 lbs., made up as follows: Silver King, crude, 1,757,740 lbs., concentrates, 302,190 lbs.; Daly-West, crude, 1,205,350 lbs., concentrates, 902,560 lbs.; Anchor, concentrates, 617,210 lbs.; Ontario, crude, 610,580 lbs.; Loring Bros., concentrates, 91,800 lbs.; Quinn, concentrates, 60,980 lbs.; California, concentrates, 48,350 lbs.

Daly.—Mining is resumed. A promising ore shoot on 1,200-level is being further explored and there is a likelihood that an assessment will not be required. There is \$20,000 in the treasury available for exploration.

Daly-West.—An overture to purchase the Daly-West for \$2,250,000 was recently declined. It is authoritatively said that the bulk of the shares could not be had for \$30, or at the rate of \$4,500,000 for the property.

Silver King.—Another surprise is to be credited to this great mine in the opening of a strong copper ore body on 1,200-level. It carries 20 to 40% copper with high values in silver and a sweetening of gold.

#### Tooele County.

(From Our Special Correspondent.)

Consolidated Mercur.—Alluring reports of what the mines and mill achieved in August are published. Ore production is said to have reached 1,200 tons in 24 hours and the average put through the mill was 1,000 tons a day. Superintendent Edwards promised to maintain an \$8 battery, of which \$7 would be recovered and 31,000 tons would afford a gross gold production of \$217,000. No one conversant with conditions believes that the August gross yield topped \$170,000. Some sort of an official statement is expected from the management of the new company soon.

#### Washington County.

(From Our Special Correspondent.)

St. George Copper Company.—W. F. Snyder and associates, who have recently secured control, are carrying out the programme favored by President W. S. McCornick. The horse whim is to be replaced by a 24-H. P. gasoline hoist and the shaft, down 255 ft., is to be sunk to 750 ft. The bond on the Dixie group of mines is extended to October 1st, 1901. No attempt will be made to operate the smelting for 90 days.

#### WASHINGTON.

##### Ferry County—Republic.

(From Our Special Correspondent.)

Rebate.—The cross-cut tunnel is 300 ft. and looks near the vein. It passed under the apex at 150 ft., at a depth of about 200 ft.

Republic Exploration and Cyaniding Company.—This is an offshoot of the Republic Consolidated Gold Mining Company. The structure for the 200-ton custom mill is finished. About 20 car-loads of steel, bolts, etc., for the furnaces and roasters have yet to be received, and it will be 2 months after their arrival before the mill will be in running order. Clarence J. McCuaig of Montreal, Quebec, and Warner Miller of New York, while here stated that a railroad would soon be built into Republic from Grand Forks, B. C. The Republic Exploration and Cyaniding Company has secured franchises to supply the city with water and electric lights, and to build an ore and passenger locomotive tramway from the mill to the Tulip Mine. Work on both projects will begin immediately. Later the tramway will be continued 3 miles to the Tom Thumb Mine.

San Poll.—The winze on the vein, going down below the adit level, is down 20 ft. in good ore.

#### FOREIGN MINING NEWS.

##### AUSTRALASIA.

###### Victoria.

(From Our Special Correspondent.)

Bendigo Mining District.—A day or two in this field during July rather favorably impressed the writer. There is plenty of undeveloped ground for shallow and deep mining. The gold is fairly pure, nearly 950 fine; the ore may be said to be ideal free milling, easily crushed, coarse gold with a minimum of slime; labor is abundant and cheap, \$1.75 per day of 8 hours; freight on stores cheap, as the mines are at an elevation of from 700 to 1,000 ft. and directly in and immediately around a town of 40,000 inhabitants.

In this field the lower Silurian rocks have been folded into arches. The cavities formed during the folding have been subsequently filled with quartz, thereby forming what are usually known as "saddle" or "inverted saddle reefs," which lie one under the other at intervals of from 80 to 200 ft. apart and have an average strike of N16°W for several miles. The 3 lines of reefs are known as Garden-Sully, New Chum and Hustlers. The first is still worked for fully 8 miles and profitably for 6 miles. For 2 miles nearly every foot has been valuable to an average depth of 3,000 ft. Thirty-five mining companies (not to mention individuals) have paid \$13,000,000 in dividends. The New Chum Railway shaft has been sunk 3,320 ft. and is still sinking. Lansell's, 3,600 ft., and Garden Gully may be classed among the deepest gold mines of the world.

The 3 reefs are fairly parallel, and at the widest are probably 2 miles apart from east to west, while the extremities appear to be converging. The size of the field is about 7 by 20 miles, whereas the lower Silurian rocks cover fully 400 sq. miles. The country rocks are sandstones, slates and shales. The oxidized zone depth is from 400 to 500 ft., and the color is usually bluish gray or drab.

Faults, joints, etc., exercise considerable influence upon the value of the quartz. The miners are always glad when in barren and perfectly white quartz to encounter a slide, and when in payable quartz regard with disfavor such intrusion of a slide. As a rule, the mines which have been most persistently rich in depth were not at surface, though there are a few notable exceptions.

The New Moon Mine is down 1,500 ft., and is one of the most northerly dividend-payers on the reefs. During 1899, 24,769 tons were treated

for 9,913 oz., and dividends to the amount of £21,000 were paid. For the first half of 1900 14,450 tons were mined and milled for 4,760 oz., and the dividends paid amounted to £9,600, besides paying for new machinery. On the mine is a 71-head battery, as economically worked as one can imagine. The vacuum gauge showed 26 in. and in all the mines visited I saw no gauge which registered below 20 in.

Appended is a table showing the amount of gold won half-yearly, the calls and dividends paid since 1898:

	Gold. oz.	Calls.	Div'ds.
First half, 1898.....	101,105	£73,707	£105,945
Second half, 1898.....	117,839	77,503	122,715
First half, 1899.....	112,478	67,066	107,423
Second half, 1899.....	114,828	69,711	119,850
First half, 1900.....	94,756	57,797	65,815

##### CANADA.

###### British Columbia—East Kootenay District.

(From Our Special Correspondent.)

North Star.—According to the statement of Frank Robbins, manager, the mine is shipping 100 tons of argentiferous lead ore daily to the Nelson, Everett and Great Falls smelters. The management will declare the second dividend September 15th. Mr. Robbins is responsible for the statement that there are large ore reserves in the mine.

###### British Columbia—West Kootenay District.

(From Our Special Correspondent.)

Ore Shipments.—For the 8 months ending August 31st there were shipped to smelters from Rossland mines 115,000 tons of ore, valued at \$1,840,000 tons gross, as follows: Le Roi, 95,000 tons; War Eagle, 10,000 tons; Center Star, 7,000 tons; Iron Mask, 1,400 tons; Le Roi No. 2, 500 tons; Evening Star, 350 tons; I. X. L., 400 tons; Monte Christo, 270 tons; Iron Colt, 80 tons; Giant, 40 tons. For the corresponding 8 months of 1899 the shipments amounted to 100,000 tons, valued at \$1,700,000 gross. Of this output the Le Roi shipped 56,600 tons, the War Eagle 33,400 tons, Center Star 6,600 tons, Iron Mask 2,600 tons and the Evening Star 700 tons. For the corresponding period of 1898 the shipments amounted to 58,000 tons.

The shipments of ore for the past 8 months from other camps, exclusive of Rossland and within East and West Kootenay and Yale, amounted to 75,000 tons, of which the Boundary District produced 30,000 tons, the Silver camps of West Kootenay, including Nelson and Yomer, 30,000, and East Kootenay 15,000 tons, making a total of 190,000 for the entire mining fields of the two Kootenays and Yale.

Mineral Tax.—The text of the mines amendment act introduced by Minister of Finance Turner provides for a 2% tax on the assessed value of all ore or mineral-bearing substances which has been sold or removed from mining properties.

The provisions are not to apply where not more than 500 tons are produced in any one year, and placer or dredging mines are not to be taxed unless the value of production exceeds \$2,000 in any one year.

The act further requires mine owners and managers to furnish the assessor of each district with the following information: The amount of ore minerals or mineral-bearing substances shipped during the preceding quarter, also the quantity treated on the premises, the name of the smelter or mill to which ore has been sent for treatment; the cost of transportation, the cost of smelter or mill charges, the value exclusive of charges for freight and treatment, the value of ore treated on mining premises exclusive of smelter or milling charges.

Brandon & Golden Crown.—The shipments from the mine to date amount to 2,400 tons.

Greenwood Smelter.—The smelter which is to be erected about 3 miles from Greenwood is a standard hot and cold blast pyritic furnace ordered from the Denver Engineering Works, Colo. The smelter will have a capacity of 200 tons. The date when this will blow in is fixed for December 1st.

Iron Mask.—The management employs about 45 men in the workings.

Le Roi No. 2.—The management is shipping about 200 tons weekly to the Northport smelter. At the 300-ft. level a stope is begun. The shaft is being widened by a 3d compartment. Drifting is in progress on the 600-ft. level of the No. 1 and the Annie shaft has reached a depth of 150 ft and 6 on ore.

Old Ironsides and Knob Hill.—These have shipped about 3,000 tons, the greater portion of which has gone to the Grand Forks smelter.

War Eagle and Center Star.—According to the statement of T. G. Blackstock, vice-president of both companies, the management will shortly be shipping from 350 to 400 tons from these mines daily.

Winnipeg.—The management has shipped about 900 tons to date. The B. C. has shipped 8,000 tons.

British Columbia—Yale District.  
(From Our Special Correspondent.)

Evening Star.—Andrew Laidlaw, one of the proprietors of the new pyritic smelter at Greenwood, has bonded this property for \$45,000. The Evening Star is situated in Wellington Camp and was located in 1895. It is said recent developments show the vein to be 100 ft. wide. It has been uncovered for a distance of 400 ft. The ore is low-grade gold-copper.

Winnipeg.—At the 300-ft. level a winze has been sunk on the north vein, and the ore taken out is being sent to the Granby smelter at Grand Forks. It is stated, but the report lacks confirmation, that at the distance of 10 ft. the ore suddenly widened from 18 in. to 11 ft. The ore is low grade, running from \$12, \$14.40 to \$18.

Nova Scotia—Guysboro County.  
(From Our Special Correspondent.)

Hurricane Point.—This mine, at Wine Harbor, makes a return of 176 oz. from 97 tons milled.

Richardson.—This mine, at Isaacs Harbor, milled 2,132 tons of ore in August, which yielded 511 oz. The management is now preparing for deep sinking. A new 8-drill air compressor has recently been installed.

Wine Harbor.—S. J. Lowe's mill has returned 542 oz. from 1,042 tons ore in August. The ore belt is now at a depth of 200 ft., 16 ft. wide.

Nova Scotia—Halifax County.  
(From Our Special Correspondent.)

Blue Nose.—This mine at Goldenville has just put in commission 10 more stamps, making now 30 stamps in all. The company is also installing 2 Wilfey concentrators. The output for August was 332 oz. from 1,100 tons of ore.

Guffey Jennings.—This mine, in Caribou District, from development work returned for August 123 oz. from 254 tons.

Harrigan Cove District.—A new lead, recently discovered by Thomas O. Larey, bids fair to make a good mine. A recent milling of 457 tons of ore yielded 518½ oz. of gold. The cost of mining is comparatively small; several other owners of areas are now doing considerable prospecting work.

Royal Oak Mining Company.—This company will in a short time have the new 10-stamp mill in operation. The shaft is now 450 ft. deep and miners recently cut a very promising lead in crosscutting.

Nova Scotia—Hants County.  
(From Our Special Correspondent.)

Messrs. Evan, Thompson & Company, in the Renfren District, have recently opened a very rich vein of ore. The property adjoins the Jubilee, which has recently been making some marvelously rich returns.

Ontario—Michipicoten District.  
(From Our Special Correspondent.)

Helen.—Powell & Mitchell, mining contractors, have about 20 men at work, with 100 more busy about the location, erecting buildings, trams, machinery, etc. The daily output is about 1,000 tons of crushed ore. The force of men is increasing and will be much larger soon. The company expects to continue mining through the winter, stockpiling the ore for shipment. At the harbor numerous buildings are going up, equipment is arriving, and there is a scene of great activity.

Ontario—Seine River District.  
(From Our Special Correspondent.)

Mining location m h 251, bought by J. H. Caslor, has been looking well, and a crew of men is at work in development. Assays run very high.

The Glass Reef Mine, in the Big Lake region, will have a 10-stamp mill at work in a month or so, the machinery being on the way. The Big Mater Mine will also have a 10-stamp mill and one has been ordered for the Sullivan properties in the Deer Lake region. The new mill of the Gold Winner Company in the Island Falls region is starting up.

Decca.—This company has ordered a 20-stamp mill and is arranging for its erection at the Manhattan Mine. The consolidated company has money and is in shape to push work.

**COAL TRADE REVIEW.**

**New York.** Sept. 7.  
**Anthracite.**

(From Our Special Correspondent.)

The demand for anthracite coal, though not what it might be, is distinctly good for this time of the year. The possibility of a long strike and the certainty of higher prices prevailing in case anything like a general strike comes off, have affected cautious buyers and the movement of coal from the collieries is liberal. Still, many buyers apparently are still of opinion that no strike will be declared and are holding off. As production is but little ahead of current demand, it looks as if those buyers

who delay too long will get nipped. Stocks on hand are reported as generally small.

In the West conditions show improvement. In Chicago territory buyers still hold off, but prices are firmly held and there is little chance of picking up bargains this year. Nut coal is in most demand. At the head of the Lakes the receipts of coal are dropping off, while shipments are fairly large. Lake freights from Buffalo to Duluth are 30c. per ton for wild tonnage. Along the lower lakes trade is inclined to be dull. In the East the market is in pretty fair shape. While July 1st prices are not realized as a rule, they are in some cases and there has been little cutting of the older quotations. All shippers report enough business on hand to take care of the coal as it comes from the mines. All-rail trade is steady, especially at points to the North. The sizes in most demand at New York are broken and nut, though the small steam sizes are active and prices are firmer.

The July list price for free burning anthracite f. o. b. New York are: Egg, \$3.75; broken and nut, \$4.

To an outsider it looks as though the public statement of the anthracite operators left little room for discussing an advance in wages to the miners, and the prospects of a strike are serious. At the same time the leaders of the United Mine Workers are evidently not eager for a trial of strength, but have put themselves in a position where they cannot back down. Under such circumstances there can be but one outcome of a strike, and that outcome is not full of promise to the miner.

**Notes of the Week.**

The Schuylkill Coal Exchange states that its drawn-to-return price for stove coal sold in August was \$2.49 and the rate for mining in the last half of August and first half of September is basis wages.

**Bituminous.**

The Atlantic seaboard soft coal trade continues to show a brisk demand for coal, particularly for the better grades. Consumers this year seem to have a better knowledge of coal, or at least to scrutinize the character of different grades more closely. The high-grade coals are most wanted and the demand gradually works down to the poorer grades. This demand for better coals has affected to some extent the market for those that are poorer.

The demand for coal from points beyond Cape Cod and along Long Island Sound continues heavy. New York Harbor trade is fair, while all-rail trade is still dull. Foreign trade continues good. Some inquiries for Asiatic ports have been received and shipments to Japan have already taken place. The European market offers good openings. We understand that some consumers abroad are so alarmed at the outlook as to seriously discuss the prospect of \$25 coal.

Transportation from mines to tide is weak. Car supply is short. In the coastwise vessel market vessels were in such short supply at Philadelphia that the captains posted a freight rate of \$1.10 to Boston. This led to a rush of all available light-draught vessels to that port, with the result that the rate fell to 85c. to Boston and 70c. to Providence, New Bedford and the Sound. It is thought that rates will finally settle down to about 5c. per ton higher than these figures.

**Notes of the Week.**

The Pennsylvania Railroad makes the following statement of coal and coke traffic originating on its lines east of Pittsburgh and Erie, for the eight months ending September 1st, in short tons:

	1899.	1900.
Anthracite coal.....	2,253,181	2,803,827
Bituminous coal.....	10,805,776	12,921,221
Coke.....	4,923,779	5,332,041
Totals.....	18,264,716	21,077,089

The total traffic shows an increase of 2,812,373 tons, or 15.4%, this year.

**Birmingham, Ala.** Sept. 3.

(From Our Special Correspondent.)

There is little change in the coal market in Alabama. There is a sharper demand and the railroads are slow in supplying cars. The mines are working steadily and outputs are increasing. There are no labor troubles on and the production will continue steady. Northern Alabama manufacturers are also buying some coke in Virginia because of the scarcity of the product here. Preparations are being made to increase the production of coke, however.

The Sayreton mines, in Jefferson County, belonging to the Republic Iron and Steel Company, have shut down temporarily. This company will not enter the domestic market with its Sayreton coal, having great demand at its rolling mills, now shut down, and furnaces at Thomas, one of which is shut down. Mr. W. H. Hassinger, district manager for the company, states that the shut-down of the Sayreton Mines is temporary and that the men will probably not lose more than a fortnight.

Contracts for the winter supply of coal are bringing better prices than last year.

**Chicago.** Sept. 4.

(From Our Special Correspondent.)

Anthracite coal in and about this city remains dull, the lack of buying being observed. There is nothing in the present prospect for any early betterment. Weather conditions favor small sales and there is no thought of any activity in hard coal until colder temperature drives people to buying. That there must be some large buying ere long is not doubted, stocks all over this territory being at a very low ebb, so that replenishment must occur before winter sets in. Prices are uniformly held, but under present conditions it's a hard task. September circular will probably be the same as August—\$5.25 for grate and \$5.50 for egg, stove and chestnut.

Bituminous coal is in even smaller demand while the supply is larger, both Eastern and Western soft coal producers shipping coal here in large quantities. Consequently prices are on the down grade and big bargains are daily being made with consumers in order to lower supply. Even at the present low prices on soft coal many are holding off, hoping for further reductions, but the fact that winter will soon be here makes it look as though soft coal would not go much lower than at present.

**Cleveland, O.** Sept. 5.

(From Our Special Correspondent.)

This week has seen an improvement in the demand for coal boats for Lake Michigan. There has been little or nothing to attract boats to those ports and few have been going there unless for contract stuff or chartered for grain. This was cutting down the supply of boats which was available for the coal shippers and some of them commenced to grow anxious. Grain has started to move heavily from Chicago, however, so that the shippers to Lake Michigan will soon have all of the tonnage they care for. The slow movement of coal up the lakes is due largely to the congested condition of the upper lake docks. It is now said that by an agreement between the thick and thin vein mine operators the latter are being shut down and the former worked to the limit of their capacity, therefore flooding the market with the coal which is mined at the lowest figure. Most of this stuff is now being brought to the lakes. Conditions are now shaping themselves to give mine operators a wider scope. Commercial coal will soon begin to move and with it the production at the mines will have to be increased. The railroads are commencing to figure on this movement and are getting their rolling stock in shape. This has been none too plentiful of late and in fact, to some lake ports cars have been rather scarce. There is some talk now of increasing the price of coal, especially in the Massillon District, although no definite steps have been taken as yet. It is believed that the price is to be raised before the fall movement is started.

**Pittsburg.** Sept. 5.

(From Our Special Correspondent.)

Connellsville Coke.—Shipments and production remain almost stationary, the only changes being slight decreases. The market is at an extremely low level. However, an advance in both production and shipments is in prospect. The prospective improvement in the iron markets will be reflected in the coke market. Railroads report a better outlook for the former. It is expected the furnaces that have been blown out will not remain cold long.

The operations in the Connellsville region the last week are reported as follows: Of 20,420 ovens, 13,939 were in operation, the estimated production being 143,789 tons, as compared with 141,753 the previous week. Shipments were 7,405 cars as follows: To Pittsburg and river tipples, 2,810 cars; to points west of Pittsburg, 3,252; to points east of Connellsville, 1,343 cars. The shipments the week before were 184 cars greater than this total.

Furnace coke has sold as low as \$1.75 at the ovens, although the largest producers are holding their product up to \$2 per ton. Foundry coke is held at \$2.25@2.50.

**Shanghai, China.** Aug. 8.

(Special Report of Wheelock & Co.)

Coal.—The market in Japan is higher all around, but it has not yet responded here. A considerable quantity of Cardiff has been sold to the various men-of-war at prices from 21.50@22.50 taels per ton. Sydney Wollongong is very quiet. Arrivals of all kinds of coal during the fortnight ending August 8th were 10,301 tons. We quote per ton as follows: American anthracite (no stocks), 2.50 taels; Welsh Cardiff, 23 taels; Australian Wollongong, cargo, 13 taels, and other sorts, 6.50@7 taels; Chinese Kaiping, lump, 7.50@8.50 taels; dust, 5 taels, and mixed, 5.50@6 taels; Japan, all contracted for.

Kerosene Oil.—Very little has been done in this article, and no movement can be expected until the present troubles are nearer a settlement. We estimate stocks at 1,072,500 cases American, 696,590 cases Russian and 32,050 cases Sumatra; total, 1,801,140 cases. Quotations per case are as

follows: American Devoes, 1.93 taels; Russian, Batum, Anchor Chop, 1.82½ taels; Star & Crescent and Ram Chop, 1.80 taels; Horse Chop, 1.79 taels, and bulk oil, 2 tins, 1.73 taels, and loose, 1.35 taels; Sumatra Langkat, 2 tins, 1.73 taels, and loose, 1.35 taels.

**SLATE TRADE REVIEW.**

New York. Sept. 7.

The list of prices per square for No. 1 slate standard brand f. o. b. at quarries in carload lots, is given below:

Size, inches	Monson or Br. v. ville.	Banor.	Banor Ribbon.	Alb'n. or Jackson Banor.	Lehigh.	Peach Bottom.	Sea Gr'n.	Unfad'g Green.	Red.
24 x 14	6.50	3.50	3.00	3.25	3.10	5.10	3.15	.....	.....
24 x 12	6.60	3.50	3.00	3.25	3.10	5.25	3.15	3.75	.....
22 x 12	6.60	3.50	3.25	3.50	3.25	5.25	3.15	3.75	.....
22 x 11	6.50	3.75	3.25	3.50	3.25	5.25	3.15	4.00	.....
20 x 12	6.90	3.75	.....	3.50	3.25	5.25	3.15	3.75	.....
20 x 11	6.80	.....	.....	3.75	3.50	5.25	3.15	.....	.....
20 x 10	6.80	4.25	3.50	3.75	3.50	5.35	3.15	4.25	10.50
18 x 12	6.80	3.75	.....	3.50	3.25	5.25	3.15	3.50	.....
18 x 11	7.00	.....	.....	.....	.....	.....	3.15	3.75	.....
18 x 10	7.00	4.25	3.50	3.75	3.50	5.35	3.15	4.00	10.50
18 x 9	7.00	4.50	3.50	3.75	3.50	5.35	3.15	4.25	10.50
16 x 12	6.80	3.75	.....	3.50	3.25	5.25	2.95	3.50	.....
16 x 10	7.00	4.25	3.50	3.75	3.50	5.35	2.95	4.00	10.50
16 x 9	7.00	4.25	.....	3.75	3.50	5.35	2.95	4.25	10.50
16 x 8	7.00	4.50	3.50	3.75	3.50	5.35	2.95	4.25	10.50
14 x 10	6.60	3.75	3.25	3.25	3.25	5.25	2.85	3.75	10.50
14 x 9	6.50	.....	.....	.....	.....	.....	2.85	3.75	10.50
14 x 8	6.60	3.75	3.25	3.25	3.10	5.10	2.85	4.25	10.50
14 x 7	6.40	3.75	3.25	3.25	3.10	5.10	2.60	4.25	10.50
12 x 10	5.75	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 9	5.60	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 8	5.50	3.50	.....	3.00	2.80	4.85	2.60	3.50	9.00
12 x 7	5.00	3.25	.....	3.00	2.80	4.85	2.50	3.50	9.00
12 x 6	4.80	3.25	.....	3.00	2.80	4.75	2.50	3.50	8.50

A square of slate is 100 sq. ft. as laid on the roof.

There is no change of consequence to report. Buyers have the advantage in the market, and all sorts of prices, especially for roofing slate, are heard of.

The shipments of slate through Slatington and Walnutport, Pa., in the week ending August 23d, were 6,265 squares roofing, 700 cases school slates and 1,148 crates blackboards. Since January 1st the shipments were 122,952 squares roofing slate, 14,084 cases school slates and 10,417 crates blackboards.

**IRON MARKET REVIEW.**

New York, Sept. 7, 1900.

**Pig Iron Production and Furnaces in Blast.**

Fuel used	Week ending			From Jan., '99.	From Jan., '00.
	Sept. 8, 1899.	Sept. 7, 1900.	F'ces. Tons.		
An' racite & Coke.	233	262,300	197	225,425	8,772,517
Charcoal.	21	5,750	31	8,225	184,592
Totals..	257	272,050	228	233,650	8,957,079

The September returns of the furnaces show a further decrease in production. The falling off is 11,300 tons a week; but the active furnaces are still turning out iron at the rate of over 12,000,000 tons a year.

Little or no business is reported in Bessemer pig, but there has been quite a movement in foundry iron, and much more activity is looked for. Steel billets have been very quiet, with some inquiries, but little business reported.

In finished material there has been a good deal of selling of bars and pipes. Wrought-iron pipe has been advanced 5%. Standard steel is quiet, with only a moderate amount of new business. No rails are being sold now, but a new adjustment of prices is expected soon. Railroad people claim that \$25—or \$10 below the present nominal quotation—is the highest that ought to be asked, in view of the present conditions.

The Amalgamated Association and the American Tin-plate Company have finally agreed on the new wage scale, both parties making some concessions. Work in the tin-plate mills will be resumed. A conference between the Association and the bar iron people is now going on.

Ore shipments from Lake Superior up to September 1st amounted to 9,449,539 tons, an increase of 1,909,833 tons, or 25.3%, over the corresponding period last year.

Birmingham, Ala. Sept. 3.

(From Our Special Correspondent.)

Furnacemen in the Birmingham District contend that while there have been some good orders of export iron during the past week or two,

still production is far greater than sales and stocks keep accumulating. Though more than 100,000 tons of pig iron have been booked for export during the next 5 or 6 months, more than 120,000 tons of iron have been stocked already and there seems to be no improvement in quotations.

During the past week there were several thousand tons of pig iron shipped for export, 3,000 tons alone being for Bremen, Germany. The railroad officials are keeping their eyes open to handle all the traffic thus coming in and now and then some extra heavy movements are to be noticed.

The domestic market is very quiet. There is hardly any iron going north of the Ohio River, says one furnaceman, and he does not look for any business from that direction until after the election.

Mr. George Hughes, local manager for the American Pig Iron Storage Warrant Company yards, announces that during the month of August there was received in the company's yards in Alabama 7,000 tons of pig iron, while 1,100 tons went out, making a difference of 5,900 to the yards.

Mr. W. L. Law, who is connected with the Talladega Furnace of the Alabama Coal and Iron Company, says that his company is selling all the iron that it is making now, between 100 and 125 tons daily. Last week a shipment of 1,000 tons was made to Germany, and the idea of shutting down the plant until the market recovers some has been abandoned.

The following quotations are given for the product: No. 1 foundry, \$11.50@12; No. 2, \$11@11.50; No. 3, \$10.50@11; No. 4, \$10@10.50; gray forge, \$10; No. 1, soft, \$11.50@12; No. 2, \$11@11.50.

Buffalo. Sept. 5.

(Special Report of Rogers, Brown & Co.)

The foundry iron market in this vicinity has been rather quiet during the past week. Sales have not been quite so numerous, but prices have been equally as firm. Shipments from furnaces have been, if anything, a little heavier. In charcoal iron several good-sized sales have been made for several months' requirements; in some cases for a sufficient amount to last until navigation opens next spring. It has become quite evident that very little stock will be carried here this winter, as has been the usual custom, and consumers of that material therefore are purchasing what they will need to run them through the winter. We quote below, on the cash basis f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$18.25; No. 2, \$17.25; Southern, soft, No. 1, \$18.25; No. 2, \$18.50; Lake Superior charcoal, \$19; coke Malleable, \$17.

Cleveland, O. Sept. 5.

(From Our Special Correspondent.)

Iron Ore.—According to figures compiled at Duluth the shipment of ore down the lakes from that region, including Duluth, Two Harbors and Ashland, it exceeds by 2,000,000 tons what it was up to September a year ago. The report shows, what has been generally known, that during August this year the ore movement fell off heavily, owing to the fact that the shippers are already ahead of their orders. The slump amounted to 200,000 tons from the same month last year. Marine men say that this is an indication of the movement for the remainder of the fall. The shipments so far from the head of the lakes has been almost 10,000,000 tons and when it is considered that there are but 18,000,000 tons to move and that the movement from Marquette and Lake Michigan points is not considered in the above figures, it is easily seen how much latitude the shippers now have for taking wild tonnage.

Pig Iron.—The market is exceedingly quiet just now, almost nothing being done for spot delivery. There are a few sales, but they are restricted to car-load lots, and even these are small in number. The demand for iron for future delivery is heavier, but the furnacemen are cautious about making sales, fearing to duplicate what appears to be the errors of some of the mill men in filling up their plants with orders on low-priced stuff. As a consequence, sales are comparatively light, although more or less business is being done all along. On sales both for spot delivery and for the future the old prices of \$15.50 and \$15 apply on Nos. 1 and 2 foundry. The Bessemer market is as quiet as ever, all of the furnaces having gone out of blast.

Finished Material.—Prices have taken a decided brace in the last week. The mills having a limited capacity, not covered by contract, are able to demand higher prices for the stuff that is now making its appearance on the market. As a result plates are now bringing 1.15@1.20c., and bars are selling at the same price. This is a decided improvement in bars, as the market is strong at that quotation. The sales this week have shown contracts for 5,000 tons of ship plates, 2,000 tons of shapes and 1,000 tons of

bridge material. Ship plate is probably responsible for the stronger feeling in that market, as the lake vessel owners are building extensively, making the demand for plates stronger. The building boom also continues, not being hindered by any increase in the price of stuff. On shapes the association price holds. The week has also seen an increased demand for billets, which are bringing \$18.

Old Iron.—The scrap market is at a standstill. Speculators are bidding heavily for stuff, believing that the prices are bound to go up, but those who have it are holding on to it. Aside from this there is also an increased demand from the trade.

Philadelphia. Sept. 6.

(From Our Special Correspondent.)

Pig Iron.—Our local people report to-day a further improvement in inquiry, but no special improvement in demand. The fall selling movement has not set in. Prices have not changed, although some agents are quoting forge nominally 25c. higher. Consumers here are awaiting developments elsewhere. Furnace men are making no effort to sell for forward delivery, and both foundry men and mill men are not buying largely. No. 1 is \$17@17.50; No. 2, \$17; No. 2, plain, \$15.75; mill, \$14@15.

Billets.—To-day's inquiries among all consuming interests show that the policy of buying material just as is needed continues. Stocks are very low here and our advice is that the restriction in Bessemer pig and billet production will harden the market. This possibility has not influenced buyers a particle. Open hearth billets are \$21@22.

Merchant Bars.—The retail demand is better than last week and 2 mills that were running single time are now on double. Buyers take only what is needed. Best refined, 1.30@1.35c.; steel bars, 1.25@1.30c.

Pipes and Tubes.—Better prices have been realized on some business placed this week.

Merchant Steel.—The smaller buyers find no concessions within reach, but no doubt very large orders could be placed at considerably lower than current prices.

Sheets.—Common and refined sheets are selling very well. A good deal of retail trade is starting up.

Plates.—The pressure on shipyards is greater and large contracts for ship plates will be placed as soon as buyers think prices are low as they will likely go. Bridge-builders are not ordering more than they have to for the same reason. The orders for foreign delivery within the past 5 weeks are estimated at 30,000 tons.

Structural Material.—No large business has been reported recently, but trade conditions are quite satisfactory. The revival in building has made quick deliveries essential. Beams and channels are 1.60c.; angles 1.30@1.40c.

Rails.—The very best information to be had amounts to nothing. Standard sections are nominally \$35. Railroad companies are willing to pay \$25.

Old Rails.—Old iron rails are quoted at \$14.50@15; old steel at \$12@13.

Scrap.—Choice railroad scrap sold as high as \$15 this week and there is more sale and inquiry for it. Heavy steel scrap is also wanted and is worth \$11@13. There is none on the market, all picked up in advance. Iron axles are quoted at \$15 and steel at \$15.50. No. 1 yard scrap, \$12; wrought turnings, \$8.50. The scrap men are on the war-path for supplies, but are not willing to pay the prices that holders think they ought to have.

Pittsburg. Sept. 5.

(From Our Special Correspondent.)

During the past week the tin-plate scale was adjusted and signed by the American Tin-Plate Company, for the ensuing year. The signing of this scale has done much to instill confidence in the local market and it is believed that there will be little trouble in reaching an agreement on the bar iron scale which is under discussion at Detroit. The mills of the Tin-Plate Company all over the country will resume operation as soon as the tin house scale is signed, a conference for the adjustment of which will be held in Cleveland Tuesday next. That the Republic Iron and Steel Company is anxiously awaiting the settlement of the bar iron scale goes without saying and within the next two weeks it can be confidently predicted that the greater portion of the mill capacity of the country will again be in operation. Prices during the past week on finished material have been firm, but have not advanced. On the other hand, pig iron is weaker, with the exception of a few instances. The Southern furnaces insist on holding up the price on foundry iron and as a result are finding no market for their product in this district. A few of the furnaces in valleys on foundry iron are holding up a stiff price but there are still a few that are anxious to







CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 300.)

New York. Sept. 7.

Heavy Chemicals.—Glass factories are beginning to order soda ash more freely. Domestic high test caustic soda for 1901 delivery has sold at \$1.75@1.80 per 100 lbs., f. o. b. works, and immediate shipments are quoted as below. We are advised that the Columbia Chemical Company, of Barberton, O., expects to produce daily about 300 tons soda ash and 40 tons caustic soda. Sal soda shows an improved demand. Bleaching powder imports are restricted, owing to the scarcity of ocean freight room and high rates, hence the market is firmer.

The imports of bleaching powder into the United States in the 7 months of this year are compiled by us as follows, in long tons:

	From Great Britain.	From Ger., Belg., etc.
January.....	3,752	1,058
February.....	4,753	236
March.....	6,092	2,238
April.....	4,244	2,35
May.....	3,721	712
June.....	2,186	1,462
July.....	2,127	1,570
Total tons.....	27,075	9,717

The total imports were 36,792 tons, as against 30,832 tons last year, showing an increase of 5,960 tons in 1900. Chlorate of potash, domestic make, is weakish, owing to free offerings. The English article is sympathetically lower in price.

Quotations per 100 lbs. are as below. Domestic soda ash in bulk can be had at 2½c. less per 100 lbs.:

Articles.	Domestic.		Foreign.
	F.o.b. Works.	In New York	In New York.
Alkali, 58%.....	75@80	.....	90@95
48%.....	80@85	.....	\$1.00@1.05
Caustic Soda, high test.....	\$1.85@1.90	.....	2.40@2.55
powd., 60%.....	3.00@3.25	.....	.....
70@74%.....	3.25@3.50	.....	.....
98%.....	3.50@4.00	.....	3.75@4.00
Sol Soda.....	70@80	.....	67½
"conc.".....	1.15@1.75	.....	1.75
Bicarb. Soda.....	1.25@1.37½	.....	1.75@2.25
"extra.....	3.25@3.50	.....	.....
Bleach. Pdr., Eng. prime.....	.....	.....	1.80@1.87½
other brnds.....	.....	.....	1.50@1.65
Chl. Pot. Cryst.....	8.75@9.00	.....	9.75@10.00
powd.....	8.75@9.00	.....	10.00@10.5

Acids.—August contract deliveries of acetic and sulphuric acid were larger than the previous month, while those of muriatic acid were somewhat less. So far this month deliveries are fair. Blue vitriol meets with a better export demand, but owing to high freight rates the movement is limited.

Quotations as below are for large lots delivered in New York and vicinity, per 100 lbs., unless otherwise specified.

Acetic, No 8 in lbs.....	\$1.62½	Nitric, 36°.....	3.87½
Bl. c. Vitriol.....	5.00@5.25	Nitric, 38°.....	4.12½
Aqua Fortis, 36°.....	3.82½	Nitric, 40°.....	4.37
Aqua Fortis, 38°.....	3.87½	Nitric, 42°.....	4.75d.
Aqua Fortis, 40°.....	4.12½	Oxalic.....	5.75@5.87½
Aqua Fortis, 42°.....	4.50	Sulphuric, 66°.....	1.20
Muriatic, 18°.....	1.20	Sulphuric, 60°.....	1.0
Muriatic, 20°.....	1.35	bulk 50° ton.....	14.00
Muriatic 22°.....	1.50		

Paints.—On August 30th domestic corrodors advanced prices of white lead ¼c. per lb., owing to the higher cost of raw material. The new quotations, f. o. b. New York, for white lead, dry or in oil, red lead and litharge in kegs, lots of 500 lbs. or over, 6¼c. per lb.; dry white lead in barrels, 5¼c. Terms, 60 days or 2% discount for cash if paid in 15 days from date of invoice. Domestic orange mineral has not been advanced, and is offered sparingly at 8¼c. per lb.

Brimstone.—Firm. New York imports this week were 3 lots per steamer "Citta di Messina," and another lot of 400 tons. Best unmixed seconds, nearby deliveries, are quoted at \$24@25 per long ton, and shipments in October and November at \$21.75@22. Best thirds are \$2 per ton less.

The monthly average prices of best unmixed seconds, as quoted by importers, are as follows, per long ton of 2,240 lbs.:

	Spot.	Shipments.
January.....	\$21.78	\$ 0.05
February.....	21.57	21.19
March.....	21.84	21.31
April.....	21.38	21.25
May.....	21.43	21.10
June.....	20.90	20.65
July.....	21.16	20.67
August.....	23.80	21.92
Average.....	\$21.80	\$21.10

Best unmixed thirds during this period were worth from \$2 to \$2.50 per ton less.

Pyrites.—Imports at New York this week were 4,772 metric tons for the Pennsylvania Salt Manufacturing Company. Abroad non-cupreous pyrites are quoted 3¼d. per unit f. o. b. shipping

port. Freight rates to the United States are about 13s., which would make the delivery price here about \$6.75 per ton. New orders are moderate in size, but prices continue firm and unchanged. We quote: Mineral City, Va., lump ore (basis 42%), \$5 per long ton and fines \$4.40. Charlemont, Mass., lump, \$5.50, and fines, \$5. Spanish pyrites, 13@15c. per unit, according to percentage of sulphur contents, delivery ex-ship New York and other Atlantic ports. Spanish pyrites contain from 46%@51% of sulphur; American, 42%@44%.

Fertilizing Chemicals.—The month of August has been very quiet for the leading ammoniates, as the Eastern and Northern manufacturers were already well supplied. Producers, on the other hand, are not over-stocked. Fish scrap production is closely controlled and as the catch so far has been comparatively small, prices are well maintained. Far Western business is more promising, but in the middle West it is light, owing to the small wheat crop. Sulphate of ammonia, foreign gas liquor, is easier to arrive at \$2.75@2.80 per 100 lbs. Other quotations are: High grade Western blood, \$1.90 per unit, f. o. b. Chicago; tankage, \$1.80 and 10c. per unit, f. o. b. Chicago; Calcutta bone-meal, \$23@25 per ton; domestic steamed ground bone, \$21@22; dried fish scrap, \$23 per ton f. o. b. factory; acid phosphate, 14@16%, 65@67½c. per unit; bone-black, spent, \$15@16 per ton; azotine, \$1.90@2 per unit.

Potash salts are quoted in large lots as follows: Muriate of potash, \$1.83@1.86½ per 100 lbs.; sulphate of potash, 90@98%, \$2.05½@2.08½; double manure salt, 48@53%, \$1.06@1.08½; Kainit (25% sulphate of potash), \$9.05@9.55 per long ton; sylvinit (35@37% potash), 38½@41½c. per unit.

The Virginia-Carolina Chemical Company paid a dividend of 1% on its common stock September 1st.

Nitrate of Soda.—The market is in exactly the same position as last week; importers not being anxious to sell at present prices and consumers anticipating lower prices. Spot is worth \$1.75 per 100 lbs., and deliveries during this month \$1.72½, while futures are held at \$1.80. The steamer "Polarstjernen" arrived at New York with 28,368 bags.

The monthly average prices of spot nitrate of soda, per 100 lbs. in New York, as quoted by importers, are as below, comparison being made with last year:

January.....	1899 \$1.60	1900 \$1.80
February.....	1.64	1.96
March.....	1.62	2.18
April.....	1.61	2.04
May.....	1.60	1.78
June.....	1.63	1.68
July.....	1.63	1.72
August.....	1.60	1.75
Average.....	\$1.62	\$1.86

So far this year prices show an average increase of 24c. per 100 lbs.

The shipments in August to Europe from Chile are estimated at 81,800 long tons, and loadings on September 1st are cabled as 39,100 tons. As compared with August last year, the shipments in 1900 show an increase of 16,200 tons, and the loadings on September 1st a decrease of 83,600 tons.

Concerning the Chilean market, we are advised by Messrs. Jackson Brothers, of Valparaiso, under date of July 25th, that the demand which existed during last fortnight continued until July 21st, the inquiry being principally for October-December deliveries, prices of 95% advancing from 5s. 4d. to 5s. 5d., steamer terms; but as freights also followed suit, 38s. 9d. being reported paid in Europe for season loading, the rise was checked and business slackened off entirely during the last week. In the refined quality little business has been done. The total sales amount to about 1,000,000 qtls. Producers still decline entertaining offers for next year's deliveries, except at very high limits. We quote 95%, September-December, 5s. 4½d., ordinary terms, sellers, and 96%, September-December, 5s. 5½d., same conditions. The price of 5s. 3½d. with all-round freight of 38s. 9d., stands in 7s. 10d. per cwt., net cost and freight without purchasing commission against quotations of 7s. 8d.

Salt-peter.—Shipments of crude are worth \$3.50 per 100 lbs., while spot is held at \$3.62½. The imports into the United States for the 8 months ending August 31st are computed as 42,324 bags, against 47,331 bags last year. The visible supply on September 1st amounted to 12,300 bags, against 15,313 bags in 1899. Deliveries from January 1st to August 31st were 39,624 bags, against 42,331 bags in 1899.

Phosphates.—The contract season opened September 1st, and from now until the middle of December a large business is expected. Mining operations are also better during this period, as the weather is usually dry. In the Mt. Pleasant region, Tennessee, stocks of unsold rock are small. Sales are reported of 72% rock at \$2.25 per ton; 75%, \$2.75@3; 78% domestic, \$3; 78% foreign, \$3.50, all f. o. b. Mt. Pleasant.

The Tennessee phosphate shipments during

July and the 7 months ending July 31st are compiled by us as below, in long tons:

	Domestic.	Foreign.	Total.
July.....	29,701	4,538	34,239
Seven months.....	171,977	82,525	254,502

In the corresponding period last year the total shipments were 239,574 tons, or 17,929 tons less than 1900. The exports last year were approximately 82,389 tons, which shows but a slight increase in 1900. The domestic shipments this year were larger than 1899 by 17,782 tons.

In the hard rock region of Florida mining has been curtailed, and shipments during the past month were comparatively light. More activity, however, exists in the pebble district.

The shipments of pebble and rock phosphates from Florida in July and the 7 months ending July 31st are collected by us as below:

	Domestic.	Foreign.	Total.
July.....	17,516	46,034	63,550
Seven months.....	71,110	291,505	362,615

In the same 7 months of last year the total shipments were 432,415 tons, showing a falling off in the 1900 movement of 66,800 tons, or 15%, owing to the decreased foreign trade. The domestic shipments this year, however, show an increase of 10,640 tons, or 14%.

South Carolina phosphates are in moderate request, both for home and foreign consumption. We quote, per ton, as below:

Phosphates.	Per Ton F. o. b.	C. i. f. Un'd Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (77@80%)	\$7.50@8.00	7¾@8¼d	\$12.90@12.87
*Fla. land pebble (68@73%)	4.35	7@7¼d	9.80@10.15
*Fla. Peace River (58@63%)	3.00@3.50	7@7¼d	8.40@8.70
†Tena. rock 78% export.	4.00@4.50	7¼@7¾d	11.31@11.70
†Tenn. 78% domestic.	3.30@3.30	.....	.....
†Tenn. 75%	3.00@3.25	.....	.....
†Tenn. 72%	2.65@2.75	.....	.....
So. Car. rock, crude.....	4.00	.....	.....
So. Car. rock, crid.....	4.30	6¼d	7.80
Algerian, rock..... (63@76%)	.....	7@7¼d	9.30@10.15
Algerian, rock..... (53@63)	.....	6¾@7¼d	8.10@8.70

\* Ferdinandina. † Mt. Pleasant. ‡ At mines. § On vessels, Ashley River.

Liverpool. Aug. 29.

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

The chemical market is rather featureless and there is not much doing so far as new business is concerned. Manufacturers are at present declining to quote for deliveries beyond the end of this year, but in the course of next month will probably be prepared to deal with business over 1901. Soda ash is in moderate supply, while quotations are unchanged. We quote spot range for tierces about as follows: Leblanc ash, 48%, £5@£5 5s. per ton; 58%, £5 10s.@£5 15s. per ton net cash; ammonia ash, 48%, £4 5s.@£4 10s. per ton; 58%, £4 10s.@£4 15s. per ton net cash; bags, 5s. per ton under prices for tierces. Soda crystals find a ready outlet at £3 2s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special quotations for a few favored markets. Caustic soda is steadily maintained, but demand is only moderate. We quote spot values as follows: 60%, £9 5s.; 70%, £10 5s.; 74%, £10 15s.@£10 17s. 6d.; 76%, £11 5s.@£11 10s. per ton net cash. Bleaching powder is neglected and hardwood is nominally quoted at about £6@£6 10s. per ton net cash, as to market. Chlorate of potash is fairly active and a fair number of sales are reported at prices ranging from 3¼d.@4d. per lb. net cash. Bicarb. soda is quiet at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages; also special quotations for certain export markets. Sulphate of ammonia is in light request at £11 2s. 6d.@£11 5s. per ton, less 2½% for good gray 24@25% in double bags f. o. b. here. Nitrate of soda is quietly steady at £8 7s. 6d.@£9 12s. 6d. per ton, less 2½% for double bags f. o. b. here, as to quality.

MINING STOCKS.

Complete quotations will be found on pages 287 and 288 of mining stocks listed and dealt in at:

Boston.	Philadelphia.	Montreal.
Colo. Springs.	Salt Lake.	London.
Denver.	San Francisco.	Mexico.
New York.	Spokane.	Paris.
	Toronto.	

New York. Sept. 7.

After the holiday the market showed a little more life and the copper shares moved up in price. Amalgamated on sales gained to \$88½ and Anaconda to \$45½. Union of North Carolina was most prominent on curb, owing, apparently, to inside manipulation; sales were made at \$3¾@3½. British Columbia brought \$11½ on limited transactions.

In the Colorado group Isabella, of Cripple Creek, sagged from \$1.15 to \$1.11 on sales. Alamo brought 13¼c.; Anaconda, 50c.; Iron Silver, 57@58c.; Little Chief, 16@17c.; Mt. Rosa, 64c., and Leadville Consolidated, 6c.

Quicksilver common, of California, appeared with a sale at \$1.50, the first in many weeks. Brunswick rose to 24c. on sales.

Horn Silver, of Utah, sold at \$1.25.

Of the Comstock stocks there were sales of Consolidated California & Virginia at \$1.10@1.19; Sierra Nevada at 30 c.; Mexican, 26@27c.; Potosi, 23c.; Hale & Norcross, 20@27c., and Savage at 7c.

**Boston.** Sept. 5.  
(From Our Special Correspondent.)

Speculation has run mainly to the industrials this week, and mining stocks were rather neglected. Yesterday and to-day, however, the market for the coppers hardened a little, but the improvement was mainly fractional. The trading continues to be mainly inside and the general public is taking very little interest thus far. An improvement in this respect is generally looked for after Labor Day, the holiday which marks the change from the vacation season to the beginning of the fall trade; but so far it is hardly manifest. Next week will probably show whether the public has gotten over the shock which the Globe Bank and its associated mining schemes gave confidence.

Calumet & Hecla sold at \$735, ex-dividend. The September dividend is \$20 a share, or twice the amount of the last one, which was cut down to \$10 in view of the fire at the mine. The dividend was generally expected, and had little effect on the stock. Tamarack sold at \$221; Quincy at \$142@142½; Osceola at \$69½. There were sales of Wolverine at \$42½; this company has just declared a dividend of \$2 a share, making \$4 for the year.

In the speculative coppers business was narrow. Isle Royal brought \$31; Centennial, \$16½@17; Franklin, \$15; Tri-Mountain, \$9; Wyandot, \$1½. The blind pool group was neglected, but prices showed little change, Boston & Montana being marked at \$321; Parrot, \$42½; Arcadian, \$20½.

Little trading was done in the gold stocks; Centennial-Eureka brought \$23½@24 by small sales.

In the general list Dominion Coal was stronger, the common stock selling at \$42½; while New England Gas and Coke sold at \$13½. Inside trading has brought this stock down to a point from which it is sure to recover. People are beginning to recognize the business value of these two companies in spite of the vicious energy with which a certain clique has attacked them.

**Salt Lake City.** Sept. 1.  
(From Our Special Correspondent.)

Compared to the inertness of trading in Utah mining shares for the past few months this week has experienced almost a boom. The market tone is more healthy and the outlook for better conditions seems hopeful. The Tintics are in better favor, due primarily to an ore uncovering in Yankee Consolidated, while the placing of Sunbeam out of debt has had an invigorating influence.

Bullion-Beck rules strong. Centennial-Eureka is higher. Dalton is receiving inside support. Daly advanced handsomely on the resumption of active mining coupled with the announcement that there is \$20,000 in the treasury. Daly-West is firm and higher. It is said there are very few shares to be had under \$19. Dexter has taken another spasmodic spurt upward. Mammoth paid its \$20,000 dividend to-day. May Day was put on the toboggan again.

Mercur paid a 20c. dividend, or \$40,000, to-day, with the promise of another in a month of 3c. or more when the company's affairs are finally wound up. Silver King is higher in the bid. The customary \$75,000 dividend will be paid September 10th. Sunbeam's treasury shares were disposed of favorably this week and the shares went up with a bound. Swansea as usual was the first to declare its September dividend, payable on the 10th. South Swansea shows improvement. Yankee Consolidated occasioned the sensation of the week, selling from 7½ to 25, then falling off to 17½ on profit taking.

**San Francisco.** Sept. 1.  
(From Our Special Correspondent.)

The market has again been very dull, and prices have been depressed. The trading has been of the usual class, small inside deals, and the bears have had the best of what there was. There was no news to affect prices in either direction.

Some quotations noted are: Consolidated California & Virginia, \$1.20; Caledonia, 40c.; Sierra Nevada, 34@36c.; Silver Hill, 33@35c.; Mexican, 25c.; Potosi, 21c.; Hale & Norcross, 17c.

The Oil Exchange shows a good business, with prices somewhat firmer. The demand for stocks of producing companies was good, with sales also of prospects. Some prices noted are: Oil City, \$20.25; Kern River, \$20; Home Oil, \$4.25@4.40; Twenty-eight, \$1.60; Sterling Oil & Development, \$1.20; Yukon, 62c.; California Standard, 30c.; Independence, 20c.

The trading and prices on this exchange show what could be done in mining stocks, if we had something besides the worn-out Comstocks to deal in on the exchange.

**London.** Aug. 28.  
(From Our Special Correspondent.)

The London mining market is now fairly in the middle of the summer holidays and it is not probable that any business will be done for a

month or two. The Stock Exchange is very quiet and no speculation of any kind is observable. London always takes a holiday during August and September, though, of course, if there is any reason for a boom people will come back to town in order not to miss the opportunities. But at the present time there is nothing to found a boom upon, so that the city is very empty. There is no prospect of the South African War being over for some time, and even then the country will be under strict military rule for years, so that any great increase of activity in that quarter is not to be expected just yet. The West Australian section is very depressed, owing to the difficulties that many of the leading companies are in, and no other section of the market receives any attention worth mentioning. As regards the West Australian section, there are not wanting prophets who expect a considerable revival shortly. These people point out that in the course of a few months many new plants will come into operation and that the output of the Kalgoorlie District will be considerably increased.

In the absence of business in the mining market some attention has been attracted by purchases that are being made in the shares of the Salt Union. As your readers are aware, the ordinary shares in the Salt Union have not received any dividend for some years and their quotation has been extremely low; in fact, they have fallen from a par of £10 to £1. During the last few weeks there has been some buying of these shares and the unexpected demand has naturally brought them into prominence. When events like this happen, it becomes the duty of every journalist to invent some reason for the movement, and in the present case all kinds of extravagant rumors have been circulated. One is that the Rockefellers are buying up shares to obtain control; another is that a wonderful discovery has been made with regard to the preparation of table salt; and so on. The fact is, however, that the furnaces and management of the company are being gradually overhauled so that there is a prospect of dividends being paid in the future. These rearrangements have been going on for a year or two. Firstly, the directorate was remodelled and their head office removed from London to Liverpool. Efforts have also been made to rearrange the capital and the debentures and at the present time the consent of the leading shareholders and debenture holders has actually been obtained to a scheme for partial reconstruction of the company. The capital was always too high and the administrative expenses also, but if both are put on a more reasonable basis, there should be dividends for the ordinary shares. If the ordinary shares are written down one-half to £5 and the other shares in proportion, the company could be put on a sound basis. It is obvious, therefore, that people who buy the shares in the market at £1 or even £2 will make a very good bargain and it is no wonder that the stock is being quietly picked up in hopes that the scheme may go through. The details of the plan are not at all settled, but the mere fact that the chief holders are willing to discuss some equitable proposition of this sort is quite enough for the speculator to work on.

**Paris.** Aug. 26.  
(From Our Special Correspondent.)

It cannot be said that the market for mining stocks is active. Three things are against it just now—the season and the weather; the losses on Exposition investments, and the uncertainty in political matters. Our people do not concern themselves so much about the Chinese question directly; it is the possible European complications which may result from it which make financiers uneasy. At any rate, there is a general disposition to take matters quietly and to incur few risks, which is not at all favorable to the Bourse. As to small speculators, they hardly exist for the time.

The metallurgical stocks, while hardly in demand, show no losses in price. The Russian group of stocks is generally weaker in view of the trade conditions in the Empire. On the other hand, the Russian coal stocks are very strong, and apparently with reason, since the coal trade is in a very favorable state.

The lead companies are profiting by the high prices of the metal, which are well sustained and will apparently continue so for some time. The zinc companies are also favored by good prices for the metal, though they are not so high as those of lead. The imports of zinc from the United States seem to have been absorbed without disturbing our market.

Copper continues to command a high price and the consumption is still large. It is understood that some large orders for war material have been placed lately, both here and in London, which will require a large quantity of copper. Stocks of the copper companies remain in favor, and form just now the most active section of the market.

The Transvaal gold stocks continue very quiet. One awaits now the conclusion of the war with enforced patience, knowing that affairs in South Africa are in a state where a definite conclusion cannot be reached quickly. Some of our per-

sistent Boer advocates still recommend Great Britain to make peace and permit Paul Kruger to re-establish himself in Pretoria; but it is hardly probable that their advice will be taken. The foreign coal trade of France for the half year ending June 30th is reported as below, in metric tons:

Imports:	1899.	1900.	Changes.
Coal.....	5,009,910	6,276,620	I. 1,266,710
Coke.....	688,130	760,210	I. 72,080
Exports:	1899.	1900.	Changes.
Coal.....	614,710	599,730	D. 14,980
Coke.....	28,810	36,590	I. 7,780

We thus imported this year 5,676,890 tons of coal and 723,620 tons of coke more than we exported. By far the larger part of these supplies was drawn from Great Britain.

Nearly two-thirds of the year 1900 have now passed and it must be admitted that the nineteenth century is showing a most troubled close. It is to be hoped that the year may find a settlement for some of these troubles and leave the way open for a better beginning of the next century.

We hope this, but we doubt it. Azote.

**ANNUAL MEETINGS.**

Name of Co.	Locat'n.	Date.	Place of Meeting.
Am. Sm. & Ref.	.....	Sept. 12	Jersey City, N. J.
California Borax	Cal.....	Sept. 12	San Francisco, Cal.
*Golden Star.....	Utah.....	Sept. 27	Salt Lake City, Utah.
Horn Silver.....	Utah.....	Oct. 2	Salt Lake City, Utah.
*Joe Bowers Ext.....	Utah.....	Sept. 13	Salt Lake City, Utah.
*Magnolia.....	Colo.....	Sept. 29	Colo. Springs, Colo.
Mechanics.....	Utah.....	Sept. 1	Salt Lake City, Utah.
Moon Anchor.....	Colo.....	Sept. 24	Colo. Springs, Colo.
*New Zealand.....	Colo.....	Sept. 29	Colo. Springs, Colo.
Republic I. & S.....	.....	Sept. 12	Jersey City, N. J.
*Sheep Rock.....	Utah.....	Sept. 21	Salt Lake City, Utah.

\*Special meeting.

**DIVIDENDS.**

NAME OF COMPANY.	Latest Dividend.			Total to date.
	Date	Per share.	Total.	
†Acacia, Colo.....	Sept. 15	\$.01	\$5,000	\$3,000
†Am. Steel & Wire, com.	Oct. 2	1.75	875,000	2,625,000
†Am. Steel & Wire, pf.	Oct. 2	1.75	700,000	5,600,000
Arizona Copper, ord.	Sept. 30	.84	132,943	.....
*Bunk'r Hill & Sulli'n	Sept. 4	.07	21,000	990,000
Calumet & Hecla.....	Sept. 23	20.00	2,000,000	71,850,000
†Cambria Steel.....	Oct. 1	1.00	.....	.....
*Empire State, Ida.....	Sept. 15	.30	29,554	584,025
Mercur, Utah.....	Sept. 1	.20	40,000	1,410,000
†National Lead, pf.....	Sept. 15	1.75	260,820	10,318,460
†National Steel, pf.....	Sept. 29	1.75	.....	.....
*N. Y. & Hond. Kosa'o	Sept. 15	.10	15,000	1,320,000
Republic I. & S., pf.....	Oct. 1	1.75	371,997	1,905,986
*Silver King, Utah.....	Sept. 10	.50	75,000	3,125,000
†Standard Oil.....	Sept. 15	8.00	7,800,000	.....
*Swansea, Utah.....	Sept. 10	.05	5,000	256,500
Temonj, Colo.....	Sept. 5	.25	250,000	250,000
Wolverine, Mich.....	Oct. 1	2.00	120,000	510,000

\* Monthly. † Quarterly. § Semi-Annual.

**ASSESSMENTS.**

NAME OF COMPANY.	Loca-tion.	No.	Delinq.	Sale.	Amt.
Alliance Expl. & Mg.	Cal..	3	Sept. 11	Oct. 2	.05
Belcher.....	NeV..	65	Sept 14	Oct. 5	.10
Ben Butler.....	Utah	5	Sept 10	Oct. 2	.0094
Best & Belcher.....	Cal..	71	Sept. 7	Sept. 28	.15
Blue Gravel.....	Cal..	14	Aug. 20	Sept. 13	.07
Branswick Con.....	Cal..	14	Aug. 20	Sept. 13	.07
Challenge Con.....	NeV..	29	Aug. 21	Sept. 12	.15
Chollar.....	Utah	52	Sept. 6	Sept. 27	.10
Clarissa.....	Utah	2	Oct. 1	Nov. 10	0.1½
Confidence.....	NeV..	35	Sept. 17	Oct. 8	.20
El Rey.....	Utah	1	Aug. 30	Sept. 17	.05
Eureka Con. Drift.....	Cal..	.....	Sept. 8	.....	.01
Eureka-Swansea Ext.	Utah	2	Oct. 1	Nov. 1	0.0½
Eutonia.....	Utah	3	Sept. 29	Oct. 13	.00½
Exchange.....	Utah	1	Sept 1	Sept. 17	.01
Goleta.....	Cal.	2	Sept. 25	Oct. 25	.15
Gould & Curry.....	NeV..	91	Sept. 8	Oct. 1	.15
Hale & Norcross.....	NeV..	5	Sept. 4	Sept. 25	.10
Independence.....	Utah	3	Sept. 1	Sept. 17	.01
Joe Bowers.....	Utah	2	Sept. 18	Oct. 5	.01
Julia Con.....	NeV..	30	Sept. 7	Sept. 28	.03
Justice.....	NeV..	69	Sept. 22	Oct. 15	.05
Little Chief.....	Utah	4	Aug. 25	Sept. 15	.01
Mammoth Garfield.....	Cal..	.....	Aug. 4	Oct. 2	1.7½
Occidental Con.....	NeV..	35	Aug. 17	Sept. 11	.05
Overman.....	NeV..	5	Sept. 6	Sept. 27	.06
Potosi.....	NeV..	56	Aug. 23	Sept. 12	.10
Sailor Con.....	Cal..	5	Aug. 27	Sept. 15	.01
Savage.....	NeV..	101	Sept. 18	Oct. 8	.10
Shower Con.....	Utah	2	Oct. 1	Nov. 1	.02
Tetro.....	Utah	14	Aug. 25	Sept. 15	.01
Young America.....	Utah	.....	Sept. 8	.....	.98

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing company names, locations, par values, and prices for various dates from August 31 to September 6.

BOSTON, MASS.†

Table of stock quotations for Boston, Mass., listing company names, par values, and prices for various dates from August 30 to September 5.

† Official quotations Boston Stock Exchange. Total sales, \$,694. \* Holiday. † Ex Dividend.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stock quotations, listing company names, par values, and prices.

Total sales, \$9,279.

PHILADELPHIA, PA.‡

Table of stock quotations for Philadelphia, Pa., listing company names, par values, and prices for various dates from August 30 to September 5.

Total shares sold, 4,315. § Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia. \* Holiday.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, Cal., listing company names, par values, and prices for various dates from August 30 to September 5.

\* Holiday.

CALIFORNIA OIL STOCKS.\*

Table of California oil stock quotations, listing company names, par values, and prices for various dates from August 14 to August 20.

\* California and Producers Oil Exchanges. Total sales, 1,175 shares.

SALT LAKE CITY, UTAH.

Sept. 1

Table of stock quotations for Salt Lake City, Utah, listing company names, shares, par values, and prices.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing company names, par values, and prices for various dates from August 25 to August 31.

Total shares sold, 159,305.

SPOKANE, WASH.

Table of stock quotations for Spokane, Wash., listing company names, par values, and prices for various dates from August 30 to August 31.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., and others with columns for Par. val., Aug. 25, 27, 28, 29, 30, 31, and Sales.

Colorado Springs Mining Stock Exchange. Total sales, 1,600,000 shares.

MONTREAL, CANADA.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, Canadian, and others with columns for Par. val., Week, Aug. 31, and Sales.

Montreal Stock Exchange. Total sales, 50,625 shares.

MEXICO.

Aug. 25.

Table of stock quotations for Mexico, listing companies like Durango, Barradon y Cab., and others with columns for No. of shares, Last div'd., and Prices.

DENVER, COLO.

Table of stock quotations for Denver, Colo., listing companies like Acacia, Alamo, Am. Con., and others with columns for Par. val., Aug. 25, 27, 28, 29, 30, 31, and Sales.

Official Quotations Denver Stock Exchange. Total sales, 53,300 shares.

PARIS.

Aug. 16.

Table of stock quotations for Paris, listing companies like Acierles de Creusot, Firminy, and others with columns for Country, Product, Capital, Par. value, Latest divs., and Prices.

LONDON.

Aug. 21.

Table of stock quotations for London, listing companies like Alaska Goldfields, Alaska-Mexican, and others with columns for Country, Authorized capital, Par. value, Last dividend, and Quotations.

Ex-dividend.

DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total, Latest), Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total, Latest). The table lists numerous mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. Z., Zinc. Q., Quicksilver. I., Iron. This table is corrected up to August 16th. Correspondents are requested to forward changes or additions.

