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Elsewhere we refer to the rarer metals and the frequent disposition to exaggerate their value. An instance of this is found in the reports which came from Colorado a few weeks ago about discoveries of cadmium ore in Aspen, which promised to be "immensely valuable." The existence of cadmium ores in some quantity seems quite probable; but their value is another matter. The demand for cadmium is a limited one, and in fact the Silesian production could have been expanded to considerable proportions long ago if there had been any sale for the metal. Some possible use for it in electric batteries is suggested elsewhere, but this is not yet an accomplished fact, and it would be very easy to overstock the market.

The decision of the Secretary of the Interior in some California land cases, which is given in another column, will give general satisfaction in California, and seems to be founded in justice. In this case parties who had acquired what is known as forest Neu land scrip—that is, scrip given for land included in Government forest reservations—attempted to locate it on lands which were being prospected for oil, claiming that they came under the head of agricultural lands, and could not be considered mineral lands because oil had not yet been actually found. In short, this scrip was used as a means to extort money from explorers who believed that they had a fair prospect of finding oil in some of the newly opened California basins. The decision will probably put an end to these operations, and leave the field open to the oil men.

The recent discoveries in Texas have not only given rise to wild speculation in lands which may or may not be valuable for the petroleum underneath; they have also given a chance to dishonest promoters which they are seizing eagerly. The newspapers are full of advertisements of new oil companies with wonderful prospects, but nevertheless willing to part with stock at low prices. In many cases these companies will be found, on investigation, to be simply traps to catch small investors. They own no property at all, or at best have "options" on some Texas property which is wholly unproved. Investors should be warned that these concerns are to be avoided. Companies which really own something have no difficulty in securing the capital they need, and are not selling stock below its par value. We hardly expect that the warning will be taken, since the temptation to make purchases is great, and those who are likely to buy have neither the disposition nor the means to make investigation for themselves. The warning is given, however, in the hope that at least a few may heed it.

The statement of copper production of the world, given in another column, and based upon the figures collected by Messrs. Henry R. Newton & Company, shows that the total output in 1900 was 486,184 long tons of fine copper. Of this 268,887 tons, or 55.3 per cent., was made in the United States.

The notable point about this statement is the relatively small increase in production shown in 1900. For several years up to and including 1899, the increase in the world's copper production has varied little in proportion, ranging between 8 and 10 per cent. yearly. In 1900, however, the gain over the previous year was only 3.5 per cent. The immediate effect of the strong demand and great rise in prices, which began to be manifest some two years ago, has been apparently to diminish the rate of increase in production. Undoubtedly mining copper and exploration for new deposits was stimulated, and possibly some old mines were rushed for a time. The result of the opening of new mines was not seen to any great extent in last year's production, however, while it is evident that some old and well known mines have decreased their output, either voluntarily or of necessity.

The year's result is not encouraging to those who have been hoping and perhaps waiting for cheaper copper. While this is still distant, there is some prospect of increased supplies in 1901. Some of the new mines started a year or more ago will undoubtedly become producers of some importance during the year; and, if there is no artificial restriction, the gain over 1900 ought to be nearly if not quite the average advance shown for several years previous.

We give on another page Mr. H. A. Lee's interesting notes on "Uranium in Colorado." We call attention to the article because it will serve in large part as an answer to many questions put to us. The high price of some of the rarer metals seems to have a striking effect on the imagination of miners and prospectors, and we are constantly receiving inquiries as to the advisability of prospecting for the ores of these metals and mining them if found. Uranium is a special object of attention, chiefly because inquiries for its ores were made in Colorado a year or two ago, and some sales were made to agents of a French firm. The facts in the case are given in Mr. Lee's article.

The fact is that the prices of the rare metals, as a rule, are merely nominal. The cost of separating them from other elements is high,

because tedious and delicate chemical processes are usually involved. When obtained in metallic form, however, most of them are simply curiosities for the chemical cabinet; a few grams will satisfy this demand, and there is absolutely no other. Even where there is a commercial demand—as for uranium, tungsten and a few others—it is very small. Any attempt to mine the ores or to work them on a large scale would be money and labor wasted, since a very moderate production would send down the price to a point below the cost. Usually the recovery as a by-product in treating ores for other metals will more than satisfy the limited demand. We trust that these facts will be kept in mind when such questions as we refer to are brought up.

A NEW USE FOR CADMIUM.

The new Edison electric storage battery, if it will do what is claimed for it, will develop a market for cadmium such as that metal has never had and will correspondingly help the producers of spelter in Upper Silesia who also make cadmium as a by-product. The capacity for the production of cadmium in Upper Silesia is very large, but there has never yet been an important demand for it, and consequently its recovery has been undertaken by only a few concerns and in a limited quantity, most of the cadmiferous furnace product from which it might be obtained being permitted to go to waste in so far as cadmium is concerned.

The Edison storage battery comprises cadmium-copper couples in an electrolyte consisting of a 10 per cent. solution of caustic soda. It is claimed to be not only less expensive, lighter and more compact than the lead storage batteries now in use, but also capable of withstanding rougher usage and to require less attention. Moreover, it is said that it can be discharged to zero voltage, which cannot be done with the lead battery, that it has twice the output for the same weight, and that it deteriorates very slowly indeed, if at all. These are obviously highly important advantages in a storage battery and if Edison's expectations are borne out in practice, apparatus of his type will find employment for a multitude of purposes for which the existing type of storage battery has been impossible.

In this connection it is interesting to remark that the discovery of the high efficiency and other advantages of the copper-cadmium couple was no haphazard one, but was made in pursuance of the Edisonian principle to try everything and select the combination best answering the purpose. There are doubtless many stories as to the way in which that principle is carried out in the Edison laboratory. We remember one, which we have never seen in print, of a junior chemist fresh from school who received instructions to prepare samples of the oxides of all the elements. The tale does not relate whether the chemist, no longer young, is still engaged on the task or has in the meanwhile obtained other employment, but inasmuch as his name is not recorded in the scientific hall of fame, there is no doubt that he has not yet been able to produce all the oxides.

MINING DIVIDENDS IN APRIL.

The dividend disbursements in April were the second largest this year, 81 mining and metallurgical companies reporting to the "Engineering and Mining Journal" total payments of \$15,548,079 for the month. Of this amount 50 copper, gold, silver, lead, zinc and quicksilver companies paid \$9,184,773, or 59.1 per cent., while the balance of \$6,363,306, or 40.9 per cent., is credited to 31 iron and steel, coal, petroleum, natural gas and chemical companies.

These heavy payments were due principally to the regular quarterly dividends of the large copper and steel companies, the former alone contributing \$6,779,775 of the total, and the latter \$4,180,790.

While some companies have reduced their annual rate, others have increased it, and in a few instances new dividend payers have appeared.

In the copper group the great Calumet & Hecla Mine in Michigan reduced its dividend from \$20 to \$15 per share. The Montana Ore Purchasing Company, of Montana, paid its regular quarterly dividend of 4 per cent. and an extra one of 8 per cent. on its issued capital of \$2,000,000. The Mountain Copper Company, of Shasta County, California, under British control, has reduced its annual dividend rate to 13.4 per cent. on its \$6,250,000 capital stock. Utah Consolidated (Highland Boy) of Utah also heavily held by British investors, has made its initial payment of \$1.25 per share (\$375,000), which is equal to 25 per cent. on its \$1,500,000 share capital. On this dividend the company had to pay \$18,750 income tax, according to British law.

In the gold mine list there is noted an increase by Stratton's Independence, of Cripple Creek, from 10 per cent. per annum to 15 per cent. on its outstanding capital stock of \$5,000,000. The Vindicator Consolidated Company, in the same district, also increased its dividend from 2½ to 3 per cent. quarterly. The dividends paid by the Bankers and

Garfield mines, also in Cripple Creek, of \$187,500 and \$125,000, respectively, were made to liquidate the companies, as the properties had been purchased by the W. S. Stratton Company. Both the Bull Hill and the Consolidated Gold Mines companies suspended their monthly dividends of 1 per cent. each in order to consolidate. The Gold King Mine, of Cripple Creek, resumed quarterly payments at the rate of 12 per cent. per annum on its issued capital of \$936,850. The Butterfly-Terrible Company, of Leadville, Colo., advanced its annual rate to 3 per cent. on a \$1,250,000 issued share capital.

Of the California oil companies the Central raised its monthly rate from 1 per cent. to 3 per cent., and in the Pennsylvania and West Virginia natural gas-field the Philadelphia Company increased its payment on the common shares from 1¼ to 1½ per cent. quarterly.

THE GEOLOGY OF ORE DEPOSITS.

Though foreign nations admit the energy and restless activity of the American people, yet it is sometimes said of us that we are too practical, that we do not honor the discoverer of an important truth as highly as the inventor of a useful device. Without going into any discussion of this point, it is permissible to point out that we have among us men of science, animated solely by a love of truth, leading unselfish, quiet lives. If their names are less familiar to the public than those of inventors and millionaires, yet they have the esteem of their fellow workers and the joy of discovery; and they desire no more.

Moreover, in the oldest science of all, astronomy, American workers hold first place and the most comprehensive of sciences, geology, is becoming, if a national adjective may be applied in such a case, more and more an American science. We need mention only the work done in glacial geology, in the geology of the pre-Cambrian rocks, and particularly in the investigation of ore deposits, to confirm this statement.

The miner was the first geologist, and the origin of ore deposits is perhaps the oldest problem in geology. Yet not until within a decade has there been any appearance of ultimate harmony among the many conflicting theories propounded. Of the geologists of the 16th, 17th and 18th centuries little need be said. Fantastic theories dealing with "emanations" and "exhalations" were put forth, the climax being reached in that strange hypothesis of the great Kepler—that the earth had living faculties, that mineral veins were abscesses and metals the products of disease. At the end of the 18th century Werner framed what may be called the first scientific theory, distinguishing between veins formed at the same time as the country rock and those of later date, and proving finally that veins are fissures filled with ore. Werner was a neptunist, believing that veins were formed solely by the action of water. His views were doubted by Hutton and the plutonists, who insisted on the importance of heat in mountain building and vein formation. The controversy between the neptunists and the plutonists lasted some years, and the extreme views of the neptunists were abandoned.

Various schemes of classification were put forth by Continental geologists in the first three-quarters of the 19th century. Most of them were based on the forms of ore bodies rather than on the probable methods of formation. Such classifications gave opportunity for endless modifications owing to the great variety of forms found even in a few old mining localities.

American geologists have not, as a rule, attached so much importance to form, but have given weight rather to the method of formation. We need call attention only to the classifications proposed by Whitney, Pumpelly, Raymond and Newberry. The importance of the chemical reactions which have taken place in vein formation have been emphasized by the French school of geologists and De Launay has based a system of ore deposits upon a purely chemical classification.

With the recognition of the important part played by water in vein formation came discussions as to the circulation of this ground water, and theories were put forth that veins were formed by descending waters, by ascending waters, or by lateral secretion from the country rock.

Many important papers on ore deposition have been published in the "Proceedings" of the American Institute of Mining Engineers. We may mention particularly Emmons' paper on the "Structural Relations of Ore Deposits," a concise summary of the part played by faults and other fractures in determining ore deposition, and Posepuy's paper, or rather treatise, on the "Genesis of Ore Deposits" which gave a masterly summary of the work of underground water with a wealth of illustrations from all over the world. At the last two meetings of the Institute some extremely interesting papers on deposition have been presented. Messrs. Emmons and Weed have pointed out how secondary enrichments of sulphide ore bodies may take place below the zone of oxidation. Van Hise has sought to outline the general circulation of underground waters, and at the recent Richmond meeting several papers showed that out of the chaos of conflicting theories a scheme of classification may be evolved that will be generally accepted. Such a plan will recognize the merits of different classifications, and by taking illustrations from

a wide field avoid the mistakes made in the schemes of geologists who were familiar with but a single mining district or with a few fields only.

One thing seems certain, geologists are bound to recognize the important part played by volcanic forces, by intrusions of igneous rock and the resulting hydro-thermal reactions, in ore formations.

At the Richmond meeting of the Institute, Kemp among the Americans, and Vogt of the foreign members, emphasized the action of plutonic forces. It seems likely that such views will prevail, though, of course, in some deposits—as in the great iron mines of the Mesabi Range—ore concentration was due to oxidizing surface waters, and volcanic forces could have played no part whatsoever.

In this number of the "Engineering and Mining Journal" appear summaries of several papers presented at the Richmond meeting. We hope to publish several others later, including a summary of Vogt's treatise, the most detailed paper on ore deposition presented before the Institute since Posepny's treatise. As our American geologists have shown the practical importance in mining operations of a knowledge of the probable method of ore formation in a given district, we shall give these summaries considerable space and will welcome any comments from our readers.

NEW PUBLICATIONS.

"Mines and Mining in the Black Hills." Issued by the Passenger Department of the Burlington Route. Pages, 48; illustrated.

This is a popular description of the Black Hill region and its mines. It is, of course, issued to attract business to the railroad, and therefore puts forward the more attractive side. It contains, however, much information about the mines of the region. It is illustrated by many half-tone views, chiefly of mills, mines and mining camps.

"Linear Perspective." By Herman T. C. Kraus. New York; Norman W. Henley & Company. Pages, 56; with 14 plates. Price, \$2.50.

Old draftsmen, like the reviewer, are apt to distrust books on drawing, since among the many which have been published there are very few indeed which are not overloaded with useless matter and unnecessary elaborations. A beginner is very apt to be told by his seniors to let books alone and stick to practice. The book before us, however, contains very little that is superfluous, and much that is practical and useful. Mr. Kraus' system of perspective is a rational and practical one, and can be readily understood by anyone who has a fair knowledge of the rudiments of mechanical drawing. It is free, moreover, from the useless elaborations to which we referred above. The book is published in such a form that the plates are large and clear enough to be easily studied; while the text is concise and generally clear in its explanations.

"Gold Milling Principles and Practice." By C. G. Warnford Lock. London; E. & F. N. Spon, Limited, and New York; Spon & Chamberlain. Pages, 324; illustrated. Price, \$10.

Mr. Lock has attempted no small task in this volume, since, as his preface says, the object is "to present, between one pair of covers, a comprehensive guide to the whole series of operations embraced in the industry of extracting gold from the various rocks and ores with which it is associated." He has taken the practical and commercial side of his subject and rather avoids theory. Mathematics and the higher chemistry find little place, though explanations of underlying principles are undertaken where it seems necessary.

There is very little by way of general introduction, and the author goes to work on his subject at once. The first chapter relates to storing, screening and sorting ores, while the second is on breaking ores; that is, the preliminary crushing before the stamps, rolls or other fine crushers are reached. Chapter 3 takes up wet milling and treats of stamps; this is the longest chapter in the book, as might be expected. The succeeding chapter, a comparatively short one, is devoted to other wet crushers, such as Chilean mills, the Huntington mill, ball mills, etc. A chapter on amalgamation, necessarily a long one, comes next, and is succeeded by one on dry milling. Concentration, roasting, chlorination and cyanidation are treated in successive chapters. The most elaborate of these is on cyanidation, in which space is given to accounts of practice in various parts of the world, the Transvaal occupying a prominent place. A short chapter on melting bullion winds up the milling section of the book.

A chapter on smelting is merely an outline, or brief sketch. This is, perhaps, a fair disposition, since any attempt to go further into the subject would have unduly increased the size of the book, and would also have required some discussion of copper, lead and other ores, since the winning of gold from most smelting ores is necessarily much involved with the recovery of other metals.

The closing chapter is an interesting and valuable one, containing comparisons of various milling systems, the results obtained and comparative costs. In this the different systems are illustrated by examples from all parts of the world. In his calculations the author has adopted the short ton of 2,000 lbs. as a basis, because it is more widely used in mining countries—notably America and South Africa—and because it simplifies all calculations. We hope the time is not far distant when it will be unnecessary to specify "short," "long," or any special kind of tons; and that a uniform standard will prevail.

The author has made abundant use of other authorities as well as of his own experience. A work of this kind is necessarily dependent to a considerable degree upon compilation, so that the use of earlier work is not a drawback, provided the selection is judiciously made. No man can hope to write of the whole range of gold milling from his own experience, and the excellence of a book must depend largely upon the proper assimilation of the work of others. In this case this part of the work has been generally well done, and has been supplemented by

records of recent practice. Evidently the writer has tried to bring his work up to date, and generally with success. There are some points which seem to need criticism, but space will not permit us to dwell upon them here. In others the work might have been extended. On the whole, however, it is a useful book and will be a good addition to the mining engineer's library.

"Public Water Supplies. Requirements, Resources and the Construction of Works." By F. E. Turneure and H. L. Russell. With a Chapter on "Pumping Machinery," by D. W. Mead. New York; John Wiley & Sons, and London; Chapman & Hall, Limited. Pages, 760; with 231 illustrations. Price, \$5.

The great importance of water supply in our modern economic system, in which the aggregation of population in towns and cities plays so large a part, puts questions of water supply among the most important with which an engineer has to deal. The authors say that the present volume has been prepared with particular reference to the needs of teachers and students in technical schools in which the subject of water supply receives a considerable amount of attention. The work is based chiefly upon the experience of the first-named author in teaching the subject for a number of years in the institution with which he is connected, and has been written with special reference to use in his own class-room. In the discussion of the various subjects treated, the endeavor has been to lay stress upon fundamental principles rather than upon details of practice, although methods of construction have been freely given where they might serve to illustrate the principles involved or bring out the effects of difficulties in conditions. With the same idea in mind, many problems, usually treated empirically, have been subjected to analysis, more or less crude, but useful for calling attention to certain general laws and limitations. It is believed also that such analyses may often be of much assistance in utilizing the results of observation, and that, if properly applied, they will aid much in the cultivation of the judgment. The necessity for the designer to keep constantly before him the question of true economy has been frequently emphasized, and to aid the beginner a brief general discussion of this subject has been given. The sanitary side of the subject has been treated more fully—we think wisely—than in most engineering works.

The opening chapter of the book is a general introduction; the rest is divided into two parts, the first treating of requirements and resources, the second of water-works construction. In the first part, under the sub-head of quantity required and sources of supply the authors treat in successive chapters of the considerations governing quantity and supply; of rainfall; of evaporation and percolation; of flow of streams, and of ground water. Under the second sub-head of quality the three chapters relate to examination of water supplies, to quality of water; and to the relations between water supplies and communicable diseases.

In the second part the chapter subjects are general considerations affecting construction; hydraulics; works for the collection and storage of water including wells, conduits, reservoirs and dams; works for the purification of water, including filtration processes, chemical and mechanical. The final section relates to the distribution of water, including chapters on pipes; on pumping works; on distributing reservoirs; on hydrants and connections; and on the operation and maintenance of water works.

There are numerous references to authorities, and the authors have adopted the plan of giving, at the end of each chapter, a brief list of the best literature of the subject treated. This feature will prove of value not only to the student, but especially to the young practitioner who finds it necessary to make a special study of a particular branch of the subject. According to the authors' view, there is no branch of the profession in which a good working library, consisting largely of periodicals, is more necessary than in that of municipal or sanitary engineering. To the water-works specialist there may be little that is new to be found in this work, but the form in which a large amount of widely scattered information has here been presented will prove of convenience to that class of readers; and any engineer interested in the subject will find much that is new and suggestive in the book.

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.

"Tunneling: A Practical Treatise." By Charles Prelini; with additions by Charles S. Hill. New York; the D. Van Nostrand Company. Pages, 312; with 150 diagrams and illustrations. Price, \$3.

"Thirty-first Annual Report of the Board of Directors of City Trusts of the City of Philadelphia. For the Year 1900." Philadelphia, Pa.; published by the City. Pages, 240; illustrated.

"Towers and Tanks for Water-Works: The Theory and Practice of their Design and Construction." By J. N. Hazlehurst. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 226; 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.

A Correction.

Sir: A note in a recent issue of the "Engineering and Mining Journal" refers to me as Professor Edgar Kidwell of the University of California. As I have never been connected with the University of California in any capacity, I will ask you to state this fact, as a matter of justice to that university and myself. While on a visit to one of the large mining centers I met a number of graduates of a college with

which I was formerly connected. This, in conjunction with the fact that my residence is in Berkeley, Cal., led the reporter of a local paper to state in a notice, from which your information was derived, that I was connected with the university here, which is incorrect.

Edgar Kidwell.

Berkeley, Cal., April 22, 1901.

The Ashcroft-Swinburne Sulphide Process.

Sir: In your issue of November 17th, 1900, you comment on the Ashcroft-Swinburne zinc-lead sulphide process (British patent No. 14278 of 1899) which proposes to blow chlorine gas through the mixture of the sulphide ore and fused zinc chloride in a suitable vessel, with the formation of the chlorides of the metals and the evolution of sulphur. The question you raise there, as to the chemical reaction which takes place, induced me to make some investigations of the process in the Electro-chemical Laboratory of this University.

The first experiments consisted in blowing dry chlorine gas over powdered sphalerite in a combustion tube, the temperatures varying between 150° and 300° C. Up to 250° the monochloride of sulphur was formed with little or no sulphur. Above this temperature, however, as soon as a little of the sulphide had been decomposed, sulphur and not the monochloride was formed. Only a small portion of the ore was acted on by the chlorine in these experiments. The attempt was next made to duplicate the conditions of the patent. To that end dry gas was blown through the mixture of the ore and fused zinc chloride in a retort, care being taken that the apparatus be dry. Temperatures varied from 250° to red heat. In no case was the monochloride formed.

Zinc chloride melts at 250° C., so the negative results of the first experiments above this temperature, after a little zinc chloride is formed, together with the results of the second experiments point to this conclusion. Sulphur monochloride is not formed from zinc sulphide in the presence of fused zinc chloride.

As to the practicability of the process, the experiments point to the following difficulties: The action of the chlorine gas on the sulphide ore even when passed through a 100-mesh sieve is not at all vigorous. In an experiment conducted at low red heat about 4 grams of ore were used, only about two-thirds of which was acted upon by 25 grams of chlorine. At this temperature some of the zinc chloride distilled over, since this body begins to distil at 400°. At lower temperatures, the action is even more feeble. The separation of sulphur also offers difficulties. This cannot be done by distillation as sulphur does not go over below 458°. The difficulty you mention, that is, the recovery of the zinc chloride from the gangue seems also important.

On the whole the process seems impracticable in its essentials and will scarcely succeed.

W. J. Huddle.

Indiana University, April 25, 1901.

The American Smelting and Refining Company.

Sir: I have read your statements in reference to the consolidation of the smelting industry and would like to call your attention to some facts. The weak point in the consolidation is the enormous capitalization which it carries. A total of \$100,000,000, one-half of which is preferred stock carrying a cumulative charge of \$3,500,000 yearly is far beyond the amount which should fairly represent the industry. It is not so long ago that all the smelters were complaining that there was no profit in their works and that they were unable to make necessary improvements on the rate of charges then current. They are now capitalized at a figure several times greater than the combined capitals of the different companies; and even if we disregard the common stock as being a purely speculative value—after the modern fashion of combinations—there remains an excessive amount to be carried. The rules that the capital stock of a company should be based on two considerations—the amount which would be required to replace its working plants and the amount on which it could expect to pay fair profits—have been entirely disregarded in the industrial consolidations of the present day. They are good rules and it is not safe to neglect them—as investors in industrial stocks will find out after a while.

There are two general lines of policy, either of which the company may follow. One is to look for immediate profit by exacting high treatment charges, or in other words, putting on the ore all that it will bear. The other is to build up business for the future by lowering charges and encouraging the treatment of ores of lower grade than those which are now generally known as shipping or smelting ores. This course would greatly extend the limit of the ores which are available for the company's use, and would also encourage miners in their work, both in prospecting for mines and in operating them. It would largely increase the quantity of ores to be treated and in a short time, we have no doubt, would fully employ all the company's plant.

A policy for present profit would, on the other hand, discourage prospecting and mining. Increased charges for smelting would limit the amount of business possible and restrict the grade of ores which could be mined at a profit. It would, moreover, encourage the establishment of independent smelting works; and experience in other lines has shown that these might be able to make their way in spite of all the opposition which the present powerful organization could offer.

While we believe that the men who control the consolidated company are too sagacious and far-seeing to adopt the policy which we deprecate; it must be remembered that temptations in that direction will arise from the very large capitalization on which profits are expected. It is easier to pay dividends for the time by raising charges than by cutting down expenses, whatever the future result may be; and the reduction of costs often involves some immediate expenditures, which a manager may be unwilling to recommend when he has the demand for dividends to consider.

We must also remember that the capitalization of the company represents in part the present high price of the metals—silver, lead and copper—which it produces. Of course so powerful a producing and selling organization can do much to steady prices and prevent fluctuations in the market; but it cannot prevent the decrease in demand which is sure to come with a period of industrial depression, and which must in the end bring about a lower range of values. In the past two years we

have seen the culmination of one of those periods of prosperity which come periodically in modern business. The depression has already begun in Europe, although it has not yet reached this country; but we cannot expect to escape it, even if we can postpone it for a time.

While we can see clearly many advantages to the smelting industry in consolidation under an able management, we cannot avoid seeing also the disadvantages which will result from over-capitalization and from making the industry subject in some degree to the Stock Exchange. As long as Smelting stock is a prominent industrial on Wall street there must be temptations to lines of policy which will not conduce to the best interests of the industry itself, nor to those of the mining communities which it serves. The present managers may avoid these, but changes are always possible and may be for the worse.

Denver, Colo., April 20, 1901.

T. W. N.

THE COPPER PRODUCTION OF THE WORLD.

For a number of years Messrs. Henry R. Merton & Company, of London, have been collecting statistics of copper production, and their approximation to the actual results is usually very close indeed. We give below the output of copper for the year 1900, using their figures for all other countries, but giving for the United States the production as collected for "The Mineral Industry." The figures are in long tons, of 2,240 lbs.:

	1899.	1900.	Changes.
Argentina	65	75	I. 10
Australasia	20,750	23,000	I. 2,250
Austria	915	865	D. 50
Bolivia	2,500	2,100	D. 400
Canada	6,730	8,500	I. 1,770
Chile	25,000	25,700	I. 700
Cape of Good Hope	6,490	6,720	I. 230
England	635	650	I. 15
Germany	23,460	20,410	D. 3,050
Hungary	590	490	D. 100
Italy	2,965	3,000	I. 35
Japan	28,310	27,840	D. 470
Mexico	19,335	22,050	I. 2,715
Newfoundland	2,700	1,900	D. 800
Norway	3,610	3,935	I. 325
Peru	5,165	8,220	I. 3,055
Russia	7,210	8,000	I. 790
Sweden	520	450	D. 70
Spain and Portugal	52,168	52,872	I. 704
Turkey	920	520	D. 400
Totals	210,038	217,297	I. 7,259
United States	259,517	268,887	I. 9,370
Totals	469,555	486,184	I. 16,629

It will be seen that the countries reporting considerable increase are Australasia, Canada, Mexico and Peru. The only large decrease was in Germany. Other changes are not of great importance.

In Germany, as heretofore, by far the greater part of the production—18,390 tons—came from the mines of the Mansfield Company, and the decrease in their output was 2,395 tons. In Mexico the Boleo Mine is credited with 11,050 tons, a little over half the total production. In Spain the Rio Tinto Company showed a gain, while the Tharsis fell off considerably.

The increase in the United States output has been referred to in our columns heretofore. It was the smallest reported for several years.

COAL IN BELGIUM.—The production of coal in Belgium in 1900 is reported at 23,352,352 metric tons, against 22,072,068 tons in 1899; an increase of 1,280,284 tons, or 5.8 per cent. There were 114 collieries in operation last year, and 113 in 1899.

COAL IN KASHMIR, INDIA.—"Indian Engineering" says: "What promises to be a very opportune find of coal has been made near Adampur (in Kashmir territory) 35 miles from Jammu. One of the engineers of the State has been deputed to report on the matter."

COAL LANDS OWNED BY INDIAN RAILWAYS.—The Indian Mining Association considers that "Indian coal proprietors have a legitimate grievance against Indian railways who own and work coal lands; inasmuch as in most cases those railways are owned and controlled by the State. Consequently their competition with other colliery proprietors is the competition of the State with private enterprise; and as such it is entirely contrary to the principle laid down by the Government."

UNITED STATES RAILS IN NICARAGUA.—Under date of March 2d, 1901, Consul Donaldson, of Managua, says that the Nicaraguan Government has placed an order with its agent in New York for 2,400 tons of steel rails for the new central branch of the National Railroad, which is being constructed by a German engineer, Mr. Julio Wiest. Considering the fact that Nicaragua has always purchased rails in Germany and England, says Mr. Donaldson, and that the contractor for the present railroad is a German, the placing of this order in the United States is an item of considerable importance in the growth of our trade with Central American countries.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—Imports of fuel into Spain for the two months ending February 28th included 362,669 tons coal and 24,185 tons coke. Imports of metals included 2,788 tons pig iron, 738 tons wrought iron, 5,158 tons steel and 223 tons tin-plates. Exports of minerals are reported by the "Revista Minera" as below, in metric tons:

	1900.	1901.	Changes.	Per ct.
Iron ore	1,318,015	1,218,203	D. 99,812	7.6
Copper ore	162,199	147,776	D. 14,423	8.9
Zinc ore	13,466	11,664	D. 1,802	13.3
Lead ore	510	381	D. 129	25.3
Salt	26,843	47,219	I. 20,376	75.9

Exports of metals included 633 tons pig iron, against 7,009 tons in 1900; 2,737 tons copper against 4,345 tons in 1900; and 22,182 tons lead, against 25,457 tons in the corresponding period last year.

UNDERGROUND IN A JOPLIN MINE.

The accompanying illustration is from a photograph taken in a mine near Cartersville, Mo., in the Joplin zinc and lead ore district. The view illustrates the method of working in that district, and shows some characteristic points in the deposit.

THE ORIGIN OF THE JOPLIN ORE DEPOSITS.*

By H. Foster Bain.

A restudy of the zinc and lead deposits of the Ozark Region, particularly those of the Joplin area, shows that the ore bodies result from the general action of underground water. In the Joplin area numerous deep fractures cause loss of head in the underground waters, so there are no flowing springs. The water gathered in the central plateau of the Ozarks, it is conveyed through the porous sandstones and dolomite limestones of the Siluro-Cambrian which are overlaid by the impervious Kinderhook shale. Once much of the water was transmitted down the dip through the Carboniferous limestones under a coal-

portion. This lies below a heavy bed of practically impervious shale. At an early period the waters in the Galena-Trenton were under hydrostatic pressure, but for a long period the movement of the waters and the concentration of the ores has been downward.

Decrease of temperature and pressure cannot be invoked to explain the ore-bodies in either region. There are neither hot nor warm springs in either, nor is there any independent evidence that any such have ever existed. The reactions involved in the genesis of the ores are all such as take place under present surface conditions. In the Dubuque (Iowa) Region the circulation did not extend to any depth sufficient to make pressure quantitatively important. In Missouri the same is true.

The mingling of solutions has been especially important in producing deposition in both regions. In the Stewart's Cave Mine, near Dubuque, there are two parallel crevices, about 60 ft. apart. Along the south crevice a great deal of lead has been found; in the north crevice, practically none. In the south crevice, ore is found only at points where there are cross-crevices and a chance for the waters from the other crevice to come in. Where the two solutions came together an ore deposit was formed.

In the Joplin Region the great deposits of zinc are found largely in the Carboniferous limestones, which are cut off from the Cambro-Silurian by a series of shale beds. It is only where these have been



UNDERGROUND WORKINGS AT CARTERSVILLE, MO.

measure cover. This earlier circulation seems to have been more important in bringing about the recrystallization of the limestone, and probably to some extent its replacement by chert than in causing actual ore-deposition. The present actual difference in head between the surface and the water-bearing rocks is about 700 ft. Water now rises in the Carthage well from the Silurian limestones to within a few feet of the surface, and in the Redell deep-rock well, at Joplin, to within 80 ft. of the surface.

That the ore bodies were deposited by waters rising from these deeper limestones is proved by the following facts:

(a) The ores are everywhere associated with great quantities of dolomite. The lower limestones are dolomitic, while the immediate country rock is not and shows no dolomitization away from the region of the ore bodies. The magnesia was evidently brought in at the same time as the ores. The magnesian limestones of the Siluro-Cambrian, in both the upper and the lower Mississippi regions, are almost everywhere associated with more or less ore. The carboniferous non-magnesian limestones are nowhere associated with ore, except in this particular region where the circulating waters passed from the one to the other. The conditions of circulation have been stable for a long time.

(b) The ore bodies of the Joplin Region stand in relations, usually close, with a system of fractures and faults that have broken the underlying Eureka-Kinderhook shale and allowed the intermingling of the two circulations above and below it. Faults occur, of a minimum throw of 80 ft., traceable across the country for a mile and a half. They were main channels for the upward flow of the ore-bearing waters which, once in the carboniferous limestones, wandered widely and deposited ore under many different conditions.

In the upper Mississippi Region alternating pervious and impervious beds affords several distinct circulations. The ores are mainly found in the Galena-Trenton limestone, and especially in the upper, dolomitic

broken across by faults that ore-deposits are found. The Carboniferous limestone carries large amounts of bituminous matter and the circulating waters become highly charged with it, and are reducing agents. The sulphate solutions from below have been reduced to sulphides in the limestone, making the ore deposits.

The general principle of the reduction of one sulphide by another does not seem to have been very important in the Missouri Region, although we do find evidence there of that process, but in the Iowa Region it has played a very important part.

The general principle of secondary enrichment finds exemplification all through the Joplin Region. The Boston-Get-There Mine, at Prosperity, is in the top of a big body of chert, underlying limestone. Blende has been taken away by the underground waters, carried down the dip and redeposited.

The general processes of secondary concentration and enrichment are also exemplified in the common fact that the great bodies of zinc-blende occur at and below the ground-water level. At the surface and in the small deposits below the surface, where we have direct evidence of oxidation, we commonly get galena, while at lower depths great bodies of zinc sulphide occur. Of the common sulphides, galena, blende and pyrite, the galena is the last to go into solution in the presence of oxidizing waters; hence, the general effect of the downward-flowing waters is to carry the zinc-blende away from the galena, leaving the latter at the surface.

The form and character of the ore body are controlled by the character of the rock in which the ore occurs. This is largely due to the fact that the fractures in rock are controlled by the character of the rock. Homogeneous rocks will yield under stress more uniform fractures than heterogeneous rocks. In the Joplin Region the interbanded limestones and cherts break irregularly; while the Cambro-Silurian limestones break with more regular fractures. The result is seen in the very irregular form of the Joplin ore bodies as contrasted with the usual regular vein-like form of the deposits in the central and portions of the southeastern districts.

*Abstract of contribution presented at the Richmond meeting of the American Institute of Mining Engineers.

SECONDARY ENRICHMENT OF ORE DEPOSITS.*

By Prof. L. De Launay.

I attach more and more importance to the phenomena of secondary alteration, which have produced enrichments or impoverishment in metalliferous deposits accessible to exploitation; and I fully adopt the conclusion of Mr. Weed as to the necessity of taking very careful account of these phenomena in practical and industrial estimates. I think, likewise, that in these secondary and comparatively recent reactions should be sought the interpretation of many of the phenomena of substitution, lateral alteration, or metasomatism, in the form in which they are now observed; while I continue to admit, with the school of Elie de Beaumont and Daubree, the primary influence of volatile mineralizers. These must have prepared the way by introducing into the enclosing rocks, or simply by depositing in the vein-fissures, elements such as sulphides, fluorides, chlorides, etc., which subsequently, dissolved anew by the circulation of superficial waters, have rendered to the latter essential aid in the processes of alteration. In this manner have been produced the large altered zones seen around pyritic masses in the south of Spain.

In order to formulate the study of the phenomena in question I have been led to distinguish three zones (from the surface downward) which correspond generally to those of Mr. Weed and I have thus defined them:

1. First superficial zone of oxidation, subject, in its upper part, to physical disintegration: a zone characterized by the peroxidation of iron, and, in metalliferous deposits, by the presence of native metals, oxides, carbonates or chlorides (Mr. Weed's "zone of weathering").

2. The far more important zone of cementation, of de-calcification, and, more generally, of complex chemical reactions (such as the formation of secondary sulphides), liable to show at its base an increase of certain substances, which have been dissolved in the upper part and carried away by the descending waters (the "zone of enrichment").

3. The zone of unaltered equilibrium (unchanged sulphides), below the hydrostatic level (the "zone of primary sulphides").

With regard to the process of this alteration, I believe that we ought not to attribute too absolute a value to what is called the hydrostatic level ("ground-water level"), due to the variable structure of the terrain, leaving, for instance, beneath a former hydrostatic surface, a zone in which the circulation of surface waters rich in oxygen and carbonic acid could still take place.

Moreover, it must be noted that, even in the deep zone, the waters could not be absolutely still or incapable of exercising oxidizing chemical reactions, especially if there be great fissures or faults, permitting the introduction and rapid circulation of waters from the surface. This may explain the abnormal occurrence of certain alterations and secondary enrichments more deeply situated than might have been at first expected. Here is a very interesting fact which Mr. Weed deserves the credit of bringing to light.

Perhaps also, the ascending waters, heated by deep circulation, or by contact with eruptive phenomena, have in certain cases played a part. We know that Daubree observed at Plombieres, Bourbonne, etc., evident reactions upon metals by prolonged contact with thermal waters of extremely low mineralization; and certain secondary sulphides in copper-deposits, are produced under these conditions, such as those studied by Mr. Weed.

Furthermore, the persistence of secondary reactions in depth is surprising, and appears to contradict existing theories; there is reason to inquire whether the surface of the earth was not very different at the time when these reactions took place from what it is to-day. In their study of the copper mines of Butte Messrs. Emmons and Weed adopted a similar hypothesis and give it a local geological confirmation.

Finally, in regions of complex fractures, with numerous systems of intersecting veins, there is doubtless reasons to attribute a very important role to secondary phenomena of enrichment, as explaining the variations in successive fillings, which have usually been interpreted as primary phenomena. A late deposit of highly argentiferous mineral, accompanied with calcite and cobalt, as at Freiberg, Przibram, etc., may be only the result of a simple secondary concentration. The same may be true of the cobaltiferous fillings with calcite and barite, observed in sundry faults traversing the cupiferous schists of Mansfeld, and may be the cause of many enrichments at the intersections of veins, cross-courses, etc., such as those described at Broken Hill and in the Aspen District.

THE ROLE OF THE IGNEOUS ROCKS IN THE FORMATION OF VEINS.†

By J. F. Kemp.

This paper is limited to veins. The ordinary deposits of those metals which appear as appreciable percentages in F. W. Clarke's latest estimated composition of the earth, are practically barred out, viz., Al, 8.16; Fe, 4.64; Ti, .41; Mn, .07; Cr, .01; Ni, .01. Of these, iron and manganese are admittedly favorable subjects for circulating meteoric waters which are conceded to be of themselves effective in the outer 1,000 to 2,000 ft. of the earth. The same metals are at times abundant enough in original minerals in igneous rocks to yield ores.

The author briefly states his reasons for connecting most mineral veins with igneous rocks, asserting that the action of underground water does not extend to great depths. He states his conclusions thus:

1. Igneous rocks contain the metals and the elements of the gangue minerals more abundantly than do sedimentary rocks.

2. Igneous rocks are richly provided with vapors which come up

with them from great depths. Igneous rocks are enormous reservoirs of energy.

3. Igneous districts or districts of combined igneous and sedimentary rocks are almost always the geological formations in which veins occur.

4. The vapors and solutions from intruded igneous rocks are pre-eminently favorable chemical reagents.

5. Observations in deep mines and the data from very deep wells indicate the general absence of water in the rocks below moderate depths, except in regions of expiring vulcanism. This is a grave objection to the conception of universal ground-water.

6. Capillary attraction largely an ascensive force and of problematic existence with increasing pressure. Artesian reservoirs of themselves unfavorable to extended circulations. Strange absence of the original content of water in deep-seated sediments. Standing water in abandoned shafts strong evidence of the impenetrability of rocks.

7. Hot springs necessarily connected with an abnormal rise of the isotherms and this can only be explained by intruded igneous rocks or faults. The latter do not compare with the former as an efficient cause.

8. The distribution of the ground-water is far less uniform than has been supposed. The ground-water may entirely fail in arid regions.

9. The distribution of mining districts can only be satisfactorily explained by the corresponding distribution of igneous rocks, which have been intruded under circumstances favorable to vein formation. Under any other view veins should be much more common.

LOCOMOTIVE FUEL IN ROUMANIA.—The London "Engineer" says that a combination of lignite and petroleum is now largely used for fuel on the railways of Roumania, a special apparatus having been invented for the proper consumption of the mixture. In 1896 only 2,200 tons of petroleum were consumed in the engines, but in 1899 this rose to 15,200 tons; while the consumption of lignite rose in the same period from 17,200 tons to 67,000 tons.

IRON AND STEEL EXPORTS OF GREAT BRITAIN.—The exports of iron and steel and manufactures thereof from Great Britain for the three months ending March 31st are valued as below:

	1900.	1901.	Changes.	Per ct.
Iron and steel	£8,248,268	£6,030,258	D. £2,218,010	26.9
Machinery	4,764,901	4,259,209	D. 505,692	10.6
New ships	1,194,918	3,572,456	I. 2,377,538	199.0
Totals	£14,208,087	£13,861,923	D. £346,164	2.4

In quantities the heaviest decrease this year was in pig iron, of which only 163,583 tons were exported, against 379,263 tons last year. Rail exports showed a small increase.

GERMAN IRON ORE IMPORTS.—Imports of iron ore into Germany for the year 1900 were 3,561,607 metric tons. In 1899 the imports were 3,660,724 tons, so that there was last year a decrease of 99,117 tons. The principal sources of supply in 1900 were: Spain, 1,479,392 tons; Sweden and Norway, 1,356,988 tons; Algiers, 363,150 tons; Greece, 123,455 tons. Some experimental shipments made from the United States to Germany in 1899 were not followed up by any further shipments last year.

Imports of manganese ore in 1900 were 186,890 tons, an increase of 31,411 tons over the previous year.

ACTION OF ALCOHOL UPON METALS.—This subject, says "Science," has been recently investigated by Dr. Malmijac, and his results published in the "Journal de Pharmacie et de Chimie." In his experiments he used 95 per cent. alcohol which left no residue on evaporation. The metals, copper, iron, tin, lead, zinc and galvanized iron, were corked up with the alcohol in glass flasks, and kept at ordinary temperature for six months. The copper was entirely unacted upon, but in all the other flasks there was a deposit at the bottom, and the metal was covered with a similar deposit. In the case of tin, lead, zinc and galvanized iron, the deposit was white; that from the iron was red, resembling iron rust. All the liquids, except that in which the lead had been placed, filtered clear; the latter retained its milky appearance after repeated filterings through double filters. The clear filtrates from iron, lead, zinc and galvanized iron gave much residue on evaporation, while the residue from tin was hardly appreciable. In the former cases it is clear that not only had the metal been oxidized, but a considerable quantity had entered into solution. These experiments have an important bearing on the preserving and shipping of alcohol, especially in view of the fact that absolute alcohol is very generally purchased in galvanized iron cans. In such a case redistillation is imperative.

THE SLATE QUARRIES OF ANGERS, FRANCE.—A recent elaborate paper on the "Slate Quarries of Angers," by M. J. Kersten, published in the "Revue Universelle des Mines," gives many interesting particulars. The slate deposits of Angers are extensive, the beds varying from 30 m. up to 200 m. in thickness. The beds are in some places broken and mixed with ferrous schists, but the workable area is very large. The quarries are very ancient, the first workings having been traced back to the twelfth century. The slate was worked by open quarrying entirely up to about 1850, when certain operators began to sink shafts and open underground chambers, after the methods followed in some of the Welsh quarries. The system of working followed is by benches descending. In taking out slate the waste is very great, a recovery of 14 per cent. of merchandise slate out of the whole quantity mined being considered good work.

Much of the recent progress made in these quarries is due to the Societe Ardoisiere de l'Anjou, which has substituted machine drills, electric hoist and machines of all kinds for the old, inefficient methods. This company owns and operates three large quarries—Mizengrain, Renaze and Grand Maison, the last named being the most important. The total production of slate in the Angers District is about 50,000 metric tons yearly.

*Abstract of discussion of papers by Messrs. Emmons and Weed, read at the Washington meeting of the American Institute of Mining Engineers.

†Abstract of paper for the Richmond Meeting of the American Institute of Mining Engineers.

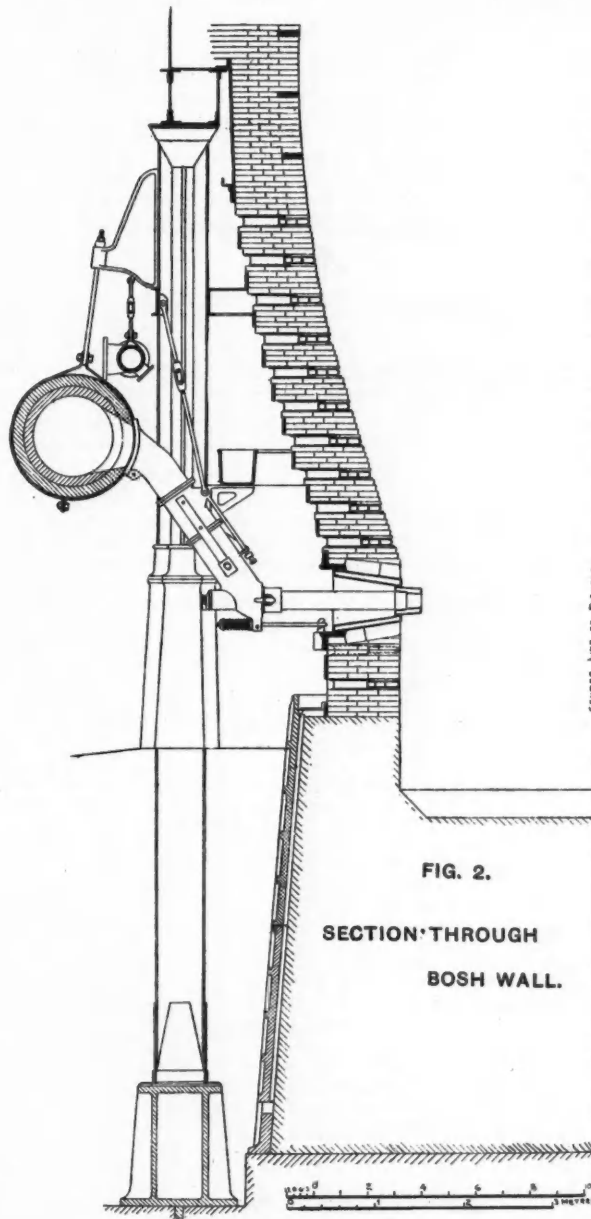
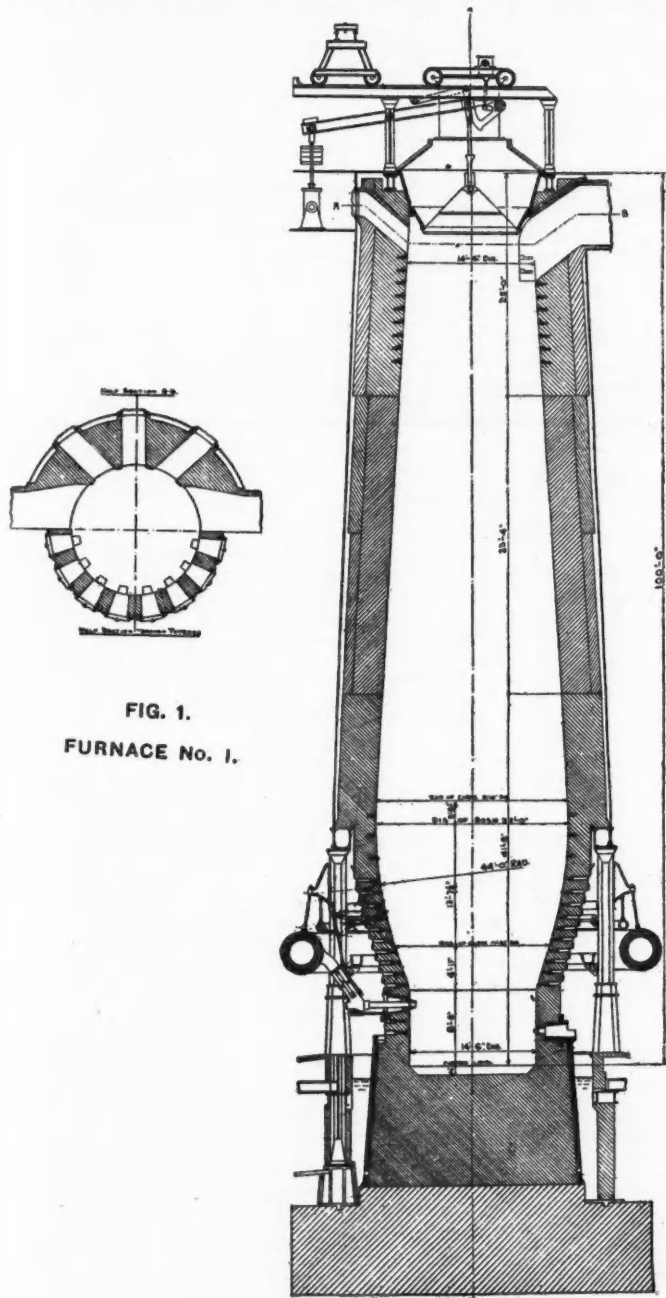
A MODERN AMERICAN BLAST FURNACE.*

By Arthur C. Johnston.

The blast furnace plant of the Lorain Steel Company, at Lorain, Ohio, was built in 1899, and consists of two stacks, each 100 ft. high from hearth level to furnace platform, 22 ft. in diameter at the bosh and 14 ft. at the hearth. By reference to the drawings it will be seen that they are arranged on the American system, which places two furnaces in a group, there being four heating stoves for each furnace and a boiler house and engine house common to both. The plant is arranged to be capable of extension by adding to the engine and boiler houses, making them of sufficient capacity for another similar group of two furnaces. Sections showing the lines and construction of the furnaces themselves are shown.

The distinctive feature of these furnaces is the great depth of the hearth jacket, and the low level to which the furnace columns are car-

ried in consequence. The hearth jacket itself is also of novel design. It consists of two series of segmental steel castings, held together by bolts and buckstays, with rust joints at the abutting edges of the different segments. Between the jacket and the masonry there is inclosed a complete ring of individual vertical pipes, intended to serve the double purpose of a cooling system and a means of relieving the jacket of excessive bursting strains, due to the expansion of the contained furnace bottom, by the partial collapse of the pipes. The intention was to have the cooling water for the jacket discharged into the annular space at the top of the same and to carry it downward through the pipes from which it would seek its level within the wall surrounding the jacket, whence it would be led off through a waste pipe placed at the desired level. In accordance with modern practice, the 6-in. tuyeres are spaced as closely as possible, there being 16 tuyeres in the circle. A special feature is the great number of cooling plates. There are 12 rings of bronze coolers, two of which are below the tuyeres and three additional rings of cast-iron coolers above the bronze plates. There are, in all, 277 bronze and 48 cast-iron coolers in each furnace. The stock lines are protected by 12 rings of cast-iron segments built into the brickwork. The mantels are built of 3/8-in. steel plate, with two courses of 1/2-in. plate at the bottom and one at the top. The gases generated in the stacks are led off through two downcomers, each 73 in. in diameter and brick-lined to .3 in. inside diameter. Owing to the steep angle at which they are carried up, it is practically impossible for dust to lodge in them at any point, which is a very important consideration. As a matter of fact, when the furnaces were blown out, after a year's run, these pipes were found to be as clean as a gun barrel. In the dust-catcher the direction of motion of the descending gases is so suddenly changed upward that ample opportunity is given for the precipitation of the dust, which can then be dropped into railway cars standing on the track which runs through the tunnel under the foundations.



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The gases are further cleansed by being precipitated against the surface of a body of water in the gas washer. From the washer the gases are led into the gas main. A by-pass, however, is arranged whereby the washer can be cut out of the system. This is accomplished by making two connections direct from the dust-catcher to the gas main, controlled by 56-in. cut-off valves, which are fitted with water-cooled seats and disks. The connections from the dust-catcher to the washer, and from the washer to the gas main, are controlled by cut-off valves of a different type.

The gas main is a steel shell 85 in. in diameter and bricklined to 75 in., and it extends along the front of the eight stoves, having a downward connection to the burner at each of them. Here again precautions are taken to precipitate the dust carried over by the gas; also in the burner itself there is still another dust-catching chamber. The stove burner is 18 in. in diameter, with a 6-in. air supply pipe, and the opening for it in the stove is 22 in. in diameter.

*Abstract of paper read before the Civil Engineers' Club, of Cleveland; from the "Journal" of the Association of Engineering Societies.

Furnace gases are slow in burning, and for economical results a long combustion chamber of ample size must be provided. By reference to the section through the stoves it will be seen that the combustion chamber is carried up to the top, and that the burnt gases descend through the rectangular passages formed by the stove bricks, which are heated thereby until they reach the desired temperature. Each stove has a heating surface of 34,000 sq. ft. The gases are passed from the stoves to the chimney through a 50-in. valve with air-cooled disk and water-cooled seat; the air is brought down through the stem. The chimney is 10 ft. in diameter and 225 ft. high, and brick-lined to the top.

In designing these furnaces it was figured that each of them would require from 45,000 to 50,000 cu. ft. of air per minute, measured by piston displacement, when making 600 tons of iron each in 24 hours. To supply this volume the engine house is equipped with five horizontal compound blowing engines, with steam cylinders 44 and 48 in. in diameter, and two air cylinders 84 in. in diameter, all having a common stroke of 66 in. The fifth engine is intended for a reserve, to be thrown on either pair of furnaces in the contemplated extension. They are designed to be capable of delivering air at a maximum pressure of 30 lbs. per square inch, although the average blast pressure is only about 14 lbs.

equalize the pressure around the complete circle. From the bustle pipes the hot blast is led to the tuyeres, and into the furnaces through the tuyere stocks. Two 16-in. drop valves are placed on the bustle pipe. These open automatically when the blast pressure is shut off, and air is admitted instead of drawing dangerous gases back through the tuyeres from the furnace; these also close automatically when the blast is turned on. Explosion doors are provided at the furnace top, and wherever possible in all pipes and chambers carrying gas.

For handling the stock at these furnaces an entirely new system is in use. The stock bins are placed underground. There are five stock bin cars, with suspended weighing hoppers, for the two furnaces. The bins are 725 ft. in length, and the ore, limestone and coke are delivered to the

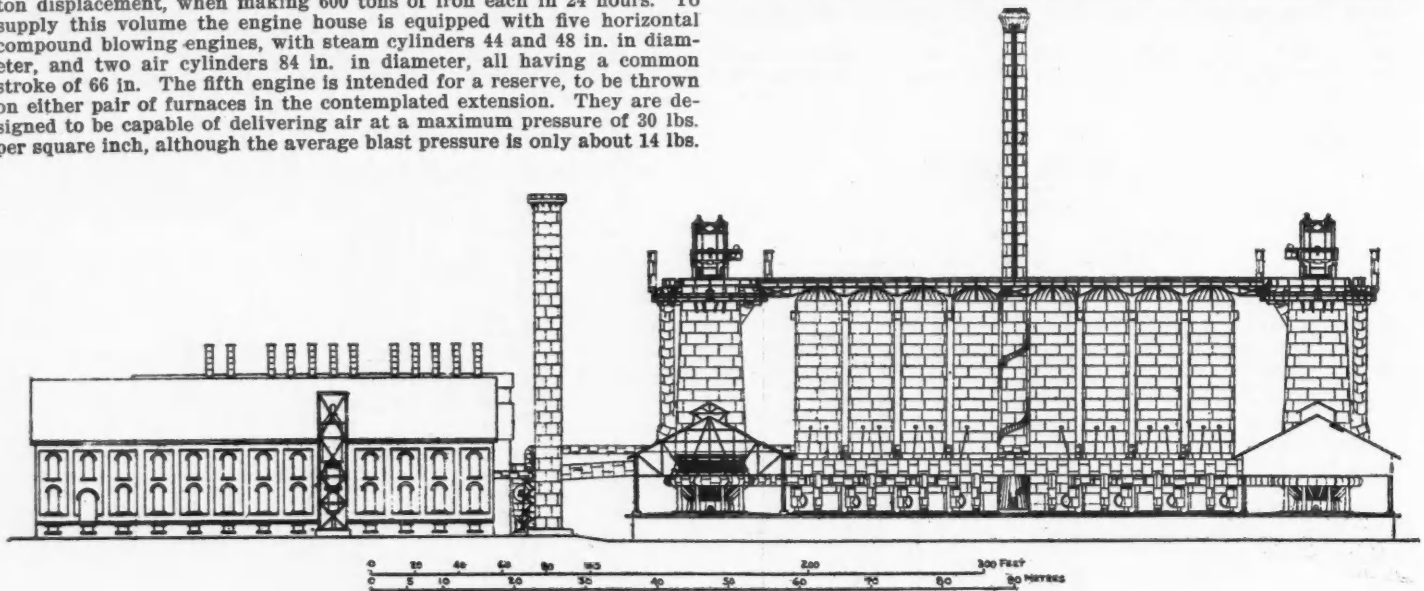


FIG. 3. FRONT ELEVATION OF FURNACES.

Any engine can be connected with either furnace at any time, as the two cold-blast mains run parallel with one another over the blowing cylinders, and each main has a connection with a shut-off valve to each cylinder.

The cold blast mains are 48 in. in diameter, and are rolled from $\frac{1}{4}$ -in. plate. Each is equipped with a 48-in. snort valve, which in closing opens a 14½-in. relief valve mounted on the same frame, and thus prevents a dangerous pressure from accumulating in the main when the blast is suddenly shut off from the furnace. In addition, there are three 8-in. safety valves on each pipe. Thirty-inch connections are made from the mains to the stoves, and the valves in these branches have in their

furnace skip car by the weighing cars, which draw their supply from the chutes in the bottom of the bins. The skip then carries the charges up the incline and delivers them at the furnace top.

The stock bin cars are driven by two railway motors, and the door in the bottom of the suspended hopper is opened and closed by an air cylinder, the pressure being supplied by an electrically-driven air-pump carried on the car. The operator can weigh all charges from the car platform. The skip has a capacity of 240 cu. ft., and is hoisted, by means of four 1¼-in. cables, by a pair of 14 by 16-in. engines geared 6.5 to 1 to a 72-in. drum. To complete a single charge the skip makes four trips—taking first two loads of coke and then two loads of ore and limestone mixed. Two loads of coke, or of limestone and ore, are kept always on the bell in order to act as a seal and to keep it cool. When making 600 tons of iron in 24 hours the skip delivers 90 charges, making 360 trips to the furnace top, an average of a return trip every 4 minutes. The skip is counterweighted, so that the engine does work both in raising and in lowering it.

For pumping water for the cooling plates there are two compound,

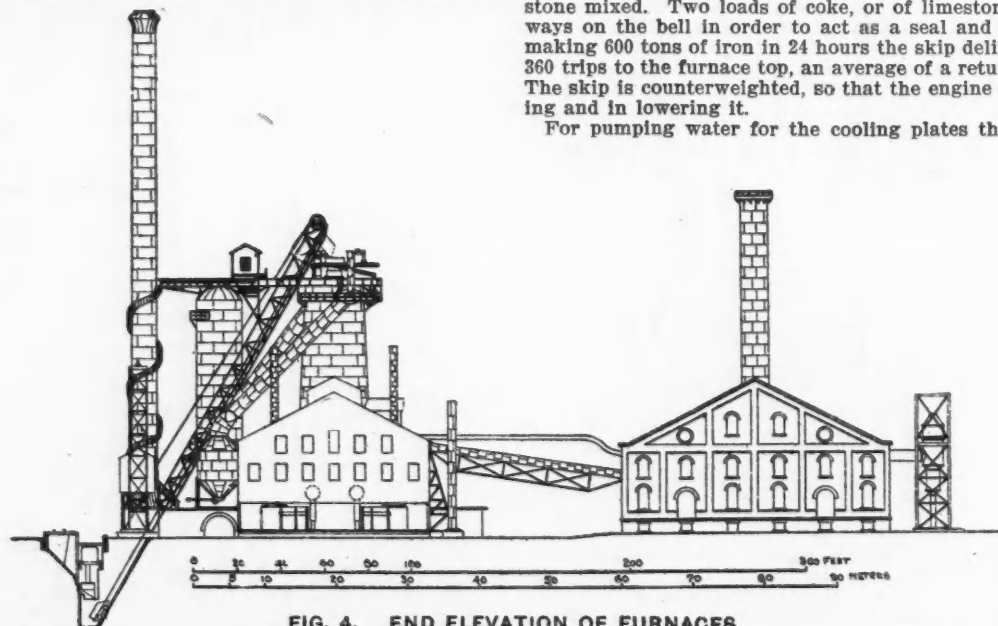


FIG. 4. END ELEVATION OF FURNACES.

seats a smaller valve which opens first automatically and relieves the pressure, an arrangement which enables the main valve to be opened more easily.

The cold air from the blast mains passes into the stoves and up through the checker bricks, which have been previously heated by the burning furnace gases, and down through the combustion chamber—the gas burner having been withdrawn and its door and chimney valve closed—into the hot-blast main through a 32-in. hot-blast valve. The hot-blast mains are 69 in. in diameter, and double brick-lined to 50 in. inside diameter. Before connecting with the bustle pipes, the hot-blast mains divide and join them with two connections in order to better

fly-wheel Holly pumps, each having two double-acting water plungers 22 in. in diameter, with a stroke of 28 in. These are capable of delivering 7,000,000 gallons of water per 24 hours each. As a reserve there is also a duplex pump with two double-acting water plungers, 14 in. in diameter and 10-in. stroke. All these pumps deliver water to a stand pipe 12 ft. in diameter and 150 ft. high. The water passes through from three to four cooling plates before being discharged into the waste troughs. Arrangement is made also whereby water from the boiler-feed system can be sent through the cooling plates, in order to force out deposits of sediment by means of the increased pressure. Brass ball-and-socket unions are used throughout the piping for the cooling system.

The boiler house is equipped with 24 vertical water-tube boilers, each of 250 H. P.; so arranged as to use either furnace gas or coal as fuel. These boilers are admirably adapted for furnace gas as fuel, as on account of their great height, there is sufficient time to effect the complete combustion of the slow-burning gases. The gas main from the furnaces is extended into the boiler house, and has a connection to the burner in front of each grate.

The pig-casting machine consists of two endless chains carrying molds or chills of pressed steel. The molten iron is poured from the ladle into a trough terminating in two spouts, from which it runs into the chills. The chain then drops down under the surface of the water contained in the tank, and travels under water for a distance of about 100 ft. It then turns upward, and as it ascends the incline the pigs are sprayed with cold water from a spray pipe; and by the time they reach the head of the machine they are sufficiently cooled to be loaded on cars which stand on the loading track. They may, as an alternative, be delivered by the machine to a conveyor, which in turn delivers them to the stock piles for use in the cupolas. The chains travel at the rate of 20 ft. per minute, and the chills are spaced 12 in. center to center, so that each chain delivers 20 pigs per minute, weighing on the average 110 lbs. each; and thus it will be understood how very efficient this machine is and what

capacity. The tapping hole is stopped up after the cast by means of a steam tapping-hole gun. It is suspended from a small jib crane attached to one of the furnace columns, and can be swung out of the way when not in use.

When the iron from the furnaces is to be used direct in the steel mill without remelting, the ladle cars containing the molten metal are taken to the mixer building, which contains a large mixer or storage tank which is capable of holding 300 tons of molten iron. Here the ladles are lifted off the cars by an overhead electric traveling crane, and the iron is poured into the tank, which serves the double purpose of a reservoir from which the steel works can draw their supply and also of insuring a very much more uniform grade of iron, since all casts are mixed together. The mixer itself can be tilted by hydraulic cylinders to pour the iron into the steel works ladle. The iron is kept from chilling by means of fuel-oil burners inserted in the doors placed on the center of rotation and in the pouring spout.

Furnace No. 1 was put in blast July 5th, 1899, and blown out July 14th, 1900; furnace No. 2 was blown in August 23d, 1899, and put out of blast July 19th, 1900. During these periods No. 1 made 162,687 tons of iron, and No. 2 made 132,290 tons. They were seldom worked to their full capacity. The lines of the furnace walls are obtained by actual measurement immediately after cooling off; measurements were taken at four points of the compass, as indicated in the figures. The diameter of the bosh had increased considerably for the short blast; bronze plates in place of the cast-iron coolers would probably have held the lines better at this point, and several new furnaces are being so equipped. The cast-iron rings protecting the stock lines were found to be badly warped inward; in many cases they had drawn the brickwork with them. This was probably caused by the high temperature at the furnace top when blowing out. However, it is very doubtful as to whether these rings are of any practical value. If they are used at all, they should be made light enough to prevent their warping from drawing the brickwork. There was a good deal of wear on the stock lines; but with unprotected walls this would be evenly distributed all the way round, and the movements of the stock would probably be more regular on account of having no projections on the walls. The action of the bell and seal was very satisfactory.

The operators' houses were originally placed over the incline on each furnace top, which necessitated keeping two men in each house on account of danger from escaping gases, but later a single house was placed on the center of the stove platform, from which the bell apparatus for both furnaces was operated with much less expense and greater immunity from danger. The furnace top is equipped with six explosion doors placed directly under the platform. This proved to be a serious defect, as whenever gas leaking from these became ignited the mantel and platform were often badly warped by the heat; and in one instance the frame carrying the incline was also badly bent. This demonstrates the necessity of carrying the explosion-door frames out from the furnace clear of everything. The surfaces in this case were machined, and the door and frame brick-lined. The value of asbestos packing for doors that open frequently is very doubtful, as it soon becomes dry, hard and lifeless, which makes the prevention of leakage impossible. In another of the large furnaces recently built in this country the joints of the furnace-top explosion-doors were simply plain, flat, machined surfaces.

The cooling system of the hearth jacket was soon rendered ineffective by the stopping up of the pipes, due to leakages and small break-outs of slag from the bosh walls, which made it necessary to spray water on the outside of the jacket. The depth of the jacket is also unnecessarily great, and perhaps the only advantage of this type of jacket is that a section can be replaced when damaged by a breakout or other cause. The average amount of cooling water used for both furnaces was about 7,000,000 gallons per 24 hours. This includes that used in the furnace-cooling system, and in the seats and discs of all water-cooled valves. The average rise in temperature of the water was 10.5° F. From these figures we may arrive at a very close approximation of the amount of heat carried away by the water. A complete system of cast-iron runners for the hot metal was originally installed, but this was soon found to be useless and was dispensed with except at the spouts. There is a great difference of opinion in regard to the use of cooling plates below the tuyeres; many claim that the tendency to chill the iron is too great, but it may be said that they were used with very satisfactory results in these stacks.

It is remarkable to what a small extent furnace designers have been guided by experience in the construction of heating stoves. Very many of the largest furnace plants have been badly crippled for long periods of time in order to allow the stoves to be reconstructed. The points of weakness are principally found in the plates forming the lower courses, and in the weakness of the stove fittings riveted to the shell. The plates of the bottom course in the Lorain stoves were ½ in. thick, and many of these were badly cracked soon after the furnace was put in blast. All the pipe connections are made at the bottom, and that cutting away so much of the plate makes it very weak. For a stove of this size, therefore, a plate not less than ¾ in. thick should be used. The flanges of castings, riveted to the stove shells, were about 1¼ in. thick, of cast iron. Many of these were also broken by the heat—especially the gas opening door—which caused bad and annoying leaks. These fittings were replaced by heavy steel castings, and no further trouble was experienced. The stove gas burner was originally designed 22 in. in diameter, with a 10-in. air-supply pipe, and the opening in the stove was made 28 in. in diameter. This burner was found to use too much gas, so that there was not sufficient for the boilers. It was modified with very satisfactory results.

The hot-blast valve is much heavier than the one originally used. The lighter valves were a great source of trouble, and in replacing them all the cast-iron rings riveted to the shells were found to be cracked. All the castings, except the bronze water-cooled seats in the later valve, were of steel. On account of the hot-blast valve being opened and closed so frequently, and its consequently greater liability to get out of order, another shut-off valve should be inserted between it and the hot-blast main; otherwise a crippled hot-blast valve cripples the furnace,

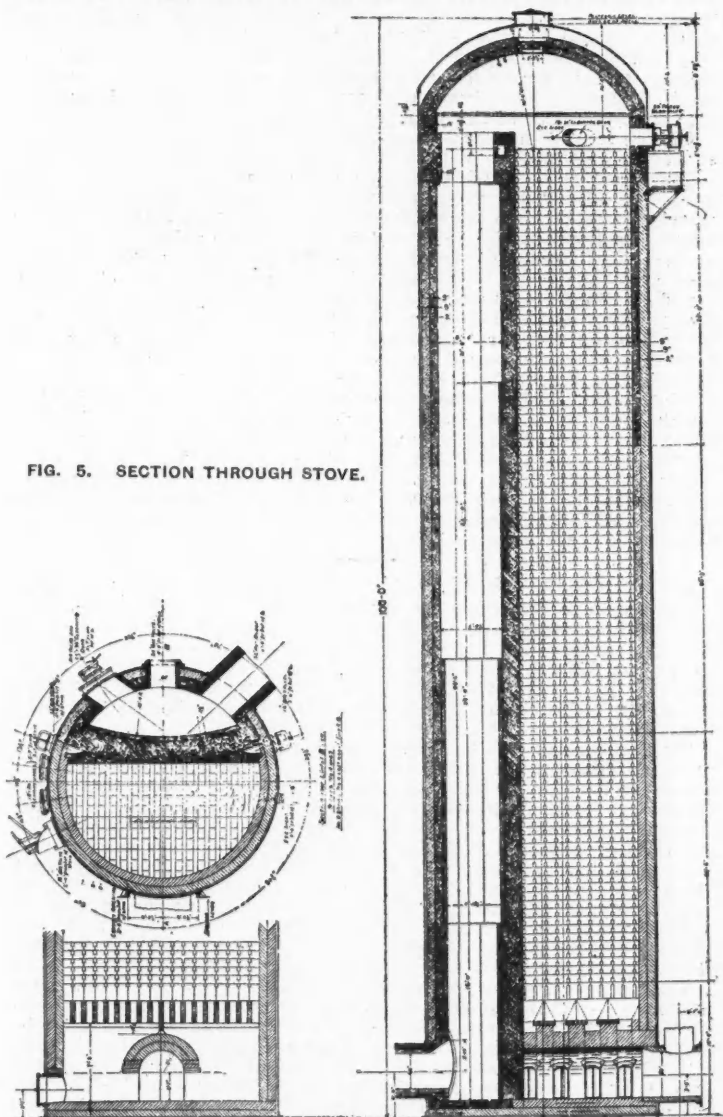


FIG. 5. SECTION THROUGH STOVE.

a great saving of labor it represents. Instead of clay washing the molds to prevent the iron from fusing with them, they are smoked by two smoke furnaces just before they pass over the tail sprockets. A set of chills will, under ordinary circumstances, last for nine months or a year. In cold weather, however, it is necessary to heat the water in the tanks, otherwise the repeated sudden and violent difference of temperature soon cracks the chills. The ladles are tipped by an electric ladle-tipping machine, from the spindle of which a connection is made with the hand wheel on the ladle car. Provision is made for casting in sand-beds at the furnaces, using the space enclosed by the retaining walls between the two stacks and opposite the stoves; but this is done only in case of accidents to the casting equipment.

Fifteen-ton ladle cars are used to convey the molten iron from the furnaces to the pig-casting machine. These stand in a row on the hot-metal track which runs along the front wall enclosing the furnace foundations, and the iron runners from the tapping holes terminate in spouts at a sufficient elevation to allow the iron to pour into the ladles. Similarly, the slag runners have spouts projecting over the cinder track, which is parallel to the end retaining wall. The cinder ladles are of 200 cu. ft. capacity, and have removable cast-iron linings, which can be renewed when worn out. The furnaces are tapped six times per day each, drawing off 100 tons of iron at each cast when working at their full

since no pressure can be carried in the hot-blast main. The longer branch made necessary by the extra valve is also of great advantage, in that more freedom is allowed for the expansion of the main.

The blast temperature could be easily raised to 1,200° or 1,300° F. with these stoves. With large percentages of soft ores in the burden, however, it is found that a high blast temperature causes a high blast pressure. A 15-in. mixing pipe, connecting the cold and hot-blast mains, was often found to be too small to reduce the hot-blast temperature by the desired amount, and a larger connection had to be made. An automatic controlling device, used with great success at another of the large furnace plants, was also contemplated. This consists of placing in the mixing pipe a butterfly valve, which is electrically controlled from the pyrometer, to keep the temperature of the blast within certain limits. The power necessary to move the valve is supplied by the blast pressure. At the plant mentioned it was found to be possible to keep the temperature of the hot blast within 5° above or below that desired.

One of the greatest sources of trouble at these furnaces was the "whipping" of the cold-blast main caused by the pulsations of the engines. This is an annoyance to which too little attention has been paid at many furnace plants, especially when it is considered how easily it can be avoided. The mistake is often made of trying to hold the pipe against these pulsations by strapping it to some solid foundation, but this can result only in loosening the rivets and causing leaks. All that is necessary is to provide a receiver of sufficient capacity to break up the column of air and absorb the pulsations.

This plant is admirably situated with respect to its ore supply, for the reason that the ore is unloaded from vessels directly to the stock piles without reshipment by rail. From the stock piles it is loaded by steam shovels into special pressed steel hopper-bottom cars of 50 tons capacity, similar to the standard steel railway cars, but much shorter. These cars are then brought to the stock bins, and their contents are dropped through the hoppers, ready for use in the furnaces. Placing the stock bins underground has the advantage that no trestle with heavy grade approaches is required, but it is very doubtful whether the great cost of construction and maintenance is fully warranted on this account, as in cold weather the ore seems to freeze in them as readily as when placed in elevated bins. Limestone and coke are received by rail, and the coke is stocked by means of a traveling cantilever crane operating a grab bucket.

In the furnace yard all the tracks are of standard gauge, and the sharpest curve is of 461 ft. radius. The hot-metal ladle car has a rigid wheel base of 7 ft. 6 in., and the 461-ft. curve has been found by experience to be about as sharp as it can round. It is very important to have the tracks carrying hot metal as free from curves, grades and other complications as possible, as a ladle full of molten metal off the track is a very serious matter. The ladle cars for hot metal are equipped with hand-tilting gear. This is an unnecessary expense and complicated for a modern furnace equipment. Wherever the ladle must be tipped—namely at the pig-casting machine, the mixer and in the ladle repair house—there are cranes at hand to do this, and the hand gear is a drawback rather than a help. Especially is this so at the mixer, where the ladles are lifted off the car and replaced thereon after pouring. A much more satisfactory ladle car would be one mounted on a pair of swiveling trucks, with simply the necessary supports to receive the ladle trunnions and a lock to prevent the ladle from tipping while in transit. A satisfactory ladle is one of the most necessary adjuncts to a modern furnace equipment.

ABSTRACTS OF OFFICIAL REPORTS.

Napa Consolidated Quicksilver Mining Company, California.

The report of this company covers the year ending December 31st, 1900. The income from sales of metal was \$205,805; interest, etc., \$6,078; total, \$211,883. The working expenses were \$167,801, leaving a surplus of \$44,082. The balance from the previous year was \$74,039, making a total of \$118,121. Dividends paid were \$50,000, leaving a balance of \$68,121 at the close of the year.

The company produced 348,075 lbs. quicksilver, as compared with 447,525 lbs. in 1899. The expenses charged included \$4,194 for depreciation and \$25,172 for development.

The report says: "Prospecting and development work have occupied our attention largely the past year, and a very large amount of new territory has been opened up with good showing. There has been a manifest improvement in the results since October and we have every reason to think this will continue. It is our practice to reduce all ores which will pay, whether high or low grade, as we encounter them in our development work, and doing the amount of development work that we have, a large proportion of the ore which went into the furnaces was of medium or low grade. We have good stopes in the property containing high grade ore. We are now opening No. 3 and No. 4 levels with good prospects. The improvement in the property has shown that we were fully justified in continuing our usual dividends and so far as we can see at present the prospects for 1901 are promising."

Sloss-Sheffield Iron and Steel Company, Alabama.

This company's report covers the year ending November 30th, 1900. The company owns extensive coal and iron ore properties in Alabama, besides blast furnaces and other iron works. Its capital account shows \$7,500,000 common stock, \$6,700,000 preferred stock and \$4,000,000 bonds. The present company was formed by the consolidation of the Sloss Coal and Iron Company with several smaller concerns.

The general account for the year shows: Profits on pig iron, \$742,852; profits on coal, \$173,718; profits on coke, \$83,163; ore sales and royalties, \$3,831; rents and store profits, \$140,789; interest and exchange, \$34,313; total, \$1,178,666. Payments were, for general expenses and taxes, \$78,242; interest on bonds, \$202,575; dividends on preferred stock, \$351,750; total, \$632,567, leaving a surplus of \$546,099. Included in expenses and deducted from the profits above are charges for depreciation calculated

at the rate of 3c. per ton of coal mined, 1½c. per ton of red ore, 3c. per ton of brown ore, and 25c. per ton of pig iron made.

There were 1,053,524 tons of coal mined from the company's properties and 367,989 tons of coke made in its ovens. The iron ore output included 129,502 tons of brown ore and 243,125 tons red ore, a total of 372,627 tons. There were 118,087 tons of dolomite mined for flux. The pig iron made was 210,268 tons.

The report says that the year was largely one of reconstruction and repair, so that production was only about 60 per cent. of the capacity. President Hopkins' report says that, bearing this in mind, "the business for the year just closed will be considered satisfactory, and this result is very largely due to the steady demand and good prices secured for our output of pig iron, coal and coke. While we may not secure as high an average market price for iron the coming year we hope by a material reduction in the cost to realize satisfactory net results per ton, and with our North Alabama furnaces in operation we will assuredly greatly increase our output, which increase we believe to be conservatively stated at from 10,000 to 12,000 tons per month."

New Idria Quicksilver Mining Company, California.

This company's report for the year ending December 31st, 1900, shows receipts as follows: Sales of metal, \$180,059; interest, \$1,280; total, \$181,339. Expenses were \$123,026, including \$19,172 for new construction and \$10,240 charged for depreciation. The surplus was \$58,313, which added to \$66,259 brought forward from previous year, made a total of \$124,572. Dividends paid were \$80,000, leaving a balance of \$44,572 at the close of the year.

The ore treated in the furnaces was 20,638 tons; the output of quicksilver was 3,990 flasks. This shows an average return of 0.74 per cent.

The report says: "During the year prospecting and developing work have been carried on very vigorously. Up to date our ore has been principally taken from above No. 4 level and we have a large quantity above this level, yet in sight, to take out. During the year we have opened No. 7 level fully and it shows the ore carrying down equally good with that above, thus giving already opened the ground between 4 and 7. No. 10 level has also been run in far enough to determine that the ore carries down there equally as good as above. Work has been done on the San Carlos end of the property during the year with favorable results and the coming year should demonstrate the value of this end of the property; the ore so far found here has been of high grade. Owing to labor troubles which lasted four months during the summer, we are unable to make our usual production of quicksilver, but with the large amount of ore in sight we felt no hesitation in continuing our usual dividends. These troubles have all been adjusted and matters are running smoothly. We have also commenced the construction of furnace No. 2 which is now nearing completion and will add considerably to our output, and the prospects for the ensuing year are very favorable."

Boston Quicksilver Mining Company, California.

The report of this company covers the year ending December 31st, 1900. The year was largely devoted to prospecting and to improving the reduction works. The financial statement shows receipts from sales of quicksilver, \$57,162; increase in supplies and material on hand, \$17,769; interest, \$1,399; total, \$76,330. The expenses were \$51,576, leaving a balance of \$24,754. From this dividends amounting to \$20,000 were paid, leaving a balance of \$4,754 on hand.

The report says: "Work has been vigorously pushed during the year, since the rainy season closed, constructing our new works and we are pleased to say that we now have our No. 2 modern furnace about completed, and it will go into commission early in the year. We shall immediately remodel the old one which we have been using meanwhile, and the two combined will handle upward of 100 tons of ore per day. No. 2 shaft has been sunk to a depth of 400 ft. and levels run at each 100 ft., and our ore developments have been very good indeed, the ore running of good grade. No. 1 shaft has been reopened and entirely re-timbered below the fifth level, old drifts cleaned up and new drifts run showing a large amount of ore in sight. We have a complete hoisting plant at both shafts. A new tram has been built to the furnaces for automatically conveying the ore and everything in and around the mine put in good condition so that we have prospect before us for a prosperous year in 1901. At the 300-ft. level, upon running a crosscut to the east to sandstone hanging wall we encountered a flow of oil and at the 400-ft. level another crosscut to the east found oil again. The oil has been flowing continuously since. We have previously called the attention of the stockholders to the fact that we propose drilling for oil in the sandstone formation to the east. That part of the work will be carried on vigorously the coming year. We are pleased to report such satisfactory progress, and although the delay has been long owing to unavoidable difficulties, we feel now that they are successfully surmounted."

PIG IRON IMPORTS IN GREAT BRITAIN.—Imports of pig iron into Great Britain for the three months ending March 31st were: From the United States, 24,623 tons (12,786 tons, 1900); Sweden, 11,607 tons (8,115 tons, 1900); other countries, 2,498 tons (1,088 tons, 1900); total, 38,728 tons, against 21,989 tons. The total increase this year was 16,739 tons, or 76.1 per cent. This year 63.6 per cent. of the total was from the United States, against 58.1 per cent. last year.

IRON ORE IMPORTS OF GREAT BRITAIN.—Imports of iron ore into Great Britain for the three months ending March 31st were, in long tons:

	1900.	1901.	Changes.	Per cent.
From Spain	1,481,623	1,115,304	D. 366,319	24.7
From other countries.....	221,542	203,263	D. 18,279	8.2
Totals	1,703,165	1,318,567	D. 384,598	22.6

Spanish ore was 84.6 per cent. of the imports this year, against 87.0 per cent. in 1900.

A SIMPLE CONNECTION BETWEEN TURBINES AND GENERATORS.

By Albert B. Herrick.

In modern engineering the tendency is to simplify the connection between the prime mover and the electric generator. This has been carried out in steam-engine practice, but up to the present date, except in one instance, the connection between the water-wheel or turbine and

connection to the turbine. The first is the flexible feathered coupling on the shaft between the turbine and generator, which allows free longitudinal play, as the generator is independently supported on its own thrust bearings and is self-contained; the shaft of the turbine may be varied in length, depending upon the head of water, either having the generator over the penstock or over the head of the tail race, the flexible coupling taking care of any expansion or contraction of the shaft without throwing any compression strains on the turbine shaft. The thrust bearing of the generator is formed of a number of annular

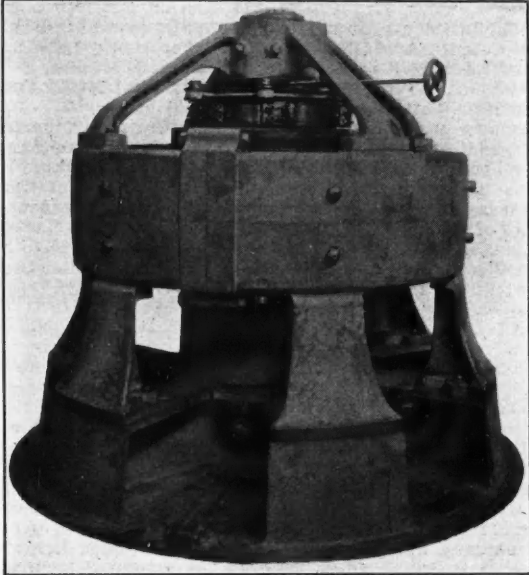


FIG. 2.

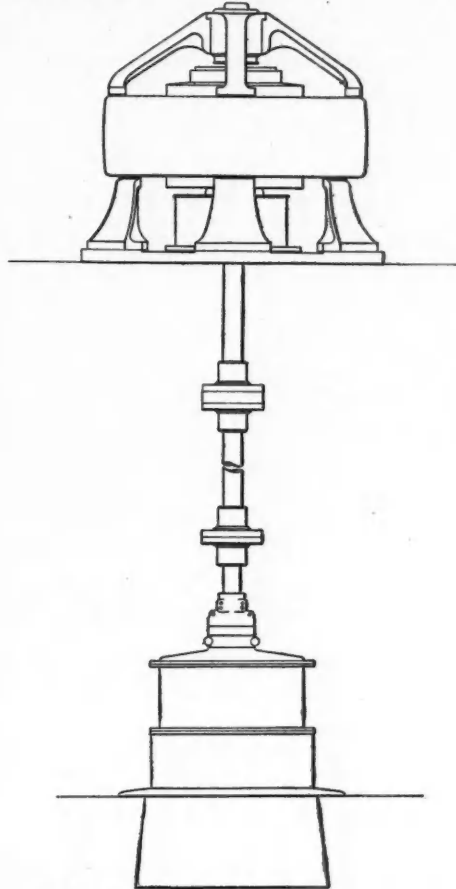


FIG. 1.—THRESHER CONNECTION BETWEEN TURBINE AND DYNAMO.

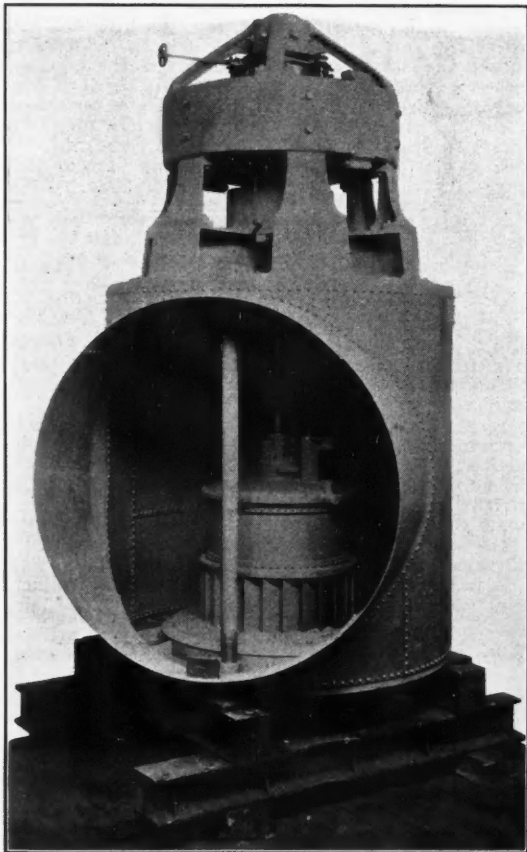


FIG. 3.

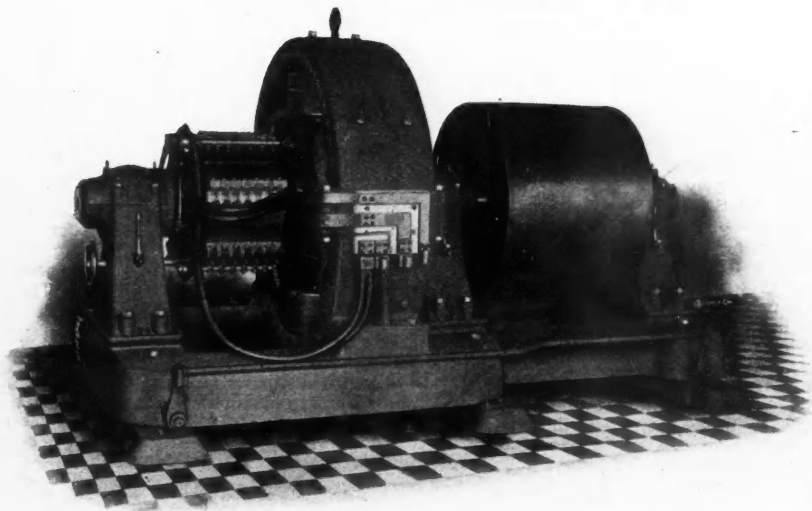


FIG. 4.—THRESHER DYNAMO.

the generator has not been reduced to the simplest mechanical connection. In the ordinary plant are found bevel gear or belt connections, both of which absorb a useful part of the power developed by the water-wheel. The Thresher Electric Company, of Dayton, Ohio, has developed a novel form of generator which is an integral part of the turbine. The advantages of this simple form of connection are that it reduces the gearing friction, which amounts to about from 18 to 22 per cent., and in case of belting, from 15 to 19 per cent. The loss in friction is a constant waste in the transmission of the power from the turbine to the generator which it drives.

Fig. 1, herewith, shows the complete turbine, with its generator, and in the same general plan of the method of connection between the shaft of the generator and the turbine. There have been several very ingenious principles involved in the construction of this generator and

rings around the generator shaft, which bears on a number of babbitted projecting surfaces. These surfaces and rings are enclosed in an oil bath, which is again surrounded by a water jacket, but the lower and upper bearings are overhung, having a heavy umbrella-shaped form which projects into the oil pocket holding the lubricant. This pocket is provided with oil-circulating ducts, so that the oil is kept in constant circulation, and being surrounded by a water jacket, keeps it cool.

Fig. 2 shows the general arrangement of this turbine and the generator which it drives, showing the character of the oil pockets and bearings used. No oil can possibly get down the shaft, and perfect alignment is provided for the armature. Fig. 3 shows a large view of the generator mounted on pedestals, which, in this case, were the top of the turbine itself, the head in this case being only about 15 ft.

This generator was made by the Thresher Electric Company for the

Massachusetts Chemical Company, for its plant at Walpole, Mass. There were two sizes of generators used in this plant—one 80 kilowatts, 150 revolutions, at 600 volts, and the other 125 kilowatts, 200 revolutions, at 600 volts. The turbines used in this plant were manufactured by the Stillwell-Bierce & Smith-Vaile Company.

It may be expected that in regulation a simple arrangement of this kind will be superior to one employing belting or gearing devices, for the reason that the regulation depends largely on the inertia of the moving parts, and the simpler the moving parts are made and the less inertia to the total revolving mechanism, the more responsive and sympathetic will be any governing device connected to the gates regulating this turbine. Anyone who is familiar with the noise and vibration caused by gearing from turbines to horizontal machines, will readily see the value of this simple arrangement of parts, which gives also a higher efficiency in transmission and is adaptable to more perfect regulation of speed for variable loads. Taking less space and smaller foundation areas, no provision is made for any movement of the commutator along the length of the brushes, as the generators made by this company do not require lateral movement of the commutator to produce uniform wear. It is certainly interesting to note such a simple solution of a mechanical problem, which replaces a much more complex and inconvenient system in the older methods of installing this class of machinery.

We also give herewith, in Fig. 4, a photograph of a dynamo of a type built by the Thresher Company for use in generating plants operated by steam engine or other motive power.

URANIUM IN COLORADO.

In the report of Mr. Harry A. Lee, Commissioner of Mines of Colorado, we find some interesting particulars in relation to uranium ores, which we reproduce below. They will serve also as answer to many inquiries which are received in relation to the ores of this metal.

The discovery of uranium in Colorado was made by Dr. Richard Pearce, of Denver, in 1871. The mineral was pitch-blende, or uraninite, and occurred in the Wood Mine, Russell District, Gilpin County. Later the same mineral was found in limited quantities in properties near the Wood Mine, notably the Kirk and the Alps.

In 1897 a new mineral was discovered by Charles Poulot, near Paradox Valley, in Montrose County. Through his efforts an analysis was made by Messrs. Fridel and Cumenge, and by them named carnotite, after Carnot. The production of carnotite in Montrose County attracted the attention of prospectors, since which time various samples of uranium minerals have been brought the Bureau of Mines, purporting to be from various sections in Routt, Rio Blanco, Montrose, San Miguel, Dolores, Montezuma, La Plata, San Juan, Ouray, Hinsdale, El Paso and Teller counties.

The pitch-blende of Gilpin County occurs in a fissure vein between granite-gneiss walls. This vein was originally located and worked for gold values. The carnotite and allied minerals of Montrose County are found in the Jura-Trias, either as the partial filling in small gash veins or veinlets formed by dynamic action or shrinkage, or distributed along the bedding or contact planes. These locations in Montrose County were originally made for supposed gold-silver-copper values.

So far as investigated by the writer, the uranium minerals occur in somewhat limited quantities. In addition the deposition may be termed erratic. In the fissure veins these minerals occur in lenticular bodies, replacing in part other minerals. These bodies are found at unequal and unknown intervals along the veins, and in amounts varying from a small pocket of a few pounds to a body of 30 ft. long, 10 ft. high, by about 10 in. thick. This latter reported by Dr. Pearce and as yet is the largest body developed. In Montrose County the uranium minerals are more easily traced on account of the bright canary-yellow color. Some fair-sized ore bodies have been developed, but in the main the amount of ore found in exploiting is somewhat limited as compared with the necessary expenditure of labor.

Some two years ago the writer's attention was called to a deposit of uranium in San Miguel County, near Placerville. Casual investigation showed a well-marked deposit in a stratum of Jurassic sandstone. Near bottom of stratum the canary-yellow color was very noticeable, and in places what appeared to be carnotite, from $\frac{1}{4}$ to $\frac{1}{2}$ in. thick, was found. Above this the sandstone was permeated with a mineral that gave the rock a peculiar greenish color, this color gradually reducing as distance from bottom was gained. Samples were taken at various points and were later transmitted to Dr. W. P. Headdon, chemist at the State Agricultural College at Fort Collins. Some time later Dr. Headdon made an oral report of his examination to the Colorado Scientific Society, stating that he found uranium and vanadium, with allied minerals, to exist in appreciable if not in commercial quantities. This deposit is quite extensive and may prove of great commercial value. Other duties have prevented Dr. Headdon from completing his investigation, which is to be regretted.

The uses of uranium, though at the present time limited, are of considerable importance as an alloy; it is used in the manufacture of a yellow fluorescent glass, which chemically arrests active rays. It is also used in photography and for producing black tints in porcelain painting. In the form of carbide it has a higher fusing point than platinum, and may come in use for pyrometers and similar instruments. It also makes an excellent alloy with steel, and may eventually replace nickel and tungsten in the manufacture of guns, armor plates and high class steels. Although some of the leading steelmakers of Europe and England have so far made public the result of experiments with uranium as to state that the addition of a small percentage of the mineral increases the elasticity and hardness of steel, the use of uranium for the purpose appears to have not yet been fully determined upon.

The value of uranium is comparable to that of all other metals, the price being governed by the law of supply and demand. Until comparatively recently the demand has been only enough to provide for consumption as a pigment. The quantity thus consumed was quite limited and the price has been proportionately high. During the past few years consumption in experimental tests has increased the demand, but so far the supply has apparently been equal to the changed condi-

tions. As an evidence of market conditions, the pitch blende procured by Dr. Pearce in the early '70s glutted the market, and not until a few years ago was the bulk of the mineral marketed by him. This lot is reported to have sold for \$10 per unit, and to have contained 53 per cent., or 53 units per ton. So far as known by the bureau, all the uranium produced has been marketed in France or England, France being the largest buyer.

The Colorado production of uranium ore, 1897-1900 inclusive, was as follows: 1897, 17 short tons, value \$9,010; 1898, 33 tons, value \$16,500; 1899, 43 tons, value \$21,500. The production for 1900 is reported as follows: Gilpin County, 13,155 lbs., average 16 per cent. uranium oxide; Montrose County, 2,000 lbs., average 16 per cent.; 1,500 lbs., average 15 per cent.; 140,000 lbs., average 5 per cent.; 60,000 lbs., average 6 per cent.; 90,000 lbs., average 10 per cent.; or a total for Montrose County of 293,500 lbs. Total for the State, 306,655 lbs.

The manager of the Black Prince mine at Uranium, Montrose County, reports in addition to above, 100 tons of uranium ore on hand, containing 3 per cent. to 5 per cent. uranium oxide. The value of the 1900 production has not been determinable. At the present time uranium ores are being bought in Denver and paid for in accordance with the percentage of uranium oxide contained. Ores carrying 8 to 10 per cent. uranium oxide, \$17.50 per unit; 10 to 15 per cent, \$18; 15 to 20 per cent, \$19; 20 per cent. and over uranium oxide, \$20 per unit. Uranium ores at present find a ready cash market at above rates.

RECENT DECISIONS AFFECTING THE MINING INDUSTRIES.

Specially Reported for the Engineering and Mining Journal.

EMPLOYER NOT LIABLE FOR NEGLIGENCE OF TUNNEL BOSS.

—Where one was employed in removing rock from the floor of a tunnel, and a large rock was thrown down by blasting, and the loose rock surrounding and supporting such stone formed the material on which such party and others were engaged, and the act of one of such employees, who was tunnel boss, caused the large rock to fall on the other employee, injuring him, the tunnel boss in such employment, being a fellow servant, and not representing the employer in providing the safe place in which to work, relieved the employer from liability for the accident.—*Ross vs. Union Cement and Lime Company* (38 North-eastern Reporter, 500); Indiana Court of Appeals.

OIL LAND LOCATIONS IN CALIFORNIA.—In Washington, April 25th, the Secretary of the Interior gave his decision in favor of the Kern Oil Company and the Gray Eagle Oil Company in the two cases instituted against them separately by C. W. Clarke in the Kern River Oil District, California. Clarke is the forest lieu land selector in each case, and the two companies named are the mineral claimants in oil land litigation which has attracted great attention in California.

The decisions are on test cases, there being many similar cases pending in the General Land Office. The two companies asserted their right under the Placer Mining law and Clarke claimed title under the forest reserve lieu selections under the Act of June 4th, 1897. The decision lays down these points:

"That where a person making selection under the Act of June 4th, 1897, has complied with all the terms and conditions necessary to entitle him to a patent to the selected land, he acquires a vested interest therein and is to be regarded as the equitable owner thereof;

"That the right to a patent under the act, once vested, is, for most purposes, the equivalent of a patent issued, and when in fact issued, the patent relates back to the time when the right to it became fixed and takes effect as of that date;

"That questions respecting the class and character of the selected lands are to be determined by the conditions existing at the time when all requirements necessary to obtaining title have been complied with by the selector, and no change in such conditions, subsequently occurring, can affect his rights."

Each decision holds that the forest reserve lieu land selector never has perfected his selection and that the lands now being admitted to be of great mineral value he cannot be permitted to perfect the selections, because to do so would be to permit the selection of mineral land. The selections, accordingly, are rejected.

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.)

333.—Ruby Silver.—The Minnesota Mine at Chloride, Mojave County, Ariz., has turned out some good specimens of ruby silver.

334.—Calomel.—This mercury chloride is stated to be found in ores taken from the Terlingua Quicksilver Mines at Terlingua, Tex. It occurs in minute particles, but in sufficient quantities to make good specimens. The mineral has never been found in the United States before. It occurs at the Almaden Mine in Spain and the Idria Mine in Austria, and has been found near Zimapan, Queretaro, Mex.

335.—Supposed Graphite.—J. W. T.—The specimen is not graphite at all. It is a much altered rock, a saprolite. It may have been a schist originally.

336.—J. W. C.—The specimen is not phosphate rock. It is a limestone containing considerable bituminous material. It does not carry more than a slight trace of phosphoric acid.

337.—Graphite.—P. & M.—The samples are graphitic schist rather

than pure graphite. Such material is not valuable. It might be used for making paint.

338.—A correspondent asks for a book on geology for beginners, also for works on mineralogy. Standard text books of geology are Dana's "Manual of Geology," price \$5, and Leconte's "Elements of Geology," price \$4. The former is the more exhaustive, the latter is perhaps easier reading. Dana's "Text-Book of Mineralogy," price \$4, is about the best treatise on crystallography and mineralogy, at least for those desiring a comprehensive book. For determinative work with the blow-pipe, Brush's "Determinative Mineralogy," price \$4, is as good as anything. An excellent work for the more important minerals, all that would ordinarily interest the mining engineer, is Moses & Parson's "Mineralogy and Crystallography," price \$2, while for a condensed scheme Crosby's "Tables for the Determination of the Common Minerals," price \$1.25, will be found valuable.

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.)

Cadmium.—Can you state the average quantity of cadmium imported into the United States yearly, either as metal or in the form of cadmium salts?—C. D.

Answer.—We have found it impossible to obtain statistics of the quantity of cadmium used or imported into this country. The quantity is small, and it is always classed among "other chemicals," not being of sufficient importance for a separate statement. Even in Germany, where nearly all the cadmium used is made, no separate account of the quantity exported is kept. The production in that country during the past three years has been between 12,000 and 15,000 kgs. yearly. Even dealers in cadmium and cadmium salts are unable to give more than a guess at the quantity imported.

Use of Charcoal as Fuel in Copper-Matte Smelting.—Are you acquainted with any literature or records of actual experience on the subject of running a copper blast furnace utilizing charcoal as fuel? If so will you be so kind as to refer me to them? About how much charcoal would be required to do the same work as coke?—O. W. K.

Answer.—Recent metallurgical literature is silent as to the use of charcoal in copper-matte smelting, probably because there is so little occasion for its use in up-to-date smelting practice. Peters, in his treatise on "Modern Copper Smelting," Hixon on "Lead and Copper Smelting," and Lang on "Matte Smelting" aim to give results of the experience in the best practice. We are of the opinion, however, that a reply to the inquiry of our correspondent will be of interest and value to a good many of our readers, inasmuch as there are many out-of-the-way places where charcoal is the only available fuel and ores can be smelted advantageously therewith, although the results as to cost per ton and percentage of metal recovered may not be so high as at works situated favorably with respect to all conditions. We are of the opinion, however, that there is no criterion of metallurgical practice, except that the best is the one which will return the most profit at each particular place.

Theoretically charcoal is a better fuel than coke, inasmuch as it contains a much lower percentage of ash, or in other words a higher percentage of carbon than the best coke, and a pound of solid carbon, whether it be in the form of charcoal or coke, has the same calorific power. There are practical reasons, however, why the theoretical superiority of charcoal is offset by the physical advantages of coke, wherefore coke is generally employed for blast furnace smelting wherever it is available.

As regards porosity charcoal is the better fuel, consisting of a large number of small cells, and on that account being capable of quick oxidation without the requirement of a high blast, which is an advantage. Its porosity also gives it a greater bulk than coke, thus making the charge looser, which is favorable to quick smelting. Furthermore its low percentage of ash saves in the cost of fluxing.

The great disadvantage of charcoal is that very few kinds are capable of sustaining a heavy burden, and because of its fragility it breaks up and crumbles in the blast furnace, the more so the higher the column of charge and therefore the pressure upon it. Fine charcoal is not only worthless as a fuel, but is also a bad conductor of heat; it leads to unclean slags and furthermore causes loss in metal by increasing the quantity of fine dust. The height of charge that can be borne varies greatly according to the kind of charcoal, but in all cases it is less than with coke.

Nut pine (pitch) charcoal is the best, but it must be well burned. Charcoal from lighter woods, such as yellow and white pine, quaking aspen and cottonwood cannot be used alone in the lead blast furnace (in which the height of charge is greater than in copper-matte smelting) and even when mixed with coke only a small percentage of charcoal is allowable; some metallurgists condemn it entirely. Mesquite makes a good charcoal, but it is obtained with difficulty in large pieces. Charcoal from hard woods, such as mahogany, cedar and oak, decrepitate in the furnace. (Hofman, "Metallurgy of Lead," Fifth Edition, p. 299.)

Another objection to the use of charcoal as a fuel is its tendency to absorb water. In burning it the water which it contains must be evaporated, and in so far as the calorific power of the fuel is consumed for that purpose its efficiency for other purposes is diminished. Inasmuch as 1 lb. of carbon is capable, theoretically, of evaporating only about 15 lbs. of water, from and at 100° C., the loss of efficiency caused by water in charcoal can be readily calculated. When charcoal is exposed to the open air for any considerable length of time it breaks up and the pro-

portion of fines increases, and to prevent deterioration in its quality it must not be exposed to the sun and should be stored in covered sheds.

Practically charcoal is an entirely feasible fuel for copper-matte smelting in the blast furnace, where coke is unavailable, and no one need fear failure in planning a smelting process on that line. We are unable to inform our correspondent what percentage of charcoal would be required as compared with coke, because we are unacquainted with any determinations of the respective quantities in practical working under the same conditions; anyway such a comparative determination would be of little value as a guide, because of the multitude of conditions, such as the physical character of the coke and charcoal, their chemical composition, character of the ores to be smelted and composition of the slags made, percentage of concentration of the ore into matte, etc., which would affect the results. We may say, however, that we are acquainted with the details of a copper-matte smelting process, in which charcoal alone was used as fuel, wherein the proportion employed varied from 12 to 20 per cent. of the weight of the charge. The charcoal was not of very good quality, containing a large proportion of fines and sometimes a good deal of water. An actual determination once showed the presence of 40 per cent. of water and even then the sample was not apparently damp. The higher percentage of charcoal was employed when its quality was poor and the slags were rather difficult; the lower percentage with charcoal of better quality and easier slags. All conditions being favorable, the smelting could be done with 12 to 14 per cent. of charcoal. The furnace was blown at 6-oz. pressure, with a column of charge 5 to 6 ft. in height. The ore had been roasted previously down to about 9 per cent. sulphur. In the blast furnace there was an oxidation of about 60 per cent.; that is, 60 per cent. of the sulphur in the charge was burned off as sulphurous and sulphuric anhydrides and only 40 per cent. went into the matte.

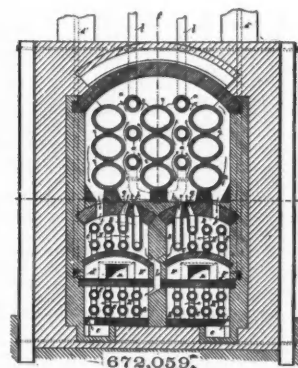
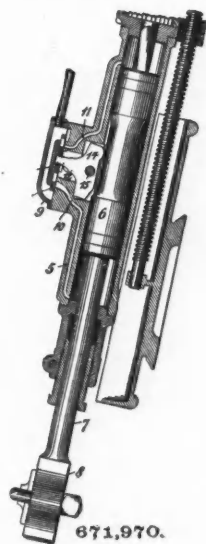
PATENTS RELATING TO MINING AND METALLURGY.

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 April 16th, 1901.

- 671,805. REVERSING MECHANISM FOR ENGINES. Henry Phillips and William E. Hunt, Ottumwa, Iowa. The combination in an engine of a valve-operating mechanism and a reversing device therefor having as elements a cylinder and piston, a throttle valve having a casing with two ports, and a valve with opening which may be moved into register with either of said ports, or out of register with both, and pipe connections between said ports and the opposite ends of the reversing cylinder, and also with the valve chest or chests of the engine.
- 671,970. ROCK DRILL. Henry Koch, Tarrytown, N. Y., assignor to Rand Drill Company, New York, N. Y. The combination with a cylinder, a piston, a distributing slide valve, and valve-operating mechanism which operates the valve at certain points in the stroke of the



piston, but leaves the valve free to move at other periods in the operation thereof, of means for balancing the valve and for holding it against accidental movement, due to its own weight, at times when it is not held or positively actuated by the valve-operating mechanism.

- 671,980. DRIER AND PULVERIZER. Benjamin B. Snyder and Jonas J. Seldner, Baltimore, Md. The combination with a cylinder, of a feeding and pulverizing screw arranged within and resting throughout its length upon the cylinder, the diameter of the screw being less than that of the interior of the cylinder, so that it can move radially thereof, and means for turning the cylinder.
- 671,988. METHOD OF TREATMENT OF AMALGAM CONTAINING COPPER OR PRECIOUS METALS. Joachim H. Burfeind, Salt Lake City, Utah, assignor to Windfield S. Keyes, Butte, Mont. The method of treating amalgams containing copper and precious metals consists in adding sulphur to the amalgam at a temperature not exceeding the boiling point of water, and separating from the amalgam the copper sulphur formed.
- 671,989 and 671,990. FEED MECHANISM FOR FURNACE. Samuel E. Diescher and Alfred J. Diescher, Pittsburg, Pa. The combination of a series of independent carrier blocks or shoes adapted to carry the article to be heated, and reciprocating mechanism for shifting said shoes or blocks step by step into and out of the furnace.
- 672,032. ARC-LAMP CARBON. Herbert A. Couchman, Burton-on-Trent, England. An arc-light carbon having a core composed of lime and silicate of alumina.
- 672,039. EXCAVATOR. George W. King, Marion, Ohio. An excavator pro-

vided with the following: A downwardly and outwardly-sloping beam provided with two channels or ways formed at opposite sides, respectively, of the beam and longitudinally of the latter; the excavating shovel held to and movable endwise of said track, and arranged to excavate in the direction of the body portion; apparatus for actuating the shovel along the said ways, and inclines or guides forming an extension of the lower ends of the said ways.

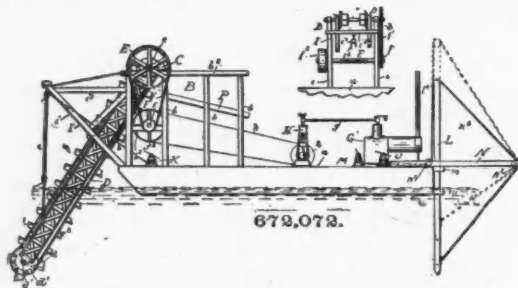
- 672,064. **ELECTRIC CRUCIBLE FURNACE.** Guillaume de Chalmot, Holcombs Rock, Va., assignor to the Willson Aluminum Company, New York, N. Y. An electric furnace comprising a furnace body or shell forming a chamber within it, a crucible suspended within said chamber, the chamber being materially larger than the crucible to form a heat-insulating space around the latter, a carbon support for said crucible making circuit connection therewith, said support connected to one terminal of the circuit, and a carbon electrode adapted to make contact with the lower part of said crucible and connected to the other terminal of the circuit and movable so that it may be fed toward the crucible as it is consumed.

- 672,069. **RETORT OVEN FOR RECOVERY OF AMMONIA.** Otto von Gliese, Hamburg, Germany. The combination with an upper chamber containing decomposing retorts and gasifying retorts, of a lower chamber containing air and gas tubes for supplying a combustible mixture to said upper chamber, a calcining furnace located in said lower chamber and dividing it into an upper and a lower section, and means for carrying the products of combustion back through the sections of said lower chamber and past said calcining furnace.

- 672,065. **APPARATUS FOR OXIDIZING ORE.** Henry C. Lawrence, Denver, Colo., assignor of two-thirds to W. B. Putnam and Roland E. Bruner, Kansas City, Mo. The combination with a furnace, a rotating ore drum, a passage communicating between said furnace and said drum, and a feed chute communicating with said passage, of a conical casing arranged in the furnace and having its smaller end seated in said passage, and a steam pipe extending into and terminating in said casing, whereby an injector blast is delivered upon the ore as it is fed into said passage.

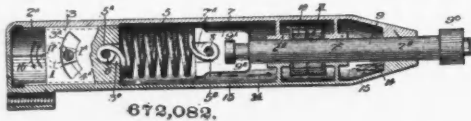
- 672,067. **ELECTRIC FURNACE.** Francis J. Patten, New York, N. Y. An electric furnace provided with two or more furnace floors or hearths having each the form of a sector of a circle, all pivoted to a common upright support or column, and revoluble about the latter in a horizontal plane in combination with electrodes co-operating with the furnace floors.

- 672,072. **MINING DREDGE.** William T. Urie, Kansas City, Mo. The combination with a boat, of guide boxes upon the end thereof, having openings and a non-rotating spud or spar within the openings in



said boxes, said spud having a longitudinal groove, an elevating cable connected with said spud within said groove, and a pulley upon said boat, in the path of the spud operating the cable.

- 672,082 and 672,083. **ROCK DRILL.** Louis T. Sicka, Denver, Colo. The combination with an inclosing case, a shaft journaled in one end thereof, a cross-head mounted to slide in said case and connected by a link to a crank on the shaft, a U-shaped spring secured to the cross-head and extending lengthwise within the case, a plunger



rod mounted to slide within the case lengthwise of and with its ends between the arms of the spring, a swiveled collar encircling the neck of the rod so as to permit it to rotate, and a pivoted link connection between the collar and the free end of the spring arms.

- 672,097. **WELL-BORING APPARATUS.** Fred A. Eastman, Litchfield, Minn. The combination with the well tube having a cylindrical strainer about its lower end, a shoe permanently secured below the strainer, a tubular attachment adapted to be secured in said coarse thread, and having an upwardly-spring-closed valve and cylindrical sharp projection or extension at its bottom end.

- 672,154. **TOOL FOR REMOVING BROKEN SUCKER RODS FROM WELLS.** Charles O. Taylor, Petrolia, N. Y. The combination with a tube adapted to be lowered into the well, of a supporting rod arranged in said tube and separated therefrom by an intervening space which receives the end attachment of a broken sucker-rod section, and a movable gripper attached to said supporting rod and arranged to clutch said end attachment to said tube.

- 672,198. **INGOT STRIPPER.** Samuel S. Wales, Munhall, Pa., assignor to Olive L. Wales, same place. The combination with means for supporting a mold, of a ram adapted to enter said mold and having an exteriorly-threaded portion, a platform through which said ram reciprocates, and rotatable means carried by said platform to engage the threaded portion of said ram for reciprocating the same.

- 672,210. **METHOD OF MAKING SILICOFLUORIDES.** Carl Enoch, Hamburg, Germany. The process of recovering silicofluoride of sodium from waste waters containing hydrofluoric acid, which consists in adding a reagent capable of forming silicofluoric acid, then adding solid sodium chloride, thereby precipitating gelatinous silicofluoride of sodium.

- 672,223. **CRUSHING MACHINE.** Henry H. Boggs, Syracuse, N. Y. The combination with a supporting frame and main shaft, of a pair of oppositely-disposed vertical parallel plates pivoted to said frame, a jaw secured to the pivoted ends of said plates, a pair of arms extending from the other ends of the plates, an opposing jaw pivoted to the frame and movable between said plates.

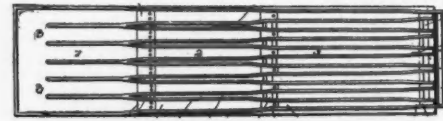
- 672,240. **MANUFACTURE OF BRICKS, TILES, SLABS, ETC.** John Saunders, Hove, England. A composition for bricks, tiles, etc., consisting of about 16 parts of sand, 1 part of Portland cement and 0.1 part of alum.

- 672,245. **ROLLING MILL.** Ephraim Truxall, Pittsburg, Pa. A pair of rolls arranged to receive the metal between them, a positive driving connection for the lower roll, and belt-driving connections from the

driving mechanism of the lower roll through a counter shaft to the upper roll.

- 672,247. **DREDGING APPARATUS.** Harry R. Wheeler, Brooklyn, N. Y., and George J. Mashek, Newark, N. J.; said Mashek assignor to said Wheeler. The combination with a suitable support, of a suction pipe arranged to engage a water-covered bottom, two or more vacuum pumps connected to said suction pipe to effect a continuous discharge of material.

- 672,298. **TROUGH CONCENTRATOR.** Charles A. Taylor, Leadville, Colo. An ore concentrator comprising a table, a series of troughs on said table, each trough having side plates perpendicular to the table, the side plates of each trough being relatively parallel at a



672,298.

plurality of points throughout the length of the table, whereby the space between such plates is greater at one end of the table than at the other, outlet openings being formed in each trough between the several adjoining parallel portions of the side plates.

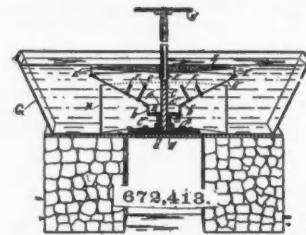
- 672,309. **PROCESS OF LOCATING METALLIC MINERALS.** Fred H. Brown, Los Angeles, Cal. The process of locating metallic or other conducting substances in the earth which consists in successively causing direct extra electrical impulses to traverse successive different definite lengths of earth forming part of a circuit superimposed upon an electrically-energized closed circuit; measuring the resistance thereof, then repeating the measurements, and finally comparing the resistances.

- 672,351 and 672,352. **COMPOSITION OF MATTER AND PROCESS OF FORMING IT.** Lewis A. Brown, St. Louis, Mo., assignor of one-half to Dwight Tredway, same place. A composition, consisting of sand 60 per cent., cement 10 per cent., sulphur 20 per cent., lampblack 5 per cent., and coloring matter 5 per cent.

- 672,358. **ENDLESS-BELT CONVEYOR.** James M. Dodge, Philadelphia, Pa., assignor to the Link Belt Engineering Company, same place. The combination of a single endless conveying belt, guides therefor whereby the carrying-run of the belt is curved from a horizontal point to a point beyond the vertical, with means for driving the belt at such a speed that the material placed upon the belt at the base of the conveyor will be elevated thereby due to centrifugal action and adhesion and will be discharged from the upper end of the conveyor.

- 672,381. **HEATING FURNACE.** Alexander Laughlin, Sewickley, Pa. In a continuous heating furnace having billet bearings extending longitudinally thereof, and having a heating chamber adjacent to the drawing or discharge end of the furnace, and a preheating chamber adjacent to the charging end, a roof formed in two sections, the section above the heating chamber being downwardly curved in the direction of its length in that portion remote from the point of discharge, and the section above the preheating chamber approximately parallel to said bearings, and a drop or depressed portion in the roof intermediate said sections.

- 672,413. **GOLD-SAVING APPLIANCE.** Thomas J. Burke, Los Angeles, Cal., assignor to William A. Russell and William E. Kinsey, same place. In a portable gold-saving apparatus, the combination with a base provided with a vertical journal pin; of a funnel-shaped pan provided with a hollow standard and journaled upon the pin, said



standard projecting above the top of the pin and being provided with a removable handle; pins rigidly secured to the edge of the pan and projecting above the top thereof; a perforated screen removably mounted on the standard and having its periphery rigidly and removably secured to the pin on the pan; and a removable collar upon the standard below the central portion of the screen.

- 672,421. **LOADING MECHANISM FOR CONVEYERS.** Augustus L. Le Grand, West Pittston, Pa. The combination with a conveyor comprising a series of pivoted buckets, of a guard-carrier provided with a series of guard plates, each arranged for engagement with the adjacent edges of a pair of buckets to cause the guard carrier and conveyor to move in unison, and auxiliary connecting devices for effecting the connection of the guard carrier and conveyor, said auxiliary devices, disposed in alternating arrangement with the guard plates.

GREAT BRITAIN.

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

Week Ending March 23d, 1901.

- 3,001 of 1900. **SULPHATE OF AMMONIA RECOVERY.** E. G. Scott, London. Method of treating ammoniacal liquors to obtain sulphate of ammonia.
- 4,226 of 1900. **HOT BLAST STOVE.** G. J. W. Richards and T. Lewis, Glen-garnock. Improvements in Cowper's hot blast stoves, with the object of facilitating cleaning and preventing honeycombing.
- 4,896 of 1900. **STEEL MAKING.** T. Turynam, London. A process for the direct production of steel in open-hearth furnaces from ores and oxides in a bath of molten metal and slag.
- 6,301 of 1900. **MINERS' LAMP.** W. Best, Morley. Improvements in the inventor's method of electrically igniting miners' oil lamps.
- 8,072 of 1900. **CONCENTRATOR.** C. Galvan, Zacatecas, Mexico. A form of shaking table for concentrating ores, with an arrangement for air blast.
- 8,133 of 1900. **TIN RECOVERY.** H. W. Hemingway, London. A stripping bath for taking tin off iron composed of persulphate of iron.
- 693 of 1901. **COAL CUTTER.** H. A. Earle, Manchester. A coal-cutting machine that can be used in either direction parallel to the face or for breast cutting transversely.
- 1,019 of 1901. **PUDDLING MACHINE.** R. A. Carter, Pittsburg, U. S. A. An improved mechanism for puddling iron and so doing away with manual labor.

PERSONAL.

Mr. Alexander Agassiz, of Cambridge, Mass., has been elected president of the National Academy of Sciences.

Mr. George Kislingbury, of Capt. J. R. De La Mar's expert staff, has moved his headquarters from Berkeley, Cal., to Los Angeles.

Mr. L. W. Morgan, of Los Angeles, Cal., is on another trip to Sonora, Mex., to make further examination of some mining properties.

Messrs. Olcott, Corning & Peale, mining engineers and metallurgists, of New York City, have removed their offices from 18 Broadway to 36 Wall street.

Mr. Thomas F. Cole, of the Oliver Iron Mining Company, will have charge of all the United States Steel Corporation's mines in Minnesota, and will live in Duluth.

Mr. John C. F. Randolph, mining engineer, of New York City, has returned from an absence of 8 months on professional business in Mysore and Hyderabad States, India.

Mr. Hudson H. Nicholson, mining engineer, is now in Chihuahua, Mexico, investigating a large copper mining and smelting proposition, in the interests of Boston men.

Mr. Wm. Magenau has resigned as engineer for the Columbia Lead Company, of Esther, Mo., and is now superintendent of the Catherine Lead Company, of Fredericktown, Mo.

Mr. Albion S. Howe, late manager of the Barrier Reefs Gold Mining Company, on Great Barrier Island, New Zealand, is in San Francisco, Cal., where he will reside for the present.

Mr. J. R. Paull, formerly of Connellsville, Pa., now cashier of the Monongahela City Bank of Pittsburg, is one of the directors of the Empire Coal Company.

Mr. J. H. Linton, heretofore assistant chemist for the Tennessee Coal, Iron and Railroad Company, with headquarters in Ensley, Ala., has accepted a more lucrative position with a company at Chicago, Ill.

Mr. James M. Meighan, manager of the Mount Jefferson Mines at Groveland, Tuolumne County, Cal., recently passed through San Francisco on his way to Boston on business of importance connected with the mines.

Mr. O. H. Packer, of San Francisco, is in Humboldt County, Cal., examining oil land in the interests of an Eastern syndicate. The oil seepages in that county are said to show paraffine base and 5 rigs are now drilling.

Mr. D. H. Peery, president of the Salt Lake Mining Exchange, is on a visit to Boston and New York. Mr. Peery has retired from the brokerage house he founded at Salt Lake and transferred the business to Mr. F. D. Higginbotham.

Mr. Chas. H. Duell, who recently resigned as commissioner of patents, has resumed the practice of law in New York City. The firm name is Duell, Megrath & Warfield and the firm will give particular attention to patent, trade-mark and corporation law.

Dr. James E. Talmage, professor of geology in the University of Utah, has been elected a life associate in the Philosophical Society of Great Britain, otherwise known as the Victoria Institute, and also a corresponding member of the Royal Scottish Geographical Society.

Mr. Wm. Van Slooten, the mining engineer, has gone to Peru to examine important mines there in the interest of prominent New York capitalists. He was accompanied by Mr. James McFarland, late chief engineer of the Anaconda Mining Company. These gentlemen will be absent about 3 months.

Mr. Paschal G. Shook, assistant superintendent of the Steel Works Division of the Tennessee Coal, Iron and Railroad Company, whose resignation goes into effect on May 1st, was recently presented with a handsome watch and chain by the foremen and heads of departments of the plant at Ensley, Ala.

Mr. A. W. Thompson, vice-president of the Republic Iron and Steel Company, has been in the Birmingham, Ala., district again looking after brown ore properties. A report has been current around Birmingham that the properties of the Republic were likely to go into the United States Steel Corporation because an inventory of all the properties of the company in the South has been taken.

Mr. W. A. Lathrop, general superintendent of the Lhigh Valley Coal Company, has, it is stated, tendered his resignation, to take effect within the next month. Mr. Lathrop has been with the Lhigh Valley Coal Company for a number of years, and for some time past has been at the head of the coal company. It is reported that Mr. Lathrop has resigned to become superintendent of the Webster Coal and Coke Company.

Mr. Arthur Keen, chairman of Guest, Keen & Company, Limited, of Dowlais, Cardiff, Newport and Birmingham, Eng., with Mr. Windsor Richards, a catalogue on the board of that company, have been in Birmingham, Ala., inspecting the coal, coke, iron and steel industries in that section. They were accompanied by Mr. H. J. Lindsay, of Pittsburg, assistant to President C. M. Schwab, of the United States Steel Corporation, and J. H. Levy, of Louisville, Ky.

SOCIETIES AND TECHNICAL SCHOOLS.

Colorado Desert Mining Association.—This society, at a recent meeting held at San Diego, Cal., elected I. A. Hubon recorder of the district and E. C. Hornbeck, N. H. Conklin and F. S. Jennings a committee on disputes and arbitration.

Engineers' Club of Philadelphia.—At the meeting on April 20th 55 members and visitors were present.

Mr. A. Wendell Hubbard presented "Notes on the Construction of a Factory Chimney," the first paper of the evening. He described the construction of a chimney at Camden, N. J., for boilers of 2,000 H. P. It is 218 ft. in total height, built of perforated radial brick above the concrete base and flue opening, and cost \$12,250. The method of excavating for and constructing the foundations, and the design and construction of all parts of the chimney, were fully described.

The second paper of the evening on "Design and Construction of Factory Chimneys," was presented by Mr. Francis Schumann, who confined his discussion to the theory and practical designing of brick chimneys. The methods of construction and resulting stability under pressure due to weight, wind, etc., were fully considered, and several formulas were given for making the necessary calculations.

A general discussion upon the subject of chimneys and the production of draught by this and other means was participated in by Messrs. D. D. Elder, R. W. Polk, Frank Sweeney, John C. Trautwine, Jr., James Christie, Henry I. Snell and others.

Syracuse University.—The last annual catalogue gives much interesting information of the rapid growth of this institution situated at Syracuse, N. Y. The academic department or college proper opened in 1871 with 41 students. The university is now one of the four large colleges of New York State, having 1,613 students enrolled. About 40 colleges of Europe and America are represented in the faculty.

A new college is opened this year—the College of Applied Science. It comprises courses in civil engineering, electrical engineering and mechanical engineering the last of which is offered for the first time at Syracuse University. A fine building is being erected on the campus to accommodate the department of mechanical engineering. It is 133 ft. by 56 ft., with 5 floors and a basement, and a drafting room in the lantern roof. Rooms are provided for testing machines, shops, laboratories, lecture and reception rooms, departmental library, museum, etc. Among the courses offered in mechanical engineering are principles of mechanism, carpentry, wood turning, and pattern making, forging, filing, etc., machine tool work, steam engine and thermodynamics, machine design, metallurgy of iron, etc.

Twenty-two courses are given in civil engineering and 10 in electrical engineering.

International Mining Congress.—Preparations for the coming sessions of the International Mining Congress, to meet in Boise, Idaho, July 23, 24 and 25, are progressing. International Secretary Irwin Mahon has been at Boise some weeks pushing the interests of the congress. The Natatorium has been secured for an exhibit hall, and the facilities for machinery exhibits are good, with ample electrical and water power.

The State Legislature at its last session appropriated \$5,000 for the congress, and the city of Boise has doubled that sum. The different committees have been named. The following are the secretaries for the different States and Territories, each of whom, it is stated, has promised to the best of his ability to secure a good attendance and first class mineral displays:

Alaska, A. Hoillis White, Ketchikan; Arizona, George P. Blair, Mammoth; Arkansas, J. S. Hanford, Batesville; California, Col. Thomas Ewing, Los Angeles; Colorado, M. S. Montgomery, Colorado Springs; Georgia, Walter P. Andrews, Atlanta; Idaho, Frank Steunenburg, Caldwell; Illinois, B. W. Goodsell, Chicago; Indiana, U. Gilbert, Michigan City; Iowa, Dr. H. G. Knapp, Dubuque; Kansas, H. F. Brinklam, Dillon; Michigan, A. L. Flewelling, Crystal Falls; Minnesota, N. E. Westerfield, St. Paul; Missouri, George P. Paxton, Joplin; Montana, L. S. Woodbury, Great Falls; Maryland, Henry Shriver, Mount Savage; Nebraska, N. M. Nice, Lincoln; North Carolina, J. Frank Wilkes, Charlotte; New York, William E. Gray, New York City; Ohio, E. L. Shafner, Cleveland; Oklahoma, W. C. Renfrew, Oklahoma City; South Dakota, Angus McKay, Deadwood; Tennessee, E. C. Camp, Knoxville; Texas, Roger Q. Mills, Corsicana; Washington, James M. Ash-

ton, Tacoma; West Virginia, Thomas Page, Ansted; Wisconsin, M. H. Richards, Platteville; Wyoming, Will Reed, Rawlins; Washington, D. C., Dr. W. Lee White; British Columbia, George Alexander, Kaslo.

INDUSTRIAL NOTES.

The New Jersey Zinc Company has moved its offices from 71 to 11 Broadway, New York City.

The Nichols Chemical Company has removed its executive offices from 32 Liberty street to the Broad Exchange Building, 25 Broad street, New York City.

The Richmond Locomotive Works, of Richmond, Va., have obtained an order for some locomotives to be shipped to the New Zealand Government Railways.

The Truax Manufacturing Company, of Denver, Colo., is now filling a second order for automatic side-dump ore cars for the Copperfield Mines, of Copperfield, Vt.

The Pencoyd Plant of the American Bridge Company shipped during March 7,339 tons. This is thought to be the largest month's shipment ever made by any bridge shop in the world.

The Baldwin Locomotive Works, of Philadelphia, Pa., recently shipped 20 locomotives, valued at some \$350,000, to Fremantle, W. A., for use on the West Australian Government railways.

The Trinidad Electric Light and Power Company, of Port au Spain, West Indies, has ordered of the Harrisburg Foundry and Machine Works, of Harrisburg, Pa., a 300 H. P. horizontal compound engine. A 200-kilowatt belted generator has been ordered of the General Electric Company.

The Norton Emery Wheel Company, of Worcester, Mass., is to erect a new plant on the lands of the Niagara Falls Power Company, at Niagara Falls, N. Y. The plant will contain the electrical apparatus required. The power will be supplied by the Niagara Falls Power Company, the contract calling for 1,000 H. P.

The Crane Company, of Chicago, Ill., manufacturer of valves, fittings, etc., has decided to erect this summer a modern fireproof building exclusively for offices. It will be about 90 ft. by 100 ft., 5 stories and basement, and will be located in the vicinity of its cast-iron and malleable fitting and valve works, at Canal and 12th streets, Chicago.

At the Pan-American Exposition the Murray Iron Works, of Burlington, Ia., will have in operation a tandem-compound-condensing Corliss engine with steam cylinders 15 in. by 42 in. and 30 in. by 42 in. It will have a wheel 16 ft. in diameter grooved for a Dodge rope drive. The engine will do daily duty in the service of the Exposition. It will embody all the features of the heavy-duty Corliss engines built by the Murray Iron Works and it will be regulated by a high-speed governor.

The Ingersoll-Sergeant Drill Company, of New York City, has secured a contract from Brandau & Company, the Zurich, Switzerland, firm of contractors, that is building the Simplon tunnel on behalf of the Jura-Simplon Railway Company, for furnishing 2 belted compound high-pressure compressors. These machines will be utilized for furnishing compressed air for operating mine locomotives used in the tunnel work. One equipment will be installed at Brig, on the Swiss side, and the other at Isalle, on Italian territory.

What is called the largest stationary engine ever built in America has been completed by the Westinghouse Machine Company at the shops in East Pittsburg, Pa. It is one of eight 6,000 H.-P. engines ordered by the New York Gas and Electric Light, Heat and Power Company. More than 10,500 separate pieces of metal are used in the engine, and it weighs 750 tons. The height from the floor line to the top of the cylinders is 37½ ft.; width across the front, 41 ft., and through from front to rear, 23 ft., or the diameter of the fly wheel. The other 7 engines are in course of construction.

Among recent orders received by the Gates Iron Works, of Chicago, are: A plant for the Granby Smelting Company, Grand Forks, B. C., making the third furnished this company, the total having a capacity of 900 tons per day; a 1,000-ton crushing plant for the Federal Lead Company, St. Francois County, Mo., for disseminated lead ores; also a large reducing plant for the American Smelting and Refining Company, Salt Lake City. The Gates Iron Works has installed the machinery for the \$500,000 plant of the St. Louis Smelting and Refining Company in St. Francois County, Mo., the machinery consisting of 60 car-loads.

The contract for machine tools for installation in the Manchester plant of the British Westinghouse Electric and Manufacturing Company, Limited, reported to represent a value of over

\$400,000, is reported awarded to the Niles-Bement-Pond Company, of New York City. The work, it is understood, will be undertaken principally in the Niles shops at Hamilton, O., while the Pond plant at Plainfield, N. J., and the Bement-Niles Works at Philadelphia will also turn out some. The Fay & Egan Company, of Cincinnati, has obtained an order for 8 wood-working machines. Mr. George Westinghouse and Managing Director Loud, of the British company, are now in England.

The B. F. Sturtevant Company, of Boston, Mass., is rapidly recovering from the effects of the fire of April 14th, which affected only the engine and electrical departments. With only a day's delay incident to the renewal of belts, the remainder of the plant has been running as usual. Already a complete new equipment of improved machine tools is nearly installed in other buildings. As the Sturtevant Company employs electric transmission for driving a considerable portion of its tools, this work of installation has been a comparatively simple matter. Further delay in shipment of engine and electrical work is unlikely, for no patterns or drawings were destroyed, and the foundry, with a large stock of castings, is intact.

The Keystone Driller Company, of Beaver Falls, Pa., states that, having closed a deal for considerable land on each side of the present works, it intends to put up 3 frame buildings as soon as possible. One building 60 ft. by 100 ft. will contain additions to the boiler plant; one building 40 ft. by 200 ft., an addition to the wood-working department, and one building 40 ft. by 200 ft., an addition to the erecting department. New machinery will be added, such as lathes, drill presses, tool grinder, wood planer, band saw, cut-off saw, gas engine; also 25 to 50 H. P. boiler and dynamo for an electric plant for all the buildings. The new machinery added to the present plant will increase the output 400 per cent. The materials used in the construction of the company's drilling tools and rigs are iron, steel, best grade of white oak and long leaf yellow pine.

For construction of the new buildings the company is in the market for hemlock, white pine, yellow pine and oak lumber and roofing slate.

Plans for a lead smelting plant to be erected either in or near to East St. Louis are being prepared in the office of E. W. Scofield, St. Louis, manager of the Guggenheim interests in Missouri. The new smelter will be built by the Federal Lead Company, which is controlled by the Guggenheim Exploration Company, and will have a capacity to treat about 200 tons of concentrates a day. Half of this tonnage will be drawn from the Exploration Company's property in St. Francois County, where new stamp mills to handle 1,000 tons of ore a day are in course of construction. At the present time the concentrates from this source are treated at the old Missouri Smelting Company's plant at Cheltenham, owned by the Federal Lead Company. Only Missouri ores are concerned in these improvements, disseminated lead ore from the southeast part of the State, along with more or less galena from Southwest Missouri. It is intended to have the plant ready by October.

Near the grounds of the Pan-American Exposition at Buffalo, though not strictly a part of the exposition, the Buffalo Railway Company is constructing a large plant for furnishing increased power for its street railway lines during the exposition period. One of the features of this plant will be a large mechanical induced-draft fan to produce the draft, and handle the gases of combustion from a boiler plant whose nominal capacity will be in the neighborhood of 3,000 H. P. The fan in question, built by the Buffalo Forge Company, is 24 ft. in diameter, of the $\frac{3}{4}$ housing up-blast type, and rigidly constructed of steel plate, braced and stiffened with angle irons. The fan is designed as an exhauster with an inlet 9 ft. in diameter, and will be driven by belting to a Buffalo 13 by 12 horizontal center crank class A engine. To cool the bearings a constant circulation of water will be maintained around them. The short stack into which the fan will discharge will be of sheet steel. This particular plant illustrates some of the inherent advantages of mechanical induced draft. There is no necessity for a tall, heavy chimney, and since the whole construction is of steel plate it can be constructed and installed in a minimum length of time. Once in place it renders the performance of the boilers independent of weather, wind, temperature.

TRADE CATALOGUES.

Mr. H. D. Crippen, of New York, manufacturer of the Jackson hand-power drill, issues catalogue No. 13, a 24-page pamphlet printed in Spanish as well as English, describing the drill in detail and giving numerous testimonials from users.

Wood direct acting shunt feed focusing and non-focusing arc lamps are described in a 32-page pamphlet published by the Fort Wayne Electric Works, of Fort Wayne, Ind. These

lamps are stated to be new in principle inasmuch as they will operate on any current from 6.5 to 9.6 amperes without adjustment. The usual cut-out magnet is entirely omitted, yet the lamp is stated to cut out always at the same voltage. The company's "Standard" lamp is for indoor service and the "Boulevard" for outdoor.

The Goheen Manufacturing Company, of Canton, O., is sending out attractive pamphlets calling attention to the necessity of a protective paint for iron and steel structures. The company states that years of practical services under all kinds of conditions and influences have shown the value of "carbonizing coating," where ordinary paints fail to give lasting results. This paint has been used on ore docks, trestles, bridges, gas tanks, and for the structural frame work of public buildings, also of mills and smelters where sulphur fumes destroy ordinary paints.

Phillips, Doup & Company, of Brooklyn, N. Y., operating the National Barrow and Truck Company, having issued a 48-page pamphlet, describing their "Perfect" sand or mortar barrows with steel trays and wood frames and their "Ideal" steel barrows for export. The firm manufactures steel dirt barrows, patent mining barrows, foundry barrows, coal barrows, pig iron barrows and brick barrows. All barrow fixtures are stated to be interchangeable except handles and gudgeon boxes; the wheels are of malleable or wrought iron with steel axles. The company also makes coal cars and wagons, coal tubs, contractors' tubs and a great variety of trucks for mills, warehouses, foundries, etc., besides screens for coal, coke, sand, 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.

ARIZONA.

Mohave County.

Philadelphia & Arizona Mining Company.—The company's ground comprises 16 claims. There are 4 shafts, 240, 300, 200 and 100 ft. deep respectively, connected on each 50-ft. level. The vein is 5 to 40 ft. wide. In many places the vein material is all pay ore. In other sections the ore is in narrow shoots. The ore is pyrite and galena accompanied by arsenical pyrites and zinc. The values are in gold, silver and lead. The high-grade lead shoots sometimes run as high as 40%. The ore also contains considerable native silver and argentite. In the 150-ton concentrating mill it is proposed to put in pans and settlers, as well as jigs and tables to save the native silver and free gold. Development work is in progress. The same company owns the Merrimac mine and mill; the latter of 10 stamps and 3 tables is operating on Minnesota ores.

Tennessee.—The new mill at this mine, near Chloride, is ready for work. It is provided with crushers, 2 sets of rolls, jigs, elevator, revolving screens and concentrating tables. The capacity is about 150 tons per 24 hours. The ore is mostly galena, the chief savings being lead, silver and gold. The mine is developed through 2 shafts, each 400 ft. deep. The vein, between granite and porphyry, is 10 ft. wide. One of the ore shoots has been opened 250 ft. long and 100 ft. high. The 2 shafts are connected underground. A cage is used in one and a bucket in the other. The high-grade ore is shipped to the El Paso Smelter. W. J. Rickell is superintendent.

Santa Cruz County.

Patagonia Mining Company.—This company is working the Hardshell Mine near Harshaw, 9 miles from Patagonia. The incline shaft is 400 ft. deep, with developments on the 100-ft., 250-ft. and 300-ft. levels. The ore is mostly lead carbonate, carrying silver, though it carries bunches of galena. The output is about 45 tons daily. The mill is equipped with crushers, rolls, revolving screens, hydraulic mixer, elevator and concentrating tables. The mill tailings are to be treated with cyanide. J. C. Smith is superintendent.

Yavapai County.

Home Run.—This group, of which D. Moynahan is manager, has a new hoist, with a shaft sunk 210 ft. on a vein of ore, in which 150 ft. of drifting has been done. The ore carries free gold and galena.

McCabe.—This mine has been purchased by a Chicago syndicate and is to be worked in connection with the mining properties of the Model

Gold Mining Company of Chicago. D. Reardon is president of this company and F. Jager is vice-president. J. H. Harty, of Wyoming, Ill., Geo. Fisher, of Vermilion, O., and ex-Gov. Powers, of Arizona, are interested.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

Oil for fuel is now being used at the Kennedy and the Oneida mines, and other mines will change from wood to oil as soon as contracts expire.

Amador Queen No. 2.—This mine has been unwatered to the 800-ft. level and cross-cutting has been resumed. The mine is being developed under the management of Vic Vanhal.

Phoenix.—A new company has been organized to work this old property 7 miles east of Jackson on the east side of the Amador canal and north of the middle fork of Jackson Creek. The capital of the company is \$25,000 and the directors for the first year are: S. G. Spagnoli, L. J. Fontenrose, Dr. A. M. Gall, John Ross, Jr., J. E. Dye, R. C. Rust and W. J. Nettle.

Butte County.

(From Our Special Correspondent.)

J. H. Leggett Ranch.—This property has been leased to W. P. Hammon and others for a term of years. A dredger will be installed, the owner to receive $\frac{1}{2}$ of the proceeds. The land comprises 160 acres, located on the Feather River just below Oroville.

Nevada County.

(From Our Special Correspondent.)

La Marque.—This property 2 miles south of Grass Valley, adjoining the North Star Mine, has been bonded to E. J. Caldwell and C. F. Seitz, of San Francisco, for 18 months and will be actively developed.

Plumas County.

(From Our Special Correspondent.)

Claybank.—This and the Thistle Shaft mines near La Porte are being operated by the owners and considerable work is going on south of Quincy on Mill Creek.

San Bernardino County.

(From Our Special Correspondent.)

Buckeye.—This group of mines, located 8 $\frac{1}{2}$ miles south of Ludlow Station, consisting of 6 claims on which considerable development work has been done, has been sold to a New York syndicate which holds large interests in the Randsburg Railway and the Santa Fe Reduction Works at Barstow. One shaft has been sunk 300 ft., and several drifts show, it is said, large bodies of \$12 ore. A well is to be sunk, and if water is found a milling plant will be installed. About 10 men are now working under E. H. Stagg.

Shasta County.

(From Our Special Correspondent.)

Clover Creek Cinnabar Company.—On the claims of this company on Clover Creek, 6 miles east from Milleville, a tunnel is being driven 300 ft. to cross-cut the ore body. A prospect shaft down 34 ft. shows a large body of ore which assays from 3 to 5% quicksilver.

Sierra County.

(From Our Special Correspondent.)

Golden Era.—A rich strike is reported at this mine, $\frac{1}{4}$ miles northeast from Sierra City, on the Yuba River. The ledge is said to be large and well defined. Thomas Murphy is the owner.

Siskiyou County.

(From Our Special Correspondent.)

Cherry Hill District.—At Cherry Creek the Cherry Hill Mine has been closed down temporarily, but will start up again soon. The Fernandez hydraulic mine on Cherry Creek is paying well, and as the water supply is larger than in any previous year a longer season is assured, and the clean-up will probably be the largest realized from the claim. A full force of men is employed at the Jillson & Roberts quartz claim at Henley.

Trinity County.

(From Our Special Correspondent.)

Headlight.—The new mill and cyanide plant being installed on this property in Red Gulch, 3 miles north of Trinity Center, are about completed.

Tuolumne County.

(From Our Special Correspondent.)

Gold Bug.—The shaft in this mine, $\frac{1}{2}$ miles southwest from Big Oak Flat, is down 100 ft. in good ore. Thomas Whitto is the owner.

Golden Gate.—The mill at this mine, southeast from Sonora, is to be increased to 40 stamps, and grading is now going on. The vein is wide, and on the 200 and 300 ft. rich ore has been developed.

Harvard.—The 20 stamps have started up and the working force increased. The property is to be worked to the full capacity.

Mountain Lily.—Another large pocket said to contain from \$30,000 to \$50,000, was found at this mine, 5 miles northeast from Columbia. The property is well equipped with a 5-stamp mill

and other machinery. A large amount of good milling ore is blocked out. The Graham vein is 7 ft. wide.

Riverside.—This old mine, 11 miles north of Soulsbyville, has been reopened under the superintendency of C. G. Grim. About 18 men are employed. It is the intention of the management to increase the size of the ditch and the capacity of the mill to 40 stamps; also to install a canvass and a cyanide plant.

COLORADO.

Gilpin County.

(From Our Special Correspondent.)

Brooklyn Group.—The Seneca Gold Mining and Reduction Company is making preparations to start up again on this property, after an idleness of several months, because of its being unable to get a clear title. New York parties are interested and Bert Campbell, Central City, is in charge.

Buckley.—A lift of 80 ft. has been sunk, making shaft 575 ft. deep, and another lift of 100 ft. has been started on. Milling ore is being taken out in development work. Michigan parties, with Russell A. Alger, are interested. J. H. Hooper, of Central City, is manager.

Camp Grove.—At this property in Nevadaville a hoisting plant has been installed. The shaft is only 160 ft. deep, but the property has not been operated for a good many years, although ores treated by the arrastra process in the 60's gave good values. Phillip Mixsell, Idaho Springs, is in charge.

Gettysburg Mining, Development and Milling Company.—A Worthington duplex pump has been installed at the 200-ft. level and development work is disclosing ore carrying very fair values. Milford Steele, of Gilpin, is manager.

Hillside Mining Company.—Good ore has been found in the deep shaft on the Hamlet Lode, and same will be reopened after shaft is in shape. A gasoline hoist plant will be installed. Regular shipments of fair-grade concentrating ores are being made. C. S. Nicols, Central City, is manager. The company's stockholders are in Nebraska, Illinois and Missouri.

James Henry & Mechanics.—Henry Bolthoff, of Denver, intends starting up these properties soon.

Lillian.—The deep shaft will be unwatered and connections made with present working shaft. Good ore has been opened and heavier shipments will follow. The property is worked by the Lillian Mining Company.

Lake County—Leadville.

(From Our Special Correspondent.)

Leadville Output.—The daily output now reaches 2,000 tons, including the zinc concentrates and the manganese ores. This tonnage is below the average, due to the bad condition of the roads. Although the railroads reach most of the large producers there are a number of properties on the gold belt that have to depend on wagons.

The ore market is very brisk and the trust smelters are taking a larger tonnage of iron than before the consolidation. The Illinois Steel Company is taking all the manganese iron that the camp offers.

A. M. W. Midas.—This group is producing per month 1,200 tons iron and sulphide ore. The average daily output is 175 tons.

Bonger Shaft.—Iron ore has been opened up in this property on Fryer Hill. Shipments will start soon.

Cadmium Ores.—The recent reported strike of this mineral in the Della S. at Aspen and the statement that this is the first discovery in the State is not correct, as the mineral has been known here for some time. It was first struck in the Maid of Erin and Henrietta in zinc ore and impaired the zinc values.

Fortuna.—This property will again resume work. The operators have located a 3-ft. streak of good silver-lead ore which yielded \$33,000 from a stope above and will be worked.

Garbut.—This property, on the gold belt, is steadily shipping from 20 to 25 tons daily to the Arkansas Valley plant and some to the new smelter at Florence.

Laplata.—This famous property on Rock Hill has been brought to the notice of a London company and arrangements are being made to secure a long lease. The mine will be opened up in a systematic manner to reach the sulphide zone. The shaft is 600 ft. deep and will be sunk to the parting quartzite.

Long & Derry Hill.—Several large deals are pending. The ground adjoins the Long & Derry and Empire properties, the latter being now developed by the Collins syndicate. In both of these properties the typical Leadville formation is disclosed.

New Elkhorn.—A heavy flow of water has been encountered at the Plummer shaft, but the combined action of a Snow sinker and several Cameron pumps is lowering it. Another Snow pump will be put in.

New Fryer Hill Mining Company.—Several

car-loads of manganiferous iron from the Buckley shaft have been shipped to the Illinois Steel Works.

New Leadville Home Mining Company.—About 1,200,000 shares of the new stock have already been issued in exchange for old stock. Preparations are being made to sink another lift at the Bon Air shaft, now down 640 ft. The iron ores shipped last winter netted from \$3.60 to \$4 a ton, while the present shipments run from \$6 to \$14 per ton, and it is estimated the value per ton is doubled. The ore at the Penrose is said to carry 15 oz. silver with 48% iron excess and to net \$7 to \$8 per ton.

Ohio.—This claim on Breece Hill has a shaft 270 ft. deep, and at 40 ft. deeper drifts will start to cut the vein. At 200 ft. an 8-ft. vein of copper sulphide was cut running \$5 to the ton—a trifle too low for pay. The prospect is, however, promising.

Penn Leasing and Mining Company.—The shipments of oxidized gold ore continue at the rate of 100 to 125 tons per day. The 3 shafts are all used.

Printer Boy.—Ground of recognized merit located on Printer Boy Hill will be worked by a new company this spring. The Printer Boy, Lower Printer Boy, Columbia, Miner's Hope and Bradshaw, comprising 20 acres, are embraced in the group. The 2 shafts are about 500 ft. apart, with a continuous vein between having an average width of 20 in.

South Winnie.—Development on this property continues to prove that a good mine has been opened up, recent assays showing values of 3.4 oz. gold, 48 oz. silver and 25% lead.

White Cap.—This property has a new outlet for its ores through the Yak tunnel and development on a lower ore horizon than yet reached in this vicinity will be facilitated.

Wolfstone.—Shipments from this shaft are steadily increasing, 250 tons daily being hoisted. Of this 65 tons of crude ore are put through the mill, producing 40 tons zinc ore and 15 tons lead sulphide.

San Juan County.

(From Our Special Correspondent.)

Aztec Gold Mining and Milling Company.—The big tunnel is now in 300 ft. Josiah Moore is general manager.

Blackberry.—Drifts are being run both ways on the vein under the management of W. A. Ptolemy, president of the San Juan Mining and Development Company. Shipments will begin as soon as the roads can be opened up.

Emma.—A large force of men will start work at this old mine when the roads can be opened.

Idaho Group.—Preparations are being made for a large force of men at this Silverton property. A small force during the winter has been blocking out ore and sufficient ground is now opened to keep many men at work for months. The property is owned by Abe Schiffer with Ole Hanson, manager.

Mammoth Tunnel and Mining Company.—This company has issued a prospectus. The head offices will be at Chicago, Ill., with branch offices in Silverton. The properties owned by it are located on the Silverton, Gladstone & North-erly railroad about 5 miles north of Silverton. The officers are: President, A. Brown; vice-president, S. W. Widney; secretary and treasurer, J. J. Munzer.

Mastodon.—The crosscut is being pushed rapidly and it is expected to cut the vein by May 15th. About 14 men are employed on development.

Montana.—This Silverton property, for which an offer of \$100,000 for a half interest was lately refused, is about to start up again, all litigation having been satisfactorily settled.

North Star.—The Smuggler-Union Company, of Telluride, is negotiating for the purchase of the North Star and if the sale is consummated will make a number of improvements. The property is now worked by J. Benjosky.

Silver Ledge.—About 25 men are employed on this Silverton property. A contract has just been let for driving an upraise of 650 ft. from the 5th level to the surface.

Waterfall.—This tunnel at Silverton is in over 200 ft. and the breast shows 3 ft. of good milling ore. A cyanide plant will be put in very shortly.

Woods Investment Company.—This company is doing much work on its properties on Bear Mountain and now has 26 claims under its management. Geo. Bibb, the manager, states that many improvements will be made during the present season.

San Miguel County.

(From Our Special Correspondent.)

Alta Mines Company.—This company, incorporated by Horace N. Hawkins, A. J. Clark and T. Walter Blom, with a capital of \$2,500,000 in \$1 shares, has as directors: Walter J. Luedke, David M. Sneddon, and Albert Thierbach. The company will take over the Alta group in Turkey Creek Basin, near Telluride. It is said

that with between 6,000 and 7,000 ft. of workings, the ore in sight is estimated at \$750,000. The vein is 3 to 16 ft. wide; 1/6 of the contents is first-class shipping ore, running from \$93 to \$110 per ton; the balance is good milling ore. The first-class carries 30 to 45% lead, and from 90 to 113 oz. in silver per ton, besides profitable values in gold. Arrangements will be made for milling 200 tons per day. The boarding house has been carried away by a snow slide. The cook was killed and a trammer badly bruised. The building and contents were valued at \$2,500. Work is temporarily suspended. The plans of the company call for larger buildings in a different location.

Keystone Hydraulic Company.—A large force of men is at work on the new flume, pipe line and sluice. Manager E. L. Davis, of Telluride, says no effort will be spared to complete the equipment at the earliest date.

San Bernardo.—This property is worked and developed by leasers under direction of Manager A. B. Litchfield. The regular shipments of first class ore show that the new openings are fully up to the past reputation of the property. In a very short time the milling plant will start.

Tomboy Company.—This company recently posted notice calling on the mine and mill men laid off on April 13th to report for work. Water is now running freely and will be abundant this year, as the snowfall is more than double that of a year ago.

Turkey Creek Group.—At 400 ft. from the mouth of the cross-cut tunnel being driven for the Turkey Creek vein, a blind lode is reported cut, carrying 4 ft. of free milling gold ore, 18 in. of which runs very high, while the entire vein matter carries profitable values. J. H. Shockley, of Telluride, is manager.

Summit County.

Colorado Zinc Company.—This company has been formed by Henry E. Wood, Alfred Chester Beatty and Henry Guggenheimer, with a capital stock of \$200,000. Mr. Wood is an assayer and ore sampler; Mr. Beatty has charge of Stratton's Independence Mine, and Mr. Guggenheimer is the son of New York's acting mayor.

The plant is designed to handle 50 tons a day and its capacity may be increased. The ore to be handled at first will come from Kokomo. The plant will employ the Wetherill process of magnetic separation.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Elkton Consolidated Gold Mining Company.—The additional pumps recently ordered for this mine have arrived and will soon be in place. Unwatering the mine has proved a much greater task than was anticipated.

Gold Coin Mining and Leasing Company.—The showing on the 1,000-ft. level is reported to be as good as on any of the upper ones. The vein has been opened up for some distance. Sinking has started again. The output is about 100 tons per day. That for March was 3,000 tons of the average value of \$40 per ton.

Stratton's Independence.—The strike reported some time ago on the 900-ft. level, as far as can be learned, is showing up very well. This will mean a great deal to the district. A rich strike is also reported on the lowest level of the Portland property in this vicinity.

Strong.—This mine is at present controlled by Messrs. Giddings and Lenox and others. During the labor troubles in 1894 the mine was blown up presumably by the miners' union. It is now alleged by Lenox, Giddings and others that the mine was blown up at the instigation of Sam Strong, who at that time owned the mine and had given the plaintiffs a lease and bond. His reason, as alleged, was that after granting the bond the mine proved to be much better than expected and he had it destroyed in order to get it back. The case is on trial at Denver, the plaintiffs suing for \$150,000 damages. The defense denies the charges. Some of the best legal talent in the State is employed on the case, which promises to be a long one.

Vindicator Consolidated Gold Mining Company.—The quarterly report shows the property to be in very good condition. Ore is being shipped from the 900-ft. and 1,000-ft. levels of No. 1 and from the 500-ft. level of No. 2 of better grade than that shipped heretofore. The upraise from the drift in the Lillie is now up over 100 ft. and only has about 85 ft. more to go to connect. When this is done the shaft will be 1,200 ft. deep. A pump will be placed on the 1,200-ft. level. A duplicate of the 267-H. P. Babcock & Wilcox boiler will also be installed. The new 15-drill compressor is proving very satisfactory. After the payment of the April dividend there will be something over \$67,000 in the treasury. The treasurer's report shows the following: Amount of ore produced during the quarter, 4,325 tons, of the value of \$186,927; freight and treatment charges, \$40,551; net value of ore, \$146,376; total receipts of mine, \$146,431. Disbursements, total expenses of mine, \$78,554; paid to lessees, \$11,437; total, \$89,991. This leaves \$56,-

440 as profit for the quarter. Of this \$6,935 was paid for building and equipment, leaving a balance of \$49,565. To this add the cash on hand January 20th, amounting to \$78,330, and subtract the January dividend of \$27,500, and there was a balance on hand on April 20th of \$100,334. It is expected that the old dividend rate of 5c. per share will be re-established, after being cut down some months ago on account of new equipment. F. J. Campbell is general manager.

IDAHO.

Boise County.

Coal Discovery.—A 4-ft. seam of lignite is reported found 2½ miles from Pearl.

I. X. L.—This company at Pearl is exploring new gold-bearing ground and sinking its shaft deeper.

Blue Bucket.—This claim near the I. X. L. is owned by the Rock Creek Mining Company. The ore is a sulphide, carrying some free gold. William McKinlay is in charge.

Latah County.

Jericho Mining Company.—This company, the successor of the Syndicate Mining Company, owns 6 claims in the Burnt Creek District near Kendrick. The company is to put up a stamp mill and cyanide plant with a capacity of 25 tons daily. A ditch and flume are under way to supply water power. The deepest shaft on the property is down 90 ft. Charles Schill is manager.

Lemhi County.

Daisy.—This group in the Blackbird District consists of 9 claims, owned by Thos. Kane, ex-Sheriff T. J. Taylor and others. It was recently bonded to R. Bell, who represents a syndicate of Eastern men.

Washington County.

Weiser Smelter.—According to a local paper Charles Whitcomb, of Boston, president and general manager of the Boston & Seven Devils Mining Company, and Messrs. G. M. Ginyant and A. B. Kennedy, mining men of Denver, Colo., who are interested in Seven Devils properties, accompanied by Messrs. E. M. Barton and Frank Harris of Weiser, have been at Weiser looking up a site for a smelter. They have concluded to erect a smelter instead of shipping the ores east.

MICHIGAN.

Copper—Houghton County.

Calumet & Hecla.—The work of putting in the machinery in the man-car engine house for Nos. 7 and 8 shafts, on the South Hecla, is progressing favorably and it is expected that the engine house will be in running order by July 15th. Already there is a large portion of the machinery in place. The building, built of sandstone, is about completed. The roof is of wood covered with corrugated iron. The Hecla stamp mill structural iron will probably be in place and the riveting and painting completed by June 1st. The addition when complete will be 157 ft. wide and 306 ft. long, with a height of 65 ft. Besides this there is a 200-ft. trestle for backing and switching the cars after the rock has been dumped into the rock bins. In the rock-bin portion of the structure some of the end sections weigh over 10 tons. In all, the building will contain some 2,200 tons of steel and 30,000 rivets. The work on the addition began on the 29th. The work is being done by the American Bridge Company, of New York. N. H. Neuman is superintendent.

Dollar Bay Smelter.—Recently 8 car-loads of copper from Black Eagle, Mont., have arrived in Houghton for delivery at the Dollar Bay Smelting Works. Each car contained 50,000 lbs. of the metal and the shipment is said to be the result of a trial car-load shipped here last season. John J. Case is superintendent.

Marquette County.

Ropes.—This old gold mine near Ishpeming, owned by Corrigan, McKinney & Company, of Cleveland, O., may be pumped out and worked again. Corrigan, McKinney & Co., have been running the old tailings through a cyanide plant. About 35,000 tons were treated last summer, yielding, it is said, a net profit to the company of about 70c. per ton. When treating the tailings began it was thought that the average amount of gold taken from them would be about \$2 per ton. It did not reach that mark, however, a little better than \$1.50 per ton being obtained. George Wallace is in charge.

MINNESOTA.

(From Our Special Correspondent.)

Ore receipts at the Two Harbors docks have diminished, as the docks are full and there is no sign of any vessels arriving, except those at Duluth, to be placed at Two Harbors, Ashland, Duluth and Superior to lighten the pressure on docks. So far receipts over the Duluth, Missabe & Northern and the Eastern Minnesota are not large.

Iron—Mesabi Range.

(From Our Special Correspondent.)

Drake & Stratton have 7 steam shovels at work on the Mesabi, 2 at Stevenson, 2 at Sharon

and 3 at Fayal. Another will start at Fayal soon.

Some very recent discoveries have been made in T. 56, R. 23, that are said to be good. At the Arcturus, in T. 56, R. 25, at T. 56, R. 24, and at the Buckeye, in T. 56, R. 25, there is much interest and considerable work is under way now.

The Kimberley transaction, mentioned last week, has been practically concluded, the final buyers being Jones & Laughlin. The properties are the ne. of the nw. of section 8, T. 58, R. 17; the s. ½ of the sw. of 4, and the se. of the se. of 5, same township; and the e. ½ of the nw. of 20, T. 58, R. 19. The first is a 25c. lease of what has been called the Columbia Mine, which has a shaft down 125 ft. It contains about 4,000,000 tons; part of it is bessemer. H. Roberts, J. H. Pearce, W. T. Bailey, M. L. Fay and others held this lease. The second tract was the property of the Wyoming Iron Company, an A. E. Humphrey property, and contains a body of nice bessemer ore. The fee was bought a few days ago by Kimberley for \$250,000. The third tract is the Itasca State lease, where some less than 10,000,000 tons of non-bessemer ore have been shown up. Jones & Laughlin have been at various times offered about all the high-grade properties on the Mesabi Range that were for sale.

The United States Steel Corporation has withheld many of its ores for its own use this year and expects to sell largely from the Hibbing stockpiles, which, though high chemically, are not quite so desirable physically. Its Fayal, Genoa and some other Mesabi ores will be retained for its own furnaces. Such discrimination as this is more important upon the general market than that of price.

Auburn.—This mine will be stripped farther at once, the contract being held by Drake & Stratton.

Fayal Iron Company.—This company is shipping slowly. The open pit has not been started yet. It is expected that Fayal's product this year will be about 1,500,000 tons, all of which will be used in the furnaces of its owners.

Northern Ore Company.—This company, which is understood to represent Jones & Laughlin, has acquired the lease of the Itasca lands in 20, T. 58, R. 19.

Oliver.—Little work will be done this year at this mine, and the efforts of the corporation will be confined largely to the Lone Jack. Many of the Oliver employees have gone to other mines and the shovels will be moved.

Saunty.—This property is now stripping heavily.

Stevenson Iron Company.—This mine has sold a large amount of its high-grade ore for this year's delivery. The company has just received a 105-ton shovel, the largest and heaviest built for ore work, and will work it in the open pit this season. This shovel is all steel frame and has a 6-ton dipper. Its work will be watched with interest. The minimum royalty at this mine on a 500,000-ton output is but 12½c.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—The market for zinc ore was extremely strong last week, and but for a shortage of cars shipments would have been much larger. A former metal market and keen competition between the Edgar Zinc Company and the Illinois Zinc Company sent the price up 50c. per ton on medium and the higher grades of zinc ore. The best price paid was \$29 per ton for the ore from the Morning Star Mine at Oronogo and the Maude B. and Stevenson-Moore mines on the McKinley lease at Prosperity, and there was a large amount of ore sold all over the district at \$28.50 to \$29 per ton. Lead advanced 25c., selling all the week at \$22.75 per 1,000 lbs. Following is the turn-in by camps of the Joplin District for the week ending April 27th:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,336,220	387,020	\$38,093
Galena-Empire	1,271,250	219,680	20,250
Carterville	1,901,350	259,010	30,610
Webb City	195,150	15,420	2,789
Aurora	775,470	19,420	8,565
Wentworth	528,000	.....	7,524
Oronogo	626,470	18,690	8,351
Zincite	391,510	.....	5,481
Carl Junction	319,940	.....	4,148
Spurgeon	126,940	92,840	3,625
Neck City	281,290	.....	4,022
Central City	234,740	31,030	3,864
Cave Springs	194,270	4,860	2,733
Duenweg	52,010	98,940	2,850
Stotts City	62,420	.....	874
Monteau County .....	.....	63,670	1,449
Granby	282,000	31,000	3,080
Total for week.....	9,583,230	1,241,530	\$148,308
Total 17 weeks.....	169,182,980	21,401,670	\$2,510,900
Zinc value for week, \$120,110; lead, \$28,193; zinc value 17 weeks, \$2,024,686; lead, \$486,214.			

During the corresponding week last year the best grades of zinc ore sold at \$31.50 per ton and lead at \$27 per 1,000 lbs. The lead sales were less than last week by 15,810 lbs., the zinc sales greater by 1,653,940 lbs. and the value greater by \$45,452. For the first 17 weeks the sales

last year were less by 5,736,590 lbs. of zinc and 2,309,930 lbs. of lead, but the value was less by \$501,586.

Compared with the previous week the shipments were less by 2,159,360 lbs. of zinc and 89,210 lbs. of lead, and the value was less by \$24,435. The export movement with the firmer tone of the metal market in St. Louis and New York is expected to bring about a much better condition in the local ore markets.

Foster-Jackson Mines.—It is reported that New York parties have secured an option on this property near Spurgeon, which consists of the fee of 160 acres. The ore formation is said to resemble that of the celebrated John Jackson at Joplin. There are 60 lots leased on the property and a large and rich ore body has been developed. The option price, including the fee and lease with all developments, is said to be in the neighborhood of \$110,000.

Geffemore Land.—Joplin parties have purchased this 40-acre tract near Seneca for \$4,000 and will open the land to miners. It adjoins some valuable mining property.

Granby Mining and Smelting Company.—This company has further increased its holdings by purchasing nearly 800 acres of land adjoining its mines at Oronogo, and the officials of the company last week paid ex-Senator U. Hendrickson \$34,000 and Moses Elliott \$40,000 for their respective interests. This gives the company 1,250 acres of land in the heart of the district. Elias S. Gatch is secretary and general manager.

Nancy Lee.—The loss by the burning of this mill at Galena recently was nearly \$11,000 with an insurance of only \$4,500. The mill was one of the best in the entire district and was built about 18 months ago. It was owned by Haldeeman brothers of Marion, Ind., J. E. Haffner, of Joplin, and J. U. Carney, of Galena. It will be rebuilt.

Renfrow Paint Company.—This company, which has a capital of \$100,000 fully paid up, is erecting a large paint factory in Joplin. It will manufacture zinc oxide and sublimed lead paints by what is called a new process, said to reduce the cost immensely. Ex-Governor William C. Renfrow, of Oklahoma, is at the head of the concern. The company owns extensive carbonate mines in the Bly District at West Plains, and will locate their zinc oxide works there. It uses Arkansas semi-anthracite coal, which it cannot ship to Joplin profitably on account of the high freight rates.

Rosebud.—Five men employed at this mine at Aurora were buried alive at 9.30 a.m. April 19th and at 1.30 a.m., April 21st, it was discovered that 3 were dead and 2 still alive. The men were in a drift 70 ft. long. The mine is owned by Illinois parties and was managed by Bert Gardner, assistant cashier of the Bank of Aurora.

Tipton Lands.—Homer P. Sewell and other Mansfield, O., men have purchased a 260-acre tract at Tipton in Monticau County, on which they have developed a big run of lead and zinc ore. With 2 hand jigs last week they cleaned up nearly 64,000 lbs. of lead.

MONTANA.

Cascade County.

(From Our Special Correspondent.)

Hurricane Smelting and Refining Company.—The announcement made last week that the Great Falls plant, which closed on April 15th, would again start up, proves to be a false rumor. Manager Smith says there is no likelihood of its starting in the near future.

Granite County.

(From Our Special Correspondent.)

Bush.—The gold property of Henry Bush is being examined by an expert from New York and will be bought by a New York company should the report be favorable. The development consists of a 200-ft. tunnel. A lead of good ore is in sight.

Princeton Placers.—The mines of this district, which work only during the summer, are again running. The Mecham & Clark property and also the Maywood Mines are worked and are producing a good profit. The J. T. Shear ground is being put in shape and will start work next week.

Sunrise.—This company is developing the Mayflower group of mines near Stone Station. The ore is rich in both silver and gold and the property is promising.

Rock Creek Sapphire Mines.—The property recently purchased by an Eastern company is worked by a large force of men under the management of L. J. Moffet. The ground is worked as a placer, the dirt being run through sluice-boxes, and the system is proving very successful. The sapphires will be shipped east as fast as produced. The mines of A. Amerine and Louis Myers are also being successfully worked and negotiations for their purchase are pending.

Jefferson County.

(From Our Special Correspondent.)

Basin & Bay State Mining Company.—The H. C. Worthington Company, of New York, has brought suit against F. C. Berendes, receiver, wherein the sum of \$2,950 is sought for mining machinery sold defendant company.

The stockholders met at Basin last week, nearly all the stock being represented by proxies in the hands of E. P. Chapin, of Springfield, Mass. F. C. Berendes, of Boulder, acting under the district court as receiver for the property of the company, was also present. Action was taken to mortgage the property for \$300,000, and it is reported that the taking of the bonds for such a mortgage is already assured, the money being raised in the East. A new board of directors was elected, 3 of them being residents of Springfield, Mass., two of Providence, R. I., and 2 others in the East. According to a change in the by-laws of the company the meetings of directors may hereafter be held elsewhere than in Basin, either at Helena or in Springfield or Providence. The new directors will at once hold a meeting and as soon as the formalities of placing the mortgage can be completed work will commence in paying off existing indebtedness and completing the mill and smelter.

Ida.—This silver-lead property, 18 miles from Boulder, owned by Beattie Brothers and John S. Harris, of Butte, is to be reopened by the owners, who will sink the shaft to the 400-ft. level. This mine proved quite a producer a few years ago, \$25,000 worth of ore being shipped in 1892.

Liverpool-Washington.—These properties in Lump Gulch, which, during the years of 1894 to 1899, produced something like \$500,000, have recently been sold to W. H. Tudhope, of London, Ont., together with all buildings, machinery, etc. The consideration is stated at \$1,000.

Silver Butte.—This property, 3 miles from Basin, owned by Pat. Dorrity, of Basin, and John S. Harris, of Butte, is to be operated under a bond for \$60,000 by Butte parties.

Lewis and Clarke County.

(From Our Special Correspondent.)

American Smelting and Refining Company.—A strike among the furnace men at the East Helena plant has taken place owing to a cut of 20% in wages through the operation of the 8-hour law passed by the last legislature. About 100 men are affected, with the probability of its extending to the rest of the employees.

Brooks Placer.—This tract of ground in the Kenwood addition to Helena has been bonded by C. W. Clark at \$50,000, the intention being to sink a shaft and exploit the property for a copper mine.

Madison County.

(From Our Special Correspondent.)

Red Bluff.—This property at Red Bluff, under the management of G. W. B. Turner, intends to install a 15-in. Cornish pump to handle the water, which is estimated to be from 1,500 to 2,000 gals. The 1,000-gal. pump on the 300-ft. level has been drowned owing to a breakage.

Strawberry.—John F. Cowan has suspended work on this property. The mill was not making a close enough saving of the values. The probabilities are that a cyanide plant will be added to the stamp mill.

Silver Bow County.

In addition to the many suits already pending between the Heinze Brothers and the Amalgamated, Anaconda and Butte & Boston and Boston & Montana companies, another suit was begun at New York on April 30th wherein John MacGinnis applied to Judge Andrews of the Supreme Court for a receiver for the Boston & Montana Copper Company of Montana, the Boston & Montana Company, of New York. The Amalgamated Copper Company and the Lewisohn Brothers are made parties to the suit. MacGinnis, the plaintiff, is a stockholder in the Boston & Montana Company, of Montana. He demands an accounting of the Boston & Montana Company, of Montana, during the time that company was in the hands of the Boston & Montana Company, of New York, and claims that between \$3,000,000 and \$4,000,000 of the assets of the former were never accounted for by the latter while it held control. The court made the order returnable May 3d, and granted a temporary injunction restraining the Boston & Montana Company, of Montana, from disposing of any of its assets or property while the suit is pending.

Parrot.—The new surface plant is being hurried to completion. The steel gallow's frame is of a new design and will be entirely open. It will be equipped with self-dumping skips. The boiler room is a building by itself, built of stone and brick, as is also the air compressor room and hoisting engines. The hoisting engine is one of the two hoisting engines built in 1878 for one of the big mines of the Comstock Lode, and was in service only about 8 months. The Parrot Mine has continued its regular output by a temporary shaft and engine. It will take a few weeks to complete the new plant and get it in operation.

Pennsylvania.—The Supreme Court has refused the request of Senator W. A. Clark and his son Charles for release from the bond for the Montana Ore Purchasing Company, given to stay an injunction against operations in the Pennsylvania Mine. The reason given was that the facts stated were not sufficient to warrant the relief demanded, or any relief or to invoke any action.

The Montana Supreme Court has made an order that the motion of the Montana Ore Purchasing Company to vacate the injunction be denied, and that the defendants, on or before May 10th, file in this court a supplemental bond or undertaking in the sum of \$350,000, with two or more good and sufficient sureties, conditioned as they have heretofore filed, and to be approved by the clerk of the court. In lieu of bond or undertaking with personal sureties, the defendants may substitute a bond with any surety company as surety thereon for the whole or any part of the matter there.

(From Our Special Correspondent.)

Carrie Copper Mining Company.—This is a new company organized to work the Carrie and Plymouth properties, with a capital stock of 500,000 shares at \$1. The owners and incorporators are the Largey Estate, Pat. Mullins and C. P. Drennen. The properties lie in the resident portion of Butte, north of Broadway, and west of Washington street. The Carrie has a 200-ft. shaft and has been operated as a silver property by Pat Mullins for some time, and is a producer in a small way. The intention is to continue the Carrie shaft to say 500 ft. deep, then to crosscut the Plymouth leads to the north. The discovery lead of the latter property shows indications of good copper values.

Climax.—This property, 20 miles southwest of Butte, which has been tied up by litigation for 10 years, will be worked by lessees. This is a gold property, and has a mill which was built in 1890, but only ran 30 days. The property is owned by C. B. Nolan, of Helena.

Pennsylvania.—The State supreme court has ordered the Montana Ore Purchasing Company to give an additional bond in the sum of \$350,000 on the application of the Boston & Montana Company. The order is made returnable by May 10th.

Speculator.—Lulu F. Largey, acting for herself and the other heirs of the Largey estate, has applied to the courts for a partition sale of the property as against John A. Creighton, of Omaha, a co-owner of a 1/2 interest. The suit is a friendly one and will not interfere with the operation of the mine, which has proved very valuable.

OREGON.

Baker County.

Golconda.—The Bryan Mill and 10 stamps are busy on ore from the 200 and 300-ft. levels. The Golconda Mining Company, a Portland corporation, has been completely reorganized. The holdings of J. T. and J. G. English were transferred to that company in March, 1900, when the company incorporated for \$1,000,000. Last February a syndicate of Pittsburg men, headed by C. A. Smith, took an option on the 700,000 shares held by the Englishes for \$350,000, and on 280,000 held in other hands for \$112,000, or the total of 980,000 shares of the original 1,000,000 for a total of \$462,000. The contract for the controlling interest in the reorganized company, now held by Mr. Smith and associates, calls for a cash payment of \$50,000, the balance at regular intervals, and a guarantee of \$75,000 being expanded in development work, during the 12 months of the option.

Virtue.—This 20-stamp mill at this mine near Baker City is to run on custom ore. The first run will be on ore from the Carrie E. claim.

PENNSYLVANIA.

Anthracite Coal.

Big Mountain No. 2.—This slope near Shamokin, employing 350 men and boys, has been permanently abandoned by the Philadelphia & Reading Coal and Iron Company, because the expense of mining the coal has become too great.

Lehigh Valley Coal Company.—This company makes the following statement for March and the four months of the fiscal year from December 1st to March 31st:

	March.	4 Months.
Earnings	\$1,556,880	\$7,254,208
Expenses	1,594,121	7,331,736
Loss	\$37,241	\$77,528

For the four months the gross earnings increased \$1,277,675 and the expenses \$1,150,696; leaving a decrease of \$126,979 in the deficit.

Philadelphia & Reading Coal and Iron Company.—This company's statement for March and the 9 months of its fiscal year from, July 1st to March 31st, is as follows:

	March.	Nine months.
Earnings	\$2,043,320	\$21,129,682
Expenses	1,881,491	19,464,754
Net	161,829	\$1,664,928

For the 9 months the earnings decreased \$1,-

167,310 and the expenses \$1,033,814; leaving a decrease of \$133,496 in the net earnings.

Prospect.—The strike that was on at this colliery of the Lehigh Valley Coal Company has been officially declared off by the officials of the United Mine Workers. Organizer Fred. Dilcher investigated the cause of the strike, and the district board requested the men to return to work.

Bituminous Coal.

Beech Creek Coal and Coke Company.—This company is a consolidation of mining interests in the same region in Clearfield, Cambria and Indiana Counties, along the line of the New York Central Railroad. The consolidated concerns are all owned by the same men. Three of them are partnerships and 3 corporations. The latter have an aggregate capital of \$840,000. The tract of land which it takes over contains 16,000 acres and there are 14 mines. The unmined coal is estimated at about 250,000,000 tons. The board of directors is composed of A. G. Palmer, John Magee, S. H. Hicks, James Kerr and A. E. Patton. Patton is the center of the company's operations.

Rochester & Pittsburg Coal and Iron Company.—This company has completed a deal for the purchase of 2,975 acres of coal in Centre, White and Black Lick Townships for \$32,947. This gives the company control of over 25,000 acres of undeveloped coal lands in Indiana County. The total investments of the company in lands in the past 18 months are said to be \$750,000. A new railroad will be necessary to the development of the tract, and the Buffalo, Rochester & Pittsburg is preparing to extend from Valier, Jefferson County.

United States Coal Company.—This company, an association of Pittsburg capital, has applied for a charter to work mines on the new line of the West Side Belt Line Railroad. The incorporators are T. N. Barnsdall, A. W. Lewis, J. W. Lee, John S. Scully, Jr., and A. S. Petrie.

Ursina Mining Company.—Deeds conveying 7,000 acres of land, belonging to the Connellsville & Ursina Coal and Coke Company, near Ursina, on the Pittsburg division of the Baltimore & Ohio Railroad, have been delivered to Wilfred Johnson, of New York. At the same time all of the stock and franchise of the Ursina & North Fork Railroad Company, a subsidiary organization of the Connellsville & Ursina Coal and Coke Company, were conveyed to Mr. Johnson and his associates, who have taken out a charter for the Ursina Mining Company, capitalized at \$1,500,000.

(From Our Special Correspondent.)

A big Somerset coal deal was completed within the last week. It embraces the transfer of 15,000 acres of coal. The territory was optioned, near Berlin, by Z. T. Kimmel, S. P. Brubaker, George Brubaker, F. B. Collins and A. C. Flotto, Berlin business men, who transferred to J. J. Hoblitzell, of Meyersdale. The latter made a sale to the W. K. Niver Company, of New York, which operates mines at Elk Lick, Somerset County. About \$1,000,000 will be spent on improvements. Two shafts will be sunk at once. One hundred houses will be erected.

There has recently been considerable discussion among experienced coke makers as to what percentage of loss results from forcing the burning of coke in the beehive ovens. When heavy charges are put in, and the time is limited to 24 hours' burning, there are always a few "black butts," etc. One expert figures that fully 12 bushels of coal are lost every 48 hours by thus forcing production.

Dorothy.—A lighted oil can dropped down the shaft at these works of the United States Steel Corporation near Latrobe set fire to the mine on April 29th. Seven men were caught in the smoke and two were overcome. Thirty mules were burned in the underground stables. The 5 men were at work when the fire started, and it was not till the rescuing party found them that they knew their peril. The fire, streaming up the shaft, burned the new tippel and spread to the engine house, boiler house and fan houses, which were destroyed. The tippel, with its big sheave wheels, fell down the shaft. The mine was opened 2 years ago by the American Steel and Wire Company, but when that company passed under the hands of the United States Steel Corporation it was absorbed with the other coal and coke interests. There were connected with the plant 230 coke ovens, producing regularly. It will be flooded. General Manager Thomas Lynch, of the steel company, is on the ground, with other officials; 400 men are out of employment.

SOUTH DAKOTA.

Custer County.

(From Our Special Correspondent.)

Saginaw Mining Company.—Men have been at work on a property 9 miles northwest of Custer, formerly owned by B. R. Wood and T. F. McLaughlin, of Custer. A drift will be run on one of 3 veins showing gold and a deep shaft sunk.

Lawrence County.

(From Our Special Correspondent.)

Detroit & Deadwood Company.—Prof. Roberts, of Denver, is in Deadwood to examine this company's properties. The 50-ton cyanide plant, on Annie Creek, has been closed down for some time. The company is working a property near Salt Lake City, Utah.

Homestake Company.—The company is running mill tailings through the new 1,200-ton cyanide plant at Lead. The mill is located about 1,000 ft. from the mills, the tailings being carried through a 12-in. pipe by gravity. There are 14 solution tanks, each 9 ft. deep and 44 ft. in diameter, capacity 600 tons each. It is expected that 2 tanks can be filled and emptied each day, making 7 days' time for the extraction of each tank. The cyanide building is 100 ft. wide by 341 ft. long. C. W. Merrill, of Denver, designed the plant. It is expected that the company will erect another cyanide plant this season. At the Caledonia Mill 20 stamps are being added to the 80, which will be ready to start in 30 days.

McLaughlin Cyanide Plant.—A 20-ton cyanide plant at Crook City, on Whitewood Creek, has been built by Captain McLaughlin and associates, of Spearfish, to treat Homestake tailings. There is a large deposit covering several acres of creek bed.

Portland Company.—Additional tanks are being put in at the 50-ton cyanide plant being operated by this company at Central City. The ore is crushed in the 20-stamp mill and cyanided.

Wasp No. 2.—The company has paid its first dividend, amounting to \$3,200. The mine is operated by the Wasp No. 2 Mining Company, recently organized by D. A. McPherson, W. L. McLaughlin, Deadwood; John Gray, Terraville; T. J. Griers, Lead, and John Blatchford, Terry. The mine is in the Yellow Creek District and has a 50-ton cyanide plant. The ore is a quartzite. R. F. Flinterman is chemist at the plant.

Pennington County.

(From Our Special Correspondent.)

Copper Cliff Company.—This company is preparing a plant at Chicago in which to treat graphite from a property in the copper district 5 miles west of Rochford. The ledge is said to be 30 ft. wide. The company has purchased a process now in use in Germany, and now being patented in the United States.

TEXAS.

Jefferson County.

Beaumont Oil Field.—Speculation in stocks of oil companies, many of them owning little or nothing, and in real estate continues to grow wilder and wilder. The Kelly Well near Beaumont came in on April 29th. This is regarded as the most important development since the Lucas gusher was struck, since it indicates a northwest extension of the oil field and increases the area probably productive.

The truth about the reported large purchases by the Standard Oil Company is said to be that J. S. Cullinan, of Corsicana, and John Searles, have purchased 30,000 acres of land from the Port Arthur Land Company, paying therefor \$25 per acre or \$750,000 for all. The deeds have been made out, but have not been passed, because some stockholders threaten to enjoin the sale. J. S. Cullinan is representative at Corsicana of the Standard Oil Company, hence the report that the Standard had bought docks and wharves at Port Arthur.

UTAH.

Jaub County.

Humbug.—Part of this and the Humbug No. 2 Mines at Tintic are reported sold by Jesse Knight to the Franklin syndicate, headed by Dr. P. A. H. Franklin, which recently acquired the Yankee Consolidated. John E. DuBois, of DuBois, Pa., is interested. A fine body of galena ore is reported in the ground.

Salt Lake County.

Bingham Copper and Gold Mining Company.—A circular sent out by the Boston office states that a new company, called the Bingham Consolidated Mining and Smelting Company, has been organized under the laws of the State of Maine, with an authorized capital of \$10,000,000, being 200,000 shares, par \$50, to take over all the property of the company. The stock of the new company will be issued as follows: 100,000 shares, par \$50 (making \$5,000,000), in exchange for the 200,000 shares of the Bingham Copper and Gold Mining Company, par \$10 (making \$2,000,000), this being at the ratio of one share of the new stock for two shares of the old; and 50,000 shares (making \$2,500,000) for the purpose of purchasing the Dalton & Lark, Brooklyn, Antelope and other groups of mines, and for the purchase of the Copper Belt Railway from the terminus of the Rio Grande Western Railroad to the Bingham Mine, and to provide \$1,000,000 cash in the treasury—all of which has been underwritten—leaving 50,000 shares unissued in the treasury of the new company, to be used only for the purchase of additional mines or for such purposes as may be deemed advisable by the directors.

The plan has already been endorsed by 75% of the stock.

The Federal Trust Company, of Boston, will receive for exchange the shares of the Bingham Copper and Gold Mining Company May 8th, 1901, and will issue therefor negotiable receipts.

Summit County.

(From Our Special Correspondent.)

Park City Shipments.—During the week ending April 27th there was marketed through the Mackintosh Sampler 3,164,690 lbs. of ore and concentrates, which represents the output of the camp. The following are contributors: Silver King, crude ore 716,720 lbs.; concentrates 269,920 lbs. Daly-West, crude ore 941,190 lbs.; concentrates 413,630 lbs. Ontario, crude ore 612,790 lbs. Anchor, concentrates 210,440 lbs.

Wayne County.

Boston Placer Mining Company.—This company has decided to put up a larger plant on the Colorado River, and has telegraphed Manager Enoch Larson to sell all its private property at Notom at a private sale. This consists of 3 gasoline engines, pipes, etc.

WASHINGTON.

Ferry County—Republic.

Railroad to Republic.—According to Spokane papers J. J. Hill has decided to build the Great Northern branch to Republic, via the Spokane Falls & Northern road and the Kettle River route, this year. The road is to connect with the Victoria, Vancouver & Eastern, the proposed Mackenzie & Mann road, which Mr. Hill is said to control, and which will be built under a Canadian charter.

(From Our Special Correspondent.)

Ben Hur.—The ore on the 230-ft. level has been stoped out 50 ft. in length and 2 floors in height.

Butte & Boston.—The north drift continues in good ore.

Chico.—The compressor is again running and power drills are in use. The bulkheading on the 300-ft. level is finished. The shaft is 20 ft. in the footwall.

El Caliph.—The northeast drift from the bottom of the shaft is in 11 ft., the vein continuing as before. The new tunnel is in 80 ft. and the vein widening.

Lone Pine-Surprise.—The new tunnel is in 85 ft.

Morning Glory.—The upraise from the 100-ft. sub-tunnel level is up 55 ft. The vein and quality of the ore continue as usual. A 20-ton shipment of ore will be ready by May 1st. About 15 tons are already sacked, reported to run from \$150 to \$450 per ton.

No. 1 Consolidated.—The new tunnel is in 40 ft.

Princess Maud.—The North drift, 300 ft. sub-tunnel level, is in 170 ft. The ore continues of good grade and a vein is widening. Next month sinking will be continued to the 400-ft. level.

Republic.—Large quantities of ore have been removed from the cropping of the vein and hauled to the mill. Teams are now hauling ore from the No. 2 tunnel dump.

Trade Dollar.—The new shaft is down 52 ft. It is being sunk 2½ ft. a day. A horse whim is used.

WEST VIRGINIA.

Marion County.

(From Our Special Correspondent.)

Highland Coal and Coke Company.—This company has purchased the Anderson Mine of the Clark Coal and Coke Company, the Chief-tain Mine of the J. A. Clark Coal Company, the Ocean mines of the Clark interests, and the Columbia Mine.

FOREIGN MINING NEWS.

AUSTRALASIA.

Tasmania.

Mount Lyell Mining Company.—This company reports for the 4 weeks ending April 3d a total of 18,543 tons ore smelted; the yield being 812 tons black copper, containing 803 tons fine copper, 52,380 oz. silver and 1,941 oz. gold. The average result was 4.33% copper, 2.82 oz. silver and 0.10 oz. gold to the ton.

CANADA.

British Columbia—West Kootenay District.

War Eagle.—The development of the lower levels at this Rossland Mine, especially the 9th, goes on. An upraise is being made to connect the 8th level with the 7th. This is under the upraise on the 7th level on the west drift of the north vein.

St. Eugene Mining Company.—This company, operating a mine near Fort Steele, has announced the payment of a second dividend of 3%, making a total of \$210,000 paid by the company to date.

COAL TRADE REVIEW.

New York.
Anthracite.

May 8.

The hard coal trade is saved from absolute dullness only by the new price lists with their graded discounts. The discount for May is 40c. per ton and sales agents are assuring their customers that the discounts are certain to be 10c. less per month till September 1st. Those buyers who have confidence in the new order of things took quite a heavy tonnage in April and some doubters are likely to lay in considerable supplies this month. There are no reports that orders for April have been carried over. In fact, the market is in excellent condition for this time of the year.

At the head of the Lakes docks are bare and practically no coal is changing hands. In Chicago territory stocks on dock are very light and will be cleaned up by the time coal begins to arrive in quantity. Trade is quiet, but the market is strong. Along the lower lakes demand has held up well. Shippers at Buffalo have been waiting for the strike of the marine engineers to end. The prospects are the rate from Buffalo to upper lake points will be 40c. In the East demand has been fairly strong. Coastwise shipments are hindered by the difficulty of getting tonnage owing to the great number of vessels and barges waiting a chance to unload at Eastern points.

The April prices for free-burning white ash coal f. o. b. New York Harbor ports are: Broken, \$3.60; egg, \$3.85; stove and nut, \$4.10.

Bituminous.

The Atlantic seaboard soft coal trade shows no improvement from the dullness of the past few weeks. There is an immense tonnage of coal lying at the tidewater shipping ports waiting for vessels. The coastwise fleet is in the East; it was a long time getting around Cape Cod owing to the bad weather, and arrived at the receiving ports in a bunch. It will have to unload slowly in consequence, and arrivals at the loading ports will be few for some time. As a result of the accumulation of coal at the loading ports the railroads have practically put embargoes on all the further lower ports, and even at nearby ports individuals who do not give immediate shipments have their car supply shut off at short notice.

In the far East there is a lot of coal on the market which will have to be unloaded slowly, as the first arrivals of the eastbound fleet secured all the available cars. As a result many vessels will have to pay demurrage. Along Long Island Sound demand is fair in places. New York Harbor trade is a little bit slower than usual. In the all-rail trade consumers are shopping and trying different coals.

Transportation from mines to tidewater is slow on account of the great number of loaded cars lying at the shipping ports or side-tracked along the lines. Car supply to each individual is limited according to the despatch shown in unloading at tidewater. In the coastwise vessel market there are practically no vessels at the shipping ports. We quote current rates from Philadelphia as follows: Boston, Salem and Portland, 70c.; Providence, New Bedford and the Sound, 60¢@65c.; Wareham and Lynn, 80c.; Bath, 75c.; Newburyport and Portsmouth, 85c.; Saco, 90c. and towages; Bangor, \$1. Rates from the further lower ports are about 10c. higher.

Quotations for the better grades of coal are unchanged, though certain poorer grades are below schedule figures.

Notes of the Week.

The Pennsylvania Railroad Company reports the coal and coke traffic originating on its lines east of Pittsburgh and Erie for the four months ending April 27th as follows, in tons of 2,000 lbs.:

	1900.	1901.	Changes.
Anthracite	1,301,548	1,523,861	I. 222,313
Bituminous	6,424,066	6,785,666	I. 361,600
Coke	3,008,179	2,621,285	D. 386,894

Totals

The notable feature in this statement is the decrease of 12.7% in coke shipments.

Birmingham, Ala.

Apr. 29.

(From Our Special Correspondent.)
The conditions in the Alabama coal market show signs of slacking. There is still much work going on at the mines, though a day or two a week is lost in some of the larger places. Good prices still obtain in the coal market in Alabama and the miners are getting within 2½c. of the maximum price according to the contract existing between the men and the operators, which is based on the selling prices of pig iron.

There have been a few minor labor troubles in this district in mining circles recently, but in every instance the trouble has been local. New Castle and Palos mines during the past week were involved in labor troubles. The miners at Palos resumed work to-day after being out 4 or 5 days, while only one-half the force has been at work at New Castle for the past 7 or 8 days. At Palos the miners struck because the company would not increase the wages of one driver on the outside 15c. a day. An amicable

settlement was arrived at. At New Castle the operators refused to recognize the United Mine Workers of America and all those men who belonged to the organization, about 75 or 80 in number, declared a strike and are now being backed up by the State organization of that order.

There is considerable coal being shipped from Alabama to adjoining States. The Mississippi River trade is active, contracts accepted some time ago being filled regularly. The report has it that during this week the sale of coal properties in Walker County, Alabama, to the Monongahela Coal Company, of Pittsburg, will be consummated and then the competition on the Mississippi River in Louisiana and lower Mississippi will be ended. A meeting of the stockholders of the Virginia & Alabama Coal Company will be held in Birmingham this week and the sale of their properties to the Pennsylvania parties will be considered, and probably completed.

Chicago, Apr. 30.

(From Our Special Correspondent.)

Anthracite Coal.—The buying of anthracite coal is very limited, business having dropped off. Small sales are in order with prompt delivery, but inquiry is very small. On May 1st the discount on anthracite coal will be reduced to 40c. off the present circular of \$5.75 broken and \$6 for domestic sizes. By September full circular will again take place, but each month until then will have a reduction of 10c.

Bituminous coal sales do not foot up large aggregate, the buying being in small quantities, with but little inquiry for larger lots. Prices are not very firm and buyers are getting the best out of the present condition. Quotations are: Brazil block, \$2.25@3.25; Island, Ind., \$2; Hocking Valley, \$2.75; Wilmington, \$2.25; Pocahontas, \$3.25; New River, \$3.25; Raymond, \$3.25.

Cleveland, O., May 1.

(From Our Special Correspondent.)

The coal trade has been in a state of expectancy all of the week, due to promises of an early opening of general navigation of the lakes. The sales-agents report that dealers in the Northwest are taking hold on material more easily than they had done before and some good-sized contracts have already been made. The shippers have started out their first cargoes, but these are now blocked in the rivers by an ice jam. It is expected to be a week yet before the boats will be moving freely and still further ahead than that when the marine engineers have gone to work and have fitted out all of the steamers which are waiting for them. The two elements that are causing delays to navigation are also preventing any chartering being done for any time in the future. A few wild charters have been made during the week at 40c. to all ports, both Lake Michigan and Lake Superior, but aside from this little has been accomplished, no season contracts for coal having been placed with vessel men. It is believed, however, that the contract rate will be approximately what has been established as the going rate. The sales this week in this territory have been fairly satisfactory, the old prices prevailing.

Pittsburg, May 1.

(From Our Special Correspondent.)

Coal.—Fully 2,000,000 bus. of coal got out during the week and shipments to Southern ports have stopped for the present. All the mines in the district are busy and the only delay in the shipment of coal will be a shortage of cars. Neither combination has made any change in prices.

Connellsville Coke.—The production of Connellsville coke continues to be heavier than at any time in the history of the region. Of the 21,447 ovens this week 19,942 are in operation and 1,502 are idle. The production was 236,181 tons, a gain of 2,233 tons during the week. The shipments aggregated 11,170 cars, distributed as follows: To Pittsburg and river tips, 3,887 cars; to points west of Pittsburg, 5,382 cars; to points east of Connellsville, 2,401 cars. This was an increase of 170 cars.

Shanghai, China, Mar. 20.

(Special Report of Wheelock & Co.)

Coal.—Nothing doing. Arrivals for the fortnight ended March 20th aggregated 30,197 tons. Quotations, per ton, are as follows: Welsh Cardiff, 22 taels (\$14.75); Australian Wollongong, nominal, cargo, ex-godown, 12 taels (\$8.04); and miscellaneous sorts, 6@7 taels (\$4.02@4.69); Chinese, Kaiping, lump, 8@10 taels (\$5.36@6.70); dust, 6 taels (\$4.02); and mixed, 7@7.50 taels (\$4.69@5.03); Japan, all contracted for.

Kerosene Oil.—There has not been a very large business, owing principally to the tightness of money. Importers are asking for Devoe's spot cargo 2 taels, less 2%, and 1.96, less 2%, to arrive. Stocks are 245,200 cases American, 480,450 cases Russian and 77,200 cases Sumatra; total, 802,850 cases. Quotations per case are as follows: American Devoes, 1.93½ taels (\$1.30); Russian Anchor Chop, 1.82½ taels (\$1.22); Ram Chop, 1.81½ taels (\$1.22); bulk oil (2 tins), 1.73½ taels (\$1.16), and loose, 1.36½ taels (92c.); Sumatra Langkat, 2 tins, 1.73½ taels (\$1.16); and loose, 1.36½ taels (92c.).

Foreign Coal Markets.

May 3.

Exports of coal from the United States in March showed a considerable decrease, as compared with March, 1900. The totals were, in long tons:

Anthracite	121,046	113,415	D. 7,631
Bituminous	622,463	422,909	D. 199,554
Total coal	743,509	536,324	D. 207,185
Coke	42,442	39,772	D. 2,670
Totals	785,951	576,096	D. 209,855

The decrease was chiefly in shipments to Canada. The destination of the coal exports this year was: Canada, 318,802 tons; Mexico, 47,907 tons; Cuba, 35,520 tons; other West Indies and South America, 77,410; Europe, 53,702; other countries, 2,983 tons. Of the shipments to Europe, 12,726 tons went to France and 6,585 tons to Germany, this last being an unusual shipment. The balance went chiefly to Italy.

No new contracts or charters for European ports are noted. There has been more activity in South American business, and demand for the West Indies is fair.

Messrs. Hull, Blyth & Company, of London and Cardiff, report under date of April 20th that owing to the proposed tax of 1s. per ton on export coal business at Cardiff is at a standstill, pending the definite decision of the Government as to the incidence of the tax. Prices are nominally as follows, ex tax: Best Welsh steam coal, \$4.20@4.32; seconds, \$4.08; thirds, \$3.84; dry coals, \$3.72@3.84; best Monmouthshire semi-bituminous, \$3.72@3.84; seconds, \$3.36@3.60; best small steam coal, \$2.28; seconds, \$1.92; other sorts, \$1.56.

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

No chartering has been done since the proposal of the Government as to the tax on coal was made known. In the previous part of the week rates were slightly firmer. Some rates noted are: Cardiff to Marseilles, \$1.90; Genoa, \$1.92; Naples, \$1.92; Port Said, \$2.16; Singapore, \$3.84; St. Vincent, \$1.86; Rio Janeiro, \$3.48; Buenos Aires, \$3.12.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 582.)

New York, May 3.

The imports and exports of chemicals, etc., at all United States ports in March, 1901, and the three months of this year, were as below:

Articles.	March.		Year, 1901.	
	Imports.	Exports.	Imports.	Exports.
Bleaching Powder, lbs.	9,845,246	1,226	30,018,954	1,226
Caustic Soda, lbs.	250,985	108,802	1,525,018	297,770
Sul Soda, lbs.	651,515	2,170	1,527,701	2,170
Soda Ash, lbs.	2,832,289	.....	17,616,560	.....
Chlorate of Potash, lbs.	1,174	7,810	171,145	14,000
Copper Sulphate, lbs.	11,222,239	.....	26,269,019	.....
Nitrate of Soda, tons.	16,822	269	44,362	569
Muriate of Potash, lbs.	1,360,630	120,000	13,876,782	120,000
Phosphate Rock, tons.	10,203	69,009	27,394	163,327
Pyrites,	49,842	.....	99,780	.....
Brimstone "	6,009	.....	22,000	.....
Salt peter, lbs.	871,416	.....	3,313,854	.....

With few exceptions March shows an increase in both imports and exports as compared with the previous month.

Heavy Chemicals.—High test domestic alkali and caustic soda are in good demand. Makers continue to ask quotations below, while jobbers are selling at less. Bleaching powder is weak and sales on spot are reported at \$1.75@1.85 per 100 lbs., according to test, while importers quote contract prices as below. Prussiate of soda is lower at 11@12c. per lb. We quote per 100 lbs. as follows: Domestic soda ash in bulk is worth 2½c. per 100 lbs. less than quotations below:

Articles.	Domestic.		Foreign.
	F.o.b. Works.	In New York.	In New York.
Alkali, 58% 49%	80@85 85@90	.....	85@87½
Caustic Soda, high test	\$1.90@1.95	.....	1.95@1.87½
powd. 70@74% 98% . . . . .	.....	2.75 2.25 3.25	3.75@4.00 67½
Sul Soda "conc"	50 1.25@1.50	60 1.05@1.10	1.75 1.37½@3.00
Bicarb. Soda, "extra"	3.25@3.50	.....	.....
Bleach Pdr. Eng. prime . . . . .	.....	.....	2.00@2.10
other brands . . . . .	.....	.....	1.90@1.95
Chl. Pot. cryst. powd. . . . .	.....	8.00@8.25 8.25@8.50	9.50@9.75 9.75@10.00

Cyanide of Potash.—Abroad makers are not working harmoniously together, and prices suf-

fer in consequence. In New York importers are selling at 24@25c. per lb. in large lots, while the demand is still only moderate.

Copperas.—Competition is keen, and bulk sales are noted at 35c. per 100 lbs., while barrels sell at 40@45c., according to quantity.

Acids.—Acetic is again unsettled by bickering between makers. Sulphuric moves more freely to soda water people. Blue vitriol shows an improved export demand.

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

Acetic, No.8	\$1.62½	Nitric, 36°	\$3.87½
Blue Vitriol,	4.50@4.75	Nitric, 38°	4.12½
Aqua Fortis, 36°	3.62½	Nitric, 40°	4.37
Aqua Fortis, 35°	3.87½	Nitric, 42°	4.75
Aqua Fortis, 40°	4.12½	Oxalic	5.75@6.00
Aqua Fortis, 42°	4.50	Sulphuric, 66°	1.20
Muriatic, 15°	1.20	Sulphuric, 60°	1.05
Muriatic, 20°	1.35	" bulk 50° ton	14.00
Muriatic 22°	1.50		

Brimstone.—The heavy arrivals at New York, amounting this week to 3,650 long tons, have weakened spot best unmixeds to \$21.25@21.50, while shipments are quoted \$21@21.25. Best thirds are about \$2 less. The imports into Great Britain in the 3 months ended March 31st amounted to 6,096 tons, against 4,628 tons in the same time last year.

Pyrites.—Consumptive demand is good, and prices are pretty well maintained. Imports into Great Britain in the 3 months ended March 31st totaled 184,088 long tons, against 206,542 tons in the corresponding period last year, showing a falling off of 22,454 tons.

We quote per ton as follows: Mineral City, Va., lump ore, \$4.90 per long ton, and fines \$4.50. Charlemont, Mass., lump, \$5.50, and fines \$5. Spanish pyrites, 12c. per unit delivered ex-ship New York and other Atlantic ports. Spanish pyrites contain from 46@51% of sulphur; American from 42@44%.

Sulphate of Ammonia.—For shipment holders of foreign gas liquor ask \$2.62½@2.65 per 100 lbs., while spot brings \$2.67½@2.70. Domestic is quoted at \$2.55@2.60, f. o. b. Boston. Trade is uninteresting.

Phosphates.—The exports from the United States in the first quarter of this year have increased 15% as compared with 1900. The lower freight market has favored a heavier movement and we may look for a still further increase in our foreign trade. A charter from Ferdinandina to Flume, Austria, is noted at 18s. 6d. (\$4.44), and from Port Royal to Cork, Ireland, at 13s. (\$3.12), both sailing this month. In Tennessee the expected consolidation of the larger producing interests has attracted attention, especially as some heavy land sales have since been made. South Carolina's domestic shipments since September 1st last show a falling off of over 40%, and a still further decrease is expected.

Christmas Island pebble phosphates are selling in the foreign markets at 8d. per unit (\$13.28 per ton). Algerian stuff, it is said, is being bought more freely in the Italian and French markets, as the deliveries of Florida pebble are too uncertain.

The imports of phosphates into Great Britain in the 3 months ending March 31st amounted to 89,399 long tons, against 103,470 tons last year; showing a decrease of 14,071 tons in 1901.

Phosphates.	Per Ton F. o. b.	C. i. f. Un'd Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (77 @ 800)	\$6.50@7.00	7½@7¼d	\$11.12@11.70
*Fla. land pebble (68 @ 734)	3.85@4.00	6½@6¼d	8.58@8.75
*Fla. Peace River (58 @ 634)	2.50@2.75	6½@6¼d	7.35@7.50
†Tenn. rock 78% export.	3.25@3.50	6½@d	10.53@10.92
†Tenn. 78% domestic.	3.00	.....	.....
†Tenn. 75% "	2.75	.....	.....
†Tenn. 70@72% "	2.00@2.50	.....	.....
†So. Car. rock, crude	2.50@2.75	.....	.....
†So. Car. rock, dried	3.25	6d	7.00
Algerian rock, (63@70%) . . . . .	.....	6½@d	8.71@9.30
Algerian rock, (58@634) . . . . .	.....	6 @6¼d	7.20@7.80
Tunis, Gafsa . . . . .	.....	6 @6¼d	7.20@7.88

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

Nitrate of Soda.—Spot sales have been made at \$1.82½ per 100 lbs., and for shipment \$1.82½@1.85, according to position. The "Salfordia" is due with 44,000 bags. There are also expected five other vessels this month with an aggregate of 87,487 bags. The European market showed an increase of 50,000 tons in the April consumption as compared with last year. Deliveries continue large, and it is expected the surplus stocks will be absorbed, hence the producing market is firmer at 6s. 3d. (\$1.50) per qtl., while freights range from 25s. @30s. (\$6@7.20).

The Santiago Nitrate Company paid an interim dividend of 5s. (\$1.20) per share on April 30th, while the San Jorge paid 4s. (96c.) per share for the year 1900.

The statistical position of the Chilean nitrate of soda industry in 1900 and 1899 is reported by the Asociacion Salitre de Propaganda as follows, in Spanish quintals:

	1899.	1900.	Changes.
Production	30,759,775	32,474,583	I. 1,714,808
Exports	30,360,239	31,549,653	I. 1,189,414
World's consumption	30,712,192	30,443,020	D. 269,172

The 1900 consumption in Germany alone fell off 1,273,050 qtls., owing to unfavorable weather, and in South Africa 259,605 qtls on account of the war.

The Permanent Nitrate Committee of London has decided to spend £36,000 (\$180,000) in propagating the use of nitrate of soda in Europe and North America. Of this amount £8,650 (\$43,250) will be spent in the United States and Canada.

Potash Salts.—Contract deliveries are regular at agents' prices as follows for New York, Boston or Philadelphia shipment: Muriate of potash, 80@85%, \$1.83 per 100 lbs.; muriate of potash, 95%, \$1.86; sulphate of potash, 90%, \$2.11; sulphate of potash, 96%, \$2.13 per 100 lbs.; double manure salt, 48@53%, \$1.12 per 100 lbs.; kainit, testing 12.4% actual potash, \$9.05 per long ton; sylvinit, 38½c. per unit of sulphate of potash; manure salt, 20% actual potash, 66c. per 100 lbs.

Messrs. Mortimer & Wisner's circular on nitrat of soda, dated, New York, May 1st, gives the following statistics:

	1901.	1900.	1899.
	Bags	Bags	Bags
Imp. into Atlantic ports from West Coast S. A., from Jan. 1, 1901, to date.	417,659	327,553	184,283
Imp. from Jan. 1 from Europe		2,063	
	417,659	329,616	184,283
Stock in store and afloat May 1, 1901, in New York.	25,034	34,573	15,852
Boston			
Philadelphia			
Baltimore		19,585	500
Norfolk, Va			
Charleston			
To arrive, due Aug. 15, 1901	441,317	237,350	347,000
Vis. supply to Aug. 15, 1901	466,351	291,578	363,352
Stock on hand Jan. 1.	13,446	9,586	58,406
Deliveries past month	64,117	86,220	86,699
Deliveries since Jan. 1, to date	406,071	285,044	226,337
Total yearly deliveries	1,176,651	976,592	
Prices current, May 1.	\$1.82½	\$1.82½	\$1.65

Liverpool. Apr. 17

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

Trade in heavy chemicals has been rather quieter, if anything, during the past week, but quotations are practically unchanged.

Soda ash is firm at the usual range, according to destination. The range for tierces may be called about as follows: Leblanc ash, 48%, £5 15s. @£6; 58%, £6 2s. 6d. @£6 7s. 6d. per ton, net cash. Ammonia ash, 48%, £4 10s. @£4 15s.; 58%, 4 15s. @£5 per ton, net cash. Bags, 5s. per ton under prices for tierces. Soda crystals are in steady request at £3 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for certain favored markets. Caustic soda is only meeting with a moderate demand, and while makers still hold for full values, there are a few re-sale parcels offering at a slight concession. We quote spot range about as follows: 60%, £9 5s.; 70%, £10 5s.; 74%, £10 15s.; 76%, £10 17s. 6d. @£11 per ton, net cash.

Bleaching powder is dull at nominally £7 @£7 5s. per ton, net cash, for hardwood packages, with special quotations for certain export markets.

Chlorate of potash is slow of sale at 3½ @3¼d. per lb., net cash.

Bicarb. soda is moving off quietly at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages; also special terms for certain favored markets.

Sulphate of ammonia continues in a depressed condition and quotations are again easier at about £10 10s. @£10 12s. 6d. per ton, less 2½% for good gray 24@25% in double bags f. o. b. here.

Nitrate of soda is selling to a moderate extent on spot at £8 15s. @£8 17s. 6d. per ton, less 2½% for double bags f. o. b. here as to quantity and quality.

IRON MARKET REVIEW.

NEW YORK, May 3, 1901.

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending				From Jan., '00.	From Jan., '01
	May 4, 1900.	May 3, 1901.	F'ces.	Tons.		
An' racite & Coke.	900	287,350	925	289,325	5,068,552	4,797,763
Charcoal.	29	7,025	25	8,025	131,488	139,725
Totals..	289	290,375	250	297,350	5,200,040	4,937,488

The iron and steel markets show little change from last week. The rush of buying is well over for the present, though orders continue to come in. The discussion of contracts for the second half of the year is going on and some have already been placed, but there is no disposition to rush matters.

Quite a number of small rail orders have been

placed in anticipation of the increase in price which took effect May 1st. The girder rail business is showing up well.

Rumors continue of all sorts of consolidations and combinations. Most of these are referred to in our news columns. The report of a consolidation of Alabama iron companies has been again asserted and again denied.

Birmingham, Ala. Apr. 29.
(From Our Special Correspondent.)

The demand for pig iron in Alabama has subsided some, but there is no apprehension on the part of the furnacemen that the market conditions are going to be unfavorable. There is a good inquiry. Shipments on orders accepted some weeks ago are being made steadily.

A feature in this district is the great activity in finished iron and steel and cast iron pipe.

From Anniston comes the report that the scheme to reorganize the Woodstock Iron Company and take charge of the three furnaces at Anniston, which have been out of blast for some time now, is meeting with some success and it is believed that the proposition will prevail. It is believed that sufficient stock will be taken to guarantee working capital for the operation of at least two of the furnaces.

Quotations remain stiff and high. No. 2 and 3 foundry iron are in active demand. The following prices are given: No. 1 foundry, \$11.75 @ \$12.50; No. 2 foundry, \$11.25 @ \$11.75; No. 3 foundry, \$10.50 @ \$11.25; No. 4 foundry, \$10 @ \$10.50; gray forge, \$10; No. 1 soft, \$11.75 @ \$12.50; No. 2 soft, \$11.25 @ \$11.75.

So far no work has been done on the construction of the pressed steel car works near Ensley by the Southern Car and Foundry Company, though it was announced several weeks since that active work would be started immediately. Good prices obtain in the steel market.

Buffalo. May 1.
(Special Report of Rogers, Brown & Co.)

The market for pig iron in this vicinity continues fairly active, in small lots. The larger consumers seem to have covered their requirements for some time and are principally in evidence as stirring up the shippers to keep supplies going forward as required. A strike at the furnaces in Buffalo has temporarily stopped two furnaces supplying this field, thus curtailing production between 400 and 500 tons daily. There is no change in prices, which are on the following basis, cash, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$16; No. 2, \$15.50; Southern soft, No. 1, \$16.50; No. 2, \$16; Lake Superior charcoal, \$18; coke malleable, \$16.50.

Chicago. Apr. 30.
(From Our Special Correspondent.)

Pig Iron.—Bessemer iron has increased in demand during the past few weeks, though the present supply is inadequate to the requirements, the furnace companies hereabouts having been unable to accept orders. Malleable iron is in heavy demand; a considerable tonnage is being placed and large orders are to come from present outlook. Implement manufacturers are doing some good buying in foundry iron for delivery after July. Business prospect is exceedingly good for pig iron, inquiry being heavy and as a rule leading up to sales.

Quotations are as follows: Lake Superior charcoal, \$18 @ \$18.50; local coke foundry, No. 1, \$16 @ \$16.50; No. 2, \$15.50 @ \$16; No. 3, \$15 @ \$15.50; local Scotch, No. 1, \$16.25 @ \$16.50; Ohio strong softeners, No. 1, \$16.50 @ \$16.75; Southern silvery, according to silicon, \$16.15 @ \$16.60; Southern Coke, No. 1, \$15.90 @ \$16.15; No. 2, \$15.40 @ \$15.90; No. 3, \$14.90 @ \$15.40; Southern, No. 1 soft, \$15.90 @ \$16.40; No. 2 soft, \$15.40 @ \$15.90; foundry forge, \$14.40 @ \$14.65.

Cleveland, O. May 1.
(From Our Special Correspondent.)

Iron Ore.—The activity in the ore market seems to have spent itself in the charters last week, by the United States Steel Corporation, of vessels enough to carry upward of 2,000,000 tons of ore. Since that time a few of the vessel owners have placed their tonnage for the season, but the shippers do not appear to be entirely ready to act. A few wild charters have been made on the basis of 80c. from the head of the lakes, but not many. It seems now as if both sides are awaiting the end of the strike of the marine engineers. The prospective vessel pool is no longer a feature in the situation, as to all intents and purposes that enterprise, for the time being, is dead.

Pig Iron.—Pig iron is very active now, although upon a small scale. The orders taken are of a moderate size, but the aggregate tonnage is quite heavy. Some of the furnaces are able to make deliveries more promptly than they have done hitherto, but the amount of material to be disposed of is constantly on the decrease. Some sales have been made beyond July 1st, although they are not many. The prices remain steady at \$16.50 for Bessemer, Valley furnace; \$16 for basic; \$16.50 for foundry No. 1, and \$15 for foundry No. 2, also at Valley furnace.

Finished Material.—Orders for steel rails to get under cover before the advance which was

made on Monday has been the feature of the week in the steel trade. In this vicinity something like 50,000 tons have been taken, which is probably the record in an equal time for this territory. The greater part of this material has been taken by the electric lines, although some of the smaller steam properties have been included in the list of buyers. Some of the buyers persisted in denying that the price was to be advanced and were caught. Since Monday the ironclad quotation has been \$28 a ton. Buying of structural steel has been light for the last few days. The activity in that quarter has not eased off to any extent, but most of the projects have had the steel purchased for them. The price has not changed, all grades now bringing 1.60c. at Pittsburg. In both structural steel and in steel plates the specifications on former orders have been heavy. Plates have been moderately active, although specifications coming in steadily have kept the mills employed. The price remains firm at 1.60c., Pittsburg. Some of the mills have given notice that the supply of billets hereafter will be better than it has been and a general shading of prices is expected.

Old Material.—The orders are small, but in good numbers. The dealers are finding the material easier to obtain. The prices hold firm as follows: Steel rails, \$16.50; iron rails, \$20; No. 1 wrought, \$16.50; machinery cast, \$13; wrought turnings, \$10; cast borings, \$6.

Philadelphia, Pa. May 2.
(From Our Special Correspondent.)

Pig Iron.—Quotations given to-day by leading pig iron interests show no change against last week except in a few instances where special brands had to be secured at any price. There are also purchasers for mill irons who early in the season did not size up the situation properly, and have been obliged to supplement their scant buyings. As to steel pig, prices keep at the top and whatever business is done is guarded from newspapers. Business for the last half of the year is being done, but of smaller proportions than would be if prices were not so high and firm. Some pig iron makers go so far as to say that a collapse in the stock market is not so remote as many imagine and that when it comes it will react on the industries and alarm iron interests, and especially pig. Apart from this fact or possibility there is not the least occasion for unrest and even higher prices for basic and Bessemer are possible and probable. Foundrymen are getting over their apprehensions about dearer pig and in some cases have withdrawn from the market for late deliveries. Quotations may be given at \$16 @ \$16.25 for No. 1 X; \$15.50 @ \$15.75 for No. 2 X; \$15 @ \$15.25 for No. 2 plain; standard gray forge, \$14.50; ordinary, \$14; basic, \$14.50; standard Bessemer, \$15.

Billets.—The furor is over and if there are any people who would like to buy they are keeping quiet. Special quality, \$30; soft steel, \$27.

Merchant Bars.—Mill owners all over our territory have aded good-sized orders during the past few days at full prices. Orders for common iron are plenty. Considerable material continues to find its way westward. Prices are not far from 1.50 @ 1.60c., delivered, for iron and 1.65c. for steel.

Sheets.—Customers are giving signs of having enough material for the present. Certain large consumers have submitted prices for late delivery. There is an intimation that shading is practiced to favorite customers. The expression among sheet mill interests is against any struggle for Autumn deliveries.

Plates.—Some new local requirements have been presented this week and as rather early deliveries were required the prices named were somewhat above usual quotations. Inquiries at all shipbuilding interests indicate that as soon as the way can be cleared for new work the plate mills will have some of the largest requirements of the year so far to figure on. Over 75% of midsummer requirements have been covered and on this account and for one or two other reasons there will be some quiet this month. Quarter-inch plates are booked all the way between 1.75 @ 2.00c.; universals, 1.85c.; flange, 2.00c.

Structural Material.—Certain large interests which are in a position to wait have named their figures for autumn deliveries, which are 0.2c. below present selling prices. No answer, if any, has been made public.

Steel Rails.—The advance to \$28 has not affected our local market. The only business coming along is for girder rails.

Scrap.—Much more business would be reported except for the disposition of holders of scrap to get the very outside cent. Old rails go at \$20 for iron and about \$17.50 for steel. Railroad scrap is held at \$20 @ \$21, while \$19 @ \$19.50 is what buyers will pay.

Pittsburg. May 1.
(From Our Special Correspondent.)

The heavy buying of steel bars by agricultural implement manufacturers is the feature of the iron and steel markets this week. Fully 100,000

tons have been ordered, which increases the total sales so far to 150,000 tons for delivery during the second quarter. The price at which the bulk of these contracts were sold is 1.40c. This was the minimum price and other lots were sold at 1.45c., but the market is firm at 1.50c.

The new price on standard steel rails went into effect to-day. The price is now \$28 a ton, an advance of \$2 over the pool price. The rail makers are all crowded with orders and it is impossible to secure prompt shipments. The Carnegie Company can make no deliveries for new business before October and the Cambria Steel Company is out of the market until November. It is said that premiums ranging from \$2 to \$4 are being offered for spot shipments. The bulk of the steel rail orders, however, have been placed.

The prices in all lines of iron and steel are firm and there are no indications of a drop. Sales of Bessemer pig iron were not as heavy as last week, not aggregating more than 5,000 tons. The price is the same. An accident to one of the Carrie furnaces will cut the supply of basic iron by probably 60,000 tons, or about 10,000 tons a month, as it will be fully six months before the damage can be repaired. As a result of the accident 10,000 tons of basic iron have been bought this week by the Carnegie Company. The United States Steel Corporation has decided to create a department for the purchase of iron and hereafter all buying will be done by one department for all of the constituent companies. The Bessemer Furnace Association met in Cleveland last Saturday and acted on a number of inquiries, but made no change in the current prices, which are \$16, Valley furnaces, for future delivery and \$16.25@16.50 for spot shipment, at the furnaces. The sales of foundry and gray forge iron during the week were low, but the prices were the same as last week.

The sales of Bessemer steel billets were heavier than usual, amounting to at least 10,000 tons. The price was \$24 for future delivery and \$24.75 @ \$25 for prompt shipment. No sales of open-hearth billets are recorded, as the scarcity continues and the price asked remains at \$30.

The Crucible Steel Company of America is to have a rival. James W. Brown, former vice-president and director, who sold his interests recently, is organizing a company which will at once invest \$1,000,000 in a crucible steel plant. The company will be perfected before the end of the week and may prove a factor in the tool steel trade of the country.

Pig Iron.—Sales of Bessemer pig iron this week did not exceed 5,000 tons. Most of it was for August and September delivery at \$16, Valley furnaces. Several lots for spot shipment sold at \$16.25@16.50. About 2,000 tons of foundry No. 2 were sold at \$15.25@15.50, Pittsburgh. Gray forge was quiet, but prices remain at \$14.50@14.75, Pittsburgh.

Steel.—There was somewhat of a boom in Bessemer steel billets and sales aggregating 10,000 tons were made at \$24 for future and \$24.75 for prompt shipment. Over 100,000 tons of steel bars were sold at 1.40c. and some sales were made at 1.45c. The price quoted for immediate shipment is 1.50c. Tank plates remain at 1.60c.

Sheets.—The demand for black sheets is unusually heavy, but there is no change in prices. No. 28 gauge is still quoted at 3.30@3.35c. and galvanized sheets at 70 and 5 to 70% off.

Ferro-manganese.—The leading producer continues to quote 80% domestic at \$58.50 and the demand is about the same as last week.

New York. May 3.

The domestic market is quieter, though prices are well maintained on finished products. Foreign trade shows a falling off, due to the decline in prices abroad.

Pig Iron.—The market is dull, and sales are light. Certain grades can be had at below quotations. We quote as follows: Northern irons, tidewater delivery: No. 1 X foundry, \$16.25@16.75; No. 2 X, \$15.50@16; No. 2 plain, \$14.50@15; gray forge, \$14.50@14.75. For Southern irons on dock, New York, No. 1 foundry, \$16@16.50; No. 2, \$15.50@15.75; No. 3, \$14.75@15.25; No. 4, \$13.75@14.25; No. 1 soft, \$16.25@16.50; No. 2, \$15.50@15.75.

Bar Iron and Steel.—Demand has been so good that prices are advanced. We quote common bars at 1.50c. for large lots on dock; refined bars, 1.58c.; soft steel bars, 1.55c.

Plates.—Mills have plenty of work, though demand is not as heavy; prices are very firm. We quote for large lots at tidewater: Tank, 1/4-in. and heavier, 1.78c.; flange, 1.88c.; marine, 1.98c.; universals, 1.78c.

Steel Rails and Rail Fastenings.—Prices were advanced May 1st. Standard sections are now quoted at \$27 at Eastern mills; light rails at \$26@30 according to weight. Spikes are 1.60c.; splice bars, 1.40c.; bolts, 2.10@2.25c.

Structural Material.—Buying has held up well. We quote for large lots at tidewater as follows: Beams, 1.75c.; channels, 1.75c.; tees, 1.80c.; angles, 1.75c.

METAL MARKET.

New York. May 3.

Gold and Silver.

Gold and Silver Exports and Imports
At all United States ports in March and year.

Metal.	March.		Year.	
	1900.	1901.	1900.	1901.
GOLD.				
Exports	\$1,081,230	\$490,269	\$8,176,228	\$9,129,040
Imports	1,921,036	2,487,019	5,824,444	8,478,305
Excess	E. \$839,756	I. \$1,996,750	E. \$2,351,384	E. \$650,735
SILVER.				
Exports	5,452,422	5,150,186	15,004,465	14,520,924
Imports	3,149,146	2,731,733	8,164,752	8,730,694
Excess	E. \$2,303,276	E. \$2,418,453	E. \$6,839,713	E. \$5,790,230

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York
For the week ending May 2d, 1901, and for years from January 1st, 1901, 1900, 1899 and 1898.

Per.iod.	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$4,018,215	\$66,169	\$821,467	\$188,950	E. \$4,604,563
1901..	16,397,994	1,083,302	12,511,205	1,417,297	E. 26,483,600
1900..	6,786,490	1,316,548	13,054,374	1,584,842	E. 16,939,394
1899..	1,888,703	5,336,775	9,313,666	1,009,307	E. 5,056,537
1898..	4,426,339	62,891,830	12,188,145	1,600,626	I. 47,577,972

Gold exports were chiefly to France and Germany; imports were from the West Indies. Silver exports went chiefly to London; imports were from South America and Mexico.

The United States Assay Office in New York reports the total receipts of silver at 101,000 oz. for the week. This makes a total of 1,309,000 oz. from January 1st.

Average Prices of Silver per oz. Troy.

Month.	1901.		1900.		1899.	
	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.
January..	28.97	63.12	27.30	59.30	27.42	59.36
February..	28.13	61.06	27.49	59.76	27.44	59.42
March.....	27.94	61.63	27.59	59.81	27.48	59.64
April.....	27.30	59.29	27.41	59.59	27.65	60.10
May.....	.....	.....	27.56	59.96	28.15	61.23
June.....	.....	.....	27.81	60.42	27.77	60.43
July.....	.....	.....	28.23	61.25	27.71	60.26
August.....	.....	.....	28.13	61.14	27.62	60.00
September..	.....	.....	28.85	61.63	27.15	58.89
October....	.....	.....	29.58	63.83	26.70	57.98
November...	.....	.....	29.66	64.04	27.02	58.67
December..	.....	.....	29.68	64.14	27.21	58.99
Year.....	.....	.....	28.17	61.41	27.44	59.58

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

Average Prices of Metals per lb., New York.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1901.	1900.	1901.	1900.	1901.	1900.	1901.	1900.
Jan.....	16.25	15.58	26.51	27.07	4.35	4.68	4.13	4.65
Feb.....	16.38	15.78	26.68	30.58	4.55	4.675	4.01	4.64
March....	16.42	16.29	26.03	32.90	4.35	4.675	3.92	4.60
April....	16.43	16.76	25.93	30.90	4.35	4.675	3.98	4.71
May.....	.....	16.34	.....	29.37	.....	4.151	.....	4.53
June.....	.....	15.75	.....	30.50	.....	3.901	.....	4.29
July.....	.....	15.97	.....	33.10	.....	4.050	.....	4.28
August...	.....	16.35	.....	31.28	.....	4.250	.....	4.17
Sept.....	.....	16.44	.....	29.42	.....	4.350	.....	4.11
October...	.....	16.37	.....	28.54	.....	4.350	.....	4.15
Nov.....	.....	16.40	.....	28.25	.....	4.350	.....	4.29
Dec.....	.....	16.31	.....	26.94	.....	4.350	.....	4.25
Year.....	.....	16.19	.....	29.90	.....	4.37	.....	4.39

The prices given in the table for copper are the averages for electrolytic copper. The average price for Lake copper for the year 1900 was 16.52c.; for the month of January, 1901, it was 16.77c.; for February, 16.90c.; for March, 16.94c.; for April, 16.94c.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	\$.48 1/2	\$.50 3/4
Peruvian soles and Chilean pesos.....	.43	.46 1/2
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.84	3.88
Twenty marks.....	4.75	4.80
Spanish 25 pesetas.....	4.78	4.82

Financial Notes of the Week.

The speculative markets continue to boom, though general trade is rather quieter. The boom is serving the purpose for which it was started, the distribution of the new trust stocks among the smaller investors, and probably the stock markets will soon be left to take care of themselves.

A new outward gold movement has started and a total of \$5,500,000 is reported taken for export thus far this week. The gold will go chiefly to France and Germany.

Silver has been in moderate request only, and there have been no special features. Rumors

about attempt to control the world's product and advance prices appear to be without foundation.

The statement of the United States Treasury on Wednesday, May 1st, shows balances in excess of outstanding certificates as below, compared with the corresponding day last week.

	Apr. 24.	May 1.	Changes.
Gold.....	\$94,792,090	\$96,767,053	I. \$1,974,963
Silver.....	17,119,702	17,487,773	I. 368,071
Legal tenders.....	8,732,585	9,070,898	I. 338,313
Treas. notes, etc..	125,865	84,903	D. 40,962
Totals.....	\$120,770,242	\$123,410,627	I. \$2,640,385

Treasury deposits with national banks amount to

Imports and Exports of Metals.

Port.	Week, May 1.		Year 1901.	
	Expts.	Impts.	Expts.	Impts.
New York.				
(N. Y. Metal Exchange.)				
Aluminum..... long tons			41	40
Antimony ore..... "			19	263
" regulus..... "			392	
Copper, fine..... "	369	390	18,860	5,809
" matte..... "	93		1,919	50
" ore..... "				13,390
" ash..... "				
Iron ore..... "				75
" pig, bar, rod	584	80	8,500	977
" plates, sheets			249	
Lead..... "	1,422	650	27,519	18,610
" ore..... "			100	4,218
Manganese, ore..... "			61	1,144
Metals, old, scrap..... "			33	3,449
Composition..... "			46	3,733
Nails..... "			50	35
Nickel..... "			1	748
" ore, matte..... "				13,285
Pipe, iron & steel..... "	508		5,992	
Railroad material..... "	25		9,051	902
Rails, old..... "				
Steel bars, plates..... "	1,728	324	24,390	4,683
" rails..... "	304		33,881	
" wire..... "	492		10,972	
Tin..... "			513	9,782
" and black plates..... "			1,001	8,565
" dross..... "				
Zinc..... "			6	537
" dross..... "				128
" ashes, skim..... "			8	316
" ore..... "				6,156
Baltimore.				
(Special Correspondence.)				
Antimony..... long tons				10
Chrome ore..... "			100	4,036
Copper, fine..... "	762	306	8,664	2,504
Copper, pig, bar, etc.. "			209	1,218
" ore..... "			7,551	102,230
Manganese ore..... "			7,550	23,534
Nails..... "				306
Pipe, iron & steel..... "			716	801
Spiegel..... "				1,140
Steel, bars, etc.. "	689		31,549	72
" wire..... "	22	31	670	102
" rails..... "	8,939		47,117	
Tin..... "				175
" and black plates..... "			10	143
Philadelphia.				
Chrome ore..... long tons				195
Copper, fine..... "				523
" ore..... "				13,185
Iron, pig, bar..... "				230
" ore..... "				2,370
" pipe..... "				68,470
Lead..... "			1,880	
" ore..... "			200	
Manganese ore..... "				3,275
Metals, old..... "				701
Nails..... "				87
Pipe, iron & steel..... "				500
Railroad material..... "				175
Steel, bars, etc.. "	13		4,177	
" rails..... "			3,776	
" wire..... "			260	
Tin..... "			40	230
" and black plates..... "				284
Zinc ore..... "			2,064	
" dross..... "			16	
" ash..... "				32
Total United States.				
Articles.	March.		Year, 1901.	
	Expts.	Impts.	Expts.	Impts.
Antimony..... long tons		69		369
" ore..... "			21	119
Copper, in all forms..... "	6,818	25,539	23,274	38,029
Iron, pig & bar..... "	6,215	3,196	42,247	8,564
" ore..... "	805	47,379	1,677	120,167
Iron & steel plates..... "	6,357	121	15,570	429
Iron & steel rails..... "	35,451		84,848	117
" wire..... "	6,915	1,251	18,533	2,205
Lead, in all forms..... "	8,840	9,495	27,046	32,916
Manganese ore and oxide..... "		13,447		22,728
Nickel " & matte..... "	165	9,724	539	13,324
Nails, cut..... "	1,531		5,029	
" wire..... "	1,406		4,456	
Quicksilver..... "	41		106	
Steel, billets, rods, etc..... "	4,397	2,022	25,171	5,463
Tin..... "	24	2,885	400	8,662
" & black plates..... "	49	2,121	410	12,972
Zinc..... "	624	1	1,315	131</

ed to \$98,361,466, showing a decrease of \$2,270,807 as compared with the corresponding day last week.

The statement of the New York banks—including the 63 banks represented on the Clearing House—for the week ending April 27th give the following totals, comparison being made with the corresponding week in 1900 and 1899:

	1899	1900	1901
Loans and discounts	\$76,038,000	\$774,548,600	\$885,444,900
Deposits	883,395 3 0	852,162,500	970,790,5 0
Circulation	13,956,700	21,128,300	31,314,900
Reserve:			
Specie	189,168 400	163,468,900	187,157,500
Legal tenders	57,255,100	66,621,600	72,999,600
Total reserve	\$246,423,5 0	\$230,089,900	\$259,477,100
Legal requirements	220,898,825	218,015,625	242,697,625
Balance, surplus	\$25,524 675	\$17,074,275	\$16,759,775

Changes for the week, this year, were increases of \$2,377,600 in loans and discounts, \$3,589,300 in deposits, \$1,473,600 in specie, \$1,261,400 in legal tenders and \$1,837,675 in surplus reserve; a decrease of \$139,200 in circulation.

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

Banks	1900		1901	
	Gold	Silver	Gold	Silver
N. Y. Ass'n	\$163,468,900	.....	\$187,157,800	.....
England	163,342,325	.....	179,366,070	.....
France	388,881,430	\$226,863,150	487,467,600	\$219,779,185
Germany	132,125,000	68,060,000	152,435,000	78,525,000
Spain	68,445,000	78,465,000	70,010,000	83,080,000
Netherlands	24,341,000	29,770,000	25,284,500	28,578,000
Belgium	14,565,000	7,285,000	14,955,000	7,465,000
Italy	77,930,000	8,460,000	76,235,000	9,654,500
Russia	422,800,000	36,415,000	364,310,000	33,970,000

The returns of the Associated Banks of New York are of date of April 27th and the others are of date of April 25th, as reported by the "Commercial and Financial Chronicle" cable. The New York banks do not report silver separately, but the specie carried is chiefly gold. The Bank of England reports gold only.

The coinage executed at the Mints of the United States in April and the four months of this year is reported by the Bureau of the Mint as below:

Denominations	April, 1901		Jan.-April	
	Pieces	Value	Pieces	Value
Double eagles	531,910	\$10,620,000.00	787,478	\$15,749,560.00
Eagles	899,300	8,993,000.00	2,283,778	22,867,780.00
Half eagles	49,000	245,000.00	1,687,945	8,439,725.00
Quar. eagles	.....	.....	245	587.50
Total gold	1,389,310	\$19,908,000.00	4,759,436	\$47,127,652.50
Dollars	1,950,000	1,950,000.00	7,310,350	7,310,350.00
Half-dollars	540,000	270,000.00	1,976,350	988,175.00
Quar.-dollars	688,000	172,000.00	5,265,014	1,316,253.50
Dimes	2,410,000	241,000.00	10,939,680	1,093,968.00
Total silver	5,588,000	\$2,633,000.00	25,491,394	\$10,708,746.50
Five c. nickels	2,183,000	109,150.00	8,654,900	432,745.00
One c. bronze	3,451,000	34,510.00	16,107,900	160,989.00
Total minor	5,634,000	\$143,660.00	22,762,800	\$593,824.00
Total coinage	12,611,310	\$21,734,660.00	53,013,630	\$58,240,223.00

As compared with the corresponding four months last year the total coinage in 1901 shows a falling off of \$8,890,573, or 13.1%. Silver shows the heaviest decrease, \$5,425,287, while gold lost \$3,407,487, owing chiefly to the larger coinage of double eagles in 1900.

Imports of specie by water at San Francisco for the three months ending March 31st are reported as below:

	Gold	Silver	Totals
Bullion	\$2,864,560	\$535,467	\$3,400,027
Coin	1,283,255	56,513	1,339,768
Totals	\$4,147,815	\$591,980	\$4,739,795
Totals, 1900	151,638	594,651	746,289

The receipts reported this year were from the following countries: Mexico, \$857,373; British Columbia, \$22,795; Australia, \$1,497,416; Japan, \$2,321,500; China, \$39,840; Central America, \$18,013; miscellaneous, \$840.

Shipments of silver from London to the East for the year up to April 18th, 1901, are reported by Messrs. Pixley & Abell's circular as follows:

	1900	1901	Changes
India	£1,624,862	£2,655,710	L. £1,030,848
China	265,324	246,125	D. 19,199
The Straits	93,152	48,976	D. 44,176
Totals	£1,983,338	£2,950,811	I. £967,473

Arrivals for the week, this year, were £166,000 in bar silver from New York and £3,000 from Chile; total, £169,000. Shipments were £125,000 in bar silver to Bombay and £10,000 to Malta; total, £135,000.

Indian exchange has been steady, Council bills having been placed in London at 15.91d. per rupee. The demand for bills is lighter, however, as the exports from India have been unusually small, largely because there has been no demand for Indian cotton for China.

Other Metals.

Daily Prices of Metals in New York.

April-May	Sterling Exchange	Silver		Copper					Spelter	
		Fine oz. Cts.	London, Pence	Lake, cts. & lb.	Electrolytic, lb.	London, \$ & ton.	Tin, cts. & lb.	Lead, cts. & lb.	N. Y. cts. & lb.	St. L. cts. & lb.
27	4.88	60	27 1/2	16 1/2	16.40	25 1/2	4.32 1/2	4.02 1/2	3.82 1/2	3.85
28	4.88	59 1/2	27 1/2	16 1/2	16.40	25 1/2	4.32 1/2	4.02 1/2	3.82 1/2	3.85
30	4.88	59 1/2	27 1/2	16 1/2	16.40	25 1/2	4.32 1/2	4.02 1/2	3.82 1/2	3.85
1	4.87 3/4	59 1/2	27 1/2	16 1/2	16.40	25 1/2	4.32 1/2	4.02 1/2	3.82 1/2	3.85
2	4.87 3/4	59 1/2	27 1/2	16 1/2	16.40	25 1/2	4.32 1/2	4.02 1/2	3.82 1/2	3.85
3	4.87 3/4	59 1/2	27 1/2	16 1/2	16.40	25 1/2	4.32 1/2	4.02 1/2	3.82 1/2	3.85

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

Copper.—During the week under review our market has remained quiet but firm, without any special feature. Consumptive demand remains good both here and abroad. Quotations are unchanged at 16 1/2 @ 17c. for Lake; 16.40 @ 16.50c. for electrolytic copper in ingots, cakes and wirebars, 16.15 @ 16.25c. in cathodes; casting copper at 16 1/2c.

The market for standard copper in London opened unchanged on Monday at £69 8s. 9d., ruled steady at about this price until Thursday, when it moved up sharply on the strength of very large speculative purchases aggregating about 3,000 tons. The closing quotations are cabled as £70 15s. @ £70 17s. 6d. for spot, £71 5s. @ £71 7s. 6d. for three months.

Statistics for the second half of April show an increase in the visible supplies of 300 tons.

Refined and manufactured sorts we quote: English tough, £73 15s. @ £74 5s.; best selected, India sheets, £80 @ £80 5s.; yellow metal, 7 @ 7 1/2d.

Tin has again been quite active. The feature of the week was the publication of the monthly statistics, which showed a decrease in the visible supplies for April of 3,750 tons. There has been a good consumptive demand for the metal, and at the close we quote Straits for prompt shipments at 26c., futures at 25 1/2 @ 25 3/4c.

The foreign market opened on Monday at £117, advanced on Wednesday, upon the publication of statistics, to £118 5s., and the closing quotations are cabled as £118 2s. 6d. @ £118 5s. for spot, £114 10s. @ £114 12s. 6d. for three months.

Imports of tin into the United States for the three months ending March 31st were: East Indies, 10,448,950 lbs.; Australasia, 430,818; Great Britain, 7,902,639; Holland, 566,723; other countries, 49,276; total, 19,398,406 lbs. In the first quarter of 1900 the total was 18,182,306 lbs., showing an increase of 1,216,100 lbs., or 6.7%, this year.

The visible supplies of tin on May 1st are reported as follows, in long tons:

	Store	Afloat	Totals
London	4,859	1,343	6,702
Holland	786	368	1,094
U. S., exc. Pacific ports	3,218	5,114	8,332
Totals	8,863	7,825	16,128

On May 1st, 1900, the stocks reported were 16,191 tons, showing only 63 tons increase this year.

Lead.—There are rumors of labor troubles in the West, but so far they have had no influence on the market, which remains quiet and steady at last prices, 4.22 1/2 @ 4.32 1/2c. St. Louis, 4.32 1/2 @ 4.37 1/2c. New York.

The foreign market ruled steady, the closing quotations being cabled as £12 7s. 6d. @ £12 10s. for Spanish lead, £12 10s. @ £12 12s. 6d. for English lead.

Imports of lead in all forms into the United States for the three months ending March 31st, and re-exports of foreign lead are given by the Bureau of Statistics as below, in short tons:

	1900	1901	Changes
Lead, metallic	20	410	I. 390
Lead in ores and base bullion	23,230	36,456	I. 13,226
Total imports	23,250	36,866	I. 13,616
Re-exports	19,433	27,945	I. 8,512
Excess, imports	3,817	8,921	I. 5,104

Of the imports this year 22,835 tons, or 62.6%, are credited to Mexico, and 11,392 tons, or 31.2%, to Canada. In addition to the foreign lead re-exported there was exported in the three months 1,143 tons domestic lead, against 72 tons last year.

Spelter continues firm. A fair amount of business has been transacted at full prices and the demand remains brisk. The ruling quotations are 3.85 @ 3.87 1/2c. St. Louis, 4.05c. New York.

The foreign market is quiet but steady, good ordinaries being quoted at £17, specials at £17 5s.

Exports of spelter or metallic zinc from the United States in March were 699 short tons. For the three months ending March 31st the total

exports were 2,180 short tons. In the corresponding period of 1900 the exports were 5,091 tons, showing a decrease this year of 2,911 tons, or 57.2%. Exports of zinc ore for the three months were 8,479 long tons, against 10,408 tons in 1900, showing a decrease of 1,929 tons, or 18.5%, this year.

Antimony is without any special feature. The ruling quotations are 10 @ 10 1/4c. for Cookson's; 8 1/2c. for Hallett's; 8 1/2c. for Hungarian, Italian, Japanese and U. S. Star.

Imports of antimony into the United States for the three months ending March 31st are reported by the Bureau of Statistics as below, in pounds:

	1900	1901	Changes
Metal or regulus	560,873	893,573	I. 332,700
Ore	1,635,379	265,280	D. 1,370,099

The points in this statement are the large increase in metal, and the very large decrease in ore imported.

Nickel.—The price continues firm at 50 @ 60c. per lb., according to size and terms of orders.

Exports of nickel, nickel oxide and nickel matte from the United States for the three months ending March 31st are reported by the Bureau of Statistics at 1,284,252 lbs. This compares with 1,210,912 lbs. in the first quarter of 1900, showing an increase of 73,340 lbs., or 6.1%, this year.

Platinum.—Consumption continues good and prices are strong. For ingot platinum in large quantities, \$18.20 per Troy oz. is quoted in New York. In London a recent quotation gives 75c. per ounce, unmanufactured, and 77s. 6d. @ 80s. for crucibles, etc. This is very nearly on a parity with New York prices.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 72c. per gram.

Imports of platinum into the United States for the three months ending March 31st were 1,645 lbs., against 2,096 lbs. in the corresponding period in 1900; a decrease of 451 lbs., or 21.5%, this year.

Quicksilver.—While the nominal quotation is still \$51 in New York, the metal can be had for \$48.75 @ \$50 per flask in large quantities, with a slightly higher rate named for small orders. San Francisco prices are the same as last week, \$46.50 @ \$47 per flask being named for domestic orders and \$42 @ \$43.50 for export. The London price continues nominally £9 2s. 6d. per flask.

Exports of quicksilver from all United States ports for the three months ending March 31st were 239,198 lbs., against 318,004 lbs. in the corresponding period of 1900; a decrease of 78,806 lbs., or 24.8%, this year.

Imports of quicksilver into Great Britain for the three months ending March 31st were 1,032,540 lbs. (120,388 lbs., 1900). Exports were 513,856 lbs. (605,756 lbs., 1900); showing a balance of imports of 518,684 lbs. this year, against an excess of exports amounting to 485,368 lbs. last year.

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

	Per lb.	Per lb.
Aluminum	No. 1, 99 1/2 ingots..... 33 @ 37c.	Ferro-titanium (20%)... \$1.00
No. 2, 90 1/2 ingots..... 31 @ 34c.	Ferro tungsten (37%)... 32c.	
Rolled sheets..... 42c. up	Magnesium..... \$2.75 @ \$3	
Alum.-bronzes..... 20 @ 23c.	Manganese (over 99%)... \$1.00	
Nickel-alum..... 33 @ 39c.	Mangan' Cop (20% Mn)... 32c.	
Bismuth..... \$2.05	Mangan' Cop (30% Mn)... 38c.	
Chromium (over 99%)... 1.00	Molybdenum (Best)... \$1.45	
Copper red oxide..... 50c.	Phosphorus..... 50c.	
Ferro-Molybdenum (50%)... \$1.00	American..... 70c.	
Ferro-Titanium (10%)... 90c.	Tungsten (Best)... 78c.	

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

LATE NEWS.

A dispatch from Johnstown, Pa., May 2d, says: "It is announced here by Attorney P. J. Little that the nine plants recently negotiated for by the Webster Coal and Coke Company have finally been purchased as follows: Mitchell Coal and Coke Company, the Gallitzin Coal and Coke Company, the Chest Creek Coal and Coke Company, the Beaver Run Land Company, the Beaverdale Water Company, the Hastings Electric Light Company, the Cresson Electric Light Company, the Gallitzin Water Company and the Kittanning Coal Company. In addition, several hundred coal cars and 500 coke ovens passed into the possession of the Webster Company."

Republic District, Washington.
(From Our Special Correspondent.)

Butte & Boston.—The north drift is in 35 ft. The last 10 ft. were driven on a fair quality of quartz from 2 to 3 ft. wide.

Flag Hill.—A boiler and pump have been installed.

Gold Ledge.—The tunnel is going ahead 6 ft. per day with the aid of the new compressor. It is now in about 250 ft.

Princess Maud.—The north pay shoot on the 300-ft. level has been followed over 55 ft and has shown great improvement in value. Assays run as high as 70 oz. in silver and \$8 in gold.

SLATE TRADE REVIEW.

New York.

May 3.

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

Size, inches	Monson or Br'n-ville.	Bangor.	Bangor-Ribbon.	Alb'n. or Jackson Bangor.	Chap'n Keyvine	Peach Bottom.	Sea Gr'n.	Unfaded Green.	Red
24 x 14	3.50	3.50	3.00	3.00	3.80	5.10	3.00	3.75	.....
24 x 12	6.00	3.50	3.00	3.00	3.80	5.25	3.00	3.75	.....
22 x 12	6.00	3.50	3.25	3.00	4.00	5.25	3.00	3.75	.....
22 x 11	6.50	3.75	3.25	3.00	4.00	5.25	3.00	4.00	.....
20 x 12	6.90	3.75	3.25	3.00	4.00	5.25	3.00	3.75	.....
20 x 11	6.90	4.25	3.50	3.25	4.00	5.35	3.00	4.25	10.50
20 x 10	6.90	3.75	3.00	3.00	4.00	5.25	3.00	3.50	.....
18 x 12	6.80	3.75	3.00	3.00	4.00	5.25	3.00	3.50	.....
18 x 11	7.00	4.25	3.50	3.25	4.00	5.35	3.00	4.00	10.50
18 x 10	7.00	4.50	3.50	3.25	4.00	5.35	3.00	4.25	10.50
18 x 9	7.00	4.00	3.50	3.25	4.00	5.25	2.90	4.00	10.50
16 x 12	6.80	3.75	3.25	3.00	4.00	5.25	2.90	4.25	10.50
16 x 10	7.00	4.25	3.50	3.25	4.00	5.35	2.90	4.25	10.50
16 x 9	7.00	4.50	3.50	3.25	4.25	5.35	2.90	4.25	10.50
14 x 10	6.00	3.75	3.25	3.00	4.00	5.25	2.70	3.75	10.50
14 x 9	6.50	3.75	3.25	3.00	4.00	5.10	2.70	3.75	10.50
14 x 8	6.00	3.75	3.25	3.00	3.75	5.10	2.50	4.25	10.50
14 x 7	6.40	3.75	3.25	3.00	3.75	5.10	2.50	4.25	10.50
12 x 10	5.75	.....	.....	.....	.....	.....	2.50	3.25	.....
12 x 9	5.60	.....	.....	.....	.....	.....	2.50	3.25	.....
12 x 8	5.50	3.50	3.25	2.85	3.25	4.85	2.50	3.50	9.00
12 x 7	5.00	3.25	3.00	2.85	3.25	4.85	2.00	3.50	9.00
12 x 6	4.80	3.25	3.00	2.85	3.25	4.75	2.00	3.50	8.50

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

Stocks of roofing slate are not large, though we hear that a few important quarries have pretty good piles of sizes that are not in demand. Consequently prices are shaded by these concerns, but on the whole the list shows little variation. Our export movement in the three months ended March 31st from all ports amounted to 40,008 squares, showing an increase of 7,546 squares as compared with last year.

Mill stock is in moderate request here, while the foreign market has depreciated.

In the Welsh industry the Penrhyn quarries are still closed down, as the owner and his workmen cannot agree. In February Carnarvon shipped 6,359 long tons of slate, against 4,940 tons in the same month last year. The shipments for the three months ended February 28th aggregated 23,790 tons, or 3,801 tons more than the previous year. The trade in and around Carnarvon is dull, and prices are unsteady. Germany is, perhaps, the best foreign customer just now. Energetic steps have been taken to introduce Newfoundland slate where the Welsh product is used and it is said competition is increasing between the two.

MINING STOCKS.

Complete quotations will be found on page 578, 579 and 580 of mining stocks listed and dealt in at:

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

New York.

May 3.

The big boom in steel and other industrial stocks has affected the mining stock market to some extent. Interest is drawn chiefly to the industrials. Fluctuations are numerous and continued profit-taking has made a changeable market.

Amalgamated Copper, which sold up to \$125 on Monday, receded to \$121 1/4 on Wednesday, while Anaconda went from \$52 1/4 to \$50 1/4. Curbstone coppers were sympathetically weaker, Tennessee selling off 2 1/2% to \$22 1/2, British Columbia at \$18, and Union, of North Carolina, 1/4% to \$6.75.

More has been done in Empire State-Idaho at \$12 1/2, as the regular 1% monthly dividend has been declared. Ontario, of Utah, came forward at \$9.75.

Quicksilver (of California) shares are in better request, common selling at \$2@2.75, and preferred at \$10@10.50.

In the Cripple Creek gold stocks the usual professional trading is noted. Elkton brought \$1.60; Portland, \$2.80, and Isabella receded from 73c. to 71c.

Comstock shares are handled more readily, as the assessments have nearly all been called, at least for the present. Consolidated California & Virginia is firmer at \$2.35, while Ophir lost 5c. at \$1.

Kingston & Pembroke, of Ontario, made a sale at 25c.

Auction sales were 88 shares Lackawanna Iron and Steel Company, Pa., at \$100 to \$100 1/4.

A seat on the New York Stock Exchange recently sold at \$66,000, while a bid of \$75,000 has been heard. A few years ago seats were obtainable at \$16,000 to \$17,000. The New York Stock Exchange has taken up quarters with the Produce Exchange until the completion of the new building to be erected on the old site, at Broad and Wall streets.

The Pennsylvania Steel Company, with an authorized capital of \$50,000,000, has been incorpo-

rated to mine, manufacture and deal in iron, steel, manganese and other metals, also coke, gas, lumber and other material. The incorporators are Effingham B. Morris, Edgar C. Felton and Luther S. Best, Camden, N. J., which is the registered New Jersey office of the company.

The articles of incorporation permit the company to have anywhere from 9 to 15 directors, and advantage is taken of the recent legislative act which permits the changing of the by-laws at any properly called meeting by a majority vote of all the stock represented at the meeting. The capital is divided into \$25,000,000 preferred and \$25,000,000 common stock, and the preferred is to pay 7% non-cumulative dividends.

This formality is in accordance with a resolution adopted on April 10th last by the stockholders of the Pennsylvania and Maryland Steel Company, when a plan was approved providing the company with additional capital for the retirement of a portion of its bonded debt and contemplating an increase of capital from \$6,500,000 to \$50,000,000, with which to acquire all the properties of the Pennsylvania & Maryland Steel Company, purchase the Spanish-American Iron Company's mines in Cuba, and to make necessary improvements to the plant in order to strengthen its position generally. The plants acquired by the proposed new corporation are those at Steelton, Pa., and Sparrows Point, Md., and besides the purchase of the Spanish-American Iron Company's mines in Cuba the purchase of other mining property is contemplated.

Announcement is made of arrangements being completed for the formation of the Allis-Chalmers Company, which will include the following manufacturers of heavy engines and mining machinery: Edward P. Allis Company, Milwaukee; Fraser & Chalmers, Chicago; the Gates Iron Works, Chicago, and the Dickson Manufacturing Company, Scranton, Pa.

The company is to have an authorized capital of \$50,000,000, half in common and half in preferred stock, of which the immediate issue is to be \$16,250,000 preferred and \$20,000,000 common. The price paid for the 4 plants is reported to have been \$9,750,000, divided as follows: Edward P. Allis Company, \$5,025,000; Fraser & Chalmers, \$3,150,000; Gates Iron Works, \$400,000; Dickson Manufacturing Company, \$1,175,000.

Vermilye & Company, of New York, have charge of the syndicating of the property. The board of directors consists of Edward D. Adams, New York; Charles Allis, Milwaukee; Mark T. Cox, Orange, N. J.; James H. Eckels, Chicago; Elbert H. Gary, New York; William A. Read, New York; James Stillman, New York; Edwin Reynolds, Milwaukee; Cornelius Vanderbilt, New York; William W. Allis, Milwaukee; Frank G. Bigelow, Milwaukee; W. J. Chalmers, Chicago; William L. Elkins, Jr., Philadelphia, and Henry W. Hoyt and Max Pam, Chicago.

For the purpose of guaranteeing the amount of cash necessary to carry out the purchase, subscriptions are now being received for \$11,900,000 cash, the syndicate to purchase \$8,400,000 of preferred stock and \$13,000,000 of common stock. This places the common stock at 2c. in formation, and the announcement is made by Vermilye & Company that no common stock will be offered to the public. The preferred stock will be offered at not less than \$105 and accrued dividend dating from May 1st.

To some extent the establishments now brought together under one management have for some time co-operated in filing large contracts, like that for the London Traction lines.

Boston.

May 2.

(From Our Special Correspondent.)

The market has been somewhat affected this week by the varied litigation over Amalgamated projects and properties and the suspension of negotiations as to Boston & Montana. The speculation in these stocks is tied up for the time, and this has made quite a difference in transactions. The interest has been chiefly in Lake coppers this week, and especially in some of the newer stocks. Thus, Mohawk has had quite a boom this week and sold up to \$42, while Copper Range was dealt in at \$58@59. Wolverine sold at \$55 and Mass at \$19 1/2. The older Lake stocks were rather quiet.

Outside of the Lake stocks there was some good business. Utah Consolidated was selling to-day around \$34, while Old Dominion was quoted \$35 1/2; British Columbia Copper, \$19, and Bingham sold up to \$25 1/2@26.

The market for coppers seems to be good for some time yet, and if the Amalgamated business is settled there will be a bigger boom than ever—for a while at least.

Gold stocks did pretty well, Centennial Eureka being in demand at \$22 and Cochiti at \$8. There were some sales of Daly-West at \$35 1/2, while Consolidated Mercur was in active demand at \$3@3 1/2.

The trading in the outside stocks was very good, but some of them were not so strong. Dominion Iron and Steel sold at \$38 1/2; Dominion Coal at \$37 1/2, and New England Gas and Coke brought \$11 1/2@12.

Boston has gone wild about the industrials, somewhat to the detriment of mining stocks. If—as some people think—the present boom was

started largely to secure the distribution of the stocks of the United States Steel and other big combine stocks, it is a big success here. Boston is loading up with those stocks to an extent which I would hardly have believed possible a year ago.

The old-timers on the Exchange are shaking their heads over some recent transactions. Two of Boston's specialties—Burlington and Mexican Central—have practically gone over to New York; why should not our most cherished specialty, the copper stocks, follow? If reports are correct, New York—or at least Amalgamated—buying of Lake stocks is to be seen in recent transactions. The time is coming, says these prophets, when the Boston Exchange will be only an annex to Wall Street.

A special meeting of stockholders of the United States Mining Company has been called for May 4th at Portland, Me., to "see if the company will increase its capital stock and if so to determine to what extent." The United States Company has purchased for \$50,000, the Northern Light, Grizzly and Fairview mining claims which adjoin the United States Mining property on the west and north.

Transactions on the Boston Stock Exchange in April, 2,218,636 shares, were larger than in any month since March, 1899, when the total sales aggregated 2,272,308 shares. The high record in share dealings on the Boston Stock Exchange is 2,562,239 shares, made in January, 1899. The total trading for the four months ending April 30th amounted to 6,610,579 shares, which compares with 3,025,937 shares in the corresponding period last year.

Colorado Springs.

Apr. 28.

(From Our Special Correspondent.)

The market during the past week has remained quiet and low prices are still general. At present the stocks are divided into four classes—mines, preferred prospects, prospects and unclassified. The latter are those which have applied for listing under the new rules and are now awaiting examination. During the week several stocks were transferred from the unclassified list to their ultimate destination. On the whole, the physical conditions in the Cripple Creek District are very good indeed and show a marked contrast to the stock market. This is accounted for by a number of the brokers by the tremendous activity of the New York market and the fact that a large number of oil stocks are being floated on some of the markets.

Elkton showed a slight falling off in price during the week, as also did Isabella. Doctor-Jack Pot continued about the same. Coriolanus scored a little advance and Pharmacist fell off a little. Pointer closed about the same. On the whole the sales were quite light.

San Francisco.

Apr. 27.

(From Our Special Correspondent.)

The bull point on the market this week has been the news that Consolidated California & Virginia just received \$13,861 from 6 car-loads of ore treated, and has a balance running well up toward \$90,000, with more ore to be heard from. This did not affect the market much, so far as volume of business was concerned, and dealings continue light.

More defections to the oil exchange are reported this week, much to the disgust of some of the old-timers.

Some quotations noted as: Consolidated California & Virginia, \$2.35@2.40; Ophir, \$1.05; Confidence, 60c.; Silver Hill, 55c.; Mexican, 34c.; Sierra Nevada, 25c.; Best & Belcher, 17c.; Gould & Curry, 17c.

On the Producers' Oil Exchange business was somewhat better than last week, but still only moderate when compared with two months ago. In the producing list Hanford sold for \$96@97; Peerless, \$8.50; Kern River, \$13; Kern Oil, \$6.35 @ \$7; Home, \$3.50. Among the prospects the favorites included California Standard, which sold at 40c.; Rex, 38c.; Lion, 17c.; Petroleum Center, 14c.

On the California Oil Exchange business was also fair, and prices were generally well supported. Some quotations noted are: San Joaquin Oil and Development, \$9.75@10; West Shore, \$2.80; Monarch, of Arizona, 54c.; Independence, 19c. The demand was for producers as well as prospects.

Paris.

Apr. 21.

(From Our Special Correspondent.)

The mining stock market has shown more fluctuations and has received more attention than for some weeks past.

The zinc and lead shares continue to be unfavorably influenced by the break in Malfidano, which seems of more importance to speculators just now than the falling off in price and demand for the metals. The latter, however, would probably justify the moderate declines which the market has witnessed.

Le Nickel shares remain strong, and the company seems to be in good condition to maintain its dividends at the current rate. Huanchaca Silver is again in some demand and has sold well.

The copper share market is active and excited. The catastrophe which recently over-

took some European speculators for the fall has set people to thinking. We begin to see that London and Paris can no longer raise or lower the value of copper, but must take what New York gives them. It is not a pleasant realization for some of our people, but they cannot help it.

Reports have been current of large purchases of Rio Tinto shares for account of the Amalgamated Copper Company. Certainly there has been heavy buying, but it is difficult to trace the shares. At any rate the report has sent up prices, and Rio Tintos are again higher, as are nearly all the copper stocks. If the Amalgamated really wishes to control this stock it may wish others also. Boleo, especially, may be named.

The Transvaal gold stocks are generally quiet. There is no change in the prospects apparently, and the future is uncertain as ever.

The foreign merchandise trade of France for the three months ending March 31st is reported by the Ministry of Commerce as below:

Table with 3 columns: Imports, Exports, Excess imports. Values for 1900 and 1901.

This shows a decrease of 102,525,000 fr., or 8.3% in exports; a decrease of 12,014,000 fr., or 1.3% in exports; and a decrease of 90,511,000 fr., or 32.2% in the excess of exports.

An interesting report on the experimental use of coal mining machinery in France has been issued by the Comite Central des Houilleres: Although coal-cutting machinery was first introduced into France but a little more than a year ago, there are now 61 machines at work in 11 collieries; 4 pick machines (2 Sullivan and 2 Sergeant) and 1 Sullivan chain machine at Lens; 5 pick and 2 chain machines (all Sullivan) at Courrieres; 1 Jeffrey cutter-bar, 1 Sullivan chain and 2 Sullivan pick machines at Bruay; 1 pick, 1 chain and 4 cutter-bar machines, all Morgan-Gardner, and 1 Sullivan chain machine at Marles; 3 Sullivan pick machines at Dourges and 10 of the same at Grand'Combe; 1 Sergeant pick machine at Roche-la-Moliere; 3 Sergeant pick; 1 Sullivan chain and 3 Sullivan pick machines at Carmaux; 1 pick and 1 chain machine, both Sullivan, at Campagnac; 9 pick machines

(7 Sullivan and 2 Harrison) at Graissessac; and 1 chain, with 4 pick machines (all Sullivan) at Decazeville. The machines have been very successful so far. Nearly all of them are of American make.

The strike at Montceau-les-Mines is growing to be a serious affair. The council of the Miners' Federation has just decided to submit to a general vote the question whether all miners should unite in a general strike to enforce the demands of their brethren at Montceau. The vote will be taken on April 28th.

The industrial situation and the need of European combination against America are still harped upon by some of our writers. They say nothing new, however, and are in danger of becoming tedious. Azote.

ANNUAL MEETINGS.

Table with 4 columns: Name of Co., Locat'n, Date, Place of Meeting.

* Special meeting.

ASSESSMENTS.

Table with 5 columns: NAME OF COMPANY, Loca-tion, No, Delinq., Sale, Amt.

DIVIDENDS.

Table with 4 columns: NAME OF COMPANY, Latest Dividend (Date, Per share, Total), Total to date.

* Monthly. † Quarterly.

STOCK QUOTATIONS.

Table titled NEW YORK. Columns: NAME OF COMPANY, Loca-tion, Par val., Apr. 26, Apr. 27, Apr. 29, Apr. 30, May 1, May 2, Sales.

SAN FRANCISCO, CAL.

Table with 11 columns: NAME OF COMPANY, Loca-tion, Par value, Apr. 25, Apr. 26, Apr. 27, Apr. 29, Apr. 30, May 1, Sales.

CALIFORNIA OIL STOCKS *

Table with 12 columns: Name of Company, No. of shares, Par Val., Apr. 13, Apr. 15, Apr. 16, Apr. 17, Apr. 18, Apr. 19, Sales.

* Producers' Oil Exchange, San Francisco. Total sales, 98,891 shares.

ST. LOUIS, MO.*

Table with 10 columns: NAME, Loca-tion, Share capital, Par val., Apr. 30, Bid., Ask., NAME, Loca-tion, Share capital, Par val., Apr. 30, Bid., Ask.

* From our special correspondent.

Table titled COAL AND INDUSTRIAL STOCKS. Columns: Am. Sm. & Ref., Am. S. & W. Con., Am. S. & W. Con. pf, Col. Fuel & L., Col. & H. C. & L., Empire S., Ida. Idabo, Federal Steel, Fleming's C. & C., Mong. R. Coal, National Lead, National Lead pf, National Salt, National Salt pf, Pittsburg Coal, Pittsburg Coal pf, Republic I. & S., Republic I. & S. pf, Sloss-Shef, Stan. Oil, Tenn. C. I. & R. R., Va. Coal & C.

* On Pittsburg, Pa. Exchange. Total sales, 969,581.

STOCK QUOTATIONS.

BOSTON, MASS.

Table of stock quotations for Boston, Mass. listing companies like Adventure Con., Actna, Alouez, Amal Copper, etc., with columns for Par Val, Shares Issued, and prices for various dates from Apr. 25 to May 1.

Official quotations Boston Stock Exchange. Total sales, 150,250 shares.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa. listing companies like Am. Alkali, Am. Cement, Bethlehem Iron, etc., with columns for Par Val, L'cation, and prices for various dates from Apr. 25 to May 1.

Total shares sold, 115,944. Reported by Townsend, Whelen & Co., 339 Walnut St. Philadelphia. Ex-Dividend.

SALT LAKE CITY, UTAH.

Table of stock quotations for Salt Lake City, Utah. Listing companies like Ajax, Albion, Alcoa, Anchor, Ben Butler, etc., with columns for Shares, Par Val, Bids, and Asks.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont. Listing companies like Ontario, Golden Star, Ham Reef, British Col., etc., with columns for Par Val, Apr. 20, Apr. 22, Apr. 23, Apr. 24, Apr. 25, Apr. 26, and Sales.

Total shares sold, 97,500.

COLORADO SPRINGS, COLO.

Large table of stock quotations for Colorado Springs, Colo. Listing companies like Acacia, Alamo, Am. Con., Ancon, Anchor, etc., with columns for Par Val, Apr. 22, Apr. 23, Apr. 24, Apr. 25, Apr. 26, Apr. 27, and Sales.

Colorado Springs Mining Stock Exchange. Total sales, 751,455 shares.

MONTREAL, CANADA.

Table of stock quotations for Montreal, Canada. Listing companies like Big Three, Calif., Can. Gold Fields, Center Star, Decca, etc., with columns for Par Val, Week Apr. 29, and Sales.

Montreal Stock Exchange. Total sales, 73,700 shares.

MEXICO.

April 19.

Table of stock quotations for Mexico. Listing companies like Durango, Barradon y Cab., Candelaria de Pan., Capuzaya Guan., etc., with columns for Name of Company, No. of shares, Last div'd, Prices, and Sales.

STOCK QUOTATIONS

LONDON. April 19.

Table of stock quotations for London, listing companies, countries, authorized capital, par value, and last dividend dates.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing companies, par value, and prices for various dates in April.

Official Quotations Denver Stock Exchange. Total sales, 60,000 shares.

SPOKANE, WASH.

Week Apr. 25.

Table of stock quotations for Spokane, Washington, listing companies, par value, and prices.

PARIS.

April 18.

Table of stock quotations for Paris, listing companies, countries, products, capital stock, and prices.

DIVIDENDS.

COAL, IRON, OIL, AND INDUSTRIAL COMPANIES.

Large table of dividends for coal, iron, oil, and industrial companies, including company names, locations, capital stock, shares, and dividend amounts.

This table is corrected up to March 18th. Correspondents are requested to forward changes or additions.

DIVIDENDS.

GOLD, SILVER, COPPER, ZINC, LEAD AND QUICKSILVER COMPANIES.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares (Issued, Par Val), Dividends (Paid, Total to Date, Latest), Number, Name and Location of Company, Authorized Capital Stock, Shares (Issued, Par Val), Dividends (Paid, Total to Date, Latest).

This table is corrected up to March 18th. Correspondents are requested to forward changes or additions.

CHEMICALS, MINERALS, RARE ELEMENTS, ETC.—CURRENT WHOLESALE PRICES

Table of chemical and mineral prices with columns for material name, quantity, and price. Includes categories like Abrasives, Borax, Cement, etc.

THE RARE ELEMENTS.

Prices given are at makers' works in Germany, unless otherwise noted.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. This table is revised up to April 10. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.