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 ROSSITER W. Raymond, Ph. D., M. E., Special Contributor.  
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We referred recently to the heavy tax put upon the mines in the Transvaal by reason of the monopoly granted by the Government to the manufacturers of dynamite, and to illustrate the disadvantages under which the operators there, mining a low-grade ore have to contend with, as compared with the conditions under which mining is carried on in this country, so far as explosives are concerned.

We will say that the contractors on the Chicago Drainage Canal bought 40 per cent. dynamite, delivered at about 10 cents per pound, and in Colorado or any Western mining point, the manager who understands his business can always secure it at 15 cents or 16 cents per pound.

According to the statistics of the Chamber of Mines at Johannesburg, dynamite can be manufactured for about \$10 per case, the actual price paid by compulsion amounts to \$25 per case, and the difference to the three leading companies in way of tax is about \$170,000 a year.

The West Australian output of gold is not increasing so rapidly as the friends of that colony would desire. In fact, the production is less than it was this time last year. The output for January, February, March and April, 1896, was 16,350 ounces, 17,922 ounces, 11,085 ounces and 16,772 ounces, respectively, making a total for the four months of 62,129, as compared with 18,687 ounces, 15,509 ounces, 19,619 ounces, and 19,128 ounces for the respective months of 1895, and a total of 72,943 ounces for the four months. This falling-off is chiefly accounted for by the fact that the celebrated bonanza, Bailey's Reward, has practically ceased production, while the majority of the promising mines have not yet arrived at a producing stage. With the extension of the plant at Great Boulder and the commencement of crushings at Hannan's Brownhill, Mainland Consols and a few others, the monthly output should soon again exceed 20,000 ounces.

The statistics of copper abroad are more than usually interesting, the last figures showing that the imports into England for the four months ending April 30th were 44,703 tons fine of 2,240 pounds, as against 39,773 tons fine in the same period of 1895. The exports show the vastly increased consumption, those of the present year scarcely exceeding those of 1895, with the result that the decrease in stocks was 10,108 tons in this year, against 42 tons in 1895. These figures are taken from Messrs. James Lewis & Son's mid-monthly report, which is very reliable, and shows an apparent consumption in England (including sulphate of copper made and exported) of 30,726 tons in the first four months of this year, against less than 20,000 tons last year, i. e., an increase of consumption at about 50 per cent., hence so far as the present aspect of the market is concerned, there need be no apprehension on the part of producers of overstocking the market.

Germany and France exhibit the same features of increased consumption of copper, and judging from the first four months in these countries and England the increased amount of American copper that can be sold and absorbed abroad during this year should amount to 50,000 to 55,000 tons. When we say American copper we speak advisedly, for from no other part of the world is there any increased production so far.

### Playa de Oro.

We learn that strong efforts are being made to sell stock of the Playa de Oro Mining Company, of Ecuador, in London, and we have received some of the literature that is being freely used to boom it there.

When the first prospectus of the company was brought out in New York in 1893 we called attention editorially in these pages to some of the exaggerations in the reports then issued and warned investors to exercise great circumspection before parting with their money for this stock. The well-known mining expert, Mr. J. D. Hague, was sent to examine the property for proposing investors. His report has not been made public, but it is generally understood that it was unfavorable.

Information has come to the *Engineering and Mining Journal* from experts who have a recent and intimate knowledge of the property and district, and who assert that the statements in the published reports of the Playa de Oro Company will never be realized, and condemn the management of the work as unskillful and extravagant.

Those who are interested in the company and those considering investing in it would do well to have the property and work being done thoroughly examined by competent and disinterested engineers, who possess that practical experience in gravel washing that is essential to render their opinions valuable. Otherwise we foresee great disappointments in store for investors.

### American Enterprise in Japan.

We gather from a report made by the British Consular service on the railways of Japan that there is a likelihood of the American manufacturers of railway material ousting, partially at least their, English competitors at no distant date. At first the English had a monopoly both in construction and management, but the Japanese have gradually learned the art of building and managing railroads, and at the present time there

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are hardly any foreigners in the service. In a short time there will not be a single foreign designer, and the Japanese will place all their orders for material without consulting foreign advisers. Of course, while Englishmen were at the head of affairs, the orders went to England, but in future, contracts and orders will be given to those who can most promptly and cheaply supply the material required.

In Great Britain, when a piece of engineering work, such as bridge construction, is taken in hand, the engineer orders material to be made to his own design. In America, on the other hand, the engineer or the company first state their requirements and the manufacturers send in competitive projects based on their own designs. It happens that the English engineer who has been the designer of railway bridges in Japan since 1882 has just given up his post, and the work will be in the hands of the Japanese in future. A good many of the Japanese engineers have been educated in the United States, and they will not be slow in taking advantage of the American system, as it will save them a great deal of trouble. At the present time all the leading American manufacturers of constructional iron work are represented personally in Japan, while their English rivals have no representatives on the spot.

The above-mentioned report gives full information about the railroad business in Japan and the requirements of the country and it should be in the hands of every American who wishes to increase his export trade.

#### The Composition of Steel and Its Bearing Upon Tensile Strength.

The number of recorded observations intended to elucidate the far-reaching question of the influence of the various components of steel upon its structural strength is already very large, and much positive information has been derived from them; but the want of uniformity in the conditions not only in the making of the metal but in the rolling of test pieces, to say nothing of the variations in methods of testing and analysis, renders them bewildering when it is attempted to generalize from a wide range of data not strictly co-ordinate. Hence it is often best to study each group of tests and analyses by itself in order that comparisons may be on the same level, and the larger the number of cases coming within the limits of rigidly similar conditions, the more instructive and reliable are the results.

Research in this direction has recently been advanced by what is perhaps the most systematic special investigation of the kind ever undertaken. It has been conducted by Mr. H. H. Campbell, Superintendent of the Pennsylvania Steel Company, and the chemical and physical laboratories of that establishment were at his command. A series of test bars was collected from about three thousand open-hearth heats, which had been rolled under precisely similar conditions, and which were tested both physically and chemically. From the records of these bars Mr. Campbell has worked out the effects of the various components by a mathematical analysis, using the method of least squares. From the results he has then derived formulæ for determining the strength of steels of known composition; and these formulæ, considering the patient thoroughness of the inquiry and the wide basis on which they rest, ought to have substantial value. In a forthcoming book on "The Manufacture and Properties of Structural Steel," to be issued by the Scientific Publishing Company, Mr. Campbell will give to the profession the extremely valuable results of this investigation.

#### NEW PUBLICATIONS.

**BROCKUNIER'S MAP OF THE WEST VIRGINIA OIL FIELDS.** By Sam Hugh Brockunier, M. E. Wheeling, W. Va., 1896. Published by the Author. Price, \$5.

Mr. Brockunier has embodied the results of his experience in the oil fields in the first published map of the West Virginia fields. That there was a more or less urgent need for such a map is obvious when one considers the magnitude and importance of the petroleum industry in that State, and it is a matter of satisfaction to know that the task has been fulfilled by a competent hand. Mr. Brockunier, who is a mining engineer, uses a scale of  $3\frac{1}{4}$  miles per inch and has indicated in color the locations, also the producing, small, gas, and dry wells. It is up to date, having been published but a few weeks ago and will be found invaluable, not only by prospectors, but by any one else who is interested in the petroleum industry of this important section. The map may be had by remitting the price to the Scientific Publishing Company, New York.

**A TEXT-BOOK ON PLAIN LETTERING.** By Henry S. Jacoby. New York, 1895. The Engineering News Publishing Company. Illustrated. Pages 82, and 48 full-page plates. Price \$3.

Professor Jacoby, associate professor of civil engineering in Cornell University, is favorably known as the co-author of a number of text-books with Prof. Mansfield Merriman, whose assistant at Lehigh University Mr. Jacoby was for a number of years. We believe that the work before us is the first in which Mr. Jacoby's name appears as the sole author, and it is to be hoped that he will continue to produce equally useful text-books.

The author states in the preface that he has prepared this volume to meet the need of technical schools for a text-book which should give a detailed treatment of the Roman, Gothic and some other styles of plain letters suitable for engineering and architectural drawings. In his dis-

cussion of the principles of proportioning and of spacing, Mr. Jacoby has used Roman letters, since their main elements form the basis of the other styles shown. In the system of measurements which has been adopted, the proportions are expressed in terms of a convenient unit. The author believes that he is the first to attempt to reduce spacing to a definite system which enables any draftsman at once to make the final location of the letters. In spacing, the same scale is used as in proportioning, and all the spacing guides for the most useful styles of letters are given in a table.

The book is divided into five chapters, treating of the following subjects: The Construction of Letters, the Spacing of Letters, Titles, The Selection of Styles and Mechanical Aids. In the text the author discusses every point that a draftsman is likely to meet with, and also gives such instructions in detail as his experience as a teacher has taught him a student needs.

The book contains 48 full page plates, showing various styles of lettering, diagrams for proportioning, specimens of titles and of various kinds of type, scales, meridians, borders, etc. It may be conscientiously recommended to instructors of drawing at our technical schools as a carefully prepared text-book on the subject.

#### BOOKS RECEIVED.

In sending books for notice, 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.

*Cours d'Exploitation des Mines.* By Haton de la Goupillière. Paris, France; Ch. Dunod et P. Vica. Pages, 304; with illustrations.

*Report on the Country in the Vicinity of Red Lake, and part of the Basin of Berens River, Keewatin.* By D. B. Dowling. Pages, 51; with map.

*Report of the Section of Chemistry and Mineralogy.* By G. Christian Hoffman, State Mineralogist. Ottawa, Canada; H. M. Printers. Pages, 68.

*Canadian Geological Survey: Report on an Exploration of the Finlay and Omenica Rivers.* By R. G. McConnell. Pages, 40; with map and illustrations.

*New Jersey Geological Survey: Annual Report, for the Year 1895.* By John C. Smock, State Geologist, Trenton, N. J.; State Printers. Pages, 198; with maps and illustrations.

*A Theoretical and Practical Treatise on the Manufacture of Sulphuric Acid and Alkali, with the Collateral Branches. Volume III.* By George Lunce. London, England; Gurney & Jackson. Pages, 840; with illustrations and diagrams.

#### CORRESPONDENCE.

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

We do not hold ourselves responsible for the opinions expressed by correspondents.

Piedmont Gold Belt Chartered Company, Va.

Sir: Being a subscriber to your *Journal*, you will confer a favor by informing me if you have any information regarding the "Piedmont Gold Belt Chartered Company," Buckingham County, Va.

NEW YORK, May 21st, 1896.

ALBERT REINEMAN.

[We have received a good deal of information concerning this company and its property, and it has been distinctly unfavorable. We believe, therefore, that great care should be exercised by intending investors and that much fuller information from competent and disinterested experts is needed.—[Ed. E. & M. J.]

Reopening of the Great Espiritu Santo Mine, of Colombia, Nearly Two Hundred Years Old.

Sir: We have crushed 493 tons and obtained 1,190.88 oz. of gold. The above is the result of the April crushing of rock from the old Spanish Espiritu Santo mine, owned by the Darien Gold Mining Company, Limited, of Manchester, England. A few remarks on the latest developments of this extraordinary property may be of interest to your readers.

Up to the end of the year 1892 work had been confined to what is known as the North mine, in contradistinction to the South, or Espiritu Santo Mine. A 20-stamp mill was erected and worked continuously for about two years, but the ore proved to be low-grade, and after spending all the original capital plus £30,000 raised by a reconstruction scheme, it was decided to abandon the North Mine and have a final try at the South. A prospecting shaft was sunk to a depth of 80 ft., and a crosscut driven out under the open-cut workings. In January, 1893, old workings were struck, and the pumps and shaft drowned with hardly a minute's warning.

Notwithstanding these disappointments, fresh capital was put up by the directors and a few friends in order to drive an adit tunnel to drain the mine to as low a level as possible. It was found that a tunnel 1,080 ft. long would tap the mine at a depth of 90 ft. Accordingly the tunnel was started in July, 1893. In the following dry season a Cameron sinking pump was got up to the mine, the prospecting shaft pumped out, the pumps recovered and the shaft sunk a further 10 ft. and a drift started from this end to meet the adit. The two ends met on July 3d, 1894, and the water which had baffled us all so long flowed by gravity into the Cana River. Levels and crosscuts were driven into the lode, which proved to be 80 ft. wide from north to south and composed of conglomerates. The lode mass was without any definite form, but had moderately well-defined walls on the north and south. To the east the conglomerate merged imperceptibly into the country rock, and to the west, owing to old workings and caves, it was impossible to explore thoroughly. Enough, however, was seen to prove that the Espiritu Santo mine was not a myth, as many people had hitherto contended. In May, 1895, 10 stamps were started on debris and pillars left by the old workers. Confidence in the concern was established among the old shareholders, and money was forthcoming to proceed with the de-

velopment of the mine, and the erection of necessary pumping and winding machinery. The enclosed report of November last will show the work accomplished and the prospects before us at that date. The sequel shows that the Spaniards were able to perform more than we gave them credit for, and it would be interesting to know if a similar experience has ever before been met with in modern mining. The new engine shaft, called Heenan's, after our sanguine president, has been fully equipped with a double winding engine and a pair of skips, and has now reached a depth of 270 ft. The 100-ft. crosscut below the adit cut the lode on the north side last December. After driving south 30 ft. through low-grade conglomerate ore, rich rock was met together with a tremendous stream of water, taxing our pumping to the utmost. The water suddenly diminished and another 4 or 5 ft. of driving took us into old workings. These were for the most part open, and could be explored to a certain extent, and I believe such a sight as met our astonished eyes has seldom, if ever, been seen by men now alive.

The old workings consisted chiefly of enormous shafts reaching upwards into darkness. They were most elaborately and systematically timbered. In two of these hanging 40 ft. above our heads were wooden treadwheels, two more were in position at our 100-ft. level, and in so perfect a state of preservation that one of them was turned a bit by a venturesome miner before it broke. These wheels are carefully made of cedar wood, are 12 ft. diameter, having a wooden axle with iron gudgeons and bands. Mounted on the axle is a drum about 4 ft. diameter, round which, no doubt, an endless chain and buckets of some sort were carried to wind the water from one stage to the other. No sign of these chains are to be found, only some pieces of tanned leather and laces. The remains of a similar wheel had been found at the adit level. Ladders and bateas, hewn from the solid, are plentiful, also ladders, made by cutting notches at regular intervals in an 8-in. diameter pole. These are placed in pairs side by side, the steps "breaking joint," so to speak, and being placed at a convenient angle in the shafts, are easy to ascend. No doubt all the ore was carried up there in bateas by slaves. The poor beggars must have had a hard time of it on the treadwheels. We are pumping 80 gallons a minute to the adit. They, no doubt, had to raise the same amount a great deal higher. It is most instructive to note the way they followed and scooped out the soft, rich rock, leaving pillars and arches around their wheels of the harder stuff. In places where the ground was suitable, narrow underhand stopes have been carried from the shafts. We are now on the bottom in two of these old workings, in two others they are yet below us. The marvelous point is that all this is 200 ft. below the surface, which is covered by tropical vegetation in the heart of a South American forest, whilst hundreds of thousands of dollars have been spent by companies, syndicates and prospectors of all nationalities during the last twenty years in vain attempts to find the Espiritu Santo mine.

The country rock of the district is a gray felspar porphyry, easily decomposed, and full of joints and fissures—these in the neighborhood of Cana carry pyrites and often look very promising, but are almost without exception barren in gold. In the lode mass itself there are at least three varieties of conglomerate, the matrix of all being the country rock, generally in angular fragments, but often consisting of water-worn pebbles and boulders. The cementing materials are calcite and small acicular quartz crystals, together with pyrites, blende and galena. The larger the percentage of sulphurets, the richer the rock. The gold is mostly coarse, though rarely visible to the eye. Nuggets are never found; it is crystalline in structure and is found attached to the crystals of both sulphurets and cementing materials. It is the finest reef gold I have ever heard of; the bullion from the furnace assays 920 to 930 fine. Preparations are now being made to sink the shaft another 100 ft.; the wood-work of the second 10-stamps is being entirely renewed, so that we hope to be able to crush from 1,200 to 1,500 tons a month before the end of the year. A ditch six miles long is being constructed to bring on the Seteganti River, and will give us a head of 330 ft. above the adit, where a hydraulic motor is being placed to work the main pumps.

Traditions state that the mines were abandoned by the Spaniards in the year 1728 in consequence of a heavy fall occurring in the main shaft and a simultaneous rising of the Indians. At all points where we have been able to examine the bottom of the old workings, they are in rich ore; and so far there are no indications of the pinching-out of the lode mass, on the contrary it is of larger area below than in the open-cut workings at surface.

ERNEST R. WOAKES.

PANAMA, Rep. of Colombia, May 1st, 1896.

#### THE HYATT-HENOCHSBERG GOLD EXTRACTION PROCESS.

This process is a pneumatic amalgamation process, in which the finely pulverized dry ore, propelled by a current of air, through a restricted channel, encounters in its way sundry pools of mercury, and has been exhibited at work at the office of Messrs. John H. Hackworth and Co., Queen Victoria street, London. The apparatus consisted of 18 ft. of 3-in. piping, coiled into a four-coil spiral and mounted horizontally; one end of the spiral projected into a dust chamber, the other end served for the attachment to the air machine, in this instance a hand-power Root's blower. At the top of the first limb of the first coil the feed-hopper was fixed and communicated with the interior by a pipe continued some way down, and provided at the throat with a balanced swing valve that prevented escape of air, but yielded to any slight pressure from above. The lower ends of the spiral were detachable, and had been charged with mercury before the arrival of the visitors, the quantity used being insufficient to entirely obstruct the passage. Material representing ore, and consisting of silver sand, to which coarse and moderately coarse gold had been added, in the presence of the visitors, was charged in the hopper, the blower was set to work slowly, and soon a cloud of dust would be seen issuing into the dust chamber. After some little time and the expenditure of much work on the blower, the sand had disappeared from the hopper, the blower was stopped, and the lower parts of the coils were detached severally, and examined separately; they contained clean, bright mercury and a not inconsiderable proportion of sand. The mercury was subsequently found to contain gold, as might be supposed, the bulk of it being in the first bend. The demonstration was conducted by Mr. Hyatt, the inventor, with the as-

sistance of Mr. Hackworth, from whom we ascertained that the apparatus used was capable of dealing with five tons of ore in a day of ten hours, and would save from 80 per cent. to all of the gold; and that apparatus of any size and capacity could be constructed; such being the case, there would be a large and useful field open to this appliance wherever dry free-milling ores are encountered. The inspection demonstrated clearly that the apparatus was of admirable simplicity, that it could be very easily worked, that a moderate current of air, stated to be about 1½ lb. per square inch, sufficed to carry away most of the sand, and that much if not all the gold remained; but owing, as is frequently the case on such occasions, to an absence of the necessary data, it is impossible to judge whether the work done had been effected at the rate of 6 cwt. or five tons in ten hours, whether or not all the gold had been saved, whether it was accompanied or not by a loss of mercury, and whether or not it could deal with different class material successfully. But anyway the apparatus is so simple, and can certainly not be very expensive, so that it should be well worth the while of mining men, requiring an appliance for treating dry free-milling ores, to bear this process in mind.—*The Engineer.*

#### RESPIRABILITY OF AIR IN WHICH A CANDLE-FLAME IS EXTINGUISHED.\*

By Frank Clowes, D. Sc.

At the last meeting of the British Association the author stated the composition of artificial mixtures of nitrogen and of carbon dioxide with air, which were just able to extinguish various flames. It was found that the flames of ordinary candles and lamps were extinguished by mixtures which contained on an average about 16.5% of oxygen and 83.5% of the extinctive gases. A flame of coal gas, however, required for its extinction a mixture still poorer in oxygen, and containing 11.3% of oxygen and 88.7% of the extinctive gases. These results have since been confirmed by a different method.

The method consisted in allowing the flames to burn in air inclosed over mercury until they were extinguished; the remaining extinctive atmosphere was then subjected to analysis, when its composition was found to be practically identical with that previously obtained from the artificial mixtures. An analysis of air expired from the lungs proved that it was also of the same composition as that which extinguished the flame of an ordinary candle or lamp.

The average percentage composition of expired air and of air which extinguishes a candle-flame is as follows: Oxygen, 15.9; nitrogen, 80.4; carbon dioxide, 3.7.

Now an atmosphere of this composition is undoubtedly respirable. Physiologists state that air may be breathed until its oxygen is reduced to 10%. The maximum amount of carbon dioxide which may be present is open to question, but it is undoubtedly considerably higher than 3%. Dr. Haldane maintains that the above atmosphere is not only respirable, but could be breathed by a healthy person without inconvenience of any kind; he further states that no permanent injury would result from breathing such an atmosphere for some time.

The conclusion to be drawn from these facts is, that an atmosphere must not be considered to be dangerous and irrespirable because the flame of an ordinary candle or oil lamp is extinguished by it. The view is very generally advanced that a man must on no account venture into air which extinguishes the flame of a candle or of a bundle of shavings. It will be seen that this precaution may deter one from entering an atmosphere which is perfectly safe and respirable, and from doing duty of a humane or necessary character.

An atmosphere which extinguishes a coal-gas flame, however, appears to approach closely to the limit of respirability, as far as the proportion of oxygen which it contains is concerned. Hence the coal-gas flame appears to be a more trustworthy indicator of respirability than the flame of a candle or oil lamp.

Undoubtedly the candle and lamp flames should be discarded as absolute tests of the respirability of air.

#### NOVA SCOTIA STEEL AND THE CANADIAN BOUNTY.

We learn from a Consular report that the Nova Scotia Steel Company, the largest producer of iron and steel in Canada, has paid a semi-annual dividend of 4% on the preferred stock. In connection with this, it may prove interesting to American manufacturers of steel to learn the amount of bounty paid to this and other Canadian companies by the Dominion Government. The Canadian Minister of Finance recently laid on the table of the House of Commons a statement showing the amounts paid in bounties, at \$2 per ton, on steel billets manufactured in Canada from pig iron made in Canada from Canadian ore. From March 31st, 1895, to December 31st, 1895, the Nova Scotia Steel Company, of New Glasgow, Pictou County, Nova Scotia, produced 26,419 tons, and were paid \$52,838. Between April 14th, 1895, and January 9th, 1896, the Nova Scotia Steel Company, at its branch in Ferrona, 10 miles from New Glasgow, produced 16,263 tons, and were paid \$32,526. This makes \$85,364 paid to one company for something like nine months' work.

During the same period, the following amounts were paid to the other steel manufacturers of Canada: Londonderry Iron Company, Acadia Mines, Nova Scotia, for 14,530 tons, \$29,060; Canada Iron Furnace Company, of Three Rivers, Quebec, 4,920 tons, \$9,840; John McDougall & Co., of Drummondville, Quebec, 629 tons, \$1,258.

It will be seen that out of a grand total for Canada of 62,761 tons produced and of \$125,522 paid in bounties, Nova Scotia produced 57,212 tons and received \$114,424 in bounties.

Mining in Turkey.—During last year only about 4,000 tons of chrome ore were exported from Salonica. From Stratoni, a port on the Cassandra Peninsula, about 30,000 tons of manganese ore were shipped during the year. A concession has lately been granted by the Turkish Government to work for a period of 60 years an emery mine situated at Bozcyok, in the sandjak of Menteshé, province of Aidin.

\* From a paper read before the British Association.

THE EFFECT OF ADDITIONS OF TITANIFEROUS TO PHOSPHORIC IRON-ORES  
IN THE BLAST FURNACE.\*

By Auguste J. Rossi, New York City.

As is well known, practically all the phosphorus of the iron-ores smelted in the blast-furnace passes into the pig-metal, increasing its fluidity, but diminishing its strength to such an extent that, if phosphorus exceeds a certain amount, the metal is only fit for fine castings, not required to resist strains, and it cannot be used for the ordinary purposes of good foundry-iron.

No phosphorus being eliminated in the acid Bessemer process, the quantity admissible in pig-metal destined for that process must be very small, and hence the ores smelted must be strictly Bessemer ores, of which, in many districts the supply is taxed to the utmost. On the other hand, very highly phosphoric pig, a metal of little or no value by itself, when refined by the Thomas-Gilchrist process in the basic converter, furnishes an excellent steel; but such pig iron must be made from ores particularly high in phosphorus; and these ores are not everywhere abundant and are much sought after for this special purpose.

But there are many iron-ores containing a moderate, though still important amount of phosphorus, which yield a pig-metal available neither for the acid nor the basic process of making steel, nor for economical use in the open-hearth, yet of indifferent value for foundry purposes.

Titaniferous ores are almost invariably Bessemer ores; and the pig-metal obtained from them is a special iron, generally admitted to possess excellent properties. It is tough and hard, nearly white or light steel-gray in color, and characterized by its large percentage of combined, and small percentage of graphitic carbon.

It has occurred to me that by mixing in proper proportions titanic and phosphoric ores, the weakening influences of phosphorus on the metal might be counteracted to such an extent as to render such mixtures available for blast-furnace use, in order to obtain a fluid, and at the same time sufficiently strong foundry-iron for most purposes. If successful, this method would utilize a class of phosphoric ores not now possessing much value.

I select four cases all worked in the same furnace. The ores or ore-mixtures were intimately mixed with powdered charcoal and appropriate fluxes, so chosen as to exclude the idea of any phosphorus being contributed to the metal by their addition. They were placed in graphite crucibles, some 200 to 500 grammes of ores being used in one operation. The crucibles were charged in a furnace filled with charcoal, through which cold air was blown under a pressure of a few ounces.

The first two experiments, B, C, were made with phosphoric ores from the Sterling mines, N. Y., containing 1.75% of P<sub>2</sub>O<sub>5</sub> (corresponding to 0.764 of phosphorus), and in round numbers 59% of metallic iron. In this ore the ratio of phosphorus to 100 of iron was 1.28.

**Experiment B.**—Sterling ore was used alone; the fluxes added were silica, alumina, lime and magnesia, practically pure. Some powdered white ordinary glass (soda-glass) was added to promote fusion. We obtained a button (147 grammes) which, added to the analysis made (as were all those which follow) by the late Dr. Gideon Moore, of New York City, contained:

	Per cent.
Graphitic carbon.....	2.99
Combined ".....	0.18
Total ".....	3.17
Phosphorus.....	1.125

The iron was No. 2 gray, fairly good and strong.

**Experiment C.**—In this experiment the same Sterling ore was used, but it was mixed in the proportion of 3 Sterling to 1 of titaniferous ores from the Adirondacks, containing some 18 to 20% of titanic acid; phosphorus, 0.017; sulphur, 0.0236; and practically the same amount of iron as the Sterling (57.90 against 59%). Enough phosphate of lime was added to the mixture to bring the percentage of phosphorus up to that of Experiment B, that is, to a ratio of 1.28 P to 100 Fe. We obtained a button (147 grammes) to all appearances of the same grade (No. 2 gray), as in the case of the Sterling ore smelted alone, but it proved quite strong and tough, and required several blows of a heavy hammer to be broken on an anvil. It analyzed as follows:

	Per cent.
Graphitic carbon.....	3.54
Combined ".....	0.33
Total ".....	3.87
Phosphorus.....	1.229
Titanium.....	0.35

The fluxes used were the same as in Experiment B, and the same quantity of powdered glass was added. Not only was the grade of iron not lowered by the addition of titaniferous ores, but the analysis proved that the button C contained much more total carbon, the excess being mostly in graphitic carbon. In preceding experiments with these same titaniferous ores, either in the blast-furnace or in the crucibles, under ordinary conditions, we had obtained white or rather light steel-gray iron of the following composition:

	Per cent.
Silica.....	0.35
Combined carbon.....	2.55
Graphitic ".....	0.23
Total ".....	2.78

And in another case:

	Per cent.
Silica.....	0.29
Manganese.....	0.34
Total carbon (mostly combined).....	4.56

The two following experiments, D and E, were made with a phosphoric mixture prepared by adding to the same Sterling ore a sufficient amount of phosphate of lime to bring up the percentage of phosphorus to 2.045 (from actual analysis made). The mixture contained 57.83% of metallic iron; ratio of phosphorus to 100 iron, 3.53. The experiments were made simultaneously in crucibles placed side by side in the same furnace, ex-

posed to the same firing for the same length of time, and removed at the same time.

**Experiment D.**—In this experiment the phosphoric Sterling ore was used alone with the phosphate of lime. The fluxes were the same as before, but no glass was added. The composition of the slag was approximately:

	Per cent.
Silica.....	44
Alumina.....	18
Lime.....	28
Magnesia.....	10

We obtained a button (72 grammes) of No. 2 gray iron, lighter if anything than button B (Sterling alone), of a fine close grain, but quite weak, breaking at the first blow. It contained 2.862% of phosphorus.

**Experiment E.**—In this experiment the mixture consisted of 80 grammes phosphoric Sterling ore (P, 2.045; Fe, 57.83) and 40 grammes of Adirondack ore, containing P, 0.023; Fe, 57.691, to which was added enough of phosphate of lime to bring up again the percentage of phosphorus in the mixture to 2.045, i.e., to make the ratio of phosphorus, to 100 of iron, 3.53.

The fluxes used were exclusively silica, lime, magnesia, alumina, and a highly titaniferous slag which we had on hand, containing 38% of titanic acid, and some 14% of silica, with only lime, magnesia and alumina as bases. The resulting slag had an approximate composition of:

	Per cent.
Silica.....	36
Titanic acid.....	14
Alumina.....	19
Lime.....	23
Magnesia.....	8
Phosphoric acid.....	0.336

The button weighed 70.89 grammes. It was No. 1 Foundry, gray, large-grained, containing much graphitic carbon (3.98), and very little combined carbon. It showed an analysis 3.229% of phosphorus and 0.47 of titanium. It was strong enough, notwithstanding this abnormal amount of phosphorus, to stand several blows before breaking. In this case both the grade of the metal and the amount of graphitic carbon it contained were higher than in Experiment D, and even higher than in Experiment C, made with a less highly phosphoric mixture and a smaller proportion of titanic ore.

The curious fact brought out by these experiments is the peculiar influence which the presence of phosphorus seems to have exerted on the state of the carbon in the pig metal obtained from mixtures of phosphoric and titanic ores.

From the titaniferous ores, used alone, a metal characterized by a large amount of combined carbon would have been normally expected, and, *a priori*, one would suppose that the addition of 25% of such ores to phosphoric ores yielding, when smelted alone, a No. 2 gray pig-metal ought to lower the grade of the resulting iron. But the amount of graphitic carbon was greater in C (titanic) than in B (phosphoric) with a percentage of from 1.12 to 1.22 of phosphorus in the metal in both cases. Furthermore, we find that under the same conditions of treatment while a highly phosphoric ore used alone yielded a button of a No. 2 light gray iron, the same ore, mixed with 33% of titanic ore yielded a metal containing the large amount of 3.89% of graphitic carbon, and strong, though containing 3.225% of phosphorus—an abnormal percentage, purposely chosen.

In short, while titanium in an iron-ore (at least under the conditions observed in smelting these ores hitherto) has a tendency to throw the carbon in the metal into the combined state, the presence of a considerable amount of phosphorus simultaneously with titanium, in a mixture, modifies the conditions of existence of the carbon to the extent of throwing it almost all into the graphitic state, this effect being the greater the more phosphoric the mixture, and the greater the proportion of titaniferous ores used.

REDUCING PLANT FOR DIRECT CYANIDING.

In West Australia and in some parts of South Africa many forms of dry crushing in conjunction with cyaniding without amalgamation are being experimented on and a fair number of plants are in practical trial. Most of the systems entail elaborate screening and returning of the larger pieces, an item of considerable expense. The system which has recently been adopted at the Afrikander gold mine in the Transvaal would seem at first sight to be the most uneconomical of all. This is the use of the Blake crusher alone, without any rolls or other reducers. The form of crusher made by Mr. H. R. Marsden, of Leeds, Eng., the principal English maker of the Blake type, who is supplying the Afrikander plant, gives much better results than might be expected, for a machine with an opening of 20 in. by 3 in. will crush three-quarters of a ton quartz to 50 mesh size in one hour. At the Afrikander mine the gold-bearing rock is very friable and crumbles to pieces at the touch, so that it is probably well suited for treatment by the Blake-Marsden crusher. The practical results at this mine will be looked forward to with interest.

**Roentgen Rays and Infernal Machines.**—A new and unexpected application of the Roentgen rays is found in their use for ascertaining the contents of suspected infernal machines. Professor Bronardel, of the Paris Municipal Laboratory, assisted by Messrs. Girard and Bordas, has given an account of their researches in this direction at a recent sitting of the Academy of Sciences, and if their statements on the subject are to be accepted without reserve, it would appear that many of the extraordinary precautions hitherto required in dealing with bombs may now be dispensed with and the contents of an ordinary infernal machine decided without risk. The explosive machines experimented with were exactly similar to those which were forwarded sometime since to two prominent deputies of the French Chamber. The mechanism of these was so adjusted that immediately the boxes were opened the explosion occurred. One of these was inclosed in a zinc case, the other in a wooden box. In the first case, the experiment was only moderately successful, the impression on the photographic plate showing only an indistinguishable black mass. In the second, however, the contents of the bomb were clearly manifested, nails, screws, a revolver cartridge, and even the grains of powder showing plainly.

\* Transactions Am. Inst. M. E.

NEW ZEALAND.

Great attention is now being paid to gold mining in New Zealand, and the more liberal investment of capital is already showing its natural results. At the same time it must not be supposed that although the ventures were on a comparatively small scale, and existed solely, or nearly so, through their self-sustaining power, the production of gold in New Zealand has been small, and to-day exceeds that of South Africa. The difference is simply that South Africa has had unlimited capital at its disposal, and all the highest paid, and, therefore, the most intelligent and experienced professional skill devoted to it, so that in a few years the output nearly reaches that of New Zealand—the result of years of toil, patience and lack of capital. Up to the end of the year 1895, gold amounting in value to £51,351,002 had been exported from New Zealand. In connection with this subject we reproduce from the *New Zealand*



may be consolidated and one issued for the number of miner's rights, which the consolidated miners' right is meant to represent. The holder of a miner's right, subject to the regulations, is entitled to the following special privileges:

- "To enter upon any Crown Lands and prospect and search for gold, notwithstanding that such land is under lease or license from the Crown."
- "To take up a piece of said land, and as long as they use same for mining purposes, keep exclusive possession of same."
- "To cut and take from any Crown Lands (unless same are expressly excepted) any live or dead timber, for building or for mining purposes, or for fuel, with rights to make roads and tramways for these purposes."
- "To divert water flowing through or adjoining Crown Lands, and lead it in channels to any desired place, and use same for domestic or mining purposes, driving machinery, etc."
- "To occupy a portion of the Crown Lands in any mining district for residence, or for residence and cultivation, or for carrying on his business, and to put up any building or remove the same."
- "The foregoing are the privileges which a Miner's Right carries with it, subject to the liberal regulations laid down in the act. It is clear that as these privileges only apply to Crown lands, their extent depends upon the area belonging to the Crown. In New Zealand all auriferous lands have, as far as possible, been retained by the Crown, so that a miner may have what is virtually a free home, free timber, free water, a free mine, and a right-of-way where he pleases. Such privileges are not granted by the State to any other persons or body of persons whomsoever."

"Referring now to the areas which may be licensed for mining purposes, and the time for which the license may last, a Miner's Right entitles the holder to take up:

- "(a) AN ORDINARY ALLUVIAL CLAIM, the area of which shall not exceed 100 ft. x 100 ft. for each holder of a Miner's Right; but not more than the area for 10 Miners' Rights; 100,000 ft., can be held in one claim. The warden may, at his discretion, grant larger claims, where special circumstances make this necessary or desirable."
- "(b) A FRONTAGE CLAIM, having 100 ft. frontage to the terrace river bank, lake bank, or hillside, for each holder of a Miner's Right. Within a reasonable time after the discovery of gold an ordinary claim has to be taken up within the area, and the frontage claim is thereby cancelled."
- "(c) A QUARTZ CLAIM of 100 ft. in length, along the lode or vein, by 300 ft. in width, for each holder of a miner's right. No claim for a party or person to exceed 1,000 ft. in length."
- "(d) A RIVER OR CREEK CLAIM, for each holder of a miner's right 100 ft. in length along the course of the stream, by not less than 100 ft. in width; but when the stream exceeds 100 ft. in width, then from bank to bank."
- "(e) A SEA BEACH CLAIM of 100 ft. frontage to the sea for each holder of a miner's right, by a depth not exceeding 100 ft. above high-water marks; but not more than 1,000 ft. frontage in one claim."

These are the ordinary claims which can be held for working under a miner's right, either with or without registration; but certain discretionary powers are given to wardens for extending the areas or relaxing the rules where this course seems to them desirable.

As the easily worked claims where gold could be won cheaply by individual labor became exhausted, the mining population were compelled to resort to auriferous deposits which required the expenditure of capital before they could be worked at a profit. To induce the holders of capital to invest in such a speculative industry as gold mining, they must necessarily have secured to them the benefits that might arise from any discovery made by its means. Obviously they must have:

- "(1) A reasonably large area of ground, so that in working it out their capital may be restored to them with profits."
- "(2) Security of tenure for a reasonably long term for the same reason."
- "(3) They must know that the rent and conditions upon which the mining areas are granted encourage *bona fide* work and do not harass the industry."

With regard to these, the following are the areas which may be held, and the regulations and conditions affecting them:

"(1) An Extended Prospecting License, which may be granted by the Governor, for prospecting any lands either within or outside of a mining district, and which are difficult of access and not within two miles of any actual workings. The term of this license shall not exceed two years, but may be renewed from year to year at the Governor's discretion. The area shall not exceed 640 acres, nor include any river or river bed. The licensee must prospect the land vigorously and continuously, and must expend annually £3 per acre, and employ upon the land not less than one man for every 36 acres, and must immediately report the discovery of any minerals to the warden. By the license he acquires the exclusive right to prospect and search for gold, silver or other minerals (except coal), and on discovery of gold may obtain licensed holdings and special claims (*q. v.*, in a later issue) not exceeding three in number."

"(2) A Tunnel Prospecting License, which may be granted by the Governor to any person who proposes to construct a tunnel for mining purposes. The term of this license shall not exceed two years, but may be renewed from year to year at the Governor's discretion, and the area shall not exceed 150 yards on each side of the middle line of the tunnel along its length or proposed length, but shall not include any river or river bed. As in the last case, the holder must prosecute work vigorously and continuously, and promptly notify the warden of any discovery of minerals. He must also spend a minimum sum (to be declared when the license is granted) in mining operations, and must employ not less than six men to every 40 chains in length of any tunnel proposed to be made. At any time during its term he may take up within the area three licensed holdings or special claims."

**Railroad Building in Korea.**—The representative of the American Trading Company in Japan, Mr. Morse, has obtained from the Korean Government a concession for the first railroad in Korea between Seoul and Chempulpo. The distance by road is 26 miles, but by rail it will be 30.

**Amount of Fire Damp Given off by the Collieries in the Saarbruck Basin, Germany.**—Some interesting figures have recently been furnished by the laboratory located at Saarbruck in regard to the amount of fire damp liberated in the coal mines of that locality. Six hundred and fifty-two analyses have been made of the air coming from 23 coal mines in the vicinity of Saarbruck, and these analyses show that the volumes of fire damp given off varied from 464 to 29,956, and in one instance 61,109 l. per ton of coal mined, or in round numbers  $\frac{1}{4}$  to 30 and even 60 cu. m. per ton of coal mined. According to the colliery considered the volume of fire damp given off per day varied from 251 to 20,733 cu. m. By combining the figures from these 23 collieries the total amount of fire damp carried out by the air used for ventilating purposes in one year amounts to 62,246,000 cu. m.; which, if we take 712 g. as the weight of 1 cu. m. of fire damp, represents 44,000 tons of that gas, an amount which surpasses in calorific value the total coal production of these same collieries. —*Revue Universelle, March, 1896.*

*Mining Journal* the last Government official map, showing the various mineral districts that are being worked and their character. We also append the mining laws now in operation, so that if any of our readers are tempted to try their fortune in New Zealand in place of South Africa, they will know beforehand the conditions:

"The first wardens in the colony came from Victoria, where many years of experience had perfected a very acceptable system of mining laws and regulations. These were embodied in the earliest gold-mining legislation in the colony, viz.: 'The Goldfields Act, 1858.' Then followed a series of repeals and re-enactments in the years 1862 and 1866, till in 1877 a consolidation of the various enactments was effected in the Mines' Act of that year."

"There is little change in the general tenor of these various enactments, and a synopsis of the act which at present regulates the industry will embody the main features of each. As the basis of the extensive privileges given to those engaged in gold mining it is necessary to apply for and obtain a miner's right. This is granted, renewable yearly, to any person over fourteen years of age on payment of the sum of ten shillings, and is in force all over the colony, except in districts owned by the natives, where more stringent regulations prevail. If desired, two or more of these rights

MINERAL INDUSTRY IN GREECE.

We learn from a British Foreign Office report that the year 1895 opened with the news of the bankruptcy of a London firm which had in its hands almost the whole trade of manganese iron ore produced. This news, owing to its effect on all mine owners, was followed by a stoppage in the exports, and during the first quarter of the year, when there is usually a brisk movement in the port, there were but very few shipments of ore.

The prospects were so unfavorable that several mines had to stop or reduce the output and it was only by the end of May last that a sudden demand of large quantities raised the price to hitherto unknown figures, owing to the competition from the iron foundries in the west of England, who sent out their representatives to purchase the output of all the mines in the district.

Contracts were made with the Workington Hematite and Iron Company, Limited, and Messrs. Borner & Co., Limited, for five years.

Both firms agreed to purchase about 400,000 tons of manganese iron. The prices ranged from 9s. 6d. to 10s. per ton dry weight for 35% iron and 15% manganese, with usual scale of payment for delivery alongside ship.

The owners of Grammatico (Marathon) Hematite mines have also sold 300,000 tons at 5s. 3d.

Two hundred and three thousand five hundred and ninety-six tons of lead ore were smelted, out of which 18,175 tons of pig lead were made, containing from 2,100 to 2,357 grammes of silver to the ton.

The following are the quantities of marketable ores produced in addition to the above:

	Quantity. Tons.
Manganese iron ore.....	145,314
Hematite iron ore.....	29,600
Galena (dressed).....	12,087
Lead ore (foundry).....	10,594
Lead smelt.....	1,715
Blend of zinc lead.....	512
Zinc ore, calamine (roasted).....	25,682
Total.....	225,414

It is rather difficult to say what will be the Government's revenue on the above products for 1895, as its 10% share on the net profits is fixed by a special board, seven months after the end of the year; but it may be stated that the Government share in 1895 will be much more than in 1894, in which year it was 400,000dr. (£9,900).

A bill has been introduced to amend the Mining Laws of 1884 and to facilitate the granting of mining concessions. During the 12 years that the present law has been in force no mining concessions have been granted owing to the restrictions imposed and the difficulty of getting a concession grant through Parliament. It is proposed that concessions should in future be granted by royal decree on the advice of the Board of Mines.

THE IRON ORES OF INDIA.

In the Manchester *Guardian*, England, Capt. Collingwood Townsend, R. A., suggests that enquiry should be made as to whether India cannot find a source of revenue in the working of her iron ores as a State monopoly. He proposes that the Indian Government should smelt and work up sufficient of the metal to meet its own requirements for railways, public works and military equipments, and should also export a quantity of ore to England to be placed judiciously on the market. The ores are said to be far richer than any ores used in England, so their merits would create a demand, and mining rights could then be leased on a liberal sliding scale of royalties, nothing but a deposit being charged at first, but when the mines paid 2% the payment of royalties could begin and increase in proportion to the profits. By working up local ores for State needs the amount to be remitted annually in gold to England would be very greatly lessened, and by selling ore in England a considerable sum might be realized annually, which would still further reduce the loss by exchange; while, if the mining royalties were paid in gold in England, the amount of silver that had to be annually devoted to the purchase of gold would, in a few years, be comparatively small.

That iron could be profitably exported to England from India has already been demonstrated. The cost of freight from India is low, and if it is profitable to import hematite from Spain, it would probably be profitable to import the rich ores from India. The present supply of foreign ore has already shown signs of an early decline in quantity, and ironmasters are ready enough to consider any fresh source. In his presidential address to the Iron and Steel Institute in May, 1893, Mr. Windsor Richards suggested that Indian ores might be substituted for Spanish ores. In 1859 a meeting of ironworkers at Sheffield declared that iron from Southern India was superior to Swedish iron for the production of steel, and the Menai and Britannia tubular bridges were putly made of iron extracted from Indian ores. Any scheme for placing Indian ore on the English market, through State aid, would be opposed, no doubt, by those who are interested in importing iron and steel into India; but English ironmasters would directly profit by the new departure, for they would obtain rich ore at a moderate price from within the Empire.

Iron ore, principally magnetic, exists in enormous quantities in Southern India, the hills of Salem, a district in the Madras Presidency, most notably, being practically composed of magnetite, and unlimited quantities of the ore can be obtained by merely quarrying in the hillside. The distribution of these ores is described by Mr. Holland, of the Indian Geological Survey, in the *Handbook of Commercial Products*, No. 3, of the Imperial Institute Series.

In a pamphlet published in 1890, Captain Townsend remarked: "There is a vast and magnificent future before the Indian iron trade, a future that would stagger men if only they could realize it, but the energy and capital are wanting;" and he now remarks that what was true in 1890 is still true, but that further experience of the last four years leads him to believe that the development of Indian iron can best be begun by the export of the ore. The main difficulty in the way of working up the ore on the spot is the absence of any coal beds within a reasonable distance of the ore fields. This would not, however, affect the export of ore to England, the utilization of ore for State purposes, or the manufacture on the spot of the highest qualities of steel with charcoal, as in Sweden and Styria, or with peat, by the latest Swedish process. There is plenty of peat within

a reasonable distance and sufficient timber. The ore could be worked up for State purposes by taking it to the banks of the Hooghly, where coal is plentiful and cheap.

The analyses by Professor Turner, of the Mason College, Birmingham, of some samples of magnetite from Rajdoba (which is known to be, if anything, inferior to the magnetite of Salem) show over 90% of oxide of iron, equivalent to 63.92% of metallic iron. The ore is, therefore, exceedingly pure, and, if exported to England, should command a high price.

Captain Townsend remarks in conclusion: "To pay in silver, as India does now, means a loss of over 40% on each rupee, and may mean more. She cannot pay in gold, for she has no gold to speak of. Let her, therefore, pay in iron. I would at least ask that the question may not be prejudiced by any calculations based on the figures of many years ago. The fall in exchange has altered all the conditions, and is, in a manner, like iron-mining, distinctly favorable to India."—*Imperial Institute Journal*.

PRODUCTION OF BASIC OR THOMAS-GILCHRIST STEEL, 1878-93.

Since the close of 1893, when the patents ran out, no figures of the output have been systematically collected, though it has been ascertained by the British Iron Trade Association that 415,917 tons were made in Great Britain in 1894. Some endeavors have been made to collect the statistics for foreign countries since 1893, but these have not as yet met with success. The figures given below, however, are complete up to 1893. There is good reason to believe that a considerable extension of the manufacture is going on abroad, now that no royalties have been paid, and the demand for steel is rapidly increasing with the revival of trade.

Year.	Eng-land. Tons.	Ger-many. Tons.	Luxem-burg. Tons.	Aus-tria. Tons.
1878.....	20	.....	.....	.....
1879.....	1,150	50	.....	.....
1880.....	10,000	18,180	.....	13,754
1881.....	46,120	200,000	.....	54,700
1882.....	109,354	235,132	.....	64,214
1883.....	122,389	328,909	.....	85,593
1884.....	179,000	440,000	.....	80,300
1885.....	145,707	548,252	.....	69,262
1886.....	258,466	767,754	17,158	99,617
1887.....	435,046	1,095,429	72,273	142,409
1888.....	408,594	1,059,347	78,285	138,438
1889.....	493,919	1,209,327	96,569	175,755
1890.....	503,000	1,390,289	102,868	202,315
1891.....	436,261	1,654,109	125,670	221,212
1892.....	406,839	1,881,891	128,683	288,122
1893.....	358,636	2,218,014	126,740	314,992

Year.	France. Tons.	Belgium. Tons.	Russia. Tons.	United States of America. Tons.
1878.....	.....	.....	.....	.....
1879.....	.....	.....	.....	.....
1880.....	4,771	3,295	.....	.....
1881.....	10,480	14,200	.....	10,500
1882.....	12,306	16,672	.....	12,312
1883.....	38,229	27,799	.....	31,863
1884.....	113,000	31,700	.....	28,000
1885.....	130,582	21,056	.....	30,458
1886.....	122,711	27,938	.....	29,657
1887.....	210,301	50,777	.....	17,836
1888.....	222,333	31,037	.....	14,300
1889.....	222,392	47,037	.....	23,562
1890.....	240,638	46,445	.....	39,340
1891.....	255,491	38,793	.....	38,973
1892.....	287,528	56,274	.....	58,664
1893.....	363,017	69,475	.....	71,970

SOME OF THE USEFUL MINERALS OF NORWAY.

Prof. Reusch, of the Norwegian Geological Survey, gives some interesting data pertaining to the mineral industry of Norway, from which we take the following:

Gold occurs in the rivers of Northern Norway. Is not mined to any extent. Such information as exists on the subject has been published by Dr. T. Dahl (Det Nordlige Norges geologi, edited by H. Reusch, Kristiania, 1891).

Feldspar is mined on the southern coast of Norway, as well as quartz and mica. Most of the feldspar is exported to Germany, most of the mica to the United States. J. P. Friis is specialist on the question of mining and the export of these minerals (Norges geologiske undersogelses aarvog, 1891, 1892 og 1893).

In 1892 Norway exported 45,589 tons of building stone. The most remarkable of the Norwegian granite is the angitesyenite from the Laurvik country. The chief constituent of the rock is feldspar (Lodium orthoclase; called by Brogger "Krypto-perthit"); other constituents are angite, brown hornblende and olivine. According to Prof. Reusch this rock is a quite distinct type of angitesyenite, which has not been found yet anywhere else, and which can be immediately recognized wherever it is used as ornamental stone. The Norwegian stonecutters call it "Labrador."

A special book on the granite industry of southern Norway has been written by Mr. C. Riiber (Norges granitindustri, 1893).

According to Professor Reusch, Norway has imported up to date all the marble it needed from other countries. In all probability, however, it will become a marble exporting country. There are inexhaustible deposits of pure white, yellowish white, grayish black and of a very beautiful red breccia marble in the district of Nordland near the polar circle.

This beautiful rose-colored rock occurs in the granitic gneiss of Hinderheim in the neighborhood of Trondhjem. It consists chiefly of piemontit and thulite (varieties of epidote and zoisite containing Mn<sub>2</sub>O<sub>3</sub>). It is used on a small scale chiefly in Paris as ornamental stone.

The geological survey has published a book written by Professor Helland, which treats on the soils of the country. The author calls it, himself, an attempt at a Norwegian "agricultural geology." According to Helland the arable soil forms only 3% of the total area of Norway; 21% are forests; 3.8% fresh water lakes; 1.6% eternal snow and icefields. The remainder consists of pastures, naked rocks and peat bogs.

Norway covers an area of 322,304 square kilometers and, numbered according to the census of January 1, 1891, 1,988,674 inhabitants.

The income of the government amounted, for the fiscal year 1892-93, to 52,544,900 kroner (\$14,261,943); the expenditure to 51,755,100 kroner (\$14,043,050).

A METALLURGIC REVOLUTION.

Written for the Engineering and Mining Journal by Dr. Theo. B. Comstock.

From a widely-spread correspondence with investors during the past year I have come to realize how very little the general public understands the changed conditions of the mining industry, which have been, for the most part, accomplished within a very few years.

There are some things which cannot be overcome—certain trade conditions which will always militate against the successful working of reduction plants for custom work at points remote from trade centers except in particular instances, usually of proprietary character, with mines thoroughly developed. These are the notable exceptions which prove the rule, or they represent special cases which do not affect the mining public as such.

But there is as yet a prevalent ignorance regarding the progress in metallurgy, which has been effected along lines not at all unfamiliar to technical men, who have heretofore predicted the results now attained in actual practice.

The end is not yet. There will be other changes, almost wholly in directions long since outlined by expert metallurgists, but slow to be adopted by practitioners who imagine that their plants are now perfect, or who must receive the impetus of close competition in order to meet the demands of their patrons.

Not many years ago the writer was sorely puzzled at times to know where to market the very few carloads of concentrates and iron sulphurets which came to him in an ordinary sampling business. Once in a while a light demand would occur for rich concentrates, and very rarely would come a call for a carload or two of pyritous ores; but the free handling of auriferous sulphurets was out of the question at profitable rates. The smelters, which absorbed the whole product shipped from the mines, were but poorly provided with roasting facilities. This condition has now been so completely revolutionized that vast areas in Colorado, California, Arizona and New Mexico are to-day marketing auriferous sulphides and other ores in quantity from mines hitherto abandoned and from below the water level in mines hitherto unprofitable within the water zone.

In the vicinity of Prescott, Ariz., the pecuniary factor, as shown by results of shipments five years ago and now, has altered as much as \$26 per ton in favor of the seller in some instances. A part of this, to be sure, is the effect of reduced freight traffic, but a very large proportion is due to the lowering of the treatment charge for smelting and the credit given for iron in the ore in excess on a neutral basis.

There are people to-day who object to investing in mines carrying pyritous ores simply because they are not informed regarding the metallurgic revolution which has given these materials a respectable standing in our ore markets. These constitute the great bulk of the product of central Arizona, as well as of other regions in the West, and many of the deposits are remarkably rich in gold. I do not think we are handling them all with adequate skill when we cling, as many do, to the old stamp-mill process, with fine concentration, although much of this practice may be justifiable with the surface ores, which carry free gold. Sooner or later the employment of coarse concentration, with chlorination or a similar process, must come to be the accepted doctrine for much of our local product, as in portions of California, although pyritic smelting may well play an important role in many instances.

Those who imagine or pretend that the changed conditions are more favorable to the success of local custom reduction works, near the mines, are reasoning from false premises or giving evidence of ignorance of metallurgic principles—I mean business principles, practical business requirements. Copper matting, or, possibly, copper smelting, for ores carrying practically no gold or silver might be judiciously operated at selected points, but rarely, as a custom plant, to as great advantage as in the hands of a mine owner. If the revolution, now but begun, has any particular effect upon the success of local works, it must be constantly to diminish their profits in proportion as it gives advantages to the large corporations at the centers of trade, the labor, money, ore and bullion markets, where costs are minimized and facilities vastly increased, to say nothing of the vantage gained by choice of ores and fluxes, with the means of enforcing low rates of freight and other concessions.

There will be more reduction plants, or plants for the beneficiation of ores, as the advance in ore treatment continues, but these will be at individual mines, or worked in connection therewith, and their products will seek the local market of cheap fuel, as the metallurgic history clearly proves. These facts are trite to those who have given the subject any earnest consideration, but they need to be emphasized at a time when "prospects" are hailed as mines, and "development" means only holes in the ground to many well-meaning but ill-advised persons.

No revolution in metallurgy can make a mine out of a tunnel or shaft, however much it may decrease the proportion of cost to income. But there are several ways in which a dollar may be justly claimed to have greater earning power than formerly on account of this particular revolution. For one thing, it has caused unwonted competition among manufacturers of machinery. As a consequence, we have more and better and cheaper mining tools and appliances than before. Powder, used more economically, is lower in price, steel is better and less costly, skilled labor is more abundant and more skilled and somewhat reduced in price. Provisions and other supplies are furnished in most mining camps much more reasonably than formerly. Ore is hauled by skillful teamsters at less cost, and in many other items the expense of mining and reducing ores has been very materially lessened within the last five years. When to all this is added the marked increase in marketable adaptability of ores of different grades and qualities, formerly outclassed or unprofitable, and the many abandoned mines which are now paying dividends from discarded dumps alone, we have a picture of the mining industry more tempting to investors than at any previous period; and careful investigation will show that it is yielding to business-like investment, more returns than any other form of enterprise open to capital.

Still another interesting, important and encouraging feature is the fact that mines can be bought or stocked at this time upon much more business-like terms than at any previous period. There is no longer any excuse for the wild-cat investment, and I believe there are not very many now

foisted upon the public from well-explored regions, except where said public deserves every bit of disappointment it gets.

The revolution referred to here has, perhaps, more favorably affected Arizona than any other portion of the West. It has illustrated and justified the statement made by myself four years ago, that this Territory could better withstand the disaster to silver than any other region by reason of its vast auriferous deposits, which then were but little appreciated even by our own citizens. But, as I also remarked at the time, no area in the United States could sooner resume the mining and marketing of silver ores with the price of that metal advancing somewhat. And so it is that our silver mines are beginning again to yield their rich treasures at the present market price.

Not long hence, I hope to give your readers some account of that most marvelous district in northwestern Arizona, which is mainly included in Mohave County. Prejudice and ignorance have blinded the eyes of Eastern capitalists to the vast mineral resources of this Territory. I speak what I do most thoroughly know when I assert that the day will come when this land will be known as the greatest mineral region in the United States. In gold, silver and copper there is no equal to it for area, quantity and average values, and lead is much more abundant than we have been wont to believe heretofore, *verbum sat*.

COMPULSORY CHARGES ON GERMAN WORKS.

The reports and balance-sheets of the leading iron and coal companies published in the German technical journals clearly show how severe is the burden of taxes and contributions to compulsory benefit funds, on German industry. In the case of the Gütehoffnungshütte, says the *Colliery Guardian*, one of the principal coal and iron companies, the taxes amounted last year to 5.08%, and compulsory contributions to 4.62% on the capital.

This interesting subject has been studied in great detail by Mr. R. Effertz, director of the Königsborn works, who has published some valuable statistics showing the tendency of these charges to increase year by year. He has selected for comparison three years, which appear to be well adapted for illustrating this increase. The year 1878 was the lowest point of the period of depression of the Rhenish-Westphalian coal trade, which extended from 1875 to 1889. The year 1885 was at the beginning of the growth of compulsory charges, while the year 1894 shows the full results of the innovation. For these three years the statistics are as follows:

Year.	1878.	1885.	1894.
Output.....tons	11,448,709	19,108,760	32,422,354
Cost of production.....£	2,830,470	4,599,857	10,346,982
Cost, per ton.....	4s. 11d.	4s. 10d.	6s. 5d.
Wages, total.....£	1,574,540	2,719,863	5,942,597
Wages, per ton.....shillings	2 7/50	2 8/46	3 6/65
Wages, proportion to cost.....per cent.	55.628	59.129	57.433
Wages, per man per shift.....shillings	2 0/3 to 3 7/1	2 2/5 to 3 1/8	2 8/10 to 3 9/1
Public charges, total.....£	133,051	227,835	904,490
Public charges, per ton.....shillings	0 2/22	0 2/28	0 5/57
Public charges, proportion to cost.....per cent.	4.700	4.952	8.740
Public charges, per man, per year.....shillings	29 5/1 to 113 0/0	31 7/5 to 200 0/0	64 8/0 to 261 9/9

Under the head of public charges are included State taxes, local taxes and mining taxes, the works, contributions to miners' fund, insurance fund, sick and pension fund, and contributions to benevolent funds, schools and church. It will be noticed that the cost of production in 1878 and in 1885 was practically the same, the working efficiency being greater in the latter year than in the former. The annual output per miner is shown by the following figures published by the Society for Promoting Mining Interests:

Year.	Output. Tons.	Number of men employed.	Annual output per man. Tons.
1878.....	19,208,942	74,364	258.3
1885.....	28,970,568	101,829	284.5
1894.....	40,613,073	154,136	263.5

The year 1894, however, showed an increase in the cost of production of nearly 33% compared with 1885, and of nearly 30% compared with 1878. The wages paid per ton increased in 1894 about 33.3% compared with 1878, and more than 28% compared with 1885. The average wage per man per shift in 1894 was 3 1/5s., that is 35% more than in 1878, and 19% more than in 1885.

We now come to the ratio of the public charges to the cost of production. Calculated on the basis of a ton, these charges in 1894 were 140% greater than in 1878, and 134% greater than in 1885.

Mr. Effertz's statistics are undoubtedly most suggestive, and cannot fail to throw doubt on the suggestion contained in the report of the Delegation of Employers and Workmen, organized to investigate the German iron trade, that the Continental employer has a fair equivalent for the burdens placed upon him by the State. In that report it is acknowledged that the serious increase of the cost of the accident insurance and other special workmen's funds has led to several proposals being considered with a view to either diminishing the amount of the indemnities and pensions, or to so altering the law itself as to reduce its pressure on the industrial works of Germany. The opinion is, however, expressed that the existence of these funds, involving, as they do, the care and protection of the employed by their employers, appears to secure harmonious relations between them.

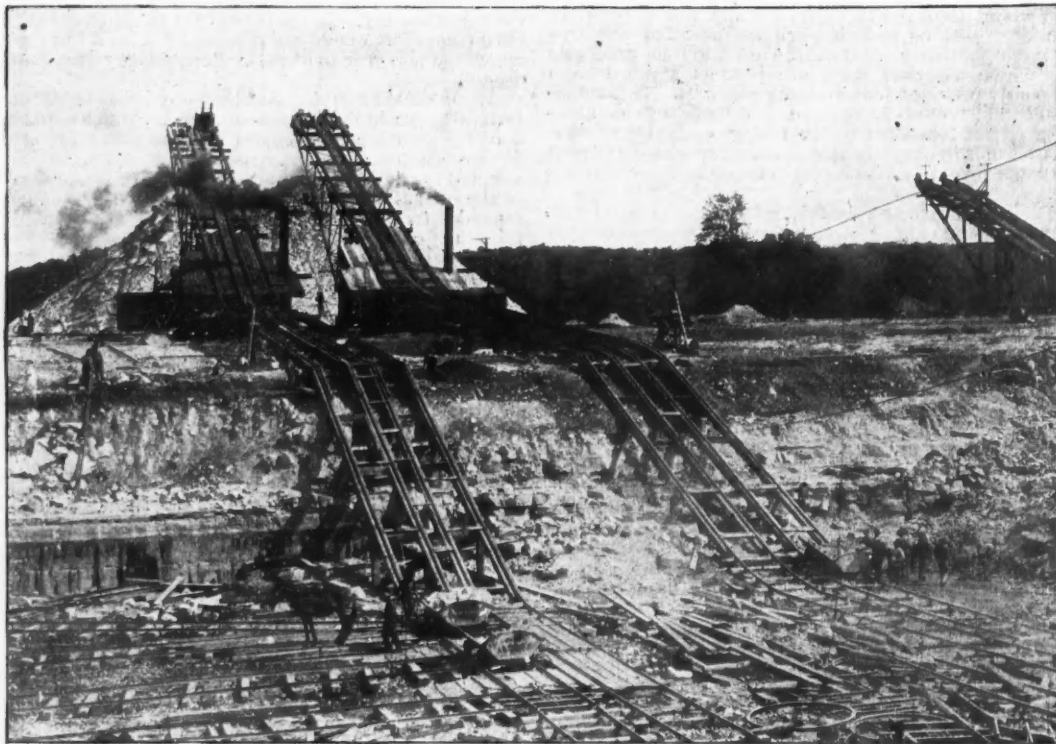
The Sicilian Sulphur Industry.—One of the chief questions now engaging the attention of the Italian Government is that of the amelioration of the sulphur industry of Sicily, which is at present in a very depressed condition, owing to the competition of pyrites for the production of sulphuric acid, and the fact that the supply now largely exceeds the demand, not to mention the threatened rivalry of Japanese sulphur. The price has fallen from 140 lire to 60 lire per ton. It is now proposed to abolish the export duty of 20 per cent., which formerly yielded an annual revenue of 3,400,000 lire. In order to make good the deficit thus caused to the revenue, it is proposed to levy a tax of 1 lira per ton on sulphur exported from Sicily, to increase the import duty on barley and white maize from 1.15 lire to 4 lire, and to introduce a statistical fee, ranging from 10 centimes per quintal to 10 centimes per ton, on imported goods not specified in the treaties of commerce.

## THE CHICAGO DRAINAGE CANAL.

The importance of this work has perhaps been underestimated from the quiet manner in which it has been carried on, but the experience gained in canal excavating on the largest scale up to date, cannot fail to be of great advantage in the consideration of the Nicaragua Canal and other similar enterprises. In this case we have actual data to go upon for both rock work and earth work paid for in gold, and the reason for our making this special allusion in figuring out the cost of the work, is the fact that one reason of discrepancy between the Government Commission in their estimates of the Nicaragua Canal cost and those of the company was that the former figured everything in gold, while the latter naturally calculated the cost in silver so far as labor was concerned, as it would be paid in that metal.

We are in possession of figures which have never been before published and which we know to be accurate, showing conclusively that the greater experience gained, and the greater improvements applied for the mechanical excavation and handling of the material the cheaper the cost, and, if we are not mistaken, the last and lowest contract price on the Chicago Drainage Canal is considerably less than any estimate made by Mr. Menocal and his associates.

After the work on the drainage canal had been under way upwards of a year at prices varying from 73 to 80c. per cubic yard, section 15 was let to Wright, Meysenberg, Sinclair & Carry for 59c. per cubic yard. It is also well known that the contractors made money on their contract spite of the unprecedented figure. One item makes quite a difference



TIPPLE INCLINES USED ON ROCK EXCAVATION, CHICAGO DRAINAGE CANAL.

between the price of to-day and that of a few years ago, viz., the reduced cost of the dynamite, which amounts to 10c. per cubic yard less than in 1891. The contractors on the Chicago canal bought 40% dynamite at about 10c. per pound.

We are indebted to the Ingersoll-Sergeant Drill Company and the Brown Hoisting and Conveying Machine Company for some of the following data.

Through the rock divisions of the canal, the specifications require that the side walls be formed by channels made in one to three cuts by channeling machines, and, where necessary, walls of masonry laid in cement will be built upon the rock surface to a height of 5 ft. above low water level (1847) of Lake Michigan. Where the excavation is wholly through earth, the banks of the canal have a two-to-one slope, no masonry being used. The grade in the rock sections is 1 ft. in 20,000, and the canal is designed for an ultimate flow of 600,000 cu. ft. of water per minute, providing for a future population of 3,000,000 people.

According to present estimates, it will cost \$27,303,216 to complete the work, which, when finished, will be 35 miles in length, and will necessitate the removal of 39,972,762 cu. yds. of material. In the "Rock Section" of the canal, which is 160 ft. wide and 35 ft. deep, 12,071,668 cu. yds. of material will be channeled, drilled, and blasted out of solid rock.

It is estimated that the work of excavation on the Chicago Canal will be carried out for less than one-half the cost of similar work on the Manchester Canal.

Mr. Jackson, one of the contractors, first grasped the thought which, when developed, produced Brown's cantilever hoist, a balanced steel-framed truss, 342 ft. long, which reaches over the canal opening, and across a 50-ft. berme and over a mountainous spoil bank, whose apex may be 90 ft. above the ground. This machine, with clockwork precision, takes away about 600 cu. yds. per day.

We illustrate some of the ingenious devices by which the works are being executed at so low a cost compared with those of the Panama, Manchester, Suez, North Sea and Corinth canals.

## NOTE ON THE ORIGIN OF MALACHITE.\*

By Edgar Hall.

It is now generally conceded by mineralogists that the oxidized portions of mineral lodes represent merely the weathered condition of the originals, and that the oxide, carbonate and sulphate minerals contained therein have been formed by atmospheric influences alone. Very few men of experience in the every-day working of mines now think those influences to have been abnormal at any time. All the phenomena can be explained by the changes which are still going on, and present atmospheric conditions are ample to produce the weathering seen at the largest of mines. Such being the case, abandoned mines offer an interesting field of study to a mineralogist, as their workings expose large surfaces to the action of air and water.

Numerous as are the abandoned mines of New South Wales, the number available for examination and likely to yield valuable information is small. This is due to two reasons: one is, that the mines have not been abandoned long enough, and the other, that most of the mines are situated in the eastern coast ranges, where the rainfall is high, and consequently the mines get filled with water to a point very near the surface. It is obvious that a comparatively arid climate, or one where long periods of dry weather alternate with intervals of heavy rainfall, is required to produce large masses of oxidized ore bodies. Such a climate obtains in our far western districts, and accounts for the large bodies of oxidized ores found at Broken Hill, Cobar and other well-known places.

In such a climate oxidation proceeds very rapidly. Iron pyrites where occurring in large quantity will, in four or five years, produce such a plentiful crop of crystals of iron sulphate that the sides and floor of a drive will be covered as if by snow; so much so that the sound of one's footfall is muffled as one proceeds.

The writer had occasion, a short time ago, to visit the abandoned workings of a copper mine, and the observations made there are the subject of this note. The mine in question is situated at Girilambone, in the western part of the colony, about 100 miles from the Darling. The ore occurs as a copper-bearing schist, and where unaltered is a bluish micaceous rock, carrying strings and blebs of a pyrite poor in copper. Permanent water stands at a depth of 180 ft.; above this level the rock is soft and weathered, and the copper occurs as azurite and malachite, with a little oxide of copper. Copper glance is said to have been found there in the early days.

The azurite and malachite occur mainly as nodules of varying size; these are not pure carbonate of copper, but are earthy, and consist of portions of schist which have been saturated with the mineral. Malachite occurs also as narrow strings of pure carbonate of the fibrous variety. It is to this I wish to draw particular attention.

Between the surface and water-level a great deal of excavation has been made in the schist, and these excavations can now be examined in safety. Most of them have been standing so for 13 years past. The workings are very dry and crystals are not very plentiful, but in one crosscut, where there appears to be a drainage channel, the sides and roof are covered with particularly fine and long crystals of sulphate of copper and sulphate of iron, some of the crystals being an inch and a half long.

Further investigation showed that the schist in the crosscut was full of crystals of copper sulphate. The crystals had formed in the foliation planes of the schist, and were closely packed bundles of very fine fibrous crystals, completely filling the fissure. In most cases the crystals were at right angles to the sides of the fissure, but in some cases the fibrous

\*Royal Soc., N. S. Wales.



crystals had become curved, and had forced a layer of schist outwards into the drive. The crystals were of a brilliant blue color, and of course were very brittle, but in other respects the resemblance to fibrous malachite as seen in the schist at other places in the mine was complete.

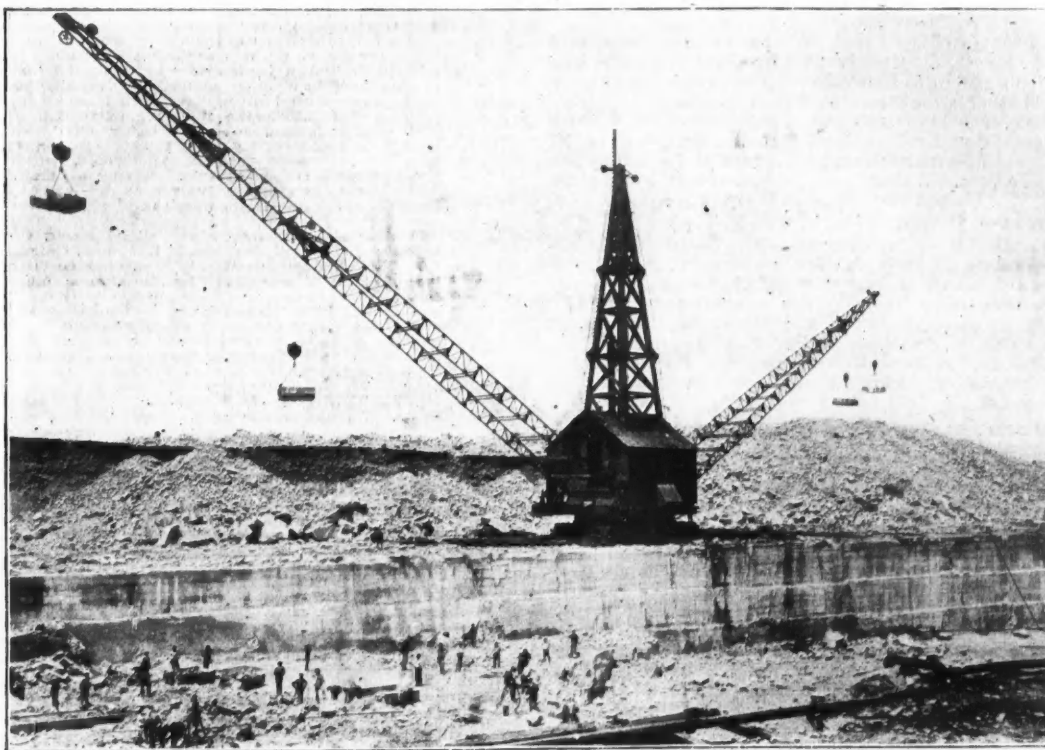
The resemblance at once suggested the origin of fibrous malachite, namely, that it is a pseudomorph after sulphate of copper. The ordinary text-books of mineralogy seldom hint at the method of formation of minerals, and in the case of malachite the writer has so far been able to find only one explanation of its formation. Frank Rutley<sup>1</sup> suggests that the

formation of the carbonate from the chalcopryite which must have formed its starting point, and this presents equal difficulties.

The production of sulphate of copper from cupreous pyrites is the first and simplest result of oxidation, and from sulphate of copper any soluble carbonate will, at ordinary temperatures and pressures, produce a basic carbonate of the composition of malachite. Verdigris, the product of slow oxidation of metallic copper in moist air at ordinary temperatures, also has the composition of malachite, but it is hardly likely that the alteration of cupreous pyrites will follow that route.



CHANNELER AND DRILL ON CHICAGO DRAINAGE CANAL.



DOUBLE BOOM DERRICKS AND ROCK DRILLING ON CHICAGO DRAINAGE CANAL.

mineral "has in most cases resulted from the percolation of water through copper-bearing rocks, and the subsequent deposition of the dissolved carbonate in fissures and cavities." This explanation seems improbable in view of the insolubility of copper carbonate. Watt<sup>2</sup> states that the basic carbonate requires a pressure of four to six atmospheres for solution in water containing carbonic acid. Such pressures are impossible under natural conditions at the short distance from the surface within which malachite is found. The deposition from solution also presupposes the

Given the oxidation of cupreous pyrites by surface influences and the formation of fibrous crystals of sulphate of copper in cavities of a lode during a prolonged period of dry weather, it is easy to understand that during an ensuing period of wet weather, the descent of waters from the surface charged with carbonic acid and carbonate of lime will change the sulphate crystals into malachite; and that this alteration will proceed without change of form is highly probable. That this has been the mode of formation of the fibrous malachite in the cupiferous schists of Girilambone the writer has no doubt what-

<sup>1</sup> Mineralogy, p. 211. <sup>2</sup> Dictionary of Chemistry, New Edition.

ever, and he believes that the explanation will hold good for all occurrences of the mineral.

The following is suggested as the series of changes which have produced the carbonates of copper:

I. A period of wet weather during which the rocks and ore formations within surface influences become saturated with, and all cavities full of, water.

II. A period of dry weather. At first the excess of water drains off rapidly, leaving the rocks merely wet all through. As the drying proceeds oxidation of the damp minerals goes on very fast and sulphates are formed. The flow of water is insufficient to carry these far, so they saturate part of the adjacent earthy minerals, and also effloresce in cavities, particularly where there is a current of air. Finally, at the end of the dry period, the sulphates will be left as such, forming quite dry mixtures with other substances, and incrustations or crystals in cavities and fissures.

III. Another wet period arrives. At first the descending water permeates slowly and is saturated with carbonic acid and soluble carbonates, the slow soaking of which over the dry sulphates converts the latter into carbonates. As the volume of water increases, the CO<sub>2</sub> and soluble carbonates become less, but the sulphates will have been already converted into carbonates, so they are not dissolved. Finally the rocks become saturated with water, the wet period passes away, and another cycle of change commences.

Every cycle will add fresh layers of carbonate to the incrustations, and fresh crystals to the fibrous bundles in the cavities, until at last solid masses of concretionary and fibrous crystalline malachite result.

#### RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specialy Reported for the Engineering and Mining Journal.

**DETERMINATION OF WHAT ARE MINERAL LANDS.**—When school lands surveyed by a United States deputy surveyor are certified by him to be mineral, and his field notes and plats are approved by the surveyor-general and the commissioner of the general land office, and filed in the land office, this is a sufficient determination that the lands are mineral in character to give a State the right to select other lands as indemnity for the loss.—*Johnston vs. Morris* (72 Federal Reporter, 890), United States Circuit Court of Appeals.

**LIABILITY OF PARTNER IN MINES FOR WAGES OF OPERATIVES.**—One who was employed by a mining firm, and who had no notice of a deed of the mining property to a corporation, can recover of the partners for services rendered after the execution of the deed, though he admitted that he heard that a corporation had taken charge of the mine; it appearing that one of the partners had continued to act as superintendent of the mine, and that he stated that he did not remember that he had ever notified such employee of the change in ownership. And the individual note of one of the firm, given for wages, does not operate as a payment of the demand, if there was no intention to give or accept the note as such.—*Delapiazza vs. Foley* (44 Pacific Reporter, 727), Supreme Court of California.

**EXTRALATERAL RIGHTS AND END LINES.**—Under the statute of 1872 (United States Revenue Statute Section 2322), which gives to persons who had previously procured a patent to a surface location, as incident to one vein only, a right to all other veins throughout their depths which have their apexes within the surface line, the extralateral rights of the patentee in respect to any such additional veins extend to the vertical plane of the end lines, prolonged in their own direction, and cannot be limited by the vertical plane of any side lines.—*Walrath vs. Champion Mining Company* (72 Federal Reporter, 978), United States Circuit Court of Appeals.

**POWERS OF OFFICERS OF MINING COMPANY LIMITED BY THEIR AUTHORITY.**—The president and secretary of a mining corporation have no power to appoint an agent or attorney in fact to manage, control, sell and transfer the property of the corporation without being themselves authorized so to do, by order or resolution of the directors, duly adopted by such board. And a power of attorney to manage, control and lease the property of such corporation does not authorize an attorney in fact or agent of such officers to sell and transfer the property of the corporation, either in trust or absolutely.—*Johnson vs. Sage* (44 Pacific Reporter, 641), Supreme Court, Idaho.

**SEPARATE OWNERSHIP OF SURFACE AND MINERAL RIGHTS.**—In making a partition of lands underlaid with minerals, a court may, where the interests of the parties require it, separate the ownership of the surface from the mineral, giving the surface to one owner and the mineral to another, with distinct titles in fee in severalty.—*Ames vs. Ames* (43 Northeastern Reporter, 592), Supreme Court of Illinois.

**UNCONSTITUTIONAL MINING LAW OF ILLINOIS.**—The act of 1887, of Illinois, as amended by the act of 1891, requiring owners of coal mines paying their employees by weight, to weigh all coal mined, for the purpose of fixing the wages of the employees, is unconstitutional, as violating the rights of the employees to contract as to the manner in which their wages shall be fixed; and it is also unconstitutional, because made applicable alone to mines from which the coal is shipped by water or rail.—*Harding vs. People* (43 Northeastern Reporter, 634), Supreme Court of Illinois.

**Japanese Orders for Steel Rails.**—The Illinois Steel Company shipped 500 tons of steel rails last week in part fulfillment of a Japanese contract. The claim is made that these rails are sold to the Japanese purchasers at \$6.64 per ton less than any company willing and able to pay cash can obtain them for here.

**Coal Consumption per Car Mile in France.**—Comparative figures of the coal consumed per car mile run on French tramways, employing different methods of propulsion, are contained in an article on electric lines by E. Cadiat in the *Portfeuille Economique des Machines*. As regards storage-battery traction, on the lines from St. Denis to the Madeleine and from the Opera to Neuilly, the car mileage aggregated, in 1893, 502,060, or 1,376 car miles per day. The steam engines at St. Denis furnished for this service a total of 6,500 H. P. hours, or 4.72 H. P. hours per car mile.

**Peat Charcoal for Iron Making.**—The charcoal is peculiarly adapted for smelting iron and making steel, and in that direction the inventor believes its greatest commercial success will be achieved. It is a pure fuel, free from phosphorus and sulphur, and it contains considerably over 90% of carbon. By smelting with peat charcoal a pig-iron is obtained which will hammer, roll or bend, and consequently a cast-iron which is much tougher than any existing. Iron ore smelted with the new charcoal is a much purer metal than that produced at present, and, as the pig used is pure charcoal iron to begin with, all the difficulties of the existing mode of making steel by direct process are avoided. In converting 1 ton of dried peat into charcoal some 13,000 cu. ft. of gas of 16½ sperm candles, and perfectly free from sulphur, is produced. To make an armorplate of the best known existing quality, of, say, 12 in. thickness, to have a hardened surface of 1.39 of carbon, takes 200 hours, but by the inventor's process not only is the time reduced two-thirds, but the plates are harder on the surface and tougher at the back.—*Iron and Coal Trades Review*.

#### PATENTS RELATING TO MINING AND METALLURGY.

United States.

The following is a list of the patents relating to mining, 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 MAY 19TH, 1896.

- 560,363. **MINING-MACHINE.** Edward S. McKinlay, Denver, Colo. Filed October 19th 1894. Combination of a bed having side bars situated above the ground, bars extending downward therefrom, cross-bars resting upon the ground and one or more longitudinal bars at or near its center and connected to the cross-bars, a carriage fitted to the bed and having a cutting apparatus across the front end thereof, one or more chains for imparting motion to the cutters and extending from the rear part of the carriage to the front thereof, an engine or motor at the rear of the carriage having its central part resting upon the central longitudinal bottom bars of the bed, and rollers or wheels interposed between the carriage and the elevated side bars of the bed, all of the parts constituting a portable unitary structure.
- 560,405. **ACETYLENE GAS GENERATOR.** Henry F. Fuller, Chicago, Ill., Assignor to Wainsley, Fuller & Company, same place. Filed December 17, 1895. Combination of a generator for the production of gas from two bodies of chemically-coacting materials, one of which is solid and the other liquid, a vessel for the liquid, a shell supported in the vessel and containing a gas-chamber having an outlet at its upper end portion and opening at its lower end into the vessel, a circumferential inward extending plate in the shell above the lower end thereof, a guide-sleeve secured to and extending below the plate to a plane above the lower end of the shell and forming with the shell a gas-space about the sleeve, and a receptacle for the solid material having a perforate lower portion and supported in the guide-sleeve, a space between the shell and side wall of the vessel forming a chamber for a liquid column, whereby the gas generated by the contact of the materials passes through the solid material as generated and fills the chamber and exerts downward pressure, through the body of solid material, against the liquid to separate the materials against the resistance of the liquid column and check the generation of gas.
- 560,412. **PROCESS OF AND APPARATUS FOR ROASTING ORES.** William A. Koneman, Chicago, Ill. Filed March 6th, 1894. Renewed October 24th, 1895. Process consists in showering pulverized ore through a downward course together with a downdraft flame and retarding the acceleration of its motion in falling, diverting the fallen ore and flame into a lateral course and therein subjecting it simultaneously to a reverberatory-furnace action from above and to the oxidizing action of uprising air from below, removing the ore while in an incandescent state from the lateral course and storing and subjecting it for a prolonged period of time to the action of carbonaceous or other material by introducing pulverized carbon or such other material into contact with it, combining an ore roasting furnace, a shaft having an inlet for pulverized ore at its upper end and communicating near its upper end with the medium of heat supply, a depositing-chamber for the ore, constructed on the principle of a reverberatory furnace, as described, and extending laterally from the base portion of the shaft and having a dumping-floor comprising a series of rotably-supported valves, an ore-interrupting chamber leading from the depositing-chamber to the stack, and a storage-chamber below the floor.
- 560,413. **PROCESS OF AND APPARATUS FOR RECOVERING GOLD OR SILVER FROM REFRACTORY ORES.** William A. Koneman, Chicago, Ill. Filed May 8th, 1894. Renewed October 24th, 1895. Process consists in continuously feeding the ore, in a pulpy condition, through a rotating barrel, subjecting the ore, in its course, to dissolution and continuously discharging the ore and solution from the barrel, and in an apparatus for recovering precious metal from ore, an elongated drum rotably supported and having an ore-pulp feed at one end and a discharge at its opposite end, partitions at intervals in the drum and having openings, and means for supplying a metal dissolving medium to the ore in its course through the drum.
- 560,414. **METAL REFINING APPARATUS.** William A. Koneman, Chicago, Ill. Filed May 8th, 1894. Renewed October 24th, 1895. Combination of a furnace having a chamber for molten matte or slag and provided with a gas-outlet flue, air inlets communicating with an air-pressure supply and adapted to introduce air into the chamber in excess of the quantity required for oxidation of the metal, the air inlets inclining and converging into the chamber to direct the air downward to different points against the upper surface of the molten mass to produce rotation thereof in the chamber, thereby to bring the oxidizable and consumable and combustible ingredients constantly to the surface, gas inlets communicating with a combustible gas supply and opening into the chamber to mix the gas, and burn it upon the molten mass, with the surplus of hot air, and a slag skimmer in the chamber adjacent to its slag spout and operating by the rotation of the mass, to remove therefrom the resultant fluid impurities.
- 560,435. **ORE CONCENTRATOR.** Charles E. Seymour, Lake Geneva, Wis. Filed December 14th, 1892. Combination of a pan or bowl, a central ring within the pan or bowl having discharge-ducts leading from the same, a disk within the pan or bowl provided with a discharge-opening adapted to convey the products of concentration to the central ring, a valve normally closing the opening, and means for raising and lowering the disk and operating the valve.
- 560,463. **REFINING PETROLEUM OR HYDROCARBON OILS.** Friedrich Berg, Cleveland, O., Assignor to Joseph B. Meriam, same place. Filed May 31st, 1893. Process consists in distilling off the more volatile portions of the oil and then treating the remainder of the crude oil at a temperature of at least 110° Fahrenheit, prior to any further distillation, first, with a suitable acid, and secondly, with a suitable alkali or base and maintaining the oil at a comparatively high temperature during the entire process.
- 560,500. **ROCK DRILL.** Jacob Hengen, North Amherst, O. Filed May 3d, 1894. A hollow and tapering rock drill whose lower end is approximately flat and has the form in cross-section externally and internally of two ellipses, the outer longer in proportion to its width than the inner, and pointed at its ends, the metal between the sides of the ellipses sloping inward and that portion between their ends flat.
- 560,552. **ORE CONCENTRATOR.** Horace P. Tobey, Wareham, and George B. Thayer, Boston, Mass. Filed August 30th, 1886. Serial No. 212,266. Patented in England October 25th, 1884. No. 14,152, and in Canada November 3d, 1884. No. 20,458. Combination, with a reciprocating ore bed and means for determining the water level thereon, of a pulp screening surface slightly inclined from the horizontal, having the portion which receives the pulp immersed in the body of water flowing upon the ore bed and having its other, downstream, portion raised above the surface of the water.

## PERSONAL.

PROF. ALEXANDER AGASSIZ has gone to Australia to investigate the great Barrier reef.

MR. HENRY LANDES has succeeded Mr. GEORGE A. BETHUNE as State geologist of Washington.

MR. H. C. PITCKETT, a mining attorney of Silver City, N. M., has settled in Salt Lake City, Utah, to practice mining law.

MR. GEORGE F. DUCK, mining engineer and geologist of Fairmount, W. Va., is going to leave this place shortly on professional business.

MR. OTTO STALLMAN, metallurgical engineer, will leave shortly for Newcastle, New South Wales, where he will enter the service of the Broken Hills Proprietary Company.

MR. WM. F. KETT, late agent for the Gates Iron Works in Butte, Mont., sailed for England on May 27th to assume the management of the London office for the same concern.

MR. JOHN DERN, president and manager of the Mercur Gold Mining and Milling Company, of Utah, has gone to Europe with his family. During his absence Mr. E. H. AIRIS, secretary of the company, and Mr. GEORGE DERN, director, will manage the property.

CAPT. THOS. COUCH, manager of the Boston and Montana properties, and one of the receivers of the Butte & Boston Mining Company, left Butte, Mont., last week, and is now on his way to England, where he will remain a few months. He expects to pay a visit to South Africa and inspect the Kaffir gold fields.

## OBITUARY.

PERCY STOCKDALE, a mining engineer, was killed by a premature blast on May 25th, at Pachuca, Mexico.

JOHN K. TAGGART, a well-known Pennsylvania coal operator, and a man named Hardin were killed and others were seriously injured by the premature explosion of dynamite in a coal mine near Big Stone Gap, Va., on May 23d.

GRIFFITH ROBERTS, general superintendent of the Lehigh & Wilkes-Barre Coal Company's collieries, in the Honey Brook district, Pa., was killed by parties unknown near Hazleton, Pa., on May 21st. He was well known throughout the anthracite regions.

SAMUEL DALE, an old civil engineer, and for the past 16 years draftsman and clerk for the Boston & Albany Railroad, died suddenly at Springfield, Mass., on May 25th, aged 76 years. Under W. H. Russell he helped survey and lay out the Boston & Albany road from Springfield to Albany.

JAMES H. STANWOOD died at Boston, Mass., on May 24th, aged 34 years. He graduated from the Massachusetts Institute of Technology in 1887, and one year later was appointed Professor of Civil Engineering there, which position he retained up to the time of his death. He was a member of the American Society of Civil Engineers and of the Boston Society of Civil Engineers.

JOHN F. STONE, ex-Chief of Police of Denver, Colo., died in Philadelphia, Pa., this week, aged 36 years. Sixteen years ago he went West, settling in Colorado. First a miner and prospector in the San Juan Valley, he was later a merchant in Pueblo, finally going to Denver to take a position in the same line of trade. Here he entered politics, and in 1889 became Deputy Sheriff. At the expiration of his term of office he was appointed a lieutenant in the Denver police department. This office he held until ex-Governor Waite's "City Hall War" when Stone was made chief. He resigned shortly after. He was one of the pioneer investors in the West Creek, and at his death was president of the Hoosier Gold Mining Company, of West Creek, Colo.

GENERAL LOUIS FREDERICK MENABREA, Marquis de Val Dora, died in Chambéry, Savoy, on May 25th. He was born in Chambéry in 1809. He studied with distinction at the University of Turin and entered the corps of engineers as lieutenant. He attained the rank of captain in 1848. In the war of Italian independence, having been advanced to the rank of major-general and placed at the head of the engineering department of the army, he executed several important works. On the cession of his native province to France he determined to retain his Italian nationality and was made a lieutenant-general. In 1861 he became minister of marine and in 1866 he was sent to Germany, where, as plenipotentiary of Italy, he signed the treaty of Prague. In 1867 he formed a Cabinet, in which he held the portfolio of foreign affairs, besides being president of the council; and, notwithstanding numerous financial difficulties and the complications of the Russian question, he remained in power until November, 1869. He later filled several important diplomatic posts. He was a skillful mathematician and a member of several learned societies.

## SOCIETIES AND TECHNICAL SCHOOLS.

WESTERN PENNSYLVANIA CENTRAL MINING INSTITUTE.—The session of this institute, which opens in the Court-house June 2d, will continue four days. Papers are to be read by W. J. E. Carr, general superintendent Leavenworth Coal Company, Leav-

enworth, Kan.; W. H. Jennings, chief engineer, Hocking Valley & Lake Erie Railroad, Columbus, O.; Chancellor W. J. Holland, of the Western University; Cyrus Robison, electrical engineer, Jeffrey Manufacturing Company, Columbus, O.; Dr. Edward Orton, State geologist, Columbus, O.; B. C. Jilison, professor of chemistry and geology, Pittsburg High School; William B. Hanlon, chief engineer, Cleveland, Lorain & Wheeling Railroad; M. C. Ihseng, professor of mining, engineering and geology, State College, Pa.; N. W. Lord, professor of mining, engineering and metallurgy, Ohio State University, Columbus, O.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—A meeting of this society will be held in Toronto on the 17th, 18th and 19th of June next. It has been decided to make this a special general meeting in order that the question of the incorporation of the society and other matters of business may be discussed and acted upon. A number of interesting papers have been promised for the meeting. It is expected that at least two sessions will be devoted to the reading of papers and discussions thereon. An excursion will be made to Niagara Falls and should time permit other points of interest in the vicinity of Toronto will be visited. Through the courtesy of the Canadian Pacific Railway, the Grand Trunk Railway System and the Intercolonial Railway, members and ladies accompanying them, paying full first-class fare going to the meeting, will be granted a free return passage on presentation of a certificate signed by the ticket agent, at the point of starting, and by the Secretary of the Society. Other details regarding the meeting will be furnished in a later circular.

## INDUSTRIAL NOTES.

The Sharon (Pa.) Iron Company is contemplating the erection of an open-hearth steel plant during the summer.

The Rossie Iron Works will hold its annual meeting in Room 84, Drexel Building, New York City, on June 3d, at 12 o'clock, noon.

The Youngstown (O.) Bridge Company has been awarded the contract for the proposed bridge over the Tennessee River at Knoxville, Tenn. The bridge complete will cost \$210,000.

An electrical apparatus has been installed in the lap weld department of the National Tube Works Company, at McKeesport, Pa. It is designed to draw pipe from the fire, and is working satisfactorily.

The Cincinnati Forge and Iron Company, of Cincinnati, O., is to build a plant at Carthage, near Cincinnati, which, when completed, will contain a forge and hammer shop, a rolling mill and a machine shop.

The Specialty Manufacturing Company, of Allegheny, Pa., has just completed a 22-ton electric crane, equipped with Westinghouse motors, to be placed in the continuous mill of the Schoenberger Steel Company.

The Vanderbilt Steel and Iron Company's 125-ton blast iron furnace at East Birmingham, Ala., has been sold at public sale to John H. Blackwell and William H. Gaudy, who are said to have bought in their own right.

The Champion Iron Company, Kenton, O., has added to its plant an electro-bronzing and plating department. The tanks are of large size, to take pieces of large dimensions, being 18 ft. long, 6 ft. wide and 3 ft. deep.

The largest run of finished plates ever made at the universal mill of the Pottstown (Pa.) Iron Company was made lately. The record for April was 3,185 tons and the aggregate output of all departments of the works was 8,000 tons.

Four additional tinning stacks are being built in the tin-plate department of the Lalance-Grosjean rolling mills at Harrisburg, Pa., and when completed the plant will have 7 stacks, the operation of which will add 25% more men to the force.

At the meeting of the directors of the Troy Steel Company on the 25th inst., Vice-President and General Manager Bell said he thought the plant on Breaker Island would be ready for operations by August 1st. The cost of the improvements on Breaker Island will amount to about \$700,000.

At the annual stockholders' meeting of the G. & H. Barnett Company, Philadelphia, Pa., proprietors of the Black Diamond File Works, Mr. Henry Barnett was elected president, to succeed the late George Barnett; Henry W. Scattergood, vice-president, and Alfred W. Barnett, secretary and treasurer.

The following officers of the Wellman Steel Company, Chester, Pa., were elected last week: President, Wm. Burnham; secretary, D. G. Stokes; treasurer, J. Tatnall Lea; board of directors, Wm. Burnham, J. Tatnall Lea, E. H. McCullough, David Williams, Joseph Storm Patterson, Richard Peters, Jr., S. T. Wellman.

The Alcania Tin and Terne Plate Company, Youngstown, O., has started up one of its two tinning sets. The company has chosen the name Al-

cania as its brand for both charcoal and coke brights and ternes, and will also use the name Shenango for one of its brands of charcoal, and Mahoning for one of its brands of coke tin.

The new board of directors of the Columbus & Hocking Coal and Iron Company includes Mr. J. M. Knapp, a large owner of coal stocks; Jennings S. Cox, of J. H. Davis & Co.; Mr. M. W. Tyler, J. O. Morse, president of the company; J. E. Mancourt and S. A. McManigal, of Cleveland; Judge Nash and John I. Lentz, of Columbus, and Mr. John H. Bloodgood, of New York.

The Pittsburg Granite Wool Company, recently organized in this city for the manufacture of an insulating material from granite and lime rock, will erect a plant at Zelenople, Pa., to be about 800 x 150 ft. in size, and giving employment to about 150 men. The officers of the company are C. F. Steifel, Allegheny, Pa., president; L. D. Passano, Baltimore, Md., vice-president; E. R. Hugas, superintendent.

In commemoration of the 50th year of the business carried on by W. & L. E. Gurley, Troy, N. Y., as manufacturers of civil engineers' and surveyors' instruments, a new edition of "Gurley's Manual" has been carefully prepared, revised and almost entirely rewritten. This firm has established itself as one of the leading manufacturers in its line, and has been a successful advertiser in the *Engineering and Mining Journal* for over 15 years.

The new plant of the Weldless Tube Works, at Newark, O., will consist of seven buildings, the largest being an open hearth steel works 70 x 120, a sheet rolling mill 120 x 400, and two weldless tube works, each 80 x 235. The shops will cover 12 acres of ground. The stockholders present were Governor Campbell, E. N. Hatcher, of Columbus, O.; Dr. Hart, Wooster; George H. Everson, Dr. S. B. Bishop, W. P. Moreland and Dr. Howells, all of Pittsburg, Pa.

H. W. Minnemeyer and C. E. Wolf have been appointed receivers of the H. W. Minnemeyer Manufacturing Company, of Allegheny, Pa. A bill in equity was filed against the company, in which it stated that C. E. Wolf is a creditor of the company for \$2,350; P. C. Wolf, \$2,000, and H. W. Minnemeyer, \$1,600. Owing to depressed business the company, which was organized to manufacture iron and steel, has been unable to meet its obligations. The liabilities of the concern amount to \$58,519.

The Merralls' Mill Company, of San Francisco, Cal., has leased the land and buildings formerly belonging to the California Iron and Steel Works, at Emery, Cal., adjoining the Judson Iron Works, where it intends to manufacture its hydraulic quartz mill, rock breakers, ore feeders, water wheels, stamps, and in fact mining machinery generally. During the last week the company has sold two of its No. 3 hydraulic quartz mills; one to John Gagen, manager of the Black Butte Mining Company, Pendleton, Ore., and one to B. A. Seaborg, for Yuba County, Cal.

The large hoisting plant of the Corral Hollow Coal Mines, has arrived at Stockton, Cal. The contract for this machinery was let to the Risdon Iron Works of San Francisco. Workmen are now preparing for the reception of the plant at the mines. The railroad itself will be completed from Stockton to the mine, during the coming week. Two compound locomotives for the road left Chicago on May 15th and the other engines are in process of construction at the Richmond, Va., Locomotive Works. Fifty more cars for the road have been ordered of the Ensign Company.

The Sharon (Pa.) Fire Brick Works have been greatly enlarged within the past few months. The plant is now composed of 16 modern down-draft kilns; one building 100 x 50, two stories high; one building 157 x 50, three stories high; machinery department 40 x 60, two stories high; one 150 H. P. engine; one 50 H. P. engine; three 70 H. P. boilers; five grinding and tempering mills for preparing fire-clay. The products are high-grade fire brick for blast-furnace linings; No. 1 high grade clay brick for rolling mills, steel works and general purposes; high grade silica brick, Bessemer tuyeres, nozzles, sleeves, and in fact a full line of finished clay productions.

## TRADE CATALOGUES.

We noticed in our issue of May 9th the Cyclotomic transit, manufactured by the A. Lietz Company, of San Francisco, Cal., and in our opinion it is a very convenient and improved arrangement. This company now issues a revised edition of its "Manual of Modern Surveying Instruments and their Uses," which we find contains a large and varied amount of instructive information. All engineers will appreciate this catalogue, for the reason that it is not an ordinary trade publication, but really contains reliable data which will aid them in their work.

Part I. of this Manual refers to the establishment and its methods of working, in which the firm takes considerable pride.

Part II. deals with the manufacture of engineering instruments, the proper methods of their uses, repairs and adjustments, with the intention that they should be returned just as seldom as possible to the shop for more expensive refitting.

Part III. contains a number of professional papers which cannot fail to be appreciated by professional men.

Finally, there is a full price-list of every article

manufactured by the A. Lietz Company, and any one consulting this volume, for it is more than an ordinary catalogue, has only to use the index and a list of illustrations which are also indexed, and communicate with the manufacturers to obtain complete information.

#### MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" of 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, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line.

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#### GENERAL MINING NEWS.

##### ALASKA.

**ALASKA MEXICAN GOLD MINING COMPANY.**—This company reports its clean-up for the month of April as follows: Period since last return, 30 days; bullion shipment, \$21,365; ore milled, 6,458 tons; sulphurets treated, 126 tons. Of bullion there came from sulphurets, \$7,304. The working expenses for the month amounted to \$14,319.

##### ARIZONA.

###### PINAL COUNTY.

**SILVER KING MINING COMPANY.**—A contract was recently let to sink 200 ft. from the 70-ft. level and this work is now proceeding day and night. When this contract is completed a drift will be run to correspond with that at the 70 ft. level and the intervening ground thoroughly explored.

###### YUMA COUNTY.

**HARQUAHALA GOLD MINING COMPANY, LIMITED.**—The assistant manager of this company reports the operations of the cyanide plant for March as follows: Pulp treated, 2,896 tons; average assay of pulp, \$4.24 per ton; average assay of tailings, \$1.23 per ton; extracted according to assays, 71%; bullion and gold precipitate, estimated to yield, \$4,762; miscellaneous revenue, \$82; total revenue, \$4,844. Operating expenses, \$4,341; extraneous expenses, \$500; total expenses, \$4,842. The plant was shut down for 10 days at the commencement of the month for the purpose of moving the ore-bin and the towers to another and newer portion of the tailings bed. The tailings worked during the month gave very poor results, but experiments are now being carried on which it is hoped will remove the difficulties. Considerable gold remains in the solutions which have become fouled by the presence of base metals, thereby causing imperfect precipitation.

A note by the London office of the company, dated May 13th, says: The difficulty experienced during the month of March in successfully treating a small portion of the tailings beds necessitated the stoppage of the plant for about 10 days during the month of April, but operations have now been resumed, and the percentage extracted shows a great improvement.

##### CALIFORNIA.

###### AMADOR COUNTY.

**PIONEER GOLD MINING COMPANY.**—The original promoters of the Pioneer mine are in disagreement and suit in equity was brought at Boston, Mass., to recover of Messrs. Cox, Bickford & Co. \$80,000 or 10,000 shares of Pioneer stock. The parties bringing the legal proceedings hold a receipt for 10,000 shares of Pioneer stock, which was given to Pierre Humbert, Jr., with the understanding that it was a part of the purchase price of the property and was not transferable. Messrs. Cox, Bickford & Co. have declined to honor the receipt on the ground of fraud in the negotiations for the purchase of the property. It was represented that 20,000 shares of stock would have to be used supplementary to the auction purchase for cash.

This representation, it is now alleged by Messrs. Cox, Bickford & Co., was groundless, and when Mr. Cox visited California he was unable to find that the promised shares were any part of the negotiations for the purchase of the property. This was confirmatory of evidence previously accumulated, and the firm has since declined to honor the receipts given to Pierre Humbert, Jr. Suit is now brought by one Hugh Donnell holding the receipt for 10,000 shares to compel the company to deliver shares thereunder.

The bill, as usual, recites allegations of liability on the part of the firm and the company, and asks the appointment of a receiver for the company unless certificates are issued. Mr. J. E. Abbott, counsel for Messrs. Cox, Bickford & Co., states that the Pioneer Company is in no way liable on account of this receipt, and that the title of the company to its mines can in no way be affected by the suit. He says that there is no legal ground whatever for the appointment of a receiver for the company. He also states that there is no valid claim whatever against Messrs. Cox, Bickford & Co. on account of this receipt, and that immediate steps will be taken for the dissolution of the attachments.

(From Our Special Correspondent.)

**UNION CONSOLIDATED MINING COMPANY.**—The upper tunnel is in 800 ft. and the lower tunnel 780

ft. The 160 ft. remaining to be tunneled to connect these works with the main shaft will be completed in a short time. The mill will be started up about August 1st. The pumping and hoisting plants are almost completed and 35 men are employed.

##### CALAVERAS COUNTY.

(From Our Special Correspondent.)

**NORTH STAR.**—This drift mine is now owned by P. L. Sherman of Chicago, who is reopening the old workings and is repairing the mill. An air compressor plant is to be put in at once.

##### MADERA COUNTY.

(From Our Special Correspondent.)

**WILSON AND BERRY.**—These mines, in the Hildreth mining district, have been purchased by Fresno parties, who have put in a 5-ft. Huntington mill which has a capacity of 22 tons per day.

##### MONO COUNTY.

**BODIE CONSOLIDATED MINING COMPANY.**—The superintendent reports that the south drift from the upraise 50 ft. above the 200-ft. level shows a width of 4 ft. of low-grade ore in the face. The south drift from the west crosscut on the same level has seams of low-grade ore 5 to 6 in. wide in the face.

**BULWER CONSOLIDATED MINING COMPANY.**—The superintendent writes that the men are stopping ore on the 200-ft. level and on the tunnel level, and extracted 10 tons of good grade during the week ending May 18th.

**CALIFORNIA MINERS' ASSOCIATION.**—At a meeting of the Executive Committee of the California Miners' Association, held in San Francisco last week, it was decided to recommend the names of the following gentlemen to President Cleveland for appointment as Inspectors under the Mineral Lands bill: Edward H. Benjamin, and Thomas Povzer, of Alameda County; John McMurray, of Trinity; Mark B. Kerr and E. C. Loftus, of Calaveras; George D. McLeon, of Nevada; Hubert Vischer, of Hollister; C. Runckel, of Colfax; T. M. Kendrick, of Inyo; and John D. McGillivray, E. B. Preston, S. K. Thornton and Ferdinand Van Leicht, of San Francisco.

##### NEVADA COUNTY.

(From Our Special Correspondent.)

**ROCKY BAR.**—At this mine, on Osborne Hill, a new ledge has been discovered in the old Brennan shaft. It is a back ledge about 18 in. wide and was found almost at the bottom of the shaft. The ore is high grade.

**GOLD HILL.**—This mine, 1½ miles west of Nevada City, will be started up again. The owners intend to put in a 200 H. P. electric plant.

##### PLUMAS COUNTY.

(From Our Special Correspondent.)

**LONE STAR.**—This hydraulic mine at Cromberg is owned by L. V. Tefft, who is using a 16-in. monitor under a 280-ft. pressure with good results. The mine is rich in nuggets and pays well.

##### RIVERSIDE COUNTY.

(From Our Special Correspondent.)

**DESERT QUEEN.**—This mine, in the Pinon district, is running the 5 stamp mill on a new body of ore taken from a tunnel run into the mountain. The pay ore is only 4 ft. wide, but is very rich. The tailings and waste at this mine are being worked over and have milled as high as \$48 per ton.

##### SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

**QUEEN OF THE NIGHT.**—This mine, located in the Vanderbilt district, north of Needles, is now owned by J. K. Tatton. At a depth of 90 ft. a 3½-ft. ledge of free milling ore has been opened up. Fifty tons have been taken out so far, some of which is rich in wire gold.

##### TUOLUMNE COUNTY.

(From Our Special Correspondent.)

**APP.**—About 50 ft. remains to be sunk before connections with the upraise will be made. The tunnel on the 200-ft. level has cut the ledge in the old workings and shows up a good body of ore about 15 ft. in width.

**MOONEY, McCANN AND TRIO.**—These mines at Whiskey Hill have been purchased by a Boston syndicate, which is interested in the new Idria, Elna and Napa Consolidated quicksilver mines, for \$150,000. These mines contain a very large body of low grade ore. Work will be commenced at once. They will begin by sinking a shaft at least 1,000 ft. It is understood that \$100,000 will be expended in development work. This group lies between the App and the Rawhide mines.

##### COLORADO.

The United States surveyor general for Colorado has approved the following mineral surveys: 10338, Pueblo, general lode; 10759, Denver, Belmont, Flora Thorne, Pilgrim, Little Fred and Anna May lodes; 10388, Pueblo, Top and M. O. H. lodes; 10643, Pueblo, First Discovery; 10372, Pueblo, Little Johnnie; 10252, Pueblo, Belmont; 10155, Pueblo, War Dance; 10061, Pueblo, Horse Shoe; 10279, Pueblo, Free Gold, Charm and Free Coinage lodes; 10573, Pueblo, Sunol placer; 10361, Pueblo, Last Stake; 10595, Pueblo, Genevieve; 10633, Pueblo, the Spinney mill site; 10254, Pueblo, Carbonate; 10617, Pueblo, Harvey; 10413, Pueblo, Lulu S.; 10165, Pueblo, Linus; 10300, Pueblo, Halle-lujah; 10430, Pueblo, Earl, Maggie C., Orva May, Elks and Antlers lodes; 10520, A. and B., Denver, Vindicator lode and Mammoth mill site; 10872, Lead-

ville, Mary; 10339, Pueblo, Susquehanna and Monongahela lodes; 10739, Pueblo, M. D.; 10316, Pueblo, Cleveland, O. H. Michigan, O. K., No. 1, and O. K. No. 2 lodes; 10408, Pueblo, Edna Alice; 10945, Pueblo, McKinley, Kenny and Clara B. lodes.

Amended work, G. I. O.—8173, Pueblo, Kentucky Bill, Elkton and Walter lodes, affidavits of \$500 expenditures issued; 10120, Pueblo, Bessie K. and Richard M. lodes; 9972, Pueblo, Musquito lode; 9321, Leadville, Superior, Michigan, Huron, Champlain, Ontario, Erie, Hill Top No. 2, Treasury Vault, Gold Star, Agassiz, Calumet, Heising, Blow, Emmons and Hayden lodes; 10086, Pueblo, Kansas City; 8773, Pueblo, Mary Wynne and Silver Bell lodes; 10063, Pueblo, Old Hundred, Bull Domingo, Bessemer, Mary W., Little Cylon, Red King, Red King No. 2, Park Ridge, Ida C. and Fanny Davenport lodes; 10186, Pueblo, Pride of Grassy.

##### CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

**ALBRO.**—The new owners of this mine have reduced the water below the third level, and are now beginning all drifts, driving them in both directions. Large bodies of ore are uncovered, the milling dirt being treated at one of the concentrators.

**ALKIRE.**—In driving a crosscut tunnel on this property a blind lead was cut some time ago, which has since been drifted on. About 15 in. of mineral is now showing in the breast, one-third of which is smelting ore and worth \$125 a ton; the balance is a milling proposition and suitable for concentration.

**ANGLO-AMERICAN.**—An 80-H. P. boiler has been put in at this mine at Idaho Springs, and arrangements are under way to push the development work started some months ago. Good bodies of mineral are uncovered with high values in silver. It also produces some gold.

**AMERICAN SISTERS.**—Although lower levels of this mine have been driven westward for about 1,200 ft. each, yet they failed to get through a porphyry intrusion and work with air drills was stopped. Lessees recently began working in the upper ground and have already opened out a pocket of high-grade ore. Four carloads of it have just been shipped to the Denver smelters with favorable results, and it is now reported that the owners will again take up the development work with air drills and a large force of miners.

**ANOKA COUNTY.**—In sinking the shaft on this claim, owned by the Stanley people at Idaho Springs, but worked by lessees, a big body of iron pyrites was cut measuring more than 2 ft. in width. A carload shipment just made returned \$16 net to the ton.

##### CUSTER COUNTY.

**GOOD HOPE MINING COMPANY.**—At this company's property near Silver Cliff, there has been opened up a streak of ore, which, it is said, to run ½ oz. in gold and 237 oz. in silver to the ton.

##### EL PASO COUNTY—CRIPPLE CREEK DISTRICT.

(From Our Special Correspondent.)

**GOLDEN CRATER.**—This property, on Globe Hill, has again resumed operations under new management. The shaft has been sunk 650 ft., and sinking is resumed. The present superintendent feels sanguine that as soon as the present stratum of gypsum has been penetrated high values will be encountered. The owners are prepared to sink the shaft 1,000 ft., and the new machinery is more than adequate for that depth.

**JOE DANDY.**—This mine, just west of the Sheriff, on Raven Hill, is being worked by the owners, they being averse to a renewal on favorable terms to the lessees, who erected a steam hoist, etc. In the severe storm of a few weeks ago the shaft house was blown down and the lessees refused to rebuild it, as their time was short. Mining men of late when asked to take leases have refused to do so unless a term or lease of at least three years is granted. Consequently the mining companies are anxious to have the ground worked on lease, but cannot do so. Again, the companies will not lease the ground which they or their agent consider valuable, but the lessee is expected to find the ore, and then hand it over to the company without consideration. One company owning claims on Gold Hill intends to "reserve such portion of the ground as it now considers most valuable, and lease other sections on condition that deep mining is hereafter performed. Deep mining means machinery, and that is what the company wants. Each new lease will call for at least 25 ft. of shafting per month." Fortunately, the miners are not forced to take leases on such terms—to sink 30 ft. during 12 months for a lease 100 ft. in length on the vein, and to pay royalties ranging from 15 to 35%.

**NELLIE V.**—This claim on Squaw Mountain is being actively worked under a lease which expires June 1st. The property now employs nearly 100 men. The shaft has been sunk 150 ft. and the "ore shoot," so far as exposed, is about 250 ft. long. The shipping ore is of good grade, sampling about 8 oz. or \$160 to the ton. When the owners take possession the mine will be systematically developed, and the shaft will be sunk 150 ft. deeper.

**SHERIFF.**—This property, on Raven Hill, after varying fortunes is likely to reward a set of lessees on the south end, who in sinking a shaft found a large vein of low-grade ore, about \$30 per ton, a few pieces of the rock showing sylvanite and free gold. Several hundred tons of ore have been milled from this south end which netted from \$5 to \$8 profit.

## GILPIN COUNTY.

(From Our Special Correspondent.)

**ALICE.**—The president of the Eastern Company owning this property, at Yankee Hill, was here last week, and it is to be hoped that his visit will result in deciding the company to re-commence work. The property is in many ways a remarkable one, being a large stock work formed by a porphyritic intrusion, the shrinkage cracks in which are filled by strings and webs of iron and copper pyrites. The decomposed gossan of this great deposit was at one time worked as a placer, and the ground is still held on a placer title. Subsequently, however, a large concentrator, said to be of good design and construction, was erected to treat the unaltered rock, said to yield on an average  $\frac{1}{10}$  by weight of concentrates, with an average net value of \$30.

**BUELL.**—Eben Smith, of Leadville, who has a lease and bond on this mine from the owner, Bela S. Buell, will commence work unwatering as soon as the spring floods are over. The last attempt to get the water out, just a year ago, proved a complete failure, as not only was it made at the worst season of the year, but the Bobtail pumps were then not working, and to have drained the Buell meant handling all the water from a large section of the camp.

**GOLD COIN MINES.**—Much trouble has been caused at the Hidden Treasure shaft by breakage of the pump-column, and also by want of ventilation—pumping from this shaft necessitating an entire change in the air-current. The former trouble is being overcome by the substitution of a completely new column and steam pipe. Fortunately the season has so far proved exceptionally dry, so that the water has not reached the 900-ft. level. The stopes are yielding well, both in the Hidden Treasure and Indiana Ground, especially at the 800-ft. level.

**PERIGO.**—Messrs. Lightbown & Brooks have taken a lease and bond on the Perigo group of mines, including also the small stamp mill near Rollinsville. The Perigo is the only mine in Gilpin County outside the Central City district which has hitherto been a really extensive producer, although, several mines have shipped largely for a short period.

**WAUTAUGA.**—The new shaft house on this claim is complete. The work of retimbering the shaft is, however, proving a very slow job.

## LAKE COUNTY.

(From Our Special Correspondent.)

**ALPS LEASING COMPANY.**—The shaft is going down rapidly in good-looking porphyry. This is entirely new territory.

**BURMAH GOLD MINING COMPANY.**—Articles of incorporation filed this week give the capital stock at \$500,000, divided into 500,000 shares. The incorporators are F. F. Struby, George H. Estabrook, J. C. Heinz, William Linsey and H. C. Carson. The principal office of the company will be in Denver.

**CLEVELAND.**—A depth of 160 ft. has been reached and 40 ft. more will put these people in ore. The company hopes to be shipping within 30 days, if it meets with no mishaps in sinking.

**COLUMBIA GROUP.**—Leadville lessees recently secured this ground and it is stated that they have a body of ore that is over 60 ft. wide and samples assay 20% lead and quite well in silver.

**FIRST NATIONAL.**—Lessee O'Neill has resumed work on this property after fitting it out with a first-class plant of machinery. In the 165-ft. level he has opened up a breast of 40 ft. in ore, which run fairly well in lead, gold and silver.

**HOLLAND.**—The shaft has reached a depth of 150 ft. Considerable water has been encountered and machinery is being put in place.

**KOHINOOR.**—The lessees are endeavoring to catch the main ore chute of Little Ellen hill and the outlook is encouraging.

**LONG & DERRY.**—The lessees intend to sink a new shaft to catch the main ore chute, which is already opened up in the old workings. The Long & Derry has been known as a good property, but has for years been tied up by litigation.

**PUMPING AGREEMENT.**—The matter of dividing up the pumping expense of the Smith-Moffat group, mentioned last week, has been satisfactorily settled. At a meeting of the mine managers in Denver the Mahala and Small Hopes people agreed to pay their share of the pumping at the Maid. This means that the pumps at the latter property will not now be pulled as intimidated, and that new development work will be vigorously prosecuted.

**SEDALIA.**—The contractors have the shaft down 630 ft. and are getting very close to contact. A first-class plant of machinery has been placed in position.

**STEWART GROUP.**—The reported strike in this property, mentioned in my last letter, has proven to be of great importance. After cutting through a fine body of iron ore, 4 ft. of carbonates were opened up. Shipments are being made from this strike, and the lead value in the ore pays smelter treatment. The stuff runs 29 oz. silver. The Stewart group is located in Empire Gulch and the strike is causing renewed interest in that section.

**WELDEN.**—A great deal of development work is being carried on at the 600-ft. level and about 50 tons of fine carbonate ore are being shipped daily.

**ZELLA GROUP.**—This ground, in which Leadville

people are largely interested, lies in the cottonwood district. In sinking an assessment hole this week a vein was disclosed from which 30 tons of ore have been taken. The stuff runs over 40 oz. silver to the ton.

## PITKIN COUNTY.

**TABOR MINES AND MILL COMPANY.**—An order was issued by District Judge Rucker at Aspen, on May 19th, on application of Attorney Miles Johnson, for plaintiff, in the suit of Thos. Wiswall against the Tabor Mines and Mill Company, involving the O'Shanter group of mines at Ashcroft. The order is for the appearance of ex-Senator H. A. W. Tabor and E. W. Tabor, both of Denver, as witnesses in the case. E. W. Tabor will be required to produce all books, papers and records of the mining company.

## SAN MIGUEL COUNTY.

**SMUGGLER-UNION MINING COMPANY.**—The annual meeting of this company was held in Denver last week, and the following directors chosen to serve for the coming year: J. A. Porter, A. H. Fowler, J. B. Grant, Richard Pearce, W. D. Bishop, Jr., W. A. Bell and Anton Eilers.

## IDAHO.

## ELMORE COUNTY.

**BIG LODE AND OPHIR.**—Stephen A. Oglesby has put 60 men at work on these mines at Atlanta. The mines have been idle for some time.

## OWYHEE COUNTY.

**DE LAMAR MINING COMPANY, LIMITED.**—The following is the return for April: Crushed during the month 4,658 tons; bullion produced in the mill, \$57,785; estimated value of ore shipped to smelters, \$4,300; miscellaneous revenue, \$645; total product, \$62,730; total expenses, \$37,555; profit for the month of April, \$25,175.

## INDIANA.

State Geologist Blatchley has prepared the 20th annual report of the Department of Geology going into statistics relative to the coal and oil resources of Indiana, as well as its stone and natural gas supplies. The report says that the oil and gas supply is rapidly diminishing. Originally the gas field comprised the greater part or all of 17 counties in the northeast of the State, in dimensions about 5,000 square miles. Because of the encroachments of salt water and petroleum this area has gradually diminished, until now the main gas field contains an approximate area of 2,500 square miles. Originally the rock pressure was 325 lbs to the sq. in., but the Natural Gas Surveyor now estimates the average pressure throughout the field at 230 lbs., and he coincides with the geologist in the belief that the pressure will more rapidly diminish in the future than shown in the past.

## KANSAS.

## CHEROKEE COUNTY.

**ADAMS & COMPANY.**—On the Mastin land, Adams & Company in shaft No. 1, are drifting at 96 ft., on a good face of ore in open ground and are making 4 tons of free ore, 3,500 of lead and 30 tons of crush ore. At shaft No. 2, they are drifting 93 ft. on a large face of ore in hard ground and are making 10 tons of free ore, 2,000 of lead and 50 tons of crush ore.

**BLACK ROBIN COMPANY.**—On the McCann lease, at the Black Robin mine, this company is drifting at 105 ft. on a large face of lead and zinc ore in open ground, and every week it produces about 5 tons of free zinc ore, 25,000 of lead and 75 tons of crush ore.

**BRINDLE STEER COMPANY.**—On the DeGraff Bros. lease at the Brindle Steer mine the men are drifting at 117 ft. on a large face of lead and zinc ore in hard ground and last week turned in 9,250 lbs. of lead, but did not sell any zinc ore.

**M QUAD COMPANY.**—On the DeGraff Bros. lease the M Quad shaft is down 117 ft. There is 16 ft. face of zinc ore in open ground and drifting will begin next week.

**DWIGHT & HUFF.**—This firm has leased 26 acres of the Conner land in Cooper Hollow and is sinking a prospect shaft. At 50 ft. good live dirt in flint ground was struck.

**SPRING RIVER COMPANY.**—This company has leased 40 acres of the Carter land, west of the Bonanza land and across the river. In sinking a prospect shaft, the men struck lead at 18 ft. and have gone through 26 ft. of lead and zinc ores in flint ground and are still sinking in pay dirt. This is the richest shallow mine in the camp.

**VINCENT & PICKETT.**—On the Ohio Company's land at the Vincent & Pickett mine the miners are drifting at 100 ft. on a large face of lead and zinc ore in hard ground and their weekly turning has been 15 tons of free zinc ore, 20,000 lbs. of lead and 75 tons of crush ore.

(From Our Special Correspondent.)

**BEN Q.**—At this mine, on the Mastin land, they are drifting at 90 ft. on a large face of lead and zinc ore in open ground and are producing every week from 20,000 to 50,000 lbs. of lead, 12 to 15 tons of free zinc ore and about 75 tons of crush ore.

**ELI COMPANY.**—On the Ohio Company's land at the Eli Company's mine, the men are drifting at 90 ft. on a large face of zinc ore in hard ground and last week they turned in six tons of free zinc ore at \$20 per ton, eight tons of crush ore at \$10 per ton and 25 tons of crush ore at \$3.50 per ton. This is a new mine and has been worked only three weeks. It employs only seven men.

**WOOD & Co.**—On the McCann lease, Wood & Co. are putting up a steam hoister. They are drifting at 60 ft. in ribby ground and the weekly output is 45,000 lbs. of lead, 10 tons of free zinc ore and 50 tons of crush ore.

## WILSON COUNTY.

**FOREST OIL COMPANY.**—Large machine shops, including a large steam trip hammer, general blacksmith and repair, and tank departments are being put in by the company because the large amount of machinery in operation in the Kansas oil field necessitates it.

## MICHIGAN.

## BAY COUNTY.

**BAY COUNTY COAL COMPANY.**—This company, which was recently organized, has completed drilling several test holes on property owned by John Zill, president of the company, and they have struck a vein of coal 54 in. thick, the best vein, by several inches, that has been found in the entire vicinity. The company will at once commence sinking a shaft, and will start mining operations within a short time.

## COPPER.

**FRANKLIN MINING COMPANY.**—A dispatch from Boston states that United States Master in Chancery Peter White has found that the Franklin Mining Company is indebted to the Pewabic Mining Company in the sum of \$201,000.

**TAMARACK MINING COMPANY.**—This company will begin work this month on the foundations for a new mill to supplement the present mill of seven stamps. This was made necessary by the increased production.

## IRON—MARQUETTE RANGE.

**PRINCE OF WALES.**—This mine, which has been idle since the panic of 1893, was started up last week with a full force of miners, and will be regularly worked from now on.

## MISSOURI.

## JASPER COUNTY.

**CENTRAL MINING COMPANY.**—This company has 87 acres of the O'Regan land, located a half a mile west of Joplin, and has laid out 40 acres in mining lots. One shaft is down to 131 ft. in pay dirt and another 145 ft., with a good face of lead and zinc ore in open ground. The water is easily handled with an 8-in. pump.

**KOHINOOR No. 2.**—At this mine, on the Empire Company's lease, they are drifting at 155 ft. on a large face of high-grade zinc ore in hard ground, and last week turned in 18 tons of zinc ore at the top price. This is a new mine and will soon be among the large producers.

**WHITE SWAN.**—On the Indiana and Missouri Company's land, at the White Swan mine, they are taking up a 5-ft. stope, rich in pebble zinc ore, and last week they turned in 10 tons of zinc ore.

(From Our Special Correspondent.)

**JOPLIN ORE MARKET.**—The output of ore was restricted by the heavy rain storms. Considerable damage has been done in all the camps, but West City and Centerville suffered the most, as the mines in those camps are older and have larger drifts cut out to fill with water. Nearly all the mines will be running this week, although in some it will take several weeks to get the water out. Owing to the light output of zinc ore the price was advanced \$1, making the top price \$21, with an average of more than \$18 per ton. The price will be still higher this week. The sale of lead was about the same; the top price paid was \$16 per thousand, with 50c. added for hauling. The lead mines were not affected as much as the zinc by the rains. The following was the output of the different camps: Joplin, zinc, 1,018,800 lbs.; lead, 207,490 lbs.; value \$13,579. Webb City, zinc, 450,340 lbs.; lead, 25,910 lbs.; value \$5,098. Cartersville, zinc, 846,790 lbs.; lead, 180,080 lbs.; value \$10,485. Galena, Kan., 1,930,000 lbs. of zinc; lead, 395,000 lbs.; value, \$22,735. Aurora, 450,000 lbs. of zinc; lead, 90,000 lbs.; value, \$4,487. Alba, zinc, 84,000 lbs.; value, \$798. Oronogo, lead, 19,600 lbs.; value, \$264. Totals for the district, zinc, 4,806,930 lbs.; lead, 925,080 lbs.; value, \$57,418.

**BAKER MINING COMPANY.**—The Baker plant at Wentworth has been running double shifts for the past two weeks, but has not been able to operate the jigs to their full capacity on account of insufficient water. This will be remedied in a short time. The plant in other respects is doing finely, and the run of ore continues to improve.

**CLAYCOMB & Co.**—Claycomb & Co. have leased 40 acres of the O'Keefe land and have purchased the old Guinse plant, southeast of the city, and have moved it to a shaft on their lease. They are putting in pumps and machinery. They have a good run of ore to commence on.

**HAMAR COMPANY.**—The arrival of an air compressor, which had been made by a special order, is all that now delays the completion and the starting of the big Hamar plant.

**GOBLER.**—At the Gobbler plant there are from 250 to 300 tons of zinc ore which it is expected to sell next week.

**HOUSTON LEAD AND ZINC COMPANY.**—This company is pushing developments on 240 acres of land, which it owns near the famous old Burch mines at Scotland. The officers of the company are: Edwin J. Houston, of Philadelphia, Pa., president; Chas. M. Dodson, vice-president, and Josiah Buchman,

treasurer, of Bethlehem, Pa., and E. J. Winslow, of Webb City, Mo., superintendent. The company has leased 40 acres of this tract to Lawyer Gates & Co., of Webb City, who have put down a drill hole in which they struck lead at 130 ft. The drill went through 25 ft. of lead-bearing ground and they have started a shaft 15 ft. from the drill hole to catch the run of ore. The ground is soft and will be easy to sink. They will have no water until they get down 150 ft. They will lay out the 40 acres in running lots and sub-lease them.

## MONTANA.

## FERGUS COUNTY.

**GILT EDGE.**—This mine, near Maiden, which last year passed into the hands of the lien holders, is now being worked to good advantage by the creditors, who are mostly Lewiston parties.

## JEFFERSON COUNTY.

**HIGH ORE.**—In cutting a tunnel recently in this mine a 22-ft. vein was pierced, 3 ft. of which is said to assay as high as 1,300 oz. in silver, \$60 in gold and 35% lead. A concentrator will be erected to treat the ore. The vein was cut at a depth of 425 ft.

**KING SOLOMON.**—The shaft on this mine is now down 300 ft. all in ore. A steam hoist will be put in at once and then the mine will resume ore shipments.

(From Our Special Correspondent.)

**OVERLAND.**—Some excitement was created recently by striking a large rich chute of gold ore in the Overland mine, situated about 10 miles southeast of Helena. They are shipping 6 to 10 cars a week to the East Helena Smelter of the rich ore which is in a Jasper quartz; and milling the low-grade in a stamp mill. This ore is not sufficiently blocked out yet to know how large it is. It is in the limestone but close to contact with the diorite. This is an old claim that has been worked at intervals for several years with more or less success and given up. All the adjacent country on the contact line was promptly taken up. It is in the gold belt that runs northeast, 3 to 4 miles south of Helena; and the country is dotted with tents of prospectors outside of this line.

## LEWIS &amp; CLARKE COUNTY.

(From Our Special Correspondent.)

**HELENA COPPER FINDS.**—Quite an excitement was created early in March by the opening of a fine copper lode within the city limits of Helena, carrying a good percentage of silver and lead with some gold. The location is on an old time abandoned claim. The adjacent mountains swarmed with prospectors and many an old abandoned claim was relocated, and much new ground taken up. It has aroused the old spirit of enterprise and some good will result from it. The last shipment of a carload of ore from this copper claim, called the Ninety-six, brought at the smelter for the high grade, which was more than half, \$83.10 per ton and \$30.33 for the second grade. The high grade was lead 10%, copper 9%, silver 75 oz. per ton and gold 1/2 oz. per ton. The second grade was lead 6%, copper 4%, silver 22.9 oz. per ton and gold 0.13 oz. per ton.

## MADISON COUNTY.

**BERTHA.**—It is said a Butte company is being formed to work this mine adjoining the Kennett.

**KENNETT.**—A good strike of gold ore was made in this mine last week.

## MEAGHER COUNTY.

**QUEEN MINING COMPANY.**—A rich ore body was encountered recently in the main tunnel of the Queen mine, nearly 1,500 ft. from its entrance. This tunnel is drifting on the Queen vein and has traversed a long chute of ore in its course, from which considerable ore has been shipped. The tunnel has been driven about 400 ft. past this part of the ledge and now enters the second ore body. The ore body is on an average about 3 ft. wide, the pay streak being about half that width.

## MISSOULA COUNTY.

(From Our Special Correspondent.)

**THE IRON MOUNTAIN COMPANY.**—This company has let a contract for a tunnel 5,600 ft. long to strike the vein 600 ft. below the present tunnel and on the opposite side of the mountain. This will, when completed, furnish drainage and save the cost of pumping 600 ft. Another feature in connection with it will be the removal of the hoisting and pumping plant to this lower tunnel, and from the mouth of the tunnel the ore will be delivered directly into the top of the concentrating mill. The effect of this change when completed will be to reduce expenses one-third, amounting to \$5,000 to \$6,000 per month. To meet the cost of this new tunnel and changes of plant, the usual dividend of 2c. a share monthly was reduced to 1c. a share monthly, since last November, or from \$2,000 monthly to \$5,000 monthly, and a fund of about \$40,000 has already been accumulated.

Instead of having to purchase a new plant to sink deeper, this arrangement enables the company to sink 1,400 ft. deeper with the old plant when the change is made.

## SILVER BOW COUNTY.

**LEO MINING COMPANY.**—This company, formerly known as the Major Budd, which recently resumed work with a fund in the treasury to indulge in deep mining at Butte, has received patents to four claims, the Major Budd, the Major Budd Extension, the Paraiso and the Rocky Mountain lode.

**MINNIE HEALEY.**—About two months ago James

Finlen and W. A. O'Brien secured a working lease of 13 months, with the privilege of purchase at the expiration of that time for \$100,000. They began sinking, and at the 350-ft. level drifted. When in a short distance last week they encountered the ore body, in which they found the lead to be about 8 ft. in width, and 2 ft. of this ore body is peacock copper, which will go 50%. The balance is all good shipping ore and will average about 15%, says the Butte Miner. They now have 14 men at work, but will increase the force.

**MOONLIGHT.**—D. Bricker has reached a depth of 350 ft. with the shaft on this mine, and after sinking through the hard granite, has struck soft ground. Development will be pushed to the 800-ft. level, but it is likely that a station will be cut at the 400 or 500-ft. levels and a crosscut run west to tap the ledge discovered some weeks ago through the Colusa.

**NORA.**—Geo. H. Kellogg, who has a lease on this mine, owned by P. R. Dolman, Attorney McBride and others, is putting in some improved hoisting machinery. The shaft is down 400 ft., from which point the lessee is crosscutting.

## NEVADA.

## ESMERALDA COUNTY.

(From Our Special Correspondent.)

**GRANT MOUNTAIN MINING COMPANY.**—The property of this company which comprises the California, Great Eastern, Valley View and the Lone Widow claims is located 40 miles west of Hawthorne. Mr. George R. Tuttle, mining and metallurgical engineer of San Francisco, who is in charge of the work, says: "Two extensive ore bodies are now being developed, and ore assaying from \$40 to \$120 per ton is being taken out. The property is to be thoroughly developed before any milling machinery is erected."

## STOREY COUNTY—COMSTOCK LODGE.

**HALE & NORCROSS MINING COMPANY.**—This company has contracted for 200,000 ft. of lumber for mining purposes at reduced prices. Mr. Cronan, the superintendent, stated that the contract would be greatly to the advantage of the company from an economic standpoint. The company has heretofore paid \$19 a thousand for its lumber. The rate agreed upon in the lumber contract which the company has just entered into is \$16 a thousand feet. During a period of six months in the past the mine used 175,000 ft. At that time only one level—the 975 ft.—was being opened. At present three levels—the 900 ft., 1,100 ft. and 975 ft.—are being opened, and the workings timbered, so that the consumption is greater. Six thousand feet of the lumber contracted for has been received, and Superintendent Cronan states that it is of a better quality than that heretofore purchased by the company at the old rate.

Following are extracts from the latest official weekly letters of the mine superintendents:

**BELCHER.**—Very little work is being done. The amount of ore hoisted during the week was 67 mining carloads, of the average car sample assay of \$21.33 per ton.

**CROWN POINT.**—West crosscut No. 3 on the 700-ft. level, 75 ft. south of crosscut No. 1, has reached what is believed to be the footwall. In the east crosscut from the shaft on the 800-ft. level we have raised 15 ft. on the streak of ore before reported. The streak in the top is much smaller and poorer, and does not justify further work in that direction. The west crosscut from the end of the south drift on the seventh floor of the 1,100-ft. level raise is now out 23 ft., passing through low-grade quartz, and it has reached the footwall. An east crosscut opposite it has been started.

**SAVAGE.**—On the 850-ft. level we have stope upward to the fourth floor, following the ore encountered in east crosscut No. 1. We have put in another sill floor, set the west, and have built a chute to facilitate the handling of this ore. The ore continues of the same quality as last reported, but is not so wide. In east crosscut No. 3, 90 ft. south of No. 1, we have put in two sill floor sets wide in ore of fair grade, and are stoping upward in ore of good quality and quantity. This ore shows improvement since last report. Hoisted during the week 70 mine carloads of ore, averaging \$64.31 per ton.

**SEGREGATED BELCHER.**—The week's yield at this mine was 22 mine carloads of ore, assaying \$19.33 per ton.

## NEW JERSEY.

## MORRIS COUNTY.

**NEW JERSEY IRON MINING COMPANY.**—This company recently sunk a shaft over the Old Spring vein at Irondale, and found a promising vein of iron ore. The company is also driving a tunnel and sinking a shaft on the Scrub Oak range.

**RICHARD IRON MINE.**—The Thomas Iron Company is preparing to put down a new slope on this mine near No. 3 shaft.

## NEW MEXICO.

## BERNALILLO COUNTY.

**ALBEMARLE.**—In the Cochiti district a strike of rich ore has been made in this mine. The assays are reported to show 45 oz. gold and 100 oz. silver. This mine is shipping ore sorted to average \$70.

## LINCOLN COUNTY.

**OLD ABE.**—Work is progressing on the new shaft on this mine at White Oaks, but it is not expected

that it will be completed this year. The mill is running on ore from the dump, but this will probably be exhausted before the shaft can be completed.

## SOCORRO COUNTY—COONEY MINING DISTRICT.

(From Our Special Correspondent.)

**CONFIDENCE.**—The mine and mill are working steadily, producing and treating 85 tons of ore daily. Development work is being pushed, and an air-compressor and power-drills will probably soon be introduced.

**COPPER QUEEN.**—On this property 11 men are working, doing development work. The tunnel is in over 500 ft., the upraise is about 50 ft., and the shaft down 150 ft.; connection between the raise and the shaft will be made in 40 ft. more. Work on the grade for the mill has been suspended until further order.

**DEEP DOWN.**—The mine and mill are worked under lease and bond by Mr. F. R. Brown, of Denver, Colo. The mill has been working steadily until now on Deep Down ore, taken between the mill-level and the 50-ft. level, but as no development work has been done all the ore in sight has now been extracted and no more can be got until the winze is sunk and drifts run. The ore chute appears to be about 85 ft. long, dipping south. Close to winze the ore is 10 to 12 ft. wide, but drifting south; a porphyry horse on the foot wall was encountered and the ore was almost pinched out, but opened up again and varied in width from 2 to 4 ft. A large force is employed in the mill, due to the impractical arrangement of the batteries, the ore having to be handled three times before going into the battery, which is about 8 ft. above the floor on which the ore is dumped. A crosscut was run 25 ft. into the foot-wall of the mine, but, of course, no ore was found, the well being very well defined.

**MAUD S. MINE AND MILL.**—Excellent ore is being taken from the 300-ft. level. The ore has been stoped out 70 ft. above the level, for a length of 100 ft. Work is progressing slowly here just now, due to bad air. The 250-ft. level is being pushed by three 8-hour shifts, to make connection with the slope for air. The ore averaged in width about 4 ft., and is partly free-milling and partly base in copper pyrites. The mill is working steadily, getting part of its ore from the Last Attempt.

**MOUNTAIN KEY.**—This mine it is understood, is to be bonded to Mr. H. Price, of Graham, N. M., for a period of 6 months. The consideration is \$10,000 and \$1,500 worth of development work. This mine is the southern extension of the Copper Queen.

**TIP TOP.**—This mine, the western extension of the Last Chance, has been leased and bonded to Mr. F. R. Brown, the manager of the Deep Down. A shaft is down 90 ft., the last 40 ft. in ore. The ore is hoisted by a windlass, sorted and packed to the Deep Down mill.

## NORTH CAROLINA.

## MECKLENBURG COUNTY.

(From Our Special Correspondent.)

**FRAZIER.**—This mine is being examined by William Wilkins and his two brothers of Shelton, Conn. It is reported that they will undertake extensive operations if investigation is satisfactory.

## MONTGOMERY COUNTY.

(From Our Special Correspondent.)

**SALLIE COGGINS.**—This gold mine is being operated by Pittsburg, Pa., parties. Mr. J. D. Reid, of El Dorado, N. C., is superintendent. They are hydraulic about 40 cu. yds. of surface per day, and have erected a 10-stamp mill for the treatment of ore. Mr. A. C. Munhall, one of the owners, has returned to Pittsburg, Pa.

## CHEROKEE COUNTY.

(From Our Special Correspondent.)

An English company is operating a placer of hydraulic on a large scale in this county. From all reports it is not meeting much success.

## RANDOLPH COUNTY.

(From Our Special Correspondent.)

**DIMMICK PLACERS.**—Several placers in Randolph and Montgomery Counties are being worked with good results by Robt. A. Dimmick, of Washington, D. C., who says that if he can get good results he will carry on operations on a large scale.

**HOOVER HILL GOLD MINE.**—This property owned by an English company is about to resume operations with new capital. The company has been reorganized and now owns another mine in South Africa.

**KEYSTONE.**—This gold mine, formerly the Jones, is resuming operations. Mr. McKey, of Pittsburg, Pa., is in charge and has made a 60-day run with his 10-stamp mill on average ore. It has been satisfactory to such an extent that he will put in a concentrating plant and treat the concentrates by the cyanide process.

## ROWAN COUNTY.

(From Our Special Correspondent.)

**EAMES & JUDD MILL.**—The testing mill of Eames & Judd in Salisbury has been engaged in milling ore from the Georgia gold fields for New York capitalists.

**REINER.**—At this mine, Chas. T. Brant, of Denver, Colo., has been engaged in erecting a small cyanide plant. He has made a trial run which is reported as having been satisfactory. At this mine

there is also a chlorination plant which will be abandoned if cyanide proves superior.

**OREGON.**  
**BAKER COUNTY.**

**VIRTUE.**—This mine, at Baker City, has beaten previous records. The result of three weeks' run with 20 stamps, is said to be two gold bricks weighing 112 lbs., and 13 oz. and valued at \$34,800.

(From an Occasional Correspondent.)

**COLUMBIA.**—This property to the south of the Excelsior is worked in a very small way, the richest of the ore being sent to the smelting works and the lower grades being piled up on the dumps. The owners are Messrs. Cable Bros., of Bourne, Ore. Quite a number of prospects in the vicinity are being opened in a desultory manner as the owner can find the time and the means. This neighborhood is well watered and heavily timbered, and the climate seldom cold but very snowy.

**PENNSYLVANIA.**  
**ANTHRACITE COAL.**

**LEHIGH AND WILKES-BARRE COAL COMPANY.**—Orders have been issued by this company that all the collieries about Hazleton will remain idle until further notice. The reason for the suspension is the collieries have already filled their allotment for the month, although the mines have only worked nine days.

**WOODWARD.**—A serious explosion of gas occurred at this mine last week, which did considerable damage. It occurred in the red ash vein, and happened before the employees had descended to the shaft. The air courses were badly damaged, all the bridges being knocked down. It is not known definitely what caused the explosion.

**BITUMINOUS COAL.**

Mining along the Monongahela and Youghiogheny rivers has been practically suspended, as 85% of the pits have been closed. This throws about 6,000 diggers out of employment. Everything on hand has been loaded and it is estimated that fully 10,000,000 bu. of coal are ready to go to the Southern market. Not more than 15% of the mines on the river are in operation, and these will be kept running all the time to supply mills in and about Pittsburg.

**CUMBERLAND COUNTY.**

**READING ORE MINES.**—Work was begun on May 25th, in reopening these old mines near Boiling Springs. One thousand tons of ore will be mined and if its quality proves satisfactory, a large force of men will be given work in the permanent operation of the mines.

**SOUTH DAKOTA.**  
**LAWRENCE COUNTY.**

**HOMESTAKE MINING COMPANY.**—This company last week began excavating for the machinery to run the 100 stamps mill and a 100 stamp addition, to be constructed this summer.

**UTAH.**  
**JUAB COUNTY.**

**HOMESTAKE.**—New machinery is being put in at this mine. At present the shaft is down 210 ft. while from it a drift has been run for a distance of 140 ft.

**NORWAY.**—This mine, east of the Keystone, is being developed by Lombard Brothers. One shaft run down 350 ft. is in lime and is showing fairly well. Another shaft, close to Church street, Eureka, is now down about 100 ft. and has tapped a body of ore in porphyry. The first drift on it, says the Salt Lake Tribune, was at a depth of 66 ft., where ore was found assaying \$5 in gold and 15 to 20 oz. silver. At the 100-ft. level still better ore was found, which they are stocking up.

**SHOEBRIDGE BONANZA MINING COMPANY.**—After a number of assays of the ore of this property, Superintendent Papman says that the big dump contains ore yielding 46 oz. silver and 36% lead. The main work is going ahead steadily.

**SWANSEA.**—The shaft is down 350 ft., from which level a winze has been sunk for 80 ft., the bottom being a large body of ore that averages about 40 to 50% lead and 150 oz. in silver in carload lots. The Swansea has cut through the pyrites, and the body of ore disclosed below the iron crust is of good size and quality. The South Swansea shaft is distant only 122 ft. from the Swansea workings, and at a depth of 310 ft. is going down on the Swansea vein.

**YANKEE GIRL.**—The management of this property commenced sinking a shaft this week that will be used as the permanent outlet for its ores and will be sunk to the ore body as rapidly as possible. The ore is said to be of a good smelting quality, assays going from 40 to 400 oz. in silver and a good percentage of lead. Of this there are between 2 and 3 ft. while the remainder of the vein, averaging about 7 ft. between walls, may be concentrated and find a market. Shipments will begin at once. The collar of the new shaft on the Yankee Girl will be about 50 ft. southeast of the mouth of the present incline.

**WASHINGTON.**  
**PIERCE COUNTY.**

**TACOMA SMELTING AND REFINING COMPANY.**—This company's product for April was 3,200 bars of bullion, weighing 328,791 lbs., and containing 1,139½ oz. gold, valued at \$23,555; 35,067½ oz. silver at 68c. per oz., or \$23,846, and 326,306 lbs. lead at 3c. per lb.,

or \$9,789. There were 62 men employed and the pay roll was \$4,590, and for woodchoppers and teams \$522, a total of \$5,112.

**STEVENS COUNTY.**

**GRAND PRIZE GOLD MINING COMPANY.**—This company owns the Daisy B., Spokane, Susie D. and Jessie claims, in the Colville Reservation, near the British Columbia boundary, being but five miles from Northport, B. C.

The formation is diorite, being identical to that encountered throughout the district, and the strike of veins is easterly and westerly. The character of the surface is well adapted for development by tunnels on veins. The veins, as far as opened by tunnels, cuts and shafts, show large and paying ore chutes almost from the surface. The entire width of the ledges is still unknown, only one wall as yet showing. It is the intention of this company to proceed without delay to thorough development, the building of a tramway, erection of works for the reduction of the ore, the erection of buildings, placing of machinery, diamond drill plant and compressor for machine drills to thoroughly equip and develop the group, which will cost when completed, not less than \$100,000.

**SPOKANE COPPER MINING AND SMELTING COMPANY.**—This company has recently acquired the Grand group of mines, four miles east of Chewelah, including the Grand, Magnus and Anaconda mines. The company was recently incorporated, with headquarters in Spokane. The directors are Maurice Vetter, J. E. McCall, F. Mallory, M. Monroe and P. Gilbert, all of Spokane. Mr. McCall has just let a contract for a 100-ft. shaft to be sunk on the Grand mine. There is a 30-ft. ledge of chalcopryite, between slate and porphyry, running north and south with the mountain range, dipping at an angle of about 45°. Recent assays show 28% copper and traces of gold and silver. The shaft is now down 40 ft.

**WISCONSIN.**  
**TAYLOR COUNTY.**

It is reported that a bed of manganese ore has been discovered on the farm of John Drout near Medford. The mineral is pyrolusite, and has been found in small quantities in several places along the Penoka range.

**FOREIGN MINING NEWS.**

**BRITISH COLUMBIA.**

**WAR EAGLE.**—It is reported that this mine at Trail Creek has been bonded to D. C. Corbin, of Spokane, and a syndicate of capitalists for the sum of \$800,000. The purchasing syndicate agrees to put up a smelter at or near Rossland which will cost \$150,000, and also agrees to expend another \$10,000 in development work. Besides this, the War Eagle stockholders will receive one-fifth of the stock of the new company. The purchase price will be paid in four installments, the first one being due June 18th.

**BRITISH GUIANA.**

**BARIMA GOLD MINING COMPANY.**—Better progress is being made in the erection of the stamp mill on this company's property than was at first anticipated, and it is now expected that stamps will be in working order by the middle or end of May, says the Georgetown Chronicle. It was hoped that 10 stamps would be in order to crush ore in the course by about May 5th. Ore is still being taken out of C reef, which continues to prove rich. The Barima River rose 7 ft. within a week, and advantage is being taken of the rise to send up stores and materials to the landings in that district. The Tremain mill of the Barima Development Syndicate has been removed over to the Barima mine for the purpose of crushing some of the rich ore on the company's property.

**LATE NEWS.**

**WHITNEY GAS BILL.**—The lower house of the Massachusetts Legislature has passed the Massachusetts Pipe Line bill, better known as the Whitney gas bill, and it now requires only the signature of the Governor to become a law. This bill authorizes the construction of plants to furnish fuel gas, as well as illuminating gas, to Boston and other cities in the State. The plan is to make gas on a very large scale, turning out coke also and utilizing all the by-products. Chemical works will be built in connection with the gas plants. It is proposed to use Nova Scotia coal for making the gas.

**MINNESOTA.**—Special—At the request of the State Auditor the Attorney General of Minnesota has rendered a decision that the act of the legislature permitting a tax of one cent a ton on output, a tax on mining companies and their properties, in lieu of all other taxes, is unconstitutional, basing his opinion on that clause of the State constitution which says that all property shall bear alike the expenses of government. The law in question was passed in 1881, three years before the first ore was shipped from Tower mines, and before the exploitation of the iron ores of the State had begun. It has for some time been contended that it was not in accord with the constitution, and the matter came up in the legislature in 1895, but no action could be taken against it, there being too

strong a pressure. On the contrary, a bill was made law providing for a vote by the people of the State making constitutional specific taxation on various forms of industry, among them the mining of ores. This is to be submitted to the people at the next general election, and if carried will have the effect of legalizing the present act under which the mine taxes are levied, if it is not constitutional now. The tax of 1c. a ton is a very small matter, and gives the State, county and local municipalities in which the mines are located very small return, considering the magnitude of the interests involved and their cost in a protective, educational and police way to county and municipality. The decision, if upheld, means probably at least \$100,000 a year from these mining companies, in addition to the amount they now pay.

Ore shipments from Minnesota ports are growing, those for last week from Two Harbors alone being about 78,000 tons. Ore rates are still at \$1 from the head of the lake for the summer, though Ashland rates have dropped to 95c., making a change in tonnage that has heretofore gone to Escanaba for Gogebic ore. The flood of grain from Duluth has stopped and ore will henceforth monopolize the heavy traffic. Arrangements have been closed by the Secretary of War and the contractor for the approaches to the new Sault Ste. Marie lock, by which the latter, on payment of \$12,000 additional to his contract, will have the work in readiness for ships in July. The 20-ft. lock will be ready then, and vessels will be enabled to pass out of Lake Superior drawing as much water as those going from Lake Michigan. With this work done there will remain only that in the Detroit River to complete the entire project of 20 ft. in the clear from Duluth and Chicago to Buffalo. The importance of the completion of this work can scarcely be appreciated.

**MINNESOTA IRON COMPANY.**—This company will hold its annual meeting at Duluth, June 11th. A number of the stockholders of the company will arrive a day or two previous to the meeting and make an inspection of the company's mines on this range and the Mesabi, returning to Duluth for the meeting. It is not likely that any great changes will be made at the meeting and the policy of dividends at the rate of 6 per cent. will probably be continued.

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, May 29.

Statement of shipments of anthracite coal (approximated) in tons of 2,240 lbs., for the week ending May 23d, 1896, compared with the corresponding period last year:

	1896.		1895.
	Week.	Year.	Year.
Pennsylvania Railroad.....	72,015	1,355,983	68,411
<b>PRODUCTION OF BITUMINOUS COAL, in tons of 2,000 lbs. for week ending May 23d, and for years from January 1st, 1896 and 1895:</b>			

	1896.		1895.
	Week.	Year.	Year.
<b>Shipped East and North:</b>			
Allegheny, Pa.....	45,187	956,038	2,259,288
Barclay, Pa.....	.....	.....	.....
Beech Creek, Pa.....	57,479	1,262,832	1,203,107
Broad Top, Pa.....	.....	.....	.....
Clearfield, Pa.....	115,999	1,934,895	6,886,716
Cumberland, Md.....	67,965	1,161,737	3,364,772
Kanawha, W. Va.....	75,223	1,591,494	3,673,268
Phila. & Erie.....	1,171	24,771	71,497
Pocahontas Flat Top.....	.....	.....	.....
<b>Totals.....</b>	<b>362,024</b>	<b>6,641,767</b>	<b>17,458,648</b>

	1896.		1895.
	Week.	Year.	Year.
<b>Shipped West:</b>			
Monongahela, Pa.....	23,834	408,092	1,037,925
Pittsburg, Pa.....	29,738	768,549	2,014,834
Westmoreland, Pa.....	43,277	839,349	2,464,592
<b>Totals.....</b>	<b>96,849</b>	<b>2,015,990</b>	<b>5,517,351</b>
<b>Grand totals.....</b>	<b>458,873</b>	<b>8,657,757</b>	<b>22,975,999</b>

Production of coke on line of Pennsylvania Railroad for the week ending May 23d, 1896, and year from January 1st, 1896, in tons of 2,000 lbs.: Week, 81,685 tons; year, 1,826,320; to corresponding date in 1895, 2,232,726 tons.

**Anthracite.**

There is no change in the anthracite market. All conditions are practically what they have been for the past six weeks. There is a fair movement of coal, consisting chiefly of current deliveries on old orders placed before the last advance. The West is taking the customary amount at this season and is putting in some stocks. The Eastern market is improving and inquiries are coming in more freely.

In this market new business is still very light. Good customers of the companies are able to buy at the net circular price, \$3.85 for stove, \$3.60 for egg and chestnut and \$3.35 for broken, net on board, the full rates obtaining only on small orders. So long as the companies will not agree to insure their good buyers against losses arising from a decline in prices later on, there is no particular inducement for stocking up at this time, especially if the buyer remembers the instability of the market and the uncertainty of prices of the past two years.

Notwithstanding this seeming lack of confidence in their own ability to maintain prices in the fall and the present dullness of the trade the market to-day is steadier and firmer in tone than for a long time past. It is true that the gross earnings of most of the companies show a considerable decrease as compared with the corresponding period of 1895, but on the other hand the statistical position of the

market is much better, from a seller's standpoint, and the prospects for good business after July 1st would be bright were it not for the danger of depreciated money involved in the McKinley prospective nomination. Shipments of anthracite during the month of April were 3,013,190 tons, making 12,459,288 tons for the first four months of 1896. The tonnage for May and June will be at the rate of 3,000,000 tons per month, which will mean 18,500,000 tons in round numbers for the first half of the year. It has been estimated that the market will take at least 44,000,000 tons this year, or 25,500,000 tons during the second half. This means that the production from July 1st to December 31st will have to be at the rate of 4,250,000 tons monthly. In view of the decreased amount of dead work done during the past year, 4,250,000 tons per month will require very nearly working on full time to ship. It is the knowledge of these facts which enables the companies to bide their time.

The report that prices will be advanced again on July 1st circulates persistently. There is no doubt that the companies desire it, but the advance may be deferred until August 1st, as some of the prominent interests are understood to be against too early an action. It looks now as if at last the seller will be in a position to dictate to buyers next fall, for the first time since the Reading "combine."

## NOTES OF THE WEEK.

The statement of the Philadelphia & Reading Coal and Iron Company for April, and the five months ending April 30th is given below:

	April.	Five months.
Gross earnings.....	\$1,403,963	\$8,581,869
Expenses.....	1,602,656	9,093,573
Deficit.....	\$198,693	\$511,713
Fixed charges.....	9,000	475,000
Total deficit.....	\$207,693	\$986,713

The expenses for the five months include \$358,459 for colliery improvements, and \$11,055 for permanent improvements.

## Bituminous.

The bituminous coal market is kept from being slightly active by the lack of coastwise vessels to take the coal from the shipping to the unloading ports. There are a few orders accumulating in the hands of shippers waiting a chance to be sent forward. The tonnages of these orders do not amount to a very large figure, but should they come in as regularly as for the previous week it will mean a respectable total. The far East continues to take more coal than the other consuming territories, with the points just west of Cape Cod in second place. The Sound business is quiet, and the same may be said of New York Harbor trade.

There has been some talk in the daily press regarding some American coals going to Canada. The facts seem to be these, that for forging and blacksmithing the use of Canadian coals is not satisfactory on account of the large quantity of sulphur which they contain. The shipments of several thousand tons of soft coal from the United States twice a year are for the purpose of filling the wants of the blacksmiths, forges, etc.

All-rail trade is quiet and there is a slight falling off in tonnages. Quick dispatch in loading is reported at nearly all the shipping ports. A 1,500-ton barge was loaded at Philadelphia in five hours last week.

A few of the smaller contracts have been taken during the week at "combination" figures. On May 27th the Executive Committee of the Bituminous Coal Association passed the following resolution: Resolved: That in view of the limited demand for coal likely to prevail during the month of June it is hereby recommended to all operators not to work more than three days per week.

The anxiety and uncertainty of the trade of a month ago seems to have disappeared entirely, and the association is undoubtedly holding its own at this time.

Transportation from mines to tide is only fair and there has been an accumulation of coal during the week along the main line roads. This is probably due to the extreme shortage of ocean vessels. The quantity of coal sidetracked does not amount to a blockade at any place, but still there is more than the usual quantity in the side tracks. The car supply is fairly good.

Vessels are very scarce and rates are strong, and if anything advancing. We quote current rates of freight as follows from Philadelphia: To Boston, Salem, Portland, 65c.; Providence, New Bedford, New Haven and other Sound ports, 60c. to 65c.; Wareham, 80c.; Lynn, 75c. to 90c.; Newburyport, 75c. to 80c.; Portsmouth, 70c.; Dover, \$1.10 and towage; Saco, 90c. and towage; Bath and Bangor, 65c. to 75c.; Gardiner, 70c. and towage; Pawtucket, 80c. to 85c. and towage; Wickford, 80c.; Bristol, 75c. Five and ten cents above these rates are asked for the lower shipping ports.

The Association prices remain as follows: f. o. b. Philadelphia, Norfolk and Newport News, \$2.35; Baltimore, \$2.28; New York Harbor shipping ports, \$2.80, alongside, New York Harbor, \$3. There is a 20c. differential in favor of Clearfield and Beech Creek coals.

## Buffalo, N. Y.

May 27.

(From Our Special Correspondent.)

There is a slight improvement in the anthracite coal trade the past few days, made apparent by the heaps of coal in front of some of our churches and the houses of private families. The great bulk of

our citizens and residents of near-by towns and villages are not laying in their next fall and winter stock, being expectant of a reduction in quotations notwithstanding the earnest assurance of dealers that such an event is not likely to take place and that there is a probability of a small advance on June 1st.

Bituminous coal is in moderate request and published quotations have not changed. Supply is fully adequate for all demands and a good surplus exists.

Items of news are scarce. The Rochester & Pittsburgh Coal and Iron Company were successful bidders for the 3,000 tons of soft coal for the Toronto Water Works. No price is given. One-half of the coal will be delivered by lake, the other half by railroad.

The coal freight question of transportation by lake has been quite unsettled for several days, especially to Lake Michigan ports; forwarders of the product of the mine could not obtain vessels at going rates, although "they fairly begged for tonnage," but the vesselmen showed "the marble face."

The shipments of coal from this port westward by lake from May 17th to 23d, both days inclusive, aggregated 63,834 net tons, distributed as follows: 25,575 tons to Chicago, 19,525 tons to Milwaukee, 9,300 tons to Duluth, 900 tons to Superior, 3,050 tons to Racine, 2,300 tons to Green Bay, 800 tons to Cheboygan, and 2,284 tons to Manitowoc. The rates of freight were 50c. to Chicago, Mackinaw and Racine; 45c. to Green Bay, Manitowoc and Milwaukee, and 25c. to Duluth and Superior. Last Monday vesselmen obtained 10c. higher rates to Lake Michigan ports; viz., 60c. to Chicago, 55c. to Milwaukee, and 60c. to Racine. Closing firm, with good demand for boats.

## Chicago.

May 27.

(From Our Special Correspondent.)

There has been some little increased buying in anthracite coal in this market; during the week a few sales in lots up to 1,000 tons were made. There is, however, nothing in sight of consequence. Out-of-town business is not very active, though there is more of a tendency for buying from that direction. Shipments out of town are really very small for this time of the year, and it is very apparent that country dealers have but little coal on hand. Lake and rail shipments of hard coal to Chicago are now limited, which was necessary from the fact that business did not warrant any large supply of coal coming here. The circular prices of \$5 and \$5.25 are now firmly adhered to, and there is an element of strength not observed for some time heretofore.

Bituminous Coal continues in very light demand, and the outlook is decidedly poor for future business. The buying of coal for manufacturing purposes is limited and that demand is almost entirely on the hand-to-mouth policy. There is a large accumulation of coal on cars on the tracks about the city. There are but few contracts of any importance in sight, and it takes a long time to close one up.

Coke trade is light, with prices held fairly.

## Pittsburg.

May 27.

(From Our Special Correspondent.)

Coal.—Production at the river mines in the pools has been cut down to about 15% of the normal output where actively operated. The run of the mines has been continuous almost since December, the longest period the miners have known for many years. There is more coal loaded than can be sent out in one rise; at present the amount loaded will exceed 1,000,000 bushels. Mining will be continued as long as there is an empty boat or barge. The lower markets are well stocked with coal. A June rise is expected; there was none last year. In the railroad district things show but little change. Shipments from those mines directly controlled by lake shippers show an increase, but the demand from the Northwest does not warrant any considerable buying from the outside mines as yet, the less so as the shippers continue to complain of the present freight rates to the lakes, which makes it difficult for them to compete with other plants.

The war is now on between the lake coal shippers, and it looks as if the miners in the Pittsburg district will be dragged into the fight. Ohio opens the ball by taking contracts for lake shipments at \$1.60 per ton on board vessels at lake ports. West Virginia follows with \$1.70 per ton f. o. b. boat. W. F. Robbins, who is a Baltimore & Ohio and Panhandle shipper, made contracts for \$1.80. Ohio operators have from 50 to 80 miles more haul than Pittsburg, and West Virginia mines are 100 miles further than Pittsburg mines from the lake ports, yet they get coal shipped cheaper.

Connellsville Coke.—Business since our last did not show up very well. The bulk of the coke shipments go to Chicago and Cleveland. It was figured out that if the Frick Coke Company would get the benefit of a 53c. rate to the lakes, as the Carnegie Steel Company has done, with the Pittsburg, Shenango & Lake Erie, whole trains can be ferried from Conneaut harbor to Cleveland, Detroit and Chicago at a gain over present freight rates to those points. The cost of a 60-mile haul by water is only 5c. per ton.

The coke people have had their hopes of better times dashed, and are beginning to lose heart, particularly as the season has advanced thus far without showing an improved demand for finished material. The week's business in the reg. c. l. w.s

11,422 ovens in blast and 6,232 idle. A number of ovens at several plants have been torn down but others were fired instead, leaving the total about the same; there are no special changes to note. Production for the region estimated at 109,338 tons, a decrease of 2,633 tons; this is the lowest week's production turned out in the last 6 weeks. In the running order of the 11,422 ovens in blast 4,635 made 6 days, 6,212 ovens 5 days and 575 ovens 4 days.

The shipments were distributed as follows: To Pittsburg, 2,321 cars; to points west of Pittsburg, 3,516 cars; to points east of Pittsburg, 948 cars; total, 6,785 cars. The card rates are unchanged; at the same time sales have been made below that figure.

The Sharpville furnace operators are figuring on the erection of two sets of large coke ovens, which, when completed, will give employment to about 900 men. The plan of the manufacturers is to make their own coke and not buy of the coke manufacturers. The Alice, Claire and Sharpville furnaces will erect one set and the Spearman, Mabel and Douglass the other.

## Shanghai, China.

April 21.

(Special Report of Wheelock &amp; Co.)

Coal.—At the beginning of the period under review the market for Japan coal seemed to have a firm tendency, but this had a very short life and things relapsed into their former state, leaving us worse off than before; there has been absolutely nothing done and natives seem disinclined to operate at all. As a matter of fact, they are ignoring their legitimate business and are paying all attention to the share market, which has certainly, just now, been more lucrative to them. The demand for Cardiff has somewhat fallen off and we have nothing of importance to place on record.

In American anthracite there has been nothing done for some time, with no prospect of anything transpiring in the near future. Sydney Wollongong remains steady, and that is about all that can be said; what business has been done has been for actual requirements. Our stocks are still very large and are not diminishing as rapidly as we should like; importers are acting very wisely by deferring further imports for a few months. Quotations are as follows per ton: American anthracite, 9 taels; Australian Wollongong, 9 taels; Welsh Cardiff, 10-50 taels. For Japan coal, we quote 5-75 taels per ton for Takasima lump and 4-25 taels per ton for Namazuta lump; other sorts, 3@3-25 taels per ton for such as can be procured.

Kerosene Oil.—There has been a large business done in Devoe's, both in cargo on the spot and to arrive, more attention being centered in the latter at 1-65 taels per case, while for parcels ex-godown 1-76 taels has been paid. Batoum has not been so readily inquired for. There is still a fair inquiry for Devoe's afloat, but holders are not anxious to part with any quantity just at the moment. We give current quotations as follows per case: American Devoe's, 1-72½ taels; Russian Batoum, 1-65 taels, and Batoum bulk, 1-57½ taels. Our stocks now amount to 125,000 cases American and 110,000 cases Russian including bulk.

## IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 29, 1896.

## Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending				From	From
	May 31, 1895.	May 29, 1896.	Jan., '95.	Jan., '96.	Jan., '95.	Jan., '96.
Anthracite.	35	20,876	42	21,916	455,278	626,238
Coke.....	121	130,794	138	172,480	2,983,040	3,657,799
Charcoal...	19	4,250	15	5,230	93,718	111,760
Totals....	175	155,920	195	139,620	3,532,036	4,395,797

Under the joint effect of combination doctoring and currency uncertainties the iron market continues dull. The spurt of activity reported from Pittsburg last week does not seem to have had any sustained strength and it subsided almost as quickly as it began. The uncertain condition of general business and the depressing influence of the heavy gold exports, which indicate to many minds the withdrawal of capital from this country, have had their full effect. Election uncertainties are very much felt also, and many men are settling down to the belief that no improvement is to be expected until November and perhaps not then. Trade will adapt itself to almost any conditions except one of doubt; but there must be a reasonable degree of certainty as to the future to make active business.

The fact is now fully recognized by our best and shrewdest business men that until our currency system is reformed; until the question of what a dollar stands for is absolutely settled and taken out of politics; until then we can have no settled prosperity and no security against the recurrence of panic conditions. The sooner they join in making their influence felt toward securing this end, the better it will be for all of us.

The state of the iron trade here just now is in marked contrast to its condition abroad. All over Europe there has been this year a notable improvement in the amount of business done and in prices. In England, in Germany and in France alike demand has improved greatly and the iron-makers are all busy, with such improvement in prices as to put them on a better basis than they have been for years. Instead of sharp competition for contracts we hear of



difficulty experienced in placing orders for delivery within any reasonable time.

The production of pig iron continues on nearly the same level that it has been for several months past; but stocks are reported to be increasing to an undesirable degree, and a number of furnaces are preparing to go out of blast unless there is an improvement soon.

The steel combine is not flinching times very propitious. We have been assured from week to week that the stocks on hand were exhausted and the deliveries on old contracts completed, and that everybody was getting ready to come in and buy at the combine's prices.

One result of the formation of the combine will be an increase in the manufacture of open-hearth—and particularly of basic open-hearth—steel. We hear of several cases already where plans for such plants are being prepared, and the number is daily increasing.

The railroad demand, with the exception of some orders for car iron, continues light. Capital for new roads is not to be had easily just now, and the old companies are keeping down renewals as much as possible, with the evident intention of buying no more \$28 rails than they are obliged to.

The new bolt combination proposes an increase of about 50% in prices. Full lists are not out yet, but will soon be announced.

It looks very much as if the combine-ridden market was going to resolve itself into a test of endurance between buyers and sellers, with the advantage for a time on the side of the buyers, who are not pressed by their requirements for raw material.

New York. May 29.

The local market is to a great extent a reflection of the general conditions. The only section which shows any activity is the structural department, and there most of the heavy contracts for this season have been placed, a few only being still under negotiation.

The small orders for material are fewer in number, and business in the machine shops is not good. We hear of one fine jobbing plant in New Jersey that is almost entirely idle, while others have reduced forces. There is much complaint among brokers and sellers of iron and steel of slow collection, while buyers on their side complain of unreasonable and annoying scrutiny of credits.

Electrical street railroad work in this vicinity has been rather a disappointment so far this season and much less work has materialized than had been expected. This is largely due to the unfavorable condition of general business and the reluctance of capital to go into new schemes.

Pig Iron.—Business is quiet and sales have not been small. There is an increasing pressure to sell iron by agents and brokers and many look for a general break in prices, but none can be reported as yet, though there is undoubtedly some shading on sales.

With a reservation as to shading, we continue to quote for Northern iron as follows: No. 1 foundry, \$12.75@13.25; No. 2 foundry, \$12@12.50; gray forge, \$11.25@11.75. For Southern irons we quote: No. 1 foundry, \$11.75@12.25; No. 2 foundry, \$11.25@11.75; No. 1 soft, \$11.25@11.75; No. 2 soft, \$11@11.50; forge, \$10@10.50. All prices are for tide-water delivery.

Cast Iron Pipe.—Little or no new business is reported this week. The foundries are all supplied with work for the present and deliveries are being made quite actively.

Spiegeleisen and Ferro-Manganese.—Sales continue small, and quotations are unchanged at \$19.50@20.50 for imported spiegeleisen and \$47@47.50 for ferro.

Steel Billets and Rods.—There has been no new business and we quote nominally the pool price, which is \$21.75 per ton for New York delivery. Rods are quoted nominally \$27, with light sales.

Merchant Iron and Steel.—The sales are not heavy, and there is some talk of reductions in price, but the mills are not ready to make concessions. We quote: for common bars, 1 1/2@1 1/4c.;

refined bars, 1 1/2@1 1/4c.; soft steel bars, 1 1/2@1 1/4c. Other quotations are: Steel hoops, 1 1/2@1 1/4c.; steel axles, 1 1/2@1 1/4c.; links and pins, 1 1/2@1 1/4c.; tire steel, 1 1/2@2c.; spring steel, 2 1/2@2 1/4c. Open hearth machinery steel is 1 1/2@1 1/4c.

Plates.—There is little business, and prices are unchanged. We quote for universal mill plates, 1 1/2@1 1/4c. Other quotations are: Tank, 1 1/2@1 1/4c.; boiler shell, 1 1/2@1 1/4c.; good flange, 1 1/2@1 1/4c.; firebox, 2 1/2@2 1/4c. Charcoal iron plates are 2 1/2c. for shell, 2 1/2c. for flange, and 3 1/2c. for firebox. Rivets are 3@3 1/2c. for best iron and 2 1/2@2 1/4c. for steel.

Structural Iron and Steel.—We hear talk of some new contracts, but nothing definite, and small orders are light just now. No change in prices is noted. We quote for angles, 1 1/2@1 1/4c.; channels, 1 1/2@1 1/4c.; tees, 1 1/2@1 1/4c.; beams (up to 15-in.), 1 1/2@1 1/4c. for large lots and 2@2 1/4c. for small orders.

Steel Rails and Rail Fastenings.—The market here is perfectly quiet, and no sales have been made. Steel rails are quoted at \$28.75 per ton at tidewater for standard sections; girder rails at \$29@32 at tidewater.

Rail fastenings are quiet. Fish and angle-plates, 1 1/2@1 1/4c.; spikes, 1 1/2@1 1/4c. Pending the issue of the new lists no quotations for bolts are given.

Scrap Iron.—Demand for cast scrap is light, and few sales are noted. We quote about \$10@11.50 for good machinery scrap; \$9@10 for ordinary cast scrap, and \$6@7.50 for stove-plate and mixed.

Buffalo, N. Y. May 27.

(Special Report of Rogers, Brown & Co.)

There is no material change to note in the situation as seen from this point. The consumption of foundry iron keeps up and the feeling grows stronger among founders that they will continue to receive at least as much business during the summer as they have had for some months past. Charcoal iron is, if anything, a trifle firmer, as more of the furnaces in the Lake Superior district work up ore purchased on the old basis.

Chicago. May 27.

(From our Special Correspondent.)

There has been some little improvement in the iron market of Chicago during the week. The situation, however, is yet very poor and prices are taking a tumble all around. The most important item of news for the week is the drop in the price of Northern pig iron due entirely to the weakness of the Southern material.

Pig Iron.—Northern pig iron prices dropped from 25 to 50 cents during the week. The demand is about evenly divided between Northern and Southern furnaces. Lake Superior charcoal iron sold a trifle more readily than last week. We quote Lake Superior charcoal, \$13.50@14; local coke foundry No. 1, \$12.25@12.50; local coke foundry No. 2, \$11.75@12; local coke foundry No. 3, \$11@11.50; Southern coke No. 1, \$12.10@12.35; Southern coke No. 2, \$11.60@11.85; Southern coke No. 3, \$11.10@11.60; Southern No. 1, soft, \$11.60@11.85; Southern No. 2, soft, \$11.35@11.60; Jackson County silvery, \$14.50@16; Ohio strong softeners, \$15@15.50; Alabama car-wheel, \$16.85@17.35.

Structural Material.—There has been but little business in structural material, bridge shapes having been three-fourths of the trade going. At Houghton, Mich., the Tamarack and Osceola copper companies received forty carloads of structural steel for their contemplated coal wharf. A few thousand tons of bridge material was placed for Western roads. Prices are weak. Quotations are as follows: Beams and channels, 1 1/2@1 1/4c.; angles, 1 1/2@1 1/4c.; plates, 1 1/2@1 1/4c.; tees, 1 1/2@1 1/4c. Small lots from stock are quoted 1/4c. to 1/2c. higher.

Bar Iron.—Business is only fair with inquiry limited. Sales are only of the immediate want kind, and but few contracts of any importance are in the market at present. Car building has given some little impetus to the market. Prices are, common, 1 1/2@1 1/4c.; refined, 1 3/4@1 1/2c.

Steel Rails.—There have been no sales of any importance. Quotations are \$29 and upward according to specification.

Billets and Rods.—There have been a few small sales of billets and rods. Inquiry is not large and generally business looks unfavorable. Billets are quoted at \$21.25.

Merchant Steel.—The agricultural implement firms have been buying freely and there is a prospect for a good business during the next few weeks. Prices are as follows: Open hearth spring, tire and machinery steel, 1 1/2@1 1/4c.; smooth finished ma-

chinery steel, 1 1/2@1 1/4c.; smooth finished tire, 1 1/2@1 1/4c.; tool steel, 5 1/2@7 1/2c.; specials, 1 1/2c. and upward; Bessemer bars, 1 1/2@1 1/4c.

Old Rails and Wheels.—There have been no sales of either made during the week.

Cleveland, O. May 27.

(From Our Special Correspondent.)

Iron Ore.—Sales still drag. Transactions during the week have been for small quantities and at the rates which were adopted last spring, based on \$4 for standard Bessemer. There is no intimation anywhere that the schedule of prices will be reduced a shade, even though the rates of freight on the lakes are softening. But while prices of the Bessemer are firmly held, the non-Bessemer are a point or two weaker. Standard non-Bessemer hematites, which were selling several weeks ago at \$2.75, have been pounded down to \$2.60@2.65. This, the sellers affirm, is as low as they can go.

Lake freights are still declining. From Escanaba the wild rate is down to 55c.; Marquette is dull at 80c., while from the head of the lakes a \$1 rate has been broken and charters are easily made at 95c., with an abundance of tonnage on the market. The present indications are that the rate will go still lower.

Pig Iron.—On account of the prevailing dullness a number of the furnaces at the Valley are going out of blast. Prices are nominal and sales are very slow. There is little demand for the finished product, and in the absence of sales the makers are not buying the crude material. Foundry iron sales are very meager. The foundrymen are buying in only carload lots to supply immediate necessities.

Bessemer pig is nominally \$12.75 at Cleveland; Ohio Scotch is quotable at \$13.25 and \$12.75 for 1 and 2 respectively; Northern Strong at \$12.75 and \$12.25 for the two grades; Lake Superior charcoal continues fairly active at \$13.50@14.

Philadelphia. May 27.

(From Our Special Correspondent.)

Pig Iron.—Three or four fair sales of foundry and forge iron yesterday and to-day have induced a few sellers to think that probably an improving demand has set in. Buyers in general are not heard from and when approached to purchase manifest indifference. Mill irons are particularly dull, but no further concessions are made and in two instances this week offers at a reduction were refused for first-class iron. The makers of Southern iron are not getting any more iron into this market. No. 1 foundry is \$12.50; No. 2, \$12; forge, \$11.

Steel Billets.—In the absence of important transactions it is difficult to present a fair review of the market. The only positive statement made is that billets can be had at \$21.50. Parties supposed to be in the confidence of manufacturers intimate that billets will go to \$22, bottom price, as soon as a few stray stocks disappear.

Merchant Iron.—The stores are selling about as much iron as usual and stocks are kept well up, but big mill orders are few in number and competition sharp for all business offering. Prices range from 1 1/2@1 1/4c.

Nails.—The nail trade is very dull. Prices are firm because of the success following the management of the nail interests. Consumption in all our own territory is as great as had been counted on. Buyers hope for easier prices, but manufacturers intimate there will be a further hardening.

Sheet.—The sheet mills are all busy, and, as against two weeks ago, there is even more business on hand. The outlook for the summer is very good for all kinds of sheet mill products.

Pipes and Tubes.—The latest inquiries indicate a strong mid-summer demand. Brokers representing purchasers do not recommend the placing of orders for all the pipe that will be wanted.

Merchant Steel.—The amount of business done since April 1st in merchant steel is certainly more encouraging than last year, but prices do not stay put. There is a sharp hustling going on for summer business.

Plates.—The plate mill people are all in good heart over some recent developments that they think will bring them considerable business. There is more or less dullness, however, and the usual cutting of prices from advertised rates.

Structural Material.—A large amount of business has been done quietly within a few days for terminal railroad work and new bridge building, but not a word can be had regarding prices. The office people say in a general way that structural quotations under a fair summer business are more likely to harden than weaken.

Steel Rails.—Quoted at \$28 for standard sections. Considering the amount of projected work demand is very light.

Old Rails.—Quoted at \$14.50.

Scrap.—Nothing doing.

Pittsburg. May 27.

(From Our Special Correspondent.)

Raw Iron and Steel.—Business during the last week showed signs of improvement for certain prod-

ucts. The transactions in Bessemer pig were the largest for some weeks, most of the sales extending for the balance of the year; this fact shows that purchasers of the raw material were well supplied with orders, otherwise they would not be disposed to lay in a year's supply of pig iron. Another fact is evident, parties must have come to the conclusion that prices have reached the lowest point and that a further postponement of securing a supply would be costly, which fact accounts for the sales of Bessemer pig, exceeding 60,000 tons within a few days. For certain kinds of material trade has been quiet. Hesitancy to extend operations beyond urgent need is attributed to uncertainty about financial conditions as well as to distrust of the permanency of recent advances in pool prices; but whatever the cause the fact of continued cautious movements on the part of buyers is unquestioned. Meanwhile production out-runs requirements, and stocks of pig iron are steadily increasing. Well authenticated reports are current that Pittsburg will be required to furnish a large amount of steel, that some of the big plants have sufficient orders booked to keep them busy for many months, while some will extend to the end of the year. A number of blast furnaces have blown out and others are preparing to do so; this is important at the present time as the increase of raw material since January 1st, of unsoft iron, amounts to 244,000 tons. The stocks of the great steel companies are not included in the statement; since the steel billet pool was formed these stocks have doubtless increased largely. The puddlers want an advance of 50c. a ton for puddling; some of the leading iron men say the present is no time for such a movement. The big American works of Jones & Laughlin employ no puddlers.

**Latest.**—The demand was fairly maintained; prices show scarcely any change. Bessemer quotations range from \$12.95 to \$13.25. Pittsburg, Sales of Valley are at \$12.25 to \$12.50. For steel billets the demand was light, and prices nominally unchanged. Combination figures are \$20@20.25, but middlemen's prices are \$19.50@19.90. Consumers appear to have been well stocked when the pool made the advance and some of the large concerns say it will be some time before they will be in the market as purchasers. The wire nail trust is in session and another advance is expected. The Pittsburg Wire Company is to be induced to join the pool.

The Carnegie Steel Company has completed the second order of 10,000 tons of steel rails for the Japanese Government. The rails will be shipped from Baltimore.

Tons.	Cash.
10,000 Bessemer, June to Jan., Valley	\$12.45
6,000 Bessemer, July to Jan., Valley	12.25
5,000 Bessemer, July to Jan., Valley	12.50
5,000 Bessemer, June to Jan., Valley, balance of the year, Pitts.	13.50
2,500 Bessemer, June, July, Pitts.	13.00
2,000 Bessemer, June, July, Pitts.	13.20
2,000 Bessemer, July, Aug., Pitts.	13.25
2,000 Bessemer, July, Aug., Pitts.	13.25
1,000 Gray Forge, May, June, Pitts.	11.00
1,000 Bessemer, next four months, Pitts.	13.25
1,000 Bessemer, May and June, Valley	11.90
1,000 Bessemer, June, Valley	12.00
500 Gray Forge, spot, Pitts.	10.90
100 No. 2 Foundry, Pitts.	16.25
50 Cold Blast, Pitts.	23.50
50 No. 1 Foundry, Pitts.	18.50
50 No. 2 Foundry, Pitts.	16.25

Tons.	Cash.
700 Billets, June, at mill	\$19.90
600 Billets, May and June, at mill	20.00
500 Billets, May and June, at mill	19.80
500 Billets, June, at mill	20.00
500 Billets, May and June, at mill	19.75
500 Billets, May and June, at mill	19.85

700 Wide grooved, Pitts.	\$1.50 4 m.
530 Narrow grooved, Pitts.	1.30 4 m.
400 Sheared, Pitts.	1.50 4 m.

930 Sheared, Pitts.	\$1.40 4 m.
600 Wide grooved, Pitts.	1.20 4 m.
400 Narrow grooved, Pitts.	1.20 4 m.

500 Neutral, delivered, Pitts.	\$22.00
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650 At makers' mill, Pitts.	\$28.00
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1,000 Billet and bar ends, Pitts.	\$14.00
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500 Delivered, Pitts.	\$22.25
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**METAL MARKET.**

NEW YORK, Friday Evening, May 29, 1896. Gold and Silver.

**Prices of Silver per Ounce Troy.**

May.	St. Ex.	London Pence.	N. Y. Cts.	Value of \$1. in \$.	May.	St. Ex.	London Pence.	N. Y. Cts.	Value of \$1. in \$.
23	48 3/8	31 1/4	68	.526	27	48 3/8	31 1/4	68 3/4	.529
25	48 1/4	31 1/4	68 1/2	.527	28	48 3/8	31 1/4	68 3/4	.529
26	48 1/4	31 1/4	68 1/2	.528	29	48 3/8	31 1/4	68 3/4	.529

The market has been firm on Continental orders, chiefly from Paris, where a contract has been made to supply the Russian Government with the silver

necessary to rehabilitate the subsidiary coinage system of the empire.

The United States Assay office in New York reports the total receipts of silver at 41,000 oz. for the week.

**Gold and Silver Exports and Imports.**

At all United States ports, April, 1896, and years from January 1st, 1896, 1895, 1894, 1893 and 1892:

	Specie and bullion.		In ores.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
GOLD					
April	\$3,782,266	\$1,142,502	\$5,426	\$95,119	\$2,550,071
1896.	16,916,572	23,747,264	80,319	451,022	7,293,305
1895.	33,514,726	19,033,291	310,912	432,354	14,359,993
SILV.					
April	5,139,978	568,662	14,665	1,490,055	3,695,926
1896.	20,420,322	4,391,752	554,109	5,543,136	11,039,543
1895.	15,254,515	2,596,547	.....	3,810,759	8,847,249

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

**Gold and Silver Exports and Imports, New York**

For the week ending May 23rd, 1896, and for years from January 1st, 1896, 1895, 1894, 1893 and 1892:

	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$2,822,000	\$6,541	\$681,046	\$19,556	\$3,476,949
1896	26,432,216	16,871,908	15,478,221	855,541	21,262,988
1895	32,508,122	19,743,040	13,547,201	591,144	25,722,139
1894	45,183,319	9,169,118	16,804,281	691,450	52,127,062
1893	67,859,483	5,729,196	13,411,551	1,166,358	73,985,485
1892	25,475,209	6,126,341	10,251,929	599,539	29,603,835

Of the gold exported during the past week \$22,000 were sent to the West Indies and the balance to Germany; of the silver \$1,631 went to South America, and the remainder to London. The specie imported came chiefly from Central and South America.

**Average Monthly Price of Silver**

In New York and London, per ounce Troy, from January 1st, 1896, and for corresponding months, 1895 and 1894.

Month.	1896.		1895.		1894.	
	Lon- don. Pence.	New York. Cents.	Lon- don. Pence.	New York. Cents.	Lon- don. Pence.	New York. Cents.
January	30 69	67 13	27 36	59 69	30 81	66 63
February	31 01	67 67	27 47	59 90	29 18	63 43
March	31 34	68 40	28 33	61 98	27 28	59 49
April	31 10	67 92	30 39	66 61	28 95	62 92

**FINANCIAL NOTES OF THE WEEK**

As the exchange market and "special orders" indicated last week, the export of gold has continued with the result that the Treasury reserve will probably on Saturday be reduced to about \$106,000,000. To-day it is impossible to arrive at accurate figures, as some orders may yet come in that are not yet received, and others that are expected to be executed may be cancelled to-morrow.

The gold situation in Berlin has attracted some attention from the fact that, in spite of very low rates for money in Berlin, Frankfurt and other commercial centers in Germany, the gain in gold in the Imperial Bank of Germany has been in the last three weeks \$7,800,000.

A French economic journal tells some interesting facts regarding the public debts of Europe. From 1885 to 1895, the writer says, the debts of 21 European countries have increased in the aggregate from 101,460,000,000 francs to 121,966,000,000. Most of the increase is divided thus among the great powers of the Continent.

	Francs.
Russia	7,541,000,000
Germany	5,743,000,000
France	2,278,000,000
Italy	1,914,000,000
Austria-Hungary	1,237,000,000

It is worthy of notice that these five powers constitute the Triple and Dual Alliance, and consequently have felt the strongest influence of the militarism of the day. While they have added to their debts, these countries have decreased theirs:

	Francs.
England	2,244,000,000
Spain	394,000,000
Denmark	23,000,000
Luxemburg	4,000,000

The six European countries most deeply indebted in 1895 were:

France, 26,799,000,000 francs, or 698 per inhabitant. England, 13,424,000,000 francs, or 419 per inhabitant. Russia, 15,767,000,000 francs, or 161 per inhabitant. Germany, 15,252,000,000 francs, or 290 per inhabitant.

Austria-Hungary, 14,021,000,000 francs, or 328 per inhabitant.

Italy, 12,941,000,000 francs, or 418 per inhabitant.

The writer makes this comment on the figures: It is significant that Germany and Russia, the countries in which the greatest effort has been made to preserve the old regime, have increased their

debts most rapidly in the last 10 years. In both lands the new obligations have been undertaken for future generations, not in the interest of the tasks of civilization, but for military purposes and for the strengthening of the navies."

The statement of the United States Treasury on Thursday, May 28th, shows balances in excess of outstanding certificates as below, comparison being made with the corresponding day of last week:

	May 21.	May 28.	Changes.
Gold	\$112,559,031	\$109,624,523	D. \$2,934,498
Silver	26,924,826	28,014,741	I. 1,089,915
Legal tenders	84,790,984	87,089,932	I. 2,298,948
Treasury notes, etc.	32,563,104	32,635,973	D. 72,869

Totals..... \$216,837,945 \$257,365,179 I. \$527,234  
Govt. bank dep..... 23,372,226 22,352,795 D. 1,019,430

Total United States Treasury notes issued under act of July 14th, 1890, in general circulation and in the Treasury, \$131,489,280. Against these are held in the Treasury 11,790,994 coined standard silver dollars, and the silver bullion purchased at a cost of \$119,689,286, making a total of \$131,489,280.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending May 23d, gives the following totals, comparisons being made with the corresponding weeks in 1895 and 1894:

	1891.	1895.	1896.
Loans and discounts	\$466,776,900	\$5,038,700	\$473,400,400
Deposits	574,198,800	561,903,400	497,041,200
Circulation	9,991,000	13,321,400	11,529,800
Specie	93,724,600	69,581,400	61,541,500
Legal tenders	121,426,800	110,860,600	81,420,300

Total reserve..... \$221,151,400 \$180,451,000 \$145,961,400  
Legal requirement... 143,549,700 140,475,600 124,250,300

Surplus reserve.... \$77,601,700 \$39,975,400 \$21,701,500

Changes for the week this year were increases of \$147,000 in circulation, \$1,427,200 in specie; \$1,458,300 in legal tenders, and \$3,123,525 in surplus reserve; decreases were \$3,058,900 in loans, and \$952,100 in deposits.

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 dates last year:

	Gold.	Silver.	Total.
Asso. Banks of New York			\$61,541,500
1895.....			69,581,400
Bank of England	\$236,127,715		236,127,715
1895.....	187,501,880		187,501,880
Bank of France	369,706,800	\$250,469,400	620,176,200
1895.....	410,445,068	249,913,591	660,358,659
Imp. Bank of Germany			231,475,000
1895.....			269,585,000
Austro-Hungarian Bank	134,380,000	64,022,000	198,402,000
1895.....	92,771,000	67,736,000	160,507,000
Netherlands Bank	13,176,000	34,782,000	47,958,000
1895.....	21,456,000	35,245,000	56,701,000
Belgian National Bank			19,665,000
1895.....			23,006,000
Bank of Spain	42,028,000	52,772,000	94,800,000
1895.....	40,021,000	61,869,000	101,890,000
Bank of Italy	82,625,000	10,495,000	93,120,000
1895.....	60,210,000	11,415,000	71,625,000
Imp. Bank of Russia			410,774,400
1895.....	274,950,000	34,700,000	309,650,000

The return for the Associated Banks of New York is of date May 23d; all the others are of date May 28th, except the Bank of Italy, which is dated April 20th, and the Bank of Russia whose return is dated April 16th-28th. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports its gold only, not considering silver at all. The Imperial Bank of Germany and the Belgian National Bank do not report gold and silver separately.

Shipments of silver from London to the East for the year up to May 14th are reported by Messrs. Pixley & Abell's circular as below:

	1895.	1896.	Changes.
India	£1,501,230	£1,704,798	I. 203,568
China	1,064,573	442,000	D. 622,573
The Straits	274,605	382,882	I. 108,277
Totals	£2,840,408	£2,529,680	D. 310,728

Arrivals for the week this year were £97,000 in bar silver from New York, £6,000 from Australia, and £36,000 from the West Indies; also £10,000 in Mexican dollars from New York; a total of £149,000. Shipments for the week were £32,500 in bar silver to India, and £100,000 to Japan; also £14,550 in Mexican dollars to China; a total of £147,050.

The demand for Indian exchange has felt the effects of light trade and small exports. The usual 60 lakhs of Council bills were taken, but the price has gone down below 14d., as anticipated, the average for the week being 13.90d. per rupee, the lowest for many weeks.

The Bank of Spain has been authorized to issue notes to the extent of 12,000,000 pesetas, redeemable in silver.

The Chinese Government is at out to establish an Imperial Bank, which will be conducted under the

control of the Revenue Board. The capital of the institution will be about \$8,000,000.

It is understood that the advisability of reducing the premium on gold bars for export is under consideration by the Treasury authorities. The present premium is 3-16 and it is believed that a reduction will be ordered to either 1-10 or 1/8%. The object is to change the gold shipments from coin to bars. The stock of gold bars at the Assay Office now available for shipment is about \$18,000,000, leaving about \$3,500,000 on hand for commercial purposes.

It is reported that France has bought about 500,000 oz. of silver in London since the resumption of its bids, making about 1,450,000 oz. purchased altogether this season. Some silver, both United States and Mexican, has been shipped direct to Paris. This may be partly in connection with the minting of Russian silver rubles in Paris referred to in our issue of May 2d.

**Domestic and Foreign Coins.**

The following are the latest market quotations for the leading foreign coins:

	Bid	Asked
Mexican dollars.....	\$0.53 1/4	\$0.54 1/4
Peruvian soles and Chilean pesos.....	.48 1/4	.49 1/4
Victoria sovereigns.....	4.88	4.92
Twenty francs.....	3.88	3.92
Twenty marks.....	4.75	4.80
Spanish 25 pesetas.....	4.73	4.85

**Other Metals.**

**Copper.**—The market continues very strong and in a good healthy condition. We have again to report material advances, with a large business doing, and producers are now so well sold up for some time ahead that they are very independent and refuse to go on at what appear to be very good prices. Considerable business has been done in Lake copper at 11 1/2%, and most of the companies refuse to any longer entertain this price. Electrolytic copper has remained somewhat behind, and we have to quote for cakes, wirebars or ingots 11@11 1/2, and for cathodes 10 3/4@10 1/2, while casting copper is in demand only in a retail sort of way, and we have to quote 10 1/2@10 3/4. Exports continue unusually heavy, and a large demand having also been experienced for home trade, stocks in first hands are now exceedingly small.

In Europe the strong tendency continues and the speculative sorts again show an improvement. G. M. B. touching this morning at £47 7s. 6d. @ 47 10s. for spot and £47 15s. @ £47 17s. 6d. for three months prompt, but closed 7s. 6d. lower on heavy realization sales, the quotations for refined and manufactured being as follows: English tough, £50 10s. @ £50 15s.; best selected, £51 @ £51 5s.; strong sheets, £57 @ £57 10s.; India sheets, £53 10s. @ £54; yellow metal, 4 1/4d. The consumptive demand abroad is very good, and large contracts are reported to have been made for fine copper for delivery up to the end of the year, and even longer, in London.

**Tin.**—In consequence of the firmer prices, the consumptive demand is somewhat smaller, and some new supplies having arrived, it is probable that the slight premium which has existed for the past fortnight for spot tin will disappear. Today we have, however, still to quote 13'60@13'70 for spot and 13'50@13'55 for June-July.

For once the foreign market shows hardly any alteration. The quotation of the week was stationary at £60 10s. @ £60 12s. 6d. for spot and £61 @ £61 5s. for three months prompt.

**Lead.**—Again a heavy business has to be reported, but it appears now that the stocks which had accumulated with certain refiners in the West have now been marketed, in consequence of which the market closes somewhat firmer. Early in the week 3c. was freely accepted, but now nothing is obtainable below 3'02 1/2 @ 3'05. A considerable business was reported from St. Louis early in the week at 2'77 1/2, but to-day no quotations have been received on account of the deplorable storms prevailing in that neighborhood.

In Europe a very good demand exists for spot and near delivery, and the London market is firm at £11 1s. 3d. @ £11 2s. 6d. for Spanish and 5s. higher for English.

**Spelter** continues rather irregular, and there often appear to be wide differences between the prices given out officially and those at which actual business can be done. We quote prime Western brands 4 @ 4.05c.

In Europe the good tendency for this metal continues, and spot and June spelter is reported to be very scarce. The quotation for good ordinary brands has gone up to £17 15s. and specials to £18.

**Antimony** continues dull at 7 1/2c. for Cookson's, 6 1/2c. for Hallett's, and 7c. for U. S. Star.

**Nickel.**—The market is quiet, but prices are maintained. Quotations continue at 34 @ 35c. for ton lots and 36 @ 38c. for small orders. This is, allowing for the duty, about on a parity with the London price, which is 13 1/2 @ 14d. for large lots and 14 @ 15 1/4d. for small quantities.

**Platinum.**—The quotations are steady. At present \$13.50 @ \$15 per oz. New York is named, and London prices are 49s. 6d. @ 52s. per oz.

For chemical ware, best hammered metal, Messrs. Elmer & Amend, New York, furnish the following quotation, the prices given being respectively for

orders of over 250 grams; for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 48c., 49c. and 50c. per gram. Wire and foil are 45c., 46c. and 47c. per gram. The current retail price for crucibles is 60c. per gram.

**Quicksilver.**—There is no change and the New York quotation is \$37 per flask. The London price is £6 15s. per flask, with £6 13s. 6d. @ £6 14s. quoted from second hands.

**Imports and Exports of Metals.**

New York.*	Week, May 21.		Year, 1896.	
	Expts.	Impts.	Expts.	Impts.
Aluminum..... lbs.			10,100	1,569
Antimony ore... short tons				1,706
" regulus... casks				894
Brass, old.... short tons	5		92	59
Copper, fine... long tons	1565	139	30,018	1,256
" matte... "	1510		7,197	11
" ore... "				
" sulphate... "	249		3,636	
Iron ore.... "				2,610
" pigs, bars, rods... "	87	533	87	2,580
" sulphate... "				2,275
" pyrites... "				1,700
" sulphate... "				988
Ferro-manganese			40	75
Ferro-silicon..... "			20	1,710
Manganese ore..... "			907	18,056
Spiegel-eisen..... "				15,584
Lead ore..... "	1150	1847	16,283	15,584
" pigs and bars			2	5
Magnolia metal.... "	45		357	5
Nickel..... "			319	12,017
Steel, billets, rods, Tin..... "			1400	215
Tin and black plates, boxes, Zinc (spelter)..... long tons	23,496	30	360,321	87

\* Metal Exchange Reports. † Week ending May 23.

Philadelphia.††	Imports.	
	Week, May 23.	Year, 1896.
Antimony, casks.....		67
Copper ore, long tons.....	2,344	11,481
Ferro-Manganese, long tons.....		250
Ferro-Silicon..... "		60
Iron ore, long tons.....	6,150	104,683
" pig..... "		350
" and steel scrap, long tons.....		618
Manganese ore, long tons.....		4,564
Spiegel-eisen..... "		77
Tin..... "		265
Tin and black plates, boxes.....		23,920

†† From New York Metal Exchange Reports.

Baltimore.**	Week, May 28.		Year, 1896.	
	Exp.	Imp.	Exp.	Imp.
Bismuth metal, bales, cases				26
Chrome ore..... long tons	30		30	4,894
Copper, fine..... "	981		13,456	
" matte..... "			1,529	
" sulphate..... "				177,476
Iron, ore..... "				1,973
" pigs, bars, ingots, blooms... "				300
Iron oxide..... bags				150
" pyrites..... long tons				
Ferro-manganese				1,357
Ferro-silicon..... "				70
Lead..... "	350		1,251	
Limestone..... short "				2,743
Manganese ore..... long "				3,748
Spiegel-eisen..... "				348
Steel wire, bundles..... "				10
Steel wire, bundles..... "				2,202
Tin, long tons..... "				92
Tin and black plates, boxes, Zinc (spelter) long tons.....				25
				84,587
				117

\*\* From our special correspondent.

**Average Monthly Prices of Metals**  
in New York since January 1st, 1896, and for the corresponding periods in 1895, 1891, 1893 and 1892, in cents per pound.

Month.	1896.	1895.	1891.	1893.	1892.
<b>Copper:</b>					
January.....	9'87	10'00	10'13	12'13	11'09
February.....	10'34	10'00	9'63	12'00	10'06
March.....	11'03	9'75	9'81	11'88	10'38
April.....	10'98	9'75	9'50	11'38	11'50
<b>Tin:</b>					
January.....	13'02	13'25	20'16	19'99	20'50
February.....	13'44	13'35	19'66	20'30	20'00
March.....	13'30	13'20	19'69	20'71	20'25
April.....	13'34	14'00	19'75	20'81	20'50
<b>Lead:</b>					
January.....	3'08	3'10	3'19	3'87	4'20
February.....	3'19	3'12	3'31	4'22	44'12
March.....	3'14	3'12	3'37	3'96	4'21
April.....	3'07	3'08	3'43	4'08	4'15
<b>Spelter:</b>					
January.....	3'75	3'28	3'56	4'39	4'09
February.....	4'03	3'20	3'85	4'39	4'09
March.....	4'20	3'23	3'89	4'28	4'89
April.....	4'19	3'50	3'62	4'38	4'68

The Minor Metals.—Quotations for these metals

are given in the table below, the prices being for New York delivery:

Aluminum:	
No. 1, 98% pure rolling ingots, per lb.....	50@55c.
No. 1, " ingots for re-melting, per lb.....	48@53c.
No. 2, 94% pure, ".....	38@42c.
Ingots from scrap, per lb.....	35@40c.
Aluminum-nickel casting metal, per lb.....	40@45c.
Bismuth, per lb.....	\$1.30@1.75
Phosphorus, per lb.....	50@55c.
Platinum, per oz.....	\$13@14.50
Tungsten, pure, powder per lb.....	70c.
Tungstic acid, per lb.....	45c.
Ferro-tungsten, 60% in ton lots, per lb.....	60c.

The variations in price are chiefly on size of order.

**CHEMICALS AND MINERALS.**

NEW YORK, Friday Evening, May 29.

**Heavy Chemicals.**—But little of interest has taken place in this market during the past week. Too much attention is being paid to political matters at the present time to afford an opportunity for reviving business in this market. Caustic soda does not show any change from last week. Alkali and carbonate soda ash have been fairly active considering their position during the last few weeks. Sal soda is also in better demand. There is nothing doing in bleaching powder, and from present indications it will be some time before a revival takes place in this article. We quote: Caustic soda, 2 1/2 @ 2 1/2c. for spot, according to test; carbonate soda ash, 48% is '95 @ 1'20c., according to quantities and packages. Alkali is 80 @ 85c., according to test and package. Bleaching powder, prime brands, \$1.50 @ \$1.75, Sal soda, 65 @ 67 1/2c.

**Acids.**—This market is as quiet as ever, although some trading of small account has been done in a few of the acids. The dealers are catering to new business and are hopeful of securing some orders in the near future. Prices show but little change and are as follows per 100 lbs. in New York and vicinity, in lots of 50 carboys or over: Acetic acids (in barrels), \$1.25 @ \$1.40. Muriatic acid 18", 70 @ 80c.; 20", 75 @ 85c., according to make and quantity. Nitric acid, 36", \$3.25 @ \$4.25; 40", \$4 @ \$4.50; 42", \$4.50 @ \$5.50. Oxalic acid, \$7.25 @ \$7.50. Mixed acids, according to mixture. Sulphuric acid, 66", 70 @ 95c.; 10 @ 15c. higher for small quantities; chamber acid, \$6.00 @ \$6.50 per ton at factory. Blue vitriol, \$3.87 1/2 @ \$4, according to size of order.

**Brimstone.**—The only new feature in this market has been an advance in the price of brimstone. Business remains the same as last reported. Shipments are held at \$17 for best un-mixed seconds and 50c. less for thirds.

**Fertilizing Chemicals.**—The Southern spring business in this market has been about 20 @ 25% more than it was in 1895, while that of the North decreased from 10 to 15%. The consumption of fertilizing chemicals in the South exceeds that of the North to a great extent, especially in raw materials, as illustrated by the seasons of 1894-95. The stocks of tankage on hand throughout both the East and West have been entirely sold out, with the exception of some high-grade blood and about 2,000 tons of dried fish scrap which were left over from last season. It is the general impression that a better fall business will be done in the North in alkaline materials, and it is understood that prices will rule no lower. Sulphate of ammonia is ruling higher than it was offered with in the last three weeks. We quote current prices as follows: Sulphate of ammonia, gas liquor, \$2.30; bone, \$2.20 @ \$2.30. Dried blood, high grade, \$1.35 @ \$1.45; low grade, \$1.25 @ \$1.35 per unit. f. o. b. Chicago. Azotine, \$1.80. Concentrated phosphate (30% available phosphoric acid), 70 @ 71 1/2c. per unit. Acid phosphate, 13% to 15%, av. P<sub>2</sub>O<sub>5</sub>, \$4 @ 55c. per unit at seller's works in bulk. Dissolved bone black, 17% to 18%, P<sub>2</sub>O<sub>5</sub>, 90 @ 92c. per unit. Acidulated fish scrap, \$10 @ \$11 and dried scrap with few or no sales, nominally \$16.50 @ \$17.50 f. o. b. fish factory. Tankage, high-grade, \$18.50 @ \$19.50; low grade, \$18 @ \$19. Bone tankage, \$21; ground bone, \$22. Bonemeal, \$19.50 @ \$23.

Sulphate of Potash: 90-95%, New York and Boston, \$1.96 1/4; Philadelphia, Baltimore and Norfolk, \$1.98; Southern ports, \$2. Double Manure Salts: 48-53%, New York and Boston, \$1.01; Philadelphia, Baltimore and Norfolk, \$1.02; Southern ports, \$1.03 1/4.

Muriate of Potash.—The request for this article continues small. New prices for muriate are New York and Boston, 1'78c.; Philadelphia, Baltimore and Norfolk, 1'79 1/2c.; New Orleans, 1'81 1/2c., for 80 @ 85% (basis of 80%), in lots 50 tons and upward.

Kainit.—Quotations for 1896 are as follows: New York, Boston, Philadelphia and Baltimore, \$8.80 per ton; Norfolk, \$9.15, and New Orleans, \$9.30 per ton, for 25 tons and upward. Sylvinit at the same ports is quoted at 36 1/2c., 37 1/2c. and 38c., respectively.

Nitrate of Soda.—Spot, 1'80c.; to arrive, 1'75 1/2 @ 1'80c.

The Permanent Nitrate Committee's public statistical circular for May states: Nitrate of soda: Total exports to Europe, April, 400,000 quintals; loading for Europe, May 1, 1,146,000 quintals; imports, Europe, April, 70,120 tons; deliveries, Europe, April, 105,150 tons. Visible supply, Europe, May 1: Stocks and afloat, 591,870 tons.

**Liverpool.** May 20.

(Special Report of Joseph P. Brunner & Co.)  
The market for heavy chemicals is without improvement and there is no life in anything. Soda ash is in a limited request. The spot range for tierces, according to export market, may be called about as follows: Leblanc ash, 48%, £4 @ £4 5s.; 58%, £4 5s. @ £4 10s. Ammonia ash, 48%, £3 2s. 6d. @ £3 10s.; 58%, £3 7s. 6d. @ £3 12s. 6d. per ton, net cash; bags 5s. per ton less. Soda crystals are slow at £2 7s. 6d. per ton, less 5% for barrels and 7s. less for bags.  
Caustic soda is in light demand, but without change in quotations, the spot range, according to market, being about as follows: 60%, £6 5s. @ £6 10s.; 70%, £7 5s. @ £7 10s.; 74%, £8 5s. @ £8 10s.; 76%, £9 @ £9 5s. per ton, net cash.  
Bleaching powder continues to drag, and £7 @ £7 5s. per ton, net cash, is about nominal range for hardwood packages.  
Chlorate of potash is quoted at 4% d. @ 4% d. per pound, but very little business is reported. Bicarb soda is selling fairly well at £6 15s. per ton, less 2% for the finest quality in one cwt. kegs, with the usual allowances for larger packages. Sulphate of ammonia is about stationary at £8 5s. @ £8 7s. 6d. per ton, less 3% for good gray, 24s. for 25% in double bags, f. o. b. here, according to quality. Nitrate of soda is quiet at £8 5s. @ £8 7s. 6d. per ton, less 2% for double bags, f. o. b. here, as to quality. Carb. ammonia, lump, 3% d. per pound; powdered, 3% d. per pound, less 2% for.

**MINING STOCKS.**

Complete quotations will be found on pages 534 and 535 of mining stocks listed and dealt in at:  
New York. Aspen, Colo. St. Louis.  
Boston. Colorado Springs. Paris, France.  
Philadelphia. Duluth, Minn. Mexico.  
Baltimore. Helena, Mont. Shanghai, China.  
Pittsburg. Salt Lake, Utah. Valparaiso, Chile.  
Denver, Colo. San Francisco. London, England.  
Chicago and Cleveland, page 532.

**NEW YORK, Friday Evening, May 29.**

The speculating public has been paying more attention to mining stocks during the past week than was manifested last week. Not alone do the stocks show better values in many instances, but the amount of business transacted has exceeded that of the preceding week. Trading in general may be said to show a little more activity.

The Consolidated Stock and Petroleum Exchange records an increased number of sales this week. The business done on the New York Stock Exchange in mining stocks was also fairly active, though the transactions do not foot up a very large total.

The Comstocks were in better request, 9,300 shares of Comstock Tunnel stock being sold at 86c. and a \$2,000 bond at 8%. The other stocks of this group to show transactions were Sierra Nevada with sales of 900 shares at \$1.10 @ \$1.20; Mexican, 600 shares at 18 @ 19c.; Consolidated California and Virginia with dealings of 550 shares at \$2.80 @ \$3.15; Hale & Norcross, 600 shares at \$2.35 @ \$3.00; Union Consolidated, 500 shares at \$1.00; Crown Point, 400 shares at 76 @ 79c.; Savage, 300 shares at \$1.35; Potosi, 300 shares at \$1.10 @ \$1.40; Ophir, 300 shares at \$1.90 @ \$2; Julia, 300 shares at 13c.; Yellow Jacket, 200 shares at 68c.; Chollar, 200 shares at \$2 @ \$3, and Best & Belcher, with sales of 200 shares at \$1.30 @ \$1.70.

The Colorados were dealt in rather lightly this week and show sales as follows: Creede & Cripple Creek, 300 shares at 5c.; Iron Silver, 500 shares at 18c.; Isabella, 500 shares at 56c.; Little Chief, 600 shares at 18 @ 19c.; Mount Rosa, 600 shares at 8 @ 9c., and 1,000 shares of Leadville Consolidated at 14c. Victor Consolidated has fallen off in price somewhat, opening at \$8.25 and closing at \$8, with sales of 100 shares.

There was a sale of 200 shares of Brunswick Consolidated at 12c. No other California stock was dealt in.

**Boston.** May 27.

(From Our Special Correspondent.)

The market for the copper stocks continues strong for the leading specialties, although there has been more or less realizing, and prices at times have shown wide fluctuations. This is especially true in regard to Boston & Montana, which advanced early in the week to \$88 1/2 and dropped off in later sales to \$86 1/2, with recovery to-day to \$87. The sensation of the week was the rapid decline in Franklin from \$13 1/4 to \$8 on the report that the Master in Chancery had decided that the company was indebted to the Pewabic Mining Company in the sum of \$201,000. Later, on the denial of the officials of the company that they owed the Pewabic any amount, but on the contrary that company was indebted to them, the stock partially recovered and sold up to \$10 1/2. Calumet & Hecla holds steady at \$310 @ \$311 on small transactions. Quincy advanced from \$119 to \$124 1/2 and lost \$1 in later dealings. The scrip sold at \$82 to \$83 1/2.  
Tamarack was bid up from \$96 to \$104 for a small lot, but in later sales it receded to the former figure. Osceola gained \$1 to \$31 1/2, but recent sales were at \$29 1/2, where it closed. Kearsarge sold at \$14 1/2, but in later dealings declined to \$13 1/2. Atlantic declined from \$22 to \$21 1/2. Tamarack, Jr., sold at \$14 1/2 and closed at \$14. Tecumseh declined 1/2 to \$3, and Wolverine from \$8 to \$7 1/2. Arnold sold at \$1 1/2 @ \$1 1/2, and Centennial at 50c. National was quoted at 75c.

There was quite a speculative interest in Old Dominion copper, which, in early dealings, declined from \$22 to \$20, but later on large buying orders it advanced to \$23 1/2, and closed at \$22 1/2 bid, \$22 1/2 asked.

In gold stocks, the feature of the week was Pioneer which, on account of some legal complication, was sold freely, and declined from \$9 to \$5 1/2, closing at \$5 1/2 to \$5 3/4. Gold Coins sold at 50 @ 55c. Merced was quiet this week, and declined from \$13 1/2 to \$11 1/2, with a rally later to \$12 1/2. Santa Ysabel was not quoted. Napa Quicksilver sold at \$6 1/2—a decline of 1/2 from last sale. The market closed with rather a firm tone, but no special feature.

**Chicago.** May 26.

(From our Special Correspondent.)

There has been a very gratifying reaction for the better in the mining market during the week ending to-day, and the volume of business was materially in excess of that of the previous week. A strong undercurrent of strength is manifest, and the recovery from the late depression may now be looked for. No one is expecting any boom, but the opinion is general that better times and better prices are on the way. There has been a good demand for investment. There have been no marked fluctuations in prices except perhaps in Sunnyside Gilpin, which was hammered down by persistent selling from 9c. to 5c., but struck the upturn yesterday, and is now back to 7 1/2c., with a prospect of going several points higher.

Cripple Creek Gold Mining, Bonding and Leasing Company was sold down as low as 4 1/2c. just prior to the news received from the secretary of the company that they had struck a 18-in. vein of good gold ore. This news, together with the instruction to withdraw all unsold treasury stock from the market, will probably put the price up several points.

Imperial preferred will pay its first dividend of 1 per cent. on the 1st of June, and thereafter a regular monthly dividend of not less than 1 per cent. is guaranteed. Finance has been more or less neglected of late, owing to internal difficulties between some of the larger stockholders, but it is rumored that these have at length been adjusted, and the stock seems to be again coming to the front.

The price of memberships on the Board will be advanced on the 1st of June to \$250. Although the financial status of the Board is in a flourishing state, the trustees have decided to advance the entrance fee in order to keep pace with the enhanced value of seats on the floor of the Exchange.

The following table gives the highest prices with sales of the stocks recorded on the Chicago Mineral and Mining Board for the week ending May 26th:

Stocks.	May 20	May 21	May 22	May 23	May 25	May 26	Sales.
Alchemist....	.077 1/2	.083 1/2	.083 1/2	.....	.....	.....	21,500
Boston & C.C.	.....	.....	.....	.53	.029 1/2	.....	2,500
Capaxone.....	.07	.....	.06 1/2	.06 1/2	0.65 1/2	.063 1/2	13,500
C. C. & C. C.	.....	.....	.....	.....	.....	.....	.....
C. C. Golden Group.....	.10 1/2	.....	.10 1/2	.10 1/2	.....	.10 1/2	11,600
C. C. G. M. B. & L. Co.	.....	.....	.....	.....	.....	.04 1/2	2,000
Chi. & G. Mt. Cosmopolitan.	.093 1/2	.093 1/2	.06	.06 1/2	.06	.06	60,000
Delaware Cr.	.24 1/2	.24 1/2	.25 1/2	.26 1/2	.28 1/2	.28 1/2	29,000
Finance.....	.....	.04	.04	.03 1/2	.....	.04 1/2	16,000
Great Pittsuro.	.12 1/2	.12 1/2	.12 1/2	.12 1/2	.12 1/2	.....	28,000
Hawkeye.....	.....	.....	.....	.....	.....	.....	.....
Imperial "Pfd."	.22 1/2	.22 1/2	.22 1/2	.22 1/2	.22 1/2	.22 1/2	22,500
Investors' and Prospectors' Little Gem.	.....	.04	.04	.04	.04	.04 1/2	27,000
Lucille.....	.10 1/2	.....	.10 1/2	.....	.10 1/2	.10 1/2	10,000
Medina G. M. Co.	.....	.07 1/2	.07 1/2	.07 1/2	.07 1/2	.07 1/2	17,000
Peerless G. M. Co.	.11 1/2	.12	.12 1/2	.12 1/2	.12 1/2	.12 1/2	30,000
Rhyolite.....	.04 1/2	.04 1/2	.03 1/2	.....	.04 1/2	.04 1/2	37,000
Sumpter.....	.....	.....	.....	.....	.....	.....	.....
Sunnyside-Gilpin.....	.....	.08	.05 1/2	.05 1/2	.07 1/2	.07 1/2	156,500

Total shares sold, 622,200.

**Cleveland, O.** May 27.

(From Our Special Correspondent.)

Bidding for iron ore stocks was more active this week. The local money market, which for many weeks has been very close, is now easier, and the effect on iron ore stocks is noticeable. The market, however, cannot yet be called active as owners of stocks are generally holding for higher prices. Sales of Cleveland Cliffs Iron Company are reported this week at \$45. Following are quotations:

Name of Company.	Par val.	May 27.	
		Bid.	Ask.
Aurora.....	\$25	.....	\$8
Chandler.....	25	\$38	40
Cleveland-Cliffs Iron Co.	100	42	45
Jackson Iron Co.	25	70	75
Lake Superior Iron Co.	25	30	31
Lake Superior Consolidated.	100	26	21
Minnesota Iron Co.	100	70	71
Pittsburg & Lake Angeline.	25	80	85
Republic Iron Co.	25	17	18

**Colorado Springs, Colo.** May 23.

(From Our Special Correspondent.)

The market after the brief spurt of last week noted in this correspondence seems to have relapsed into its former quietude. The demand is confined

almost entirely to the better class of stocks, the total investments in the prospects being very light just now.

Mr. D. V. Donaldson, secretary of the Colorado Springs Mining Stock Association, is constantly in receipt of so many inquiries about hotel accommodations and railroad routes from prospective visitors to Cripple Creek that he has issued the following statement:

Travelers should come directly to Colorado Springs (where the hotels are unexcelled), whence they can visit Cripple Creek and return the same day, or they can take a Pullman sleeper at Colorado Springs, spend the night in the car, the day in camp, and return by Pullman. The leading operators in mines and stocks, the leading mining exchanges, also offices of the principal mines of the camp, are located at Colorado Springs.

Messrs. Gardner & Co. furnish the closing quotations of the Colorado Springs Mining Stock Exchange for the week ending May 7th, as follows.

Name of Company.	May 21	May 22	May 23	May 25	May 26	May 27
Alamo.....	.06 1/2	.05	.05	.15	.05	.05
Anaconda.....	.61	.61	.62	.62	.62	.61
Argentum-Juniata.....	.54	.54	.54	.51	.51	.49
Blue Bell.....	.05	.05	.05	.05	.05	.05
Cripple Creek Con.	.13	.13 1/2	.13 1/2	.13 1/2	.13 1/2	.13 1/2
Golden Fleece.....	1.70	1.68	1.68	1.68	1.65	1.65
Isabella.....	.55	.56	.57	.57	.55	.57 1/2
Lucille.....	.66	.64	.64	.64	.64 1/2	.65
Mount Rosa.....	.09	.09	.09	.09	.09	.08 1/2
Pharmacist.....	.07	.06 1/2	.06 1/2	.06 1/2	.06 1/2	.06 1/2
Portland.....	1.70	1.72	1.74	1.74	1.74	1.80
Silver State.....	.01 1/2	.01 1/2	.01	.01	.01	.01
Union.....	.41	.38	.38	.33	.33 1/2	.33 1/2
Work.....	.11 1/2	.11 1/2	.1 1/2	.11 1/2	.10 1/2	.1 1/2

**Los Angeles, Cal.** May 19.

(From Our Special Correspondent.)

The Los Angeles Mining and Stock Exchange, recently organized, is now ready for active work. It has opened under gratifying conditions and hopes to become a factor in this section. The formal opening takes place on Tuesday evening, May 26th.

**Salt Lake City, Utah.** May 23.

(Special Report of James A. Pollock.)

While the attention given to investment securities has not been very marked, the past week in the local mining stock market was a very fair one. For no good reason, several of the stocks were subjected to rather violent fluctuations, but the recovery came before the end of the week and the close was fairly strong.

Upon heavy selling orders Ajax showed a considerable decline about the middle of the week and did not recover materially until the close. Alliance was without activity. The closing down of the properties and the fear that the ore bodies are not in a desirable condition were the causes of Anchor taking a considerable slump, the stock selling down as low as \$1. With the close of the week a slight reaction occurred, but bidding was not spirited, and the stock only registered a gain of about 10 or 15c. It is understood that general operations at the mine will not be resumed until the new custom concentrator is completed.

Bogan was in fair demand, but not at advancing figures. Bullion-Beck declared and paid a dividend of 15c. per share on the 19th. This makes a total of \$2,030,000 the properties have paid in dividends. The stock was in good demand and held quite strongly. Centennial-Eureka continued to hold its strength, with very light offerings and no large blocks in sight under \$37 1/2. Some odd lots were sold under \$30, however. There is still no official news as to the outcome of the option. Dalton was not strong and sold down several cents below the previous week's quotations. Dalton & Lark was without special activity. Daly was not as low as during last week. Daly-West was in fair demand at about the previous week's figures.

Eagle just held its own, there being no special activity in the stock. Four Aces was somewhat stronger, but buying orders were not numerous. Galena was held strongly and sales were made at advancing quotations. Geyser is making regular shipments of mill product, but the stock will show no special strength until after the decision of the courts in the cases involving much of its property. Horn Silver is reported to be in good shape, and the development work is progressing nicely. Very little of the stock was offered on this market, and none of it lower than \$2.25, with the bidding slightly under the asked figure. Lucky Bill has levied another assessment with which the company will continue operations at the properties. Little Pittsburg showed no activity.

Mammoth, after selling up to \$3.85, slumped to nearly \$3. Weak holders, who hold cheap stock, feared that dividend payments would be delayed longer than has recently been anticipated, and for this reason threw their stock into a market not very active. With the close of the week the stock regained considerable of its lost strength. Mercur paid its monthly dividend on the 20th, making a total of \$450,000 now paid. Malvern came on the market during the week at 25c. per share. The properties of the company adjoin the Sunshine on the south.

Ontario will pay its regular dividend of 10c. per share on May 29th. The stock was quite strong. Rover sold at about the previous week's figures. Silver King continued strong, with bidding quite active. There was little activity in Sunshine, investors being inclined to wait a final announcement from the management as to the mill tests. Swansea sold above \$2 for the first time, the reason being an increased demand for the stock.

San Francisco.

May 23.

There was no lack of activity in the stock market this week, and the various reports of strikes in the Brunswick lode, and of other happenings in the Comstock, made more excitement than we have seen for a long time. At the opening on Monday there was quite a rush to buy, and prices went up on all sides, Chollar at one time touching \$3, Hale & Norcross \$2.50, and others in proportion.

Later in the week there was a break, a flood of stocks coming on the market for sale, and the movement continued to depress prices until near close to-day, when there was a slight upward reaction. The close was not very strong, however, and there is a prospect for a weaker market.

Some closing prices are: Consolidated California & Virginia, \$2.80@2.85; Chollar, \$2.40@2.45; Hale & Norcross, \$2.20@2.25; Gould & Curry, \$1.50@1.60; Ophir, \$1.70@1.75; Occidental, \$1.45@1.50; Best & Belcher, \$1.40@1.45; Confidence, \$1.30; Savage, \$1.30; Potosi, \$1.20@1.25; Sierra Nevada, \$1@1.05. The Bodies got less attention this week and prices were lower, Bodie Consolidated selling to-day at 70c. and Bulwer at 35c.

A bullion shipment valued at \$67,500, the product of a two months' run of the mill, has been received from the Apollo mine in Alaska.

The annual meeting of the Crown Point Mining Company has been called for June 1st.

The Horseshoe Bar Consolidated Mining Company has levied an assessment of 50c. per share, delinquent June 22d.

The Central Eureka Mining Company, of Amador County, has levied an assessment of 3c. per share, delinquent June 22d.

THE NEW EXCHANGE.

The business at the San Francisco Gold Mining Exchange has been active through the week. The excitement on the old exchange seemed to have stimulated business here also instead of drawing attention away from the new board, as some people rather expected. The number of shares dealt in was large. The members of the exchange report a good deal of buying, which is evidently for investment and not for speculation. The main object is to encourage this class of business as much as possible.

Some prices reported are as follows: Champion, \$25; Amalie, \$2@2.10; Sebastopol, 52@53c.; Edna, 50c; Savannah, 40@44c.; Lockwood, 33@34c.; Grant, 14@15c. The market closed strong.

London.

May 16.

(From Our Special Correspondent.)

The past week has been a very quiet one for the South African mining market. Everything has been waiting for the decision with regard to the Pretoria prisoners, and until this decision is announced it is not likely that any serious business will be transacted either in Chartered or in the Transvaal stocks. The Matabele rising is being quelled by degrees and without the aid of Imperial troops, consequently it is hoped that it may not be necessary to have a new issue of chartered shares. It is well known that the cost of a campaign under government direction, where the army contractor controls the transport and supplies, is enormous compared with a campaign, where the fighters have to pay their own expenses, so that the chartered shareholders may congratulate themselves on not having to pay for Imperial troops. The agitation in some quarters against Mr. Rhodes and Mr. Beit has been continued, and a lawsuit has been instituted by some of the shareholders in the chartered company against Mr. Beit with a view of saddling him with the cost of the Jameson raid. It is a remarkable thing that during this agitation against Mr. Beit, it is not known in London that Mr. Beit has left England for America to get away from trouble, and that he has transferred a great deal of his property to America. As far as the public is concerned, Mr. Beit may leave the Chartered Company without their expressing regret. Whether Mr. Rhodes' resignation would be generally acceptable in England or not is a difficult question to decide, but it would be viewed with dismay by everyone in Rhodesia. There has been a revival of the rumor that the consolidated gold fields of South Africa would be required to wind up its business and quit the Transvaal, the reason for this policy being that it is the only way that Kruger can strike directly at Mr. Rhodes; but it is really improbable that such a course would be decided on, as it would do more harm to the Transvaal than good.

The gold shares of the Transvaal have not been at all active. The output for April was about the same as for March, but owing to the split in the Johannesburg Chamber of Commerce, it is impossible to obtain really correct figures, and much less interest is attached to them now than was formerly the case.

The West Australian market has been booming all the week, and the animated scenes on the exchange and on the street remind one of the South African boom of a year ago. Buying has been brisk and quotations have gone up all round. Great Boulders have as usual been most prominent, and another fortnightly return of 2,962 oz. from 800 tons has sustained the demand. Many other stocks have been boomed up, but more on prospects than on returns. Hannan's Brownhill has also been active, but a great many contradictory reports have been circulated as to the result of the crushings. The reason for these reports is that the barrel amalgamation plant is not giving the results that were anticipated, though it is certainly working as well as such a plant ever does.

The Western Australian market has continued fairly brisk throughout the week. The death of Colonel North had no effect on the market, and it may safely be said that he had far less interest in the market than was commonly supposed. After the collapse of the Londonderry Company, his popularity and influence dwindled considerably and at the time of his death he had practically no interests in the market. Great Boulders have been the chief feature in the market, and after the publication of the report last week the quotation advanced to over £10. At that figure the rise halted, as a large number of holders had left orders with their brokers to sell out at this figure. I have information which shows that there is nearly 200,000 tons of ore actually in sight, containing on an average 2 oz. per ton, so that the company has an excellent future. The floating of subsidiary companies to take over parts of the property has commenced, so that the shares are of considerable value. During the past week a West Australian Government loan of £750,000 has been successfully floated. The interest is 3%, and the applications amounted to five times the amount of stock offered. This opinion of the bankers and trust companies, with regard to the stability of the colony's resources, is decidedly flattering. The loan brought 101 1/2%.

Paris.

May 17.

(From Our Special Correspondent.)

The approaching commencement of the magnificent ceremonies at Moscow continues to attract attention, and until the pageant is over foreign affairs will be quiet. At home political matters are also quiet for the moment; the confidence felt in the Meline Ministry is shown by the fact that the 3% rentes have risen two points, and this gain is spontaneous and not through manipulation.

While speculation in stocks has not been especially active, our market has shown a good deal of strength, and all the operations are for a rise rather than a fall, except in some of the public securities, such as Italian and Spanish.

The death of Colonel North has affected the nitrate shares favorably rather than otherwise. The audacious mendacity of this speculator and the well-known unreliability of his methods kept buyers for investment away from the stocks in which he was concerned, even where they might be said to have real merit in themselves.

The shares of the zinc and lead companies make a very favorable showing, and the prices of those metals, zinc especially, continue to rise. Malfidano holds its meeting shortly, when the dividend will be announced. There was some effort to depress Laurium on the report of a general strike of the company's employees, but it appears that the outbreak was promptly suppressed with the aid of the Greek Government. The Spanish lead companies' stocks are recovering from their late depression.

The speculation in the copper stocks is still active and their prices are now at a high point, though there is this week a slight reaction. Rio Tinto especially seem to have been pushed above their real value. As to the other, one can hardly say that they are too high, and Boleo especially seems to have risen on its merits. The consumption of copper just now is enormous, and the market seems to absorb all of the metal which is offered, notwithstanding the great quantities which your mines have been sending us lately.

The metallurgical shares continue the strongest point on the market, and nearly all of them show strength and hold their previous advances. The situation in the iron trade is certainly a very strong one. Among other stocks the Huanchaca (silver) continues to fluctuate on varying reports from the mine. Your Rebecca shows a slight fall in price. The Russian stocks are all in demand, and I hear that at least two new companies are to be brought out here before long.

The market for the South African gold stocks is still very quiet and rather weak, though the political situation is somewhat calmer, thanks to the firmness and moderation of President Kruger, which has for the present rather quieted the somewhat theatrical energy of the British Colonial Minister and the absurd outbreaks of certain classes among our London neighbors. The political financiers of Johannesburg have also paused for a moment in their efforts to complicate the situation.

The foreign merchandise trade of France is reported as below by the Ministry of Commerce, for the four months ending April 30th:

	1895.	1896.
	Francs.	Francs.
Imports:		
Food.....	310,496,000	367,858,000
Raw materials.....	730,458,000	739,551,000
Manufactures.....	173,076,000	213,678,000
Total.....	1,214,030,000	1,381,087,000
Exports:		
Food.....	165,477,000	204,795,000
Raw materials.....	273,881,000	274,893,000
Manufactures.....	592,875,000	626,577,000
Postal parcels.....	40,458,000	52,002,000
Total.....	1,075,391,000	1,158,267,000
Excess, Imports.....	158,639,000	222,820,000

There was a very considerable gain this year in the volume of trade, both imports and exports.

I have to record another death this week, of M. Enrico Cernuschi, a most brilliant man and an admirable writer, whose ability one must concede, although one is not always ready to accept his conclusions. The bi-metallists have lost in him their best equipped and strongest advocate; and they

have really no one in Europe to take his place. Even if Mr. Balfour in England were not silenced by his official position, he has not the brilliancy and facility in argument of the economist who is just dead. AZOTE.

MEETINGS.

Name of Co.	Location of office.	Date.	Time.
Big Johnny Gold.	417 Mining Exchange, Denver, Colo.....	June 18	2 p. m.
Buckhorn Basin.	153 La Salle St., Chicago, Ill.....	" 6	12 m.
Leon Gold.....	415 1/2 Monig'm'ry St., San Francisco, Cal.....	" 24	11 a. m.
Lucky Bill.....	Park City, Utah.....	" 9	" "
Minnesota Iron.....	Duluth, Minn.....	" 8	11 "
Pacific Gold.....	Howland Flat, Sierra County, Cal.....	" 6	1 p. m.
St. Paul & Butte Silver Bow Gold & Precious Stone.....	37 East Broadway, Butte, Mont.....	" 17	2 p. m.

ASSESSMENTS.

Name of Co.	Loc'n.	No.	Dinq.	Sale.	Amt.
Alpha Con.....	Nev.....	16	May 12	June 2	.05
Alta.....	" 52	June 9	" 30	.10	
Boyan Silver.....	Utah.....	3	" 16	July 6	.05
Burlington.....	Cal.....	2	May 27	July 17	.03
Channel Bend.....	Utah.....	2	" 22	" 13	.05
Eureka Con.....	Utah.....	"	July 8	Sept. 5	.10
Flint Creek.....	Mont.....	"	May 22	June 12	.009 1/4
Golden Sand.....	Cal.....	2	" 20	" 8	.61
Granite Hill.....	" 14	" 20	" 10	.10	
Horseshoe Bar.....	" 1	June 22	July 14	.20	
Lady Emma.....	" 2	May 25	June 25	.20	
Leo.....	Mont.....	" 28	" 19	.009 1/4	
Lucky Bill.....	Utah.....	19	June 13	July 11	.02
Mexican Gold & Silver.....	Nev.....	54	May 28	June 18	.20
Mohawk Con.....	Utah.....	"	June 1	" 29	.01 1/4
New Era.....	S. D.....	3	" 1	" 19	.07 3/4
North Eureka.....	Utah.....	1	May 30	" 27	.06 1/4
Overman.....	Nev.....	75	June 5	" 25	.10
Peabody.....	Cal.....	6	" 13	" 24	.10
Peruvian Con.....	Utah.....	"	" 22	July 8	.02
Potosi.....	Nev.....	45	May 14	June 4	.20
Ruby Bell.....	S. D.....	13	June 1	" 19	.05
Savage.....	Nev.....	89	" 3	" 23	.20
Silver King.....	Ariz.....	14	" 16	July 14	.25
Siskiyon Con.....	Cal.....	11	" 8	June 29	.01
Skagit Cumb'r'd Coal.....	Wash.....	1	" 12	July 11	.03
Surprise.....	Cal.....	1	May 30	" 1	.20
Wide Awake.....	" 31	June 8	June 29	.05	

\*New assessment.

DIVIDENDS.

NAME OF COMPANY	Current Dividends.		Paid since Jan. 1, 1896.	Total to date.
	Date.	Amount.		
Aetna Con.....			\$10,000	\$50,000
*Alaska-Mexican.....			34,200	157,031
*Alaska-Treadwell.....			150,000	2,825,000
Anaconda.....	May 1	\$750,000		
*Aurora Iron.....			50,000	700,000
Big Six.....	" 20	\$2,500	2,500	2,500
Boston & Mont.....	" 20	\$300,000	600,000	4,025,000
Bullion Beck & Ch.....	May 15	\$15,000	80,000	2,030,000
*Calumet & Hecla.....	" 13	\$50,000	1,500,000	44,850,000
*Cariboo.....	" 16	\$16,000	16,000	79,000
*Centennial-Eureka.....	" 15	\$30,000	180,000	1,680,000
C. O. D.....			5,000	25,000
*Dalton & Lark.....	May 15	\$12,500	50,000	50,000
Dominion Coal.....			600,000	
Elkton Con.....	May 25	\$10,000	10,000	45,000
Florence.....	" 1	\$10,000	54,390	31,000
*Galena.....	" 10	\$5,000	11,000	89,348
*Gold Coin.....			45,000	60,000
*Golden Fleece.....	May 15	\$18,000	90,000	491,179
Gold & Globe Hill.....	" 15	\$2,250	17,250	26,625
Hecla Con.....			30,000	2,130,000
Highland.....			25,000	3,159,918
*Homestake.....	May 25	\$31,250	156,250	5,868,750
Horn Silver.....			50,000	5,130,000
*Iron Mountain.....	May 18	\$5,000	30,000	440,000
*Isabella.....	" 25	\$22,500	90,000	112,500
Le Roi.....	" 15	\$50,000	75,000	150,000
Mercur.....	" 11	\$25,000	100,000	450,000
Minnesota Iron.....			247,500	2,992,500
*Mont. Ore Pur. Co.....	May 20	\$10,000	200,000	360,000
Moon-Anchore.....	" 15	\$5,000	12,000	12,000
Moose.....			5,000	770,000
Napa Con.....			30,000	31,000
*Ontario.....	June 1	\$15,000	75,000	13,250,000
Osceola Con.....			75,000	2,022,500
Ottawaquachy.....			1,000	1,000
Portland.....	May 15	\$30,000	90,000	713,000
Quincy.....			40,000	8,070,000
*Silver King.....	May 15	\$37,500	225,000	675,000
Slocan Star.....	" 15	\$100,000	100,000	100,000
Small Hopes.....			25,000	3,275,000
*Smuggler-Union.....			50,000	50,000
Union.....	May 5	\$12,500	12,500	62,000
*Utah.....	" 10	\$2,000	10,000	142,000
*Victor.....	" 15	\$20,000	100,000	565,000
*Victor M. & L.....			9,000	33,000
*War Eagle.....			25,000	157,500
Totals.....			\$2,068,000	\$5,754,590

\* April dividend paid.

This table does not give all the dividends paid by mining companies, as it is impossible to obtain a complete list of dividends declared. Many companies are close corporations and refuse to give the information. Readers of the Engineering and Mining Journal will confer a favor on the publishers if they will notify the Journal of any errors or omissions in the above table.

STOCK QUOTATIONS.

BOSTON, MASS.\*

Table of stock quotations for Boston, Mass. listing companies like Allouez, Arnold, Atlantic, etc., with columns for location, par value, and daily price movements from May 21 to May 27.

\* Official quotations Boston Stock Exchange. † Ex-dividend. Total sales, 79,351.

NEW YORK.\*

Table of stock quotations for New York listing companies like Adams, Ajax, Alamo, etc., with columns for location, par value, and daily price movements from May 22 to May 28.

\* Official quotations New York Stock & Bond, Stock & Petroleum Exchanges. † Total shares sold, 21,110.

INDUSTRIAL COAL AND COAL RAILROAD.\*

Table of stock quotations for Industrial Coal and Coal Railroad listing companies like Balt. & Ohio, Ches. & Ohio, etc., with columns for par value and daily price movements from May 22 to May 28.

\* Official quotations N. Y. Stock Exchange. † Total shares sold, 59,500.

COLORADO SPRINGS, COLO.†

Table of stock quotations for Colorado Springs, Colo. listing companies like Ajax, Alamo, American, etc., with columns for par value and daily price movements from May 18 to May 23.

† Official quotations and sales Colo. Springs Mfg. Stock Assoc. \* Board of Trade Exchange.

ST. LOUIS, MO., STOCKS. Week ending May 25.

Table of stock quotations for St. Louis, Mo. listing companies like Central Lead, Doe Run Lead, etc., with columns for company name, office, par value, and last dividend.

SAN FRANCISCO, CAL.\*

Table of stock quotations for San Francisco, Cal. listing companies like Alta, Belcher, Best & Belcher, etc., with columns for location, par value, and daily price movements from May 22 to May 28.

\* Official telegraphic quotations, San Francisco Stock Exchange.

BALTIMORE, MD.\* Week ending May 27.

Table of stock quotations for Baltimore, Md. listing companies like Balt. M. & S., Conrad Hill, etc., with columns for location, par value, and daily price movements from May 22 to May 27.

\* Official quotations Baltimore Stock Exchange.

MISCELLANEOUS SECURITIES. May 27.

Table of miscellaneous securities listing companies like American Coal, Chateaugay Ore & Iron R. R., etc., with columns for company name, location, par value, and bid/ask prices.

LONDON. May 15.

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Last dividend, Quotations. Lists various mining and industrial companies from North America, Australia, and South Africa.

PARIS. Week ending May 15.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Divs. last year, Prices. Lists companies such as Acieries de Creusot, Boleo, and various metal and coal producers.

MEXICO. Week ending May 21.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Prices. Lists companies like Amistad y Concordia, Arceval y Anexas, and others.

VALPARAISO, CHILE. May 7.

Table with columns: NAME OF COMPANY, Capital, Share value, Last dividend, Prices. Lists companies like Arturo Prat, Caracoles, and others.

SHANGHAI, CHINA. April 24.

Table with columns: NAME OF COMPANY, Country, No. of shares, Value, Last dividend, Price. Lists companies like Jelebu M. & Trad., Funjom M. Co., etc.

DENVER, COLO.

Table with columns: NAME OF COMPANY, Par val., May 18, May 19, May 20, May 21, May 22, Sales. Lists numerous companies including Addie C., Agate, Alamo, and others.

All the companies are located in Colorado. Total shares sold: listed, 460,380; unlisted, 1,569,160.

PHILADELPHIA, PA.

Table with columns: NAME OF COMPANY, Location, Par Val., May 21, May 22, May 23, May 25, May 26, Sales. Lists companies like Acety. L.H. & P., Ambler Iron, etc.

Official quotations Philadelphia Stock Exchange. Total sales, 4,824.

SALT LAKE CITY, UTAH. Week ending May 23.

Table with columns: Name of Company, Par value, Bid, Asked, Actual selling price, Name of Company, Par value, Bid, Asked, Actual selling price. Lists companies like Ajax, Alliance, Am. Nat. Gas, etc.

Special Report of James A. Pollock. All the companies are located in Utah.

PITTSBURG, PA. Week ending May 23.

Table with columns: NAME OF COMPANY, Location, Par val, Bid, Ask, Selling price, NAME OF COMPANY, Location, Par val, Bid, Ask, Selling price. Lists companies like Mansfield, N.Y. & C. Gas Co., etc.

Official quotations Pittsburg Stock Exchange.

HELENA, MONT. Week ending May 21.

Table with columns: NAME OF COMPANY, Location, Company's office, Par value, Bid, Asked, Shares sold, Price, Date. Lists companies like Am. Dev. & M. Co., Butte Mont., etc.

Special Report of Samuel K. Davis. Total shares sold, 229,912.

DULUTH, MINN. Week ending May 23.

Table with columns: NAME OF COMPANY, Par value, Bid, Asked, NAME OF COMPANY, Par value, Bid, Asked. Lists companies like Adams Iron, Biwabik, etc.

Special Report of S. E. Smith.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last).

G. Gold, S. Silver, L. Lead, C. Copper, B. Borax. \* Non-assessable. + The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. † Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends and the Cons. Virginia \$42,300,000. Note.—Corrections to this table are made monthly. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.



CLASSIFIED LIST OF ADVERTISERS.

<b>Air Compressors and Rock Drills</b> Bullock, H. C. Mfg. Co. Burlington Br. & Drill Co. Clayton Air Compressor Works. Fraser & Chalmers. Ingersoll-Sergeant Drill Co. Laidlaw-Dunn-Gordon Co. (See Diamond Drills.)	<b>Air Hoists</b> Whiting Foundry Equipment Co. <b>Aluminum Bronze</b> Fairbanks Co. <b>Amalgamators</b> Bucyrus Steam Shovel & Dredge Co. Fraser & Chalmers. <b>American Blasting</b> Western Plating and Mfg. Co. <b>Anti-Friction Metals</b> Besley, Chas. H., & Co. Chester Steel Cast. Co.	<b>Architects and Builders</b> Berlin Iron Bridge Co. Pittsburg Bridge Co. Pollock, Wm. B. & Co. <b>Assayers and Chemists' Supplies</b> Ainsworth & Wm. Penna. Salt Mfg. Co. Baker & Co. Becker, Christian. Bullock & Crenshaw. Denver Fire Clay Co. Eimer & Amend. Henry Hill Chem. Co.	<b>Attorneys, Corporation</b> Emig, C. F. Hammorsley, Hamilton & La Maitre. <b>Automatic Boiler Feeds</b> D'Este & Seelye. Penberthy Injector Co. <b>Rabbit's Metal</b> Besley, Chas. H., & Co. <b>Bankers and Brokers</b> Arkell, E., & Co. Hartlett & Co. Benorigt, W. P. & Co. Breitung, E. N. Carnduff, A. A. Crandell & Huff. Crip, Cr. Syn. Inv. Co. Decker, L. H. Duer, G. A. C. Dorsey, H. H. Doubleday, Rope & Co. Edsall, Clarence & Co. Farnsworth, C. & Co. Fitts, G. W., & Sons. Fletcher, C. S., & Co. Freyschlag, Kirby & Gardner & Co. Grant, E. C. H. Handy & Harman. Harriot, W. M. Hendrickson, W. J. Heron Bros. Hodgins, L. W. Hicks & Benzie. Johnson, L. L. Keeth, F. M. Koonrick, W. F. Key, J. J. Kinney, M. Kteliander, C. F. & Co. <b>Belting</b> Carpenter, Geo. R. & Co. Hendrie & Bothoff Mfg. Co. Lepfelmer, N. Miller, Chas. N. & Co. <b>Belt Lacing</b> Bristol Co. <b>Blasting Caps</b> Metallic Cap Mfg. Co. <b>Blasting Batteries</b> Climax Fuse Co. <b>Boilers</b> Lau, J. E., & Co. <b>Blowers, Pressure</b> Connorsville Blower Co. <b>Boilers</b> American Engine Co. Denver Eng. Wks. Co. Enterprise Boiler Co. Fraser & Chalmers. Heine Safety Boiler Co. Philadelphia & N. G. Wks. Ltd. <b>Brattice Cloth</b> Besley, Chas. H., & Co. <b>Brewers</b> Pabst Brewing Co. <b>Brick Machinery</b> Proese, E. M., & Co. <b>Bridges</b> Berlin Bridge Co. Pittsburg Bridge Co. <b>Buckets</b> Scaife, Wm. B. & Sons. <b>Car Wheels</b> Whiting Foundry Equipment Co. <b>Carbons</b> Bishop, Victor, & Co. Lexow, Theodor. <b>Chain and Link Belting</b> (See Belting.) <b>Chemists</b> Baker & Adamson. Bullock & Crenshaw. Eimer & Amend. Henry Hill Chem. Co. <b>Coal</b> Berwick-White Coal Mfg. Co. <b>Caster and Curran</b> Fossilization Co. Davis Coal & Coke Co. <b>Chemists</b> Simonds & Wainwright. <b>Chilled Castings</b> Whiting Foundry Equipment Co. <b>Coal Cutters</b> Ingersoll-Sergeant Drill Co. Jeffrey Mfg. Co. Leyner, J. Geo. (See Machinery.) Link Belt Machinery Co. <b>Compressors</b> Clayton Air Compressor Works. Norwalk Iron Works Co. <b>Concentrators, Crushers, Pulverizers, Separators, Etc.</b> Allis, F. D., & Co. Beckitt Foundry & Machine Co. Boston Ore Machinery Co. Bradley Pulverizer Co. Colorado Iron Works. Denver Eng. Works Co. Dodge Mining Machinery Co. Engelbach Mach. Mfg. Co. Fraser & Chalmers. Hendrie & Bothoff Mfg. Co. Joplin Mach. Co. Krom, S. R. Krupp, F. Link Belt Machinery Co. McCully, R.	<b>Seoville, H., &amp; Co.</b> <b>Stedman Foundry &amp; Mach. Co.</b> Walburn-Swenson Mfg. Co. (See Machinery) <b>Coppers</b> James & Shakespeare. Kearse Mfg. Co. Lambert's Wharf, Co. Lewisohn Bros. Orford Copper Co. Osceola Con. Mfg. Co. Pass, C., & Son, Ltd. Penn Salt Co. Pells, Doore & Co. Tamarack Mfg. Co. Tamarack, Jr., Mfg. Co. Vivian, Younger & Bond. <b>Corrugated Iron</b> Cincinnati Corrugating Co. Sikes Steel Roofing Co. <b>Cranes</b> Whiting Foundry Equipment Co. <b>Crucibles, Graphite, Etc.</b> Denver Fire Clay Co. <b>Dampers and Regulators</b> Dixon, Jos. Crucible Co. <b>Cyanide</b> Roessler & Hasslacher Chemical Co. <b>Diamonds</b> Bishop, Victor, & Co. Lexow, Theodor. New York Diamond Drill Co. <b>Diamond Drills</b> Bishop, Victor, & Co. Bullock Mfg. Co., M. C. Lexow, Theodor. New York Diamond Drill Co. Sullivan Machinery Co. (See Air Compressors and Rock Drills.) <b>Draughtmen</b> Young, Wm. R. <b>Drawing Materials</b> Besley, Chas. H., & Co. Dietzgen, E., & Co. Heer, Peter. (See Engineering Instruments.) <b>Dredges</b> Bucyrus Steam Shovel & Dredge Co. Marion Steam Shovel Co. Southern & Co. <b>Dryers</b> Brown, Horace T. Cummer, F. D. & Son Co. Denver Eng. Wks. Co. <b>Dump Cars</b> Denver Eng. Works Co. Hendrie & Bothoff Mfg. Co. <b>Educational Institutions</b> Arizona School of Mines. Columbian University. Chicago School of Assaying. Correspondence School of Mines. Lehigh University. Mass. Inst. of Technology. Michigan Mining School. Rose Polytechnic Institute. Worcester Polytechnic Inst. <b>Electrical Batteries</b> Macbeth, James, & Co. <b>Electrical Machinery and Supplies</b> Besley, Chas. H., & Co. Link Belt Mach. Co. Okanite Co., Ltd. Repauno Chem. Co. Stiles, Geo. Walker Mfg. Co. Westinghouse Elec. Mfg. Co. <b>Elevators, Conveyors and Hoisting Machines</b> Brown Hoist. & Conv. Mach. Co. Caldwell, H. W., & Co. California Wire Wks. Co. Cooper, Hewitt & Co. Croat, W. A., & Bros. Co. Denver Eng. Wks. Co. Electrical Engineer-Ing Co. General Electric Co. Jeffrey Mfg. Co. <b>Elevators, Conveyors and Hoisting Machines</b> Brown Hoist. & Conv. Mach. Co. Caldwell, H. W., & Co. California Wire Wks. Co. Cooper, Hewitt & Co. Croat, W. A., & Bros. Co. Denver Eng. Wks. Co. Electrical Engineer-Ing Co. Field & Goetzman. Fraser & Chalmers. (See Wire Rope Tramway and Machinery.) <b>Emery Wheels</b> Besley, Chas. H., & Co. New York Belting & Packing Co., Ltd. <b>Engineers, Chemists, Metallurgists</b> (See Directory Pages 4, 5 and 6.) <b>Engineers' Instruments and Supplies</b> Buff & Berger. Bullock & Crenshaw. Dietzgen, F., & Co. Fauth & Co. Gurley, W. & L. E. Heer, Peter. Philadelphia Eng. Works, Ltd. Rifon Iron Works. Rocke Hardware Co. Stillwell - Bierce & Co. Ellison, Wm., & So... Fraser & Chalmers. Heine Safety Boiler Co. Lidgerwood Mfg. Co. (See Machinery.) <b>Excavators</b> Bucyrus Steam Shovel & Dredge Co. Marion Steam Shovel Co. Southern & Co. Vulcan Iron Works. <b>Fire-Brick and Clay</b> Chur, A. T. Denver Fire Clay Co. Moore, S. L., & Son Co. Shellock, W. B. & Co. Sheffield Car Co. Hoskins, Wm. (See Machinery.) <b>Fuses, Powder</b> Ingersoll-Sergeant Drill Co. <b>Fuse Safety Co.</b> Climax Fuse Co. <b>Gas Engines</b> Norman, J. J., & Co. <b>Gas Works</b> Pollock, Wm. B. & Co.   Wood, R. D. & Co. <b>Gas Engineering, Etc.</b> Bristol Mfg. Co. <b>Gearing</b> Besley, Chas. H., & Co.   Denver Eng. Wks. Co. Chester Steel Cast. Co.   Fraser & Chalmers. (See Machinery.) <b>Grease, Graphite, Etc.</b> Besley, Chas. H., & Co.   Dixon, Jos., Cruc. Co. <b>Harvested Steel</b> Pierce & Miller Engineering Co. <b>Heavy Machinery</b> Denver Eng. Works Co. Fraser & Chalmers. <b>Rose, Rubber, Etc.</b> New York Belting & Packing Co. Ltd. <b>Injectors</b> Penberthy Injector Co. <b>Insulated Wires and Cables</b> Okanite Co., Ltd. The	<b>Insurance Companies</b> Hartford Steam Boiler Inspect'n and Ins. Co. Mutual Life Insurance Co. <b>Joint Venturing</b> Tight Joint Co. <b>Lead Linings for Chlorination Tubs.</b> Raymond Lead Co. <b>Locomotives</b> General Electric Co. Hunt, C. W., & Co. Porter, W. U., & Co. <b>Lubricators</b> Detroit Lubricator Co. <b>Machinery</b> <b>Dealers in Mining, Milling and Other Machinery</b> Allis, Edw. P., & Co. Bacon, E. C. Becket & Fyde & Mch. Co. Besley, Chas. H., & Co. Blake, T. A. Boston Ore Mach'y Co. Bradley Pulverizer Co. Buckeye Engine Co. Bullock, M. C. Mfg. Co. Caldwell, H. W., & Co. Card Electric Co. Carp'ter, Geo. B. & Co. Channon, H. C. Colorado Iron Works. Conners-Roger Mfg. Co. Crandall & Huff. Croat, W. A., & Bros. Co. Davis-Colby Ore R. Co. Denver Mfg. Mach. Co. Denver Eng. Wks. Co. Dodge Mfg. Co. Ellison, Wm., & So... Engelbach Ma. Mfg. Co. Field & Goetzman. Fraser & Chalmers. Hammorsley, Hamilton & La Maitre. Heine Safety Boiler Co. Hendrie & Bothoff Mfg. Co. Ingersoll-Sergeant Drill Co. Jeffrey Mfg. Co. Jesse, W. & Sons, Ltd. <b>Manganese Steel</b> Taylor Iron & Steel Co. <b>Metal Dealers</b> American Dev. & Mg. Co. Lawson Bros. <b>American Metal Co.</b> Am. Zinc-Lead Co. Baker & Co. Bath, Henry & Son. Besley, Chas. H., & Co. Bridgeport Copper Co. Cookson & Co. Elliott's Metal Co., Ltd. Eureka Co. Foster, Blackett & Wilson. James & Shakespeare. Johnson, Matthey & Co. <b>Metallurgical Works and Ore Processing</b> American Dev. & Mg. Co. Amer. Zinc Lead Co. Baker & Co. Batham Sm. & Ref. Co. Baltimore Copper Wks. Bridgeport Copper Co. Canadian Copper Co. Cookson & Co. Denver Eng. Wks. Co. Elliott's Metal Co., Ltd. Electro Cyanide Gold & Silver Extr'n Co. Foster, Blackett & Wilson. Fraser & Chalmers. General Gold Extr'n Co. <b>Mine Cars</b> Crandall & Huff. Denver Eng. Wks. Co. Hendrie & Bothoff Mfg. Co. Hunt, C. W., & Co. Nelsonville Foundry & Machine Co. Sheffield Car Co. Whiting Foundry Equipment Co. (See Machinery.) <b>Mine Mill and Smelters Supplies</b> Carpenter, Geo. B. & Co. Crandall & Huff. Denver Eng. Wks. Co. Dodge Mining Machinery Co. Gates Iron Works. Parke & Williamson. Roessler & Hasslacher Chemical Co. Steren, William E. (See Machinery.) <b>Mining and Land Companies</b> American Dev. & Mg. Co. Copper Queen Mfg. Co. Detroit Copper Mfg. Co. Eureka Co. Kearse Mfg. Co. Osceola Con. Mfg. Co. Tamarack Mfg. Co. Tamarack, Jr., Mfg. Co. <b>Nicks</b> Canadian Copper Co. <b>Ore Cars</b> Trux Mfg. Co. <b>Ore Roasters</b> Brown, Horace F. Cummer, F. D., & Sons Co. Davis-Colby Ore Roaster Co. <b>Ore Testing Works</b> Hunt, F. F. Ledoux & Co. Montana Ore Purchasing Co. <b>Packing and Pipe Coverings</b> Brandt, Randolph. Jenkins Bros. Hine & Robertson. Original Patent Aitchison, R., Perf. Metal Co. Fraser & Chalmers. Harrington & King Perforating Co. <b>Peroxide of Sodium</b> Roessler & Hasslacher Chemical Co. <b>Phosphor Bronze</b> Phosphor Bronze Smelting Co. <b>Pile Drivers</b> Bucyrus Steam Shovel and Dredge Co. Ingersoll-Sergeant Drill Co. <b>Pipes</b> Pollock, Wm. B., & Co.   Wyckoff, A., & Sons. <b>Platinum</b> Baker & Co. Johnson, Matthey & Co. <b>Powder</b> Atlantic Dynamite Co. Atlas Powder Co. Ingersoll-Sergeant Drill Co. <b>Pressure Blowers</b> Connorsville Blower Co. Hendrie & Bothoff Mfg. Co. D'Este & Seelye. (Curtis.)	<b>Publications</b> American Fertilizer. Arms & Explosives. Austrian Mfg. Stand. Bullionist. Colliery Guardian. Denver Republican. Economic Mining. El Minoero Mexicano. Electrical Plant & Electrical Industry. Pumps. Blake, Geo. F. Mfg. Co. Cameron, A. S., Steam Pump Works. Denver Eng. Wks. Co. Fraser & Chalmers. Goulds Mfg. Co. <b>Quarrying Machines</b> Ingersoll-Sergeant Drill Co. Rand Drill Co. Sullivan Machinery Co. <b>Quicksilver</b> Sureka Co. <b>Railroads</b> Chicago & N. West. R. R. C. B. & Quincy R. R. Denver & Rio Grande R. R. Denver, Leadville & Gunnison Ry. Florence & Cripple Creek R. R. Hill Central R. R. Midland R. R. of Kentucky. Rio Grande Southern R. R. U. P. D. & G. R. R. <b>Railroad Supplies and Equipment</b> Carpenter, Geo. B., & Co.   Hunt, C. W., & Co. Channon, H. C.   Porter, H. K., & Co. Crandall & Huff.   Robinson & Orr. Fairbanks Co.   (See Machinery.) <b>Regulators, Damper, Ident, Etc.</b> D'Este & Seelye Co. Edly Valve Co. Jenkins Bros. <b>Return Steam Traps</b> D'Este & Seelye. (Curtis.) <b>Rock Drills.</b> (See Air Compressor.) <b>Roasting</b> Berlin Iron Bridge Co.   Pittsburgh Bridge Co. Cincinnati Corrugating Co.   Scaife, Wm. B., & Son Shiffner Bridge Co. Sikes Steel Roofing Co. <b>Rubber Goods</b> New York Belting & Packing Co., Ltd. <b>Scales</b> Fairbanks Co. <b>Screens</b> Aitchison, R., Perf. Metal Co. Denver Eng. Wks. Co. Fraser & Chalmers. Harrington & King Perforating Co. Link Belt Machinery Co. Ludlow-Hay Wire Co. (See Machinery) <b>Second Hand Machinery</b> Robinson & Orr. <b>Separators</b> Dodge Mining Machinery Co. <b>Shoes and Dies</b> Chester Steel Cast. Co.   Fraser & Chalmers Corom Steel Works.   Pierce & Miller Eng Crescent Steel Co.   neering Co. Denver Eng. Wks. Co. <b>Shovel</b> Bucyrus Steam Shovel & Dredge Co. Marion Steam Shovel Co. Southern & Co. <b>Smelting and Refining Works</b> Batham Sm. & Ref. Co. Baltimore Copper Wks. Penna. Salt Mfg. Co. Bridgeport Copper Co. Penn Smelting and Refining Works. Elliott's Metal Co., Ltd.   Phosphor Bronze Smelt. Co. Kan. City Sm. & Ref. Co. Mathison Smelting Co. <b>Steam Traps</b> D'Este & Seelye. (Curtis.) <b>Steel Rails, Castings, Reels, Drill Steel</b> Bethlehem Iron Co.   Pierce & Miller Eng Carpenter Steel Co.   neering Co. Chester Steel Cast. Co.   Robinson & Orr. Chrome Steel Works. (See Metal.) Crandall & Huff.   Pollock, Wm. B., & Co. Crescent Steel Co.   Scaife, Wm. B. & Co. Moore, S. L., & Sons Co.   Taylor Iron & Steel Co. Tanks.   Jessup Wm. & Sons Denver Eng. Wks. Co.   Walker Mfg. Co. Gates Iron Works.   Williams Mfg. Co. <b>Telegraph Wires and Cables</b> Okanite Co., Ltd. The. <b>Temperature Regulators</b> D'Este & Seelye. (Curtis.) <b>Testing Laboratories</b> Fairbanks Co. <b>Teels</b> Besley, Chas. H., & Co. Pratt & Whitney Co. <b>Tubes</b> Besley, Chas. H., & Co.   Pollock, Wm. B. & Co. <b>Turntable</b> Williams Bros. <b>New York Belting and Packing Co., Ltd.</b> <b>Turbine Water-Wheels</b> Leffel, Jas., & Co. Pelton Water Wheel Co. Stillwell-Bierce & Smith-Valle Co. <b>Valves</b> D'Este & Seelye Co.   Fairbanks Co. Edly Valve Co.   Jenkins Bros. <b>Ventilators</b> Bullock, H. C. Mfg. Co.   Tod, Wm., & Co. Fraser & Chalmers. <b>Volcanic Emery Wheels</b> New York Belting and Packing Co., Ltd. <b>Water-Wheels</b> Leffel, James & Co. Pelton Water Wheel Co. Stillwell-Bierce & Smith-Valle Co. <b>Well Drilling Machinery</b> Sullivan Mach'y Co.   Williams Bros. <b>Wharves</b> Lambert's Wharf. Co. <b>Wheels, Car</b> Chester Steel Cast. Co. Sheffield Car Co. Taylor Iron & Steel Co. <b>White Lead</b> Cookson & Co. Foster, Blackett & Co. <b>Wire Cloth</b> Aitchison, R., Perf. Metal Co. Barnum, E. T. Harrington & King Perforating Co. <b>Wire Rope and Wire</b> Besley, Chas. H., & Co.   Hunt, C. W., & Co. Broderick & Bascom.   Leaven, A., & Sons Rope Co.   California Wire Wks. Co.   Phelps, Dodge & Co. Carpenter, G. B., & Co.   R'bling, J. A. Sons & Co. Carpenter Steel Co.   Ropeways Syndicate Channon, H. C.   Trenton Iron Co. Cooper Hewitt & Co. <b>Wire Rope Tramway</b> Brown Hoist. & Conv. Mach. Co. Hunt, C. W., & Co. California Wire Wks. Co.   Roebeling, J. A., & Son Colorado Iron Works.   & Co. Denver Eng. Wks. Co.   Ropeways Synd., Lt. Fraser & Chalmers.   Vulcan Iron Works.	<b>Financial Times</b> Indian Engineer I'n & C. Trade Review McNeill's Code Mining Journal. Poor's Manual of R. R.'s Denver Republican. Economic Pub. Co. So. African Mfg. Jour. Spain & Chamberlain. Zeitschrift fur Practische Geologie. Hooker Steam Pump Works. Jeanesville Iron Works Smith-Valle Co. Tod, Wm., & Co. Worthington, Henry
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POSITIONS VACANT.

FREE ADVERTISING

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them, and in attending to the correspondence of applicants, are incurred in the interest, and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

1447--WANTED--FOR A GOLD MINE in Georgia, competent assistant foreman; also nine miners experienced in the use of power drills as head men; chance for family without children to take charge of boarding house for 40 men; references required. State wages expected for steady work. Address GOLD STAR, ENGINEERING AND MINING JOURNAL.

1448 WANTED.--A CHEMIST WELL UP in the manufacture and analysis of salts. State age, experience and salary expected. Address SODIUM, ENGINEERING AND MINING JOURNAL.

1453 WANTED A COMPETENT MAN TO take charge of sulphuric, nitric and muriatic acid departments; state age and experience. Address MODERN, ENGINEERING AND MINING JOURNAL.

1456 WANTED--A DRAUGHTSMAN WHO has had experience in designing and building blast furnaces. State qualifications, references, etc. Address P. Z., ENGINEERING AND MINING JOURNAL.

1457 WANTED--FOR FREE MILLING and smelting property (gold) near Prescott, Arizona, competent mine superintendent who can make his own assays and run his own levels; must have skill-edged references; developed property. Address FREE MILLING, ENGINEERING AND MINING JOURNAL.

1458 WANTED--QUARRY FOREMAN. A hustler, for Canada, State experience, wages expected (common labor is \$1 per day), etc. Address A. A. C., ENGINEERING AND MINING JOURNAL.

1459 WANTED--A FIRST-CLASS ASSAYER and thorough ore sampler to take charge of a branch office in the Mexican Republic, through which ores are purchased and bullion sold and a general mining and milling supply business done. Promptness, system, accuracy and thoroughness essential qualities. Address CARBON, ENGINEERING AND MINING JOURNAL.

1460 WANTED--MINE SURVEYOR AND general assistant in engineering, by large mining and smelting company in Mexico; climate healthy. Address OZONE, ENGINEERING AND MINING JOURNAL.

1461 WANTED--A MAN WHO HAS HAD practical experience in treating gold and silver ores and is competent to make accurate assays. Address LUZARNE, ENGINEERING AND MINING JOURNAL.

1462 WANTED--BY A FINANCIAL COMPANY, to represent them in Western Australia, a thoroughly qualified mining engineer, with a large experience in gold mining. Liberal terms will be arranged. Address, giving copies of testimonials as to character and ability, MINING, ENGINEERING AND MINING JOURNAL.

SITUATIONS WANTED.

Advertisements for SITUATIONS WANTED will be charged only 10 cents a line.

POSITION WANTED AS ASSAYER AND assistant by young graduate who is at present employed in Colorado gold mine. Considerable practical experience, and has studied abroad. Can survey, keep books and is familiar with cyanide process. Speaks French and some Spanish. Best of references. Address I. S., ENGINEERING AND MINING JOURNAL. No. 17,409, May 30.

MINING ENGINEER, GRADUATE, AGE 28, single, would like a position as assistant manager or superintendent in charge of mines or reduction works. Salary no object. Best references. Address MINING, ENGINEERING AND MINING JOURNAL. No. 17,407, May 30.

CHEMIST (AGE 30), EXPERIENCED IN permanent station work and in control and running of fertilizer factory, desires position. Can design and erect small fertilizer factory. Best references. Address Box 1,492, ENGINEERING AND MINING JOURNAL. No. 17,410, May 30.

A MILL MAN, WITH 14 YEARS' PRACTICAL experience with the chloridizing and leaching of silver ores in Mexico and United States, is now open for engagement. A 1 reference. Address J. H. J., 857 18th St., Denver, Colo. No. 17,419, June 13.

EXPERIENCED METALLURGIST (Ph. D.) wishes management of gold, silver or lead property. Successful treatment of refractory ores. Address COLORADO, ENGINEERING AND MINING JOURNAL. No. 17,428, June 6.

CHEMIST AND METALLURGIST, WITH many years' experience, is open for engagement. Would like position as chemist or superintendent of smelting works, chlorination or cyanide mills. First-class references. Address M. A. M., 205 Boston Building, Denver, Colo. No. 17,417, June 13.

A METALLURGIST, LEAD AND COPPER, in charge of large works in Mexico, wishes engagement with reliable company in the States. Successful experience. Best references. Address MEXICO, ENGINEERING AND MINING JOURNAL. No. 17,413, June 27.

EXPERIENCED, PRACTICAL, ACCURATE Chemist and Metallurgist wishes position as Chemist or Assistant in acid works, smelting works, steel works, or blast furnace. Low salary. Address PRACTICAL, ENGINEERING AND MINING JOURNAL. No. 17,418, May 30.

WANTED.--TRAVELING SALESMAN Acquainted in most of the large metal working and machine works in the Middle and Southern States, is open for engagement. Address ROAD SALESMAN, ENGINEERING AND MINING JOURNAL. No. 17,421, June 6.

WANTED.--A1 SALESMAN, WELL UP IN gas works, water-works, railroad and machinery supplies of every kind, wants selling agency for Pennsylvania, New Jersey and Maryland, within a radius of 100 miles of Philadelphia. Address METALS, ENGINEERING AND MINING JOURNAL. No. 17,422, June 6.

YOUNG MAN, THIRTY YEARS OF AGE, desires position as foreman or assistant superintendent of copper or lead silver smelter. Has practical knowledge of reverberatory and blast furnace work; practical builder of both furnaces. Address COPPER, ENGINEERING AND MINING JOURNAL. No. 17,423, June 20.

EXPERIENCED, ACCURATE, DOUBLE ENTRY bookkeeper, stenographer and typewriter, familiar with details of mining-office work, is open for engagement. References. Address W. R., 1645 Champa street, Denver, Colorado. No. 17,430, May 30.

ASSAYER -- POSITION WANTED BY a young man practically experienced in assaying gold ores, sweeps and bullion; also with general knowledge of chemistry, analysis of metals and alloying. Address MARTIN SCHWITZER, 382 Third St., Brooklyn. No. 17,424, June 20.

WANTED--A POSITION AS ASSISTANT in laboratory by a young man graduate of analytical laboratory, in which he has acted as assistant five years; thorough knowledge of chemistry. Address X. Y. Z., ENGINEERING AND MINING JOURNAL. No. 17,429, June 6.

YOUNG MAN OF SIX YEARS' EXPERIENCE in copper mining and smelting, as assayer, chemist and metallurgist, desires position. Speaks Spanish. References. Address CAPABLE, ENGINEERING AND MINING JOURNAL. No. 17,427, June 27.

POSITION WANTED--CHEMIST, AGE 30, four years in German universities, degree, Ph. D., nine years of practical experience in chemical works, mines and smelting works, now in position in St. Louis, wishes to make change. Can do chemical work of every description. Best of references. Address ACCURATE, ENGINEERING AND MINING JOURNAL. No. 17,425, June 20.

ELECTRICAL ENGINEER, AGE 21, TO graduate in June from Lehigh University, wants work after July 1st, electro-metallurgy preferred. Address EL&C TRIC, ENGINEERING AND MINING JOURNAL. No. 17,425, June 20.

Contracts Open.

TREASURY DEPARTMENT, OFFICE SUPERVISING ARCHITECT, Washington, D. C., May 19th, 1896. Sealed proposals will be received at this office until 2 o'clock P. M., June 16th, 1896, and opened immediately thereafter, for all labor and materials required for the erection and completion of an operating wing to the U. S. Marine Hospital at Chicago, Ill., in accordance with the drawings and specification therefor, copies of which may be had at this office or the office of the Superintendent of Construction at Chicago, Ill. With each bid must be enclosed a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any or all bids or to waive any defect or informality in any bid should it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked "Proposal for the Erection and Completion of an Operating Wing to the U. S. Marine Hospital, Chicago, Ill.," and addressed to Wm. Martin Aiken, Supervising Architect. Orig.

TREASURY DEPARTMENT, OFFICE SUPERVISING ARCHITECT, Washington, D. C. May 26th, 1896. Sealed proposals will be received at this office until 2 o'clock, p. m. on the 18th day of June, 1896, and opened immediately thereafter, for all the labor and materials required for the low pressure steam heating apparatus for the extension to the U. S. Bureau of Engraving and Printing at Washington, D. C., in accordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at the building. Each bid must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid should it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked "Proposal for the Low-Pressure Steam Heating Apparatus for the Extension to the U. S. Bureau of Engraving and Printing at Washington, D. C.," and addressed to WM. MARTIN AIKEN, Supervising Architect. Orig.

BRIDGE.--Currie, Minn.--Bids will be received until June 22d for building a concrete arch or iron bridge with masonry foundations. W. H. MELLEEN, Chairman, Township Board.

Thro' Ute Pass



Colorado Midland Railroad

Shortest and Best Route

The Line to Manitou Cascade Green Mt. Falls Manitou Park Cripple Creek Buena Vista Leadville Aspen Glenwood New Castle Grand Junct. Salt Lake Ogden and the West

Pullman Sleeping Car and Reclining Chair Cars on Thro' Trains General Offices Denver

GEO. W. RISTINE, Receiver. W. F. BAILEY, Gen. Pass. Agt.

THE ENGINEERING AND MINING JOURNAL

ADVERTISING RATES. (NONPAREIL MEASUREMENT.)

Table with columns for Lines, Inches, Regular Edition, One Month, Three Months, Six Months, Nine Months, and Twelve Months. It lists advertising rates for various ad sizes and durations.

SPECIAL POSITIONS.

Front page, double regular rates. Back outside page, 80 per cent. above regular rates. Page facing editorials, 50 per cent. above regular rates. Page facing market reports, 25 per cent. above rates. Inside front cover, 50 per cent. above regular rates. Inside back cover 25 per cent. above regular rates.

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FOR SALE, CHEAP.

One 9 x 14 cylinder Porter Locomotive, with saddle tank, six 28-in. drivers, coal burner, 38-in. gauge, steam brake; weight 11 1/4 tons. Immediate delivery in Western Pennsylvania.

ROBINSON & ORR, 419 Wood Street - PITTSBURG, PA. Also a small car of light T Rails for relaying.

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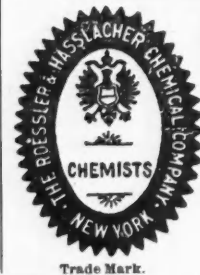
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