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Cripple Creek Fires.

Cripple Creek, the newest and largest gold mining camp in this country, has again suffered a terrible destruction of property in the fire of the 29th April, following that of the 25th, which was more than suspected to be the work of incendiaries with the object of plunder, chiefly directed against funds in the First National Bank. This last fire was also of an incendiary character and destroyed the remaining portion of the town left standing from the former and was equally destructive in its effects, so that Cripple Creek may be said to be virtually wiped out. In such a case the direct losses are never nearly covered by insurance, and the indirect losses, misery, and discomfort are uninsurable, for all which misfortunes Cripple Creek is entitled to the most sincere sympathy from every one.

The destruction of the town by fire does not of course affect the producing capacity of the mines, but at the same time it cannot fail to produce a certain disorganization which will probably show itself in a diminished product this month. We have not the slightest doubt but that the characteristic energy of Westerners in general, and Coloradoans in particular will cause Cripple Creek to rise like a Phoenix from its ashes, better built than before, and better protected against fire, and that within a very short time the production of its mines will resume their normal output.

General Electric Company's Report.

Referring to the annual report of the General Electric Company of which we gave a very full extract in our last week's issue, we wish to draw attention to the large amount of useful information contained therein, for the benefit of the stockholders. In this respect the report is a model for the great majority of corporations and it would tend very much to confidence and a sense of security in investments when made, if such a form of report were followed in other cases. The addition to capital account during the year increasing the company's assets in that direction are clearly shown and the amount written off on account of depreciation of their property, and reduction in value of patent and manufacturing plants are fully set forth and show a safe and conservative administration. The increase in value of business was less than 10 per cent. greater than that of the preceding year but at the same time the increase in the capacity of the plant and the actual output were respectively about 25 and 30 per cent. greater. The prospects for the current year are certainly bright and there seems but little doubt that the development in railroad traction will be considerable. The varied fields into which the company have carried their business and the great development of long distance transmission in mining and metallurgy are of high interest to the readers of the Journal as well as to the stockholders of the General Electric Company.

Tharsis Sulphur and Copper Company.

We publish in another column a full abstract of the report of the Tharsis Sulphur and Copper Company for the past year. In some respects the report gives a fair amount of information to the stockholders, but in others it is unfortunately deficient. There is no information as to the average price at which the copper and sulphur was marketed, nor the actual amount that was marketed, but only the figures as to the amount shipped, with the rather vague statement that the cost of copper was lower than it had ever been, and that the amount produced was greater than it had ever been. Figures relating to cost of removing overburden, and cost of mining and marketing, are entirely omitted. It may be all right for both the board of directors to publish their accounts in this shape, and for their stockholders to accept them, the latter having so much confidence in the directors on account of their undoubted integrity. Still it is a very bad example to set, and is apt to lead to great abuses, as a similar prominent example has in this country. In other companies where the directors are not men of such undoubted standing, directors take refuge behind the shelter of such an example, and take advantage of the stockholders with the most disastrous results.

The dividend declared by the Tharsis Company is the highest that it has paid during the last four years being at the rate of 17 1/2 per cent. on the par value of the stock which gives a return for the investor of 6 1/2 per cent. interest at the current market quotation, and judging from the price of copper since the commencement of the present year and the outlook of the market, they ought to be able to maintain profits in much the same ratio. All the copper companies in which the English and French investors are interested have shown remarkable improvements in their dividend distribution for the past year over the preceding three years as will be seen from the following table, which we take from the Economist:

Table with columns: Dividends (1895, 1894, 1893), Price, Yield. Rows include Cape Copper, Copiapo, Mason and Barry, Rio Tinto, Tharsis.

The Merced Bubble.

The stock of the Merced Gold Mine which was booming in Boston, up near 60, with predictions of 100, when the *Engineering and Mining Journal* exposed the scheme and told what the mine was fairly worth, has been steadily tumbling ever since and was only sustained for some time past by the expectation that the first run of the new mill would show something satisfactory. It was indeed to be expected that there had been accumulated a quantity of the best ore the mine could produce, to start upon.

The mill run has been so disappointing, that the officers have declined to state the result—perhaps some of them unlike Captains Couch and Palmer who sold out when the stock was high up in the forties, still hold some of the precious "securities" and wish to unload before all the fools have learned their value.

The quotations have gone down as low as 11½, which still leaves room for a heavy tumble; perhaps when it gets down to a small part of the \$10 paid in, there may be found some willing to assume the liability for a call of \$5 a share which still hangs over the stockholders; but, on the other hand, the costly experience purchased with Butte & Boston and with most of the other Bigelow stocks since the policy of secrecy was adopted, may however have taught a lasting lesson, and those with money to invest, to gamble with, or even "to burn," may conclude that they can get more fun, and probably more dividends, by investing it in some other game of chance.

Our esteemed contemporary, the *Boston Herald*, the only paper of the Hub that ever ventures to publish the truth about the "Bigelow management" speaks of the Merced as an "enigma"—but this is not correct. There is no mystery about it, the mine had long been worked at a loss or with very small profit: it was hawked at \$100,000 and could have been purchased far below that figure; about \$125,000 was, we believe, the actual price at which the promoters bought it. A large amount has since been expended, and in part sunk, in work which was largely unnecessary. The mine contains a great amount of very low-grade ore on which a moderate profit might possibly be made with a large mill and strictly economical management. There is no foundation for the extravagant claims made for the property by interested brokers, and in the face of the fact that those in the best position to know the truth long ago sold out their holdings, it seems unreasonable to suppose they left their principals ignorant of it. The end is not yet.

We first drew attention to this matter on September 7th, 1895, when glowing and grossly exaggerated statements were being made, if not by the directors, at least with their knowledge and consent, as they did not contradict them and must have known that purchases of stock were being made daily at the then prices on the strength of such statements. On that date we invited "the officers of the company to make public any information the company may be willing to give on this subject" through the columns of the *Journal*.

On September 14th, 1895, a correspondent from Boston entirely endorses our remarks. On September 21st, another correspondent, evidently well acquainted with the history of the mine and its value, writes from Kansas City and gives facts and figures that should have undeceived the most sanguine. Not one word from the responsible Directors and Managers to put themselves right with the public.

Witwatersrand Gold Production.

The cabled report of the Johannesburg Chamber of Mines for March at first sight shows a heavy reduction in the gold output of the Witwatersrand for the month, the total given being only 147,015 crude ounces. It appears, however, that nine companies have refused to make reports to the Chamber, indicating that the dissensions in that body, which has heretofore commanded the adhesion of all the working companies, are becoming serious. The nine companies which did not make returns are the Langlaagte Estate, the Langlaagte Block B, the George Goch Amalgamated, the Lancaster, the Randfontein, the Princess Estate, the United Main Reef, the Van Ryn and the Meyer & Charlton. Five of these—the Langlaagte Estate, Langlaagte Block B, George Goch, Meyer & Charlton and Van Ryn—have given out their returns through their London offices, the total reported by them for the month being 20,324 ounces. The other five are small companies, their aggregate output in February having been less than 4,000 ounces. Assuming that it was the same in March, as they were all at work, the total production of the Witwatersrand was 171,310 ounces, showing a gain of 4,292 ounces, or 2.6 per cent., over February, but a decrease of 13,635 ounces, or 7.4 per cent., as compared with March, 1895.

At the usual rate of fineness of Witwatersrand gold, the March output would be equivalent to 139,800 fine ounces. Considering the disturbed state of the country, and the many complaints which have been made as to the difficulty of securing labor, the showing made is not a bad one, though the apparent increase over February is not as great as the fact that there are two more working days in March would call for.

The troubles in the Chamber of Mines are those arising out of the so-called "reform movement," and though little has been said about them in the despatches, the indications are that they are increasing, and it is said that more companies are preparing to withdraw; at latest accounts 23 companies had already done so. The Chamber has been a useful body to the Witwatersrand in many ways.

The operations of the Goldenhuis Deep—the first of the deep level companies to reach the main reef and to obtain actual working returns—have been watched with a great deal of interest. The results for the first month or two were hardly a fair test, perhaps; but we have now the reports from the mine for three months of regular work—January, February and March. The company has a mill of 100 stamps and a cyanide plant, both of which were run steadily during the quarter. The total quantity of ore raised and crushed was 27,723 tons, from which there was obtained in the mill 6,179 ounces gold; 19,720 tons of tailings were treated by cyanide, yielding 3,682 ounces. The total return was therefore 9,861 ounces gold, an average yield of 0.35 ounce per ton. At the usual fineness this would give a return a little under \$6 per ton, which is far from satisfactory.

It is possible, of course, that in order to keep the mill at work the ore has not been selected, but everything taken out has been sent to the stamps. On the other hand the motive for making a good showing is strong, and it might be supposed that care would be taken to do the best possible. The returns have not been improving; in January 8,467 tons of ore were crushed, the average being 0.40 ounce per ton; in February 8,255 tons with an average of 0.34 ounce, and in March 11,000 tons, with an average of 0.33 ounce. There is no accumulation of tailings, the cyanide plant having been built of full capacity to take all that came from the mill. The Goldenhuis is not on a section of the reef which is of the best grade; but the result is hardly encouraging to the other deep level companies.

The sentence pronounced upon the Reform Leaders, including Mr. Hammond and its commutation is now a matter of history, well known to all of our readers, and no matter how they and the others who were placed on trial will be ultimately dealt with, it is a foregone conclusion that their services will be lost to the Rand district for many years if not entirely. We cannot see any other result than that the production of gold in the Transvaal will be unfavorably affected, as those chiefly interested as owners of the more important properties will find it hard to replace the men of whose services they are now deprived. No doubt there are other good men to be had both here and in Europe, but many who would have accepted a good appointment in the Transvaal six months ago, would hesitate considerably now before accepting.

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*.

Johnston's Electrical and Street Railway Directory for 1896. New York; The W. J. Johnston Co. Pages, 832.

Republica Mexicana. Exposicion del Sistema Metrico Decimal y Tablas de Equivalencias. 1895. City of Mexico; Nacional Printing Office. Pages, 24.

Republica Mexica: Ley sobre Pesas y Medidas de 19 de Junio de 1895, y Reglamento de la Misma Ley. City of Mexico; National Printing Office. Pages, 43.

New York State Museum: Bulletin No. 15. Mineral Resources of New York State. By Frederick J. H. Merrill, Albany, N. Y. Published by the State University. Pages, 595; with map.

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.

Gold Mining in the South.

Sir: In reply to article in *Journal*, March 28th, on Gold Mining in the South, I inclose a clipping from local periodical written last October. As to character of ores, pyritic or free milling, there is ample, and of good value as would do credit to any section. I do this not in the interest of any "gold boom" (for I was not aware that one was on), but solely that the truth may be made manifest.

L. C. CANNON.

WEST SPRINGS, S. C., April 18, 1896.

The "Welcome Stranger Nugget."

Sir: Kindly allow me space to correct a slight error in the interesting paper by Mr. T. A. Rickard printed in your issue of the 14th, December last. He states that the "Welcome Stranger" was a Ballarat nugget. The "Welcome Stranger" the largest Victorian nugget was found in the neighborhood of Dunolly and yielded 2,280 oz. of melted gold (2,248 oz. of pure gold). The largest Ballarat nugget was the "Welcome" nugget which weighed 2,217 oz. 16 dwt. The "Welcome" nugget was found on June 15th, 1858, and the "Welcome Stranger" on February 5th, 1869. The above mistake is commonly made even by residents in Victoria.

I am Yours, etc., ALEX PURDIE.

Professor of Geology etc., Ballarat School of Mines.

BALLARAT, March 16th, 1896.

Beryllium—Glucinum.

Sir: If you or any of your readers can inform me as to whether beryllium is actually being used for electrical purposes, and at what price it is obtainable, I shall feel much obliged. I have heard that it can be procured in quantities of a pound or less at about \$30 per pound. I am unable to confirm this, and shall be glad for any information through the medium of the *Journal*.

NEW YORK, April 17, 1896.

ELECTRICIAN.

[We published in the *Journal* a note on this subject in our issue of February 15th, our authority being the *Electrical Review* of London, stating the price to be nearly \$18 per pound. The production of this metal has not as yet been undertaken in this country.—Ed. E. & M. J.]

First National Convention of Foundrymen.

Sir: The first National Convention of Foundrymen ever held in the United States will take place at Philadelphia, Tuesday, Wednesday and Thursday, May 12th, 13th and 14th, 1896. It is to be held under the auspices of the Foundrymen's Association of Philadelphia. I am requested by the Committee on Call to cordially invite you, and shall deem it a great favor if you will extend the invitation through your valuable columns to the foundrymen who may read your paper. The reduced railroad fares extend to all parts of the United States east of Chicago, and upon application any one wishing further information on this point will be furnished it without delay, with full particulars.

The object of the convention is to bring about a more friendly feeling among the foundrymen of this country, and to allow of the presentation and discussion of papers upon interesting subjects, and other similar objects.

The business headquarters will be at the Manufacturers' Club, 1,409 Walnut street, while the hotel headquarters will be at the new Hotel Walton, so well and favorably known. Arrangements have been made with nine other hotels conveniently situated, on both European and American plans, at reasonable prices.

The following papers will be presented: 1. The Chemistry of Iron, with Determinations and Their Value, by Charles James and W. C. Henderson. 2. Physical Tests and Chemical Strength of Cast Iron, by W. J. Keepe. 3. Apprenticeships, Their Value, and How to Make New Molders, by D. J. Matlock. 4. Foundry Cranes, with the Different Methods of Driving Them, by A. E. Uoterbridge, Jr. 5. Acid Openhearth vs Basic Openhearth and the Walrand-Legenisil Bessemer Process for Making Steel Castings, by Jos. Hartshorne. 6. The Air Compressor for use in the Foundry, by C. W. Shields, of The Ingersoll-Sergeant Drill Company, Easton, Pa. 7. Cupolas and Cupola Practice up to Date, by Dr. Edward Kirk, Philadelphia. 8. Utility and Advancement of Green, Dry, and Loam Sand Molding, by Thomas D. West, Sharpville, Pa. 9. Gear Molding and Gear Molding Machines, by S. Groves, of Taylor, Wilson & Co., Limited, Pittsburg, Pa. 10. The Sand Blast for Cleaning Castings, by Fred. C. Brooksbank, of Ward & Nash, Boston, Mass. 11. Molding Machines and their Applications, by Harris Tabor, of Tabor Manufacturing Company, Elizabeth, N. J.

Invitations have been received from the Baldwin Locomotive Works, Wm. Cramp & Sons, Henry Disston & Sons, and other prominent manufacturers in the neighborhood of Philadelphia, and in the intervening time between the sessions advantage will be taken to visit these works in various parties, each following his own inclination.

HOWARD EVANS, Secretary.

PIER 45, NORTH DELAWARE AVE., Philadelphia, April 28.

The Institution of Civil and Mining Engineers of London.

Sir: In a recent issue of the *Engineering and Mining Journal* some remarks were made which were perfectly correct as referred to the above scheme, but I should like to point out to you that there is absolutely no proper comparison between that and the Institution of Mining and Metallurgy; the one you criticised was a proposed scheme of a joint stock character, got up by someone who is quite unknown both in the civil engineering and in the mining engineering professions, and without the slightest support by anyone of reputation in the business. The circular was distributed broadcast by the parties who got up the scheme, and I do not suppose that anything will ever come of it, and certainly no support will be obtained from any members of standing as an engineer, since the existing institutions cover in a much more efficient manner the objects proposed to be attained by the unknown parties who wish to start a little society of their own.

In your remarks you referred to a failure on the part of the Institution of Mining and Metallurgy to restrict the membership in some measure to those who are professionally entitled to the same. I do not think that the results at all justify such a conclusion on your part. It is recognized by everybody in the profession that it would be quite impossible to limit the members of any useful institution to those mining engineers whose reports could be absolutely accepted by the public on any proposition, and exactly the same would apply to the Institution of Civil Engineers or any other equivalent body. At the same time the Institution here by putting certain limitations as to practical experience on to membership does take a step which makes that membership, or will make that membership in time, of more value than if it were simply representing an ability to pay an annual subscription.

It is customary on this side for mining reports to be signed by engineers who give the initials of their membership in the American Institute of Mining Engineers as a sort of qualification, although the same is of course not accepted by members of the profession as any real qualification. If, therefore, membership of such institutions is used as an indication of some qualifications in the profession, the restrictions on the English Institution are certainly an advantage.

I do not consider that this portion of the Institution Rules here has been, therefore, any weak point, but is in fact its greatest advantage, and with the growing membership from engineers all over the world we have good reason for believing that the Institution will prove of increasing importance, and the average quality of papers prove more valuable

and interesting than in the past. You must not forget that the Institution here has suffered under some considerable disadvantages, besides those of youth, and that we have not here a Professor Raymond to devote the energy and special skill he possesses to the purposes of its development.

LONDON, April 9th.

WALTER McDERMOTT.

Sir Henry Bessemer on Nickel Steel.

Sir: I have read with much interest Sir Henry Bessemer's letter to the *Journal of the Iron and Steel Institute of Great Britain*, which you copy in the *Engineering and Mining Journal* of March 21st.

In this letter Sir Henry speaks in a very complimentary way of the paper read by Sir Henry Wiggin on nickel steel, before the Institute at its meeting in Birmingham in August last. He also speaks in a like complimentary manner of the paper read by Mr. James Riley before the Institute in 1888 upon nickel steel, and also makes favorable mention of the names of Mr. Marbeau and Mr. I. C. Hall in connection with this metal. Having thus complimented all of these names he gives his own experience and investigations, which he says date back to 1842.

Sir Henry is frank enough to state that, as he never made any of the results of his own experiments public, those who at a later date carried their experiments to a success were in no way indebted to him.

The facts are that neither Mr. Riley, Mr. Marbeau, Mr. Hall nor Sir Henry Wiggin—all of whom I know—were the discoverers of nickel steel. But the man who conducted a long series of experiments with the object of accomplishing a certain result, and while conducting these experiments produced nickel steel, was John Gamgee. His name is probably unknown to Sir Henry Bessemer, but it is a curious coincidence that he also, like Sir Henry, took his suggestions from meteoric iron.

I enclose you herewith a copy of the *Toronto Globe* of February 17th, 1894, containing an interview with myself with regard to the discovery of nickel at Sudbury and the origin and adoption of nickel steel by our government.

I also enclose copy of letter from myself to Fried Krupp under date of February 27th, 1887; copy of letter from General Tracy to myself under date of March 7th, 1892; copy of letter from myself to John Gamgee under date of February 28th, 1893; copy of letter from Gamgee to myself under date of March 10th, 1893.

From the data herewith enclosed you will see that Mr. Riley's experiments with nickel steel were 13 years later than those of Gamgee, and that at least five years previous to Riley's experiments an American firm (I think in Bridgeport, Conn.) were using Gamgee's alloy. All of the history contained in the enclosed data seems to be entirely unknown to Sir Henry Bessemer. My letter to Mr. Krupp, who, I believe, is also a member of the Iron and Steel Institute, was of a date 16 months previous to that of Mr. Riley's paper.

I do not pretend to have been the discoverer of this alloy. I have not the slightest desire to deprive any of the parties referred to in Sir Henry's letter of any of the honor to which they are entitled, nor have I any wish to dispute any of Sir Henry's statements, but as I was with Mr. Gamgee during all his experiments, saw them with my own eyes, aided him with my own hands, I feel like claiming for him the honor which is rightly his due.

The whole history of the discovery of this alloy and its adoption by the United States Government is such a strange blending of romance and reality that I have thought you might find sufficient material in the enclosed papers to form an interesting chapter for your new volume of the *Mineral Industry*.

S. J. RITCHIE.

AKRON, O., March 31, 1896.

Extract from letter referred to above dated March 10th, 1893, from John Gamgee: "I have used the metal from time to time since and one firm of American machine makers in America have continued to make nickel iron castings since I first instructed them in my methods in 1883."

TROPENAS STEEL PROCESS.

This process, comparatively little known in this country, has made considerable progress in Europe, the works now in operation or being erected including some of considerable importance, such as Edgar Allen & Co., Sheffield, England; Plichon & Co., Paris, and some eight or ten more, Russia, Belgium and Austria all being represented. It is claimed that the cost of Tropenas steel is lower than that made in any other converter and for certain purposes, such as machinery of almost every description, it can be used to great advantage.

The main features of the system are the use of a double row of tuyeres and their position being on one side of the converter only, greater depth of the converter, and the decarbonization attained under a very light pressure. The lower row of tuyeres are of large diameter and cylindrical, opening into a large blast pipe; these are called fining tuyeres. The top tuyeres are of smaller dimensions, and are called the combustion tuyeres. The main points of difference between the Tropenas process and other forms of Bessemerizing is that the compressed air does not enter the metal, but acts only on its surface, and in place of agitating the molten metal the point seems to be to keep it as quiet as possible during the operation.

One very important advantage claimed for the process is the very large per cent. of scrap iron that can be used it apparently being converted into steel of good quality, in some instances as much as 40% of scrap is used; the final additions (1% of 14% of ferro-silicon and 1.80% of 75% ferro-manganese) are added in a molten state in either the converter or ladle. No spectroscopic nor spectacles are employed in stopping the operation, the signs are so unmistakable and so well defined that any intelligent laborer can be taught to operate the converter in a week. The pressure of the blast being only 4½ lbs. any good rotary positive blower can be used instead of an air compressor. This is being done to-day in Germany. Very little ferro-silicon is used to make the charge liquid because this is accomplished by the top row of tuyeres.

New Use for Carborundum.—It is reported that a new use for carborundum is found in the manufacture of filaments for incandescent lamps.

ABSTRACTS OF OFFICIAL REPORTS.

Tharsis Copper and Sulphur Company, Limited.

Hecla Consolidated Mining Company.

The general manager reports that from the standpoint of profit the year 1895 was a failure, but had the conditions, quantity and quality of ore been the same as in 1894, the year 1895 would have been the most profitable in the history of the company since the great decline in the price of silver. This is shown by two tables first for 1895 showing that the total tonnage received, namely, 4,762 tons, contained 64.5 oz. of silver, 19.9% lead 29.2% silica and 10.5% iron. The corresponding period in 1894, the tonnage amounted to 8,122 tons, with a contents of 75.2 oz. silver, 23.3% lead, 21.5% silica, 9.2% iron. In 1895 the total receipts from all sources amounted to \$272,922.97; all disbursements (except dividends), \$245,589.07; net profit, \$27,333.90.

Owing to heavy carry over the surplus from 1894 of \$142,511.84, six dividends were distributed in 1895, amounting to \$90,000, leaving a surplus December 31st, 1895, of \$79,845.74.

The Cleopatra mine which for years yielded so much valuable ores, and which has been driven into the mountain for 3,300 ft., is now abandoned. Work is carried on in the Atlantis mine and Cleve mine, but not with such satisfactory results as formerly. The concentrator was in operation 201 days of 12 hours each, running entirely on tailings, the refuse product of the second class, which had already been put through the mill in former years; the product was 504 tons of concentrates, the average value of which was 29.4 lead and 46.9 oz. of silver per ton. The ratio of concentration was 21 to 1. The cost per ton treated 75c.; cost of ton per concentrate produced \$14.97. Cost of mining the first-class ore was \$22.91 per ton. The whole of the first-class ore, and a small amount of the second-class ore and the concentrates are treated by smelting. Cost of mining first and second-class, taken together, \$18.44 per ton; average cost of concentrating to date, 65.79c. per ton of crude ore. Total cash dividends to December 31st, 1895, \$2,100,000 in a period of 15 years.

The furnace report for the year ending December 31, 1895, shows that a total of 6,111 tons of ore, concentrates and furnace products were smelted, of which 4,763 tons were ore, 652 tons were concentrates, the amount of flux used being 1,165 tons of iron ore, 76 tons of lime and 2,505 of slag, making a total of 3,747 tons. The total amount of ore and flux put through the furnace, therefore, during the year was 9,858 tons. Of fuel there were consumed 1,105 tons coke, 563 tons of charcoal; total, 1,668 tons. Bullion produced 1,175,523 lbs. of lead, containing 245,596 oz. of silver. In addition to this there were 562,700 lbs. copper matte, containing 239,631 lbs. of copper and 102,045 oz. of silver, making the total production of silver 347,642 oz.; and in connection with this bullion and matte the value of gold produced amounted to \$6,791. The cost of coke per ton was \$16, and the charcoal per ton \$17, averaging \$4.46 per ton of ore, the daily average of coke used being 3.9 tons, and charcoal 2.1 tons. The average fuel charge was 11.3% coke, 5.7% charcoal. The furnace ran 281 days and 14 hours out of the 365, and the daily average of tons of all material was 41.

The two following tables show the comparative working of the mines and concentrator since 1882:

CONCENTRATOR.

Year.	Tons crude ore treated.	Tons concentrates produced.	Av. assay concentrates.		Tons lead in concentrates.	Oz. silver in concentrates.	Expenses.	Cost per ton of crude ore.	Cost per ton of concentrates.
			Pr. ct. lead.	Ounces silver.					
1882	20,258	3,882	41.5	68.4	1,607,355	261,165.30	\$24,380.28	\$1.20	\$6.28
1883	9,742	1,804	42.7	82.2	770,155	148,313.46	9,521.92	97.00	5.27
1884	7,913	959	56.0	117.0	500,000	112,644.14	6,566.87	83	6.85
1885	10,760	884	48	75.0	424,000	66,851.71	5,213.22	48.5	5.89
1886	10,522	1,425	48.8	63.7	698,000	91,918.73	6,071.34	57.5	4.25
1887	12,276	1,484	41.0	59.0	617,300	88,600.77	7,384.65	60	4.97
1888	12,954	1,647	45.0	59.0	741,000	88,685.25	6,717.75	51.5	4.07
1889	21,940	2,397	35.0	51.0	841,000	123,378.55	9,119.28	42.0	3.80
1890	21,610	1,935	35.0	52.0	693,000	101,823.08	10,570.58	48.5	5.16
1891	13,450	1,683	33.0	50.0	570,000	84,531.00	6,389.71	47.5	3.80
1892	7,997	841	32.0	47.0	271,000	39,637.00	3,368.50	67.5	6.38
1893	10,083	871	23.0	42.0	201,000	36,668.00	7,251.07	71.0	8.32
1894	11,044	514	29.0	46.0	151,000	24,109.00	7,698.00	75.0	14.97
Total.	170,629	20,330	40.0	61.0	8,156,000	1,248,626.99	\$112,253.17	\$0.65	\$5.52
Average									

MINES.

Name.	Production.	Year.	Gross ton including concentrates.	Cost per ton first-class mined.
Atlantis	17,782	1882	12,192	13.25
True Fisure and Sheep	36,922	1883	12,466	13.97
Cleopatra	97,207	1884	9,210	13.60
Ariadne	6,066	1885	12,286	10.84
Cleve and Avon	6,860	1886	9,842	12.39
Franklin	323	1887	11,249	12.20
Trapper	481	1888	17,557	11.25
Emma	9	1889	13,137	15.25
Ramshorn	76	1890	11,104	20.27
		1891	10,418	22.02
Tons, first-class	165,726	1892	8,333	20.60
Concentrates	20,330	1893	4,847	21.87
		1894	8,855	14.52
Total tons	186,056	1895	5,434	22.91
		Total.	186,056 Tons.

Tons first-class mined, 1895, 4,919, at cost of \$22.91 per ton.
Tons second-class mined, 1895, 1,186.
Cost of mining first and second-class, \$18.44 per ton.

The annual report of the above company, for the twelve months ending December 31st, 1895, shows that the mineral extracted from the Tharsis was 278,441 tons, against 333,896 tons in 1894, showing a decrease of 55,455 tons. At the Tharsis mines proper there were only 23,101 cubic meters of over-burden removed; this was from the Esperanza deposit. Work of this description is reported to be now practically completed in this part of the company's properties. From the Esperanza deposit 226,249 tons of schist were extracted, against 315,077 in 1894. The quantity of schist remaining in this deposit available for profitable working is now of limited extent.

At the Calañas mines there were removed during the year 283,113 cubic meters, against 264,806 in 1894. Mineral extracted amounted to 298,424 tons, showing an increase over the previous year 43,893 tons.

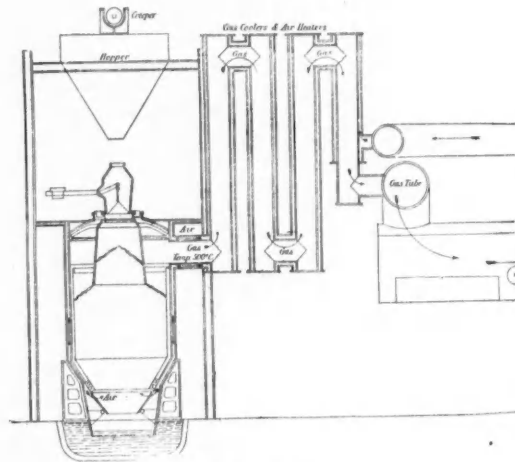
At the Lagunazo mines, being the other group owned by this company, the principal work prosecuted was the removal of 172,174 cubic meters of over burden; this has enabled the extraction of ore to be fairly commenced, 35,618 tons having been obtained, reported to be satisfactory in quality.

Summary.—The total quantity of mineral raised at all the mines was, therefore, 614,483 tons, against 588,427 tons in 1894, an increase of 24,056 tons. Production of copper at the mines was the largest in the history of the company, owing to a great extent to the abundant supply of water all through the year.

Pyrates shipments were 197,832 tons large mineral, 22,996 tons smalls and 6,001 tons washed mineral. This mineral, from which the copper had been recovered and now sold for its sulphur contents.

Of copper precipitate 9,443 tons were shipped against 7,386 tons the previous year. The reduction works and the refining works produced over 1,200 tons more of copper than they did last year owing to the larger shipment of precipitate from the mines. The refined copper was produced at a considerable lower cost than in previous years, great benefit being derived from the concentration of their scattered work; £23,690 were written off of the mines in Spain and £20,000 have been written off railway rolling stock and shipping piers.

Profit and Loss.—Including the sum of £14,948 brought forward from 1894, the total amounted for the year to £234,439, of which the directors



MOND'S GAS PRODUCER.

recommend £218,750 be appropriated in paying of dividend of 7s. per share, equal to 17½% on the capital of the company, and the balance of £15,689 be carried forward to the credit of the year 1895.

The tabular statements give no information as to cost of mining or marketing, nor are there details of producing or refining the precipitates.

The following is extract from abstract balance sheet showing the property and assets:

	Original Value.	Written off till date.		
By Mines in Spain:				
Tharsis and Calañas	£709,228 11 9	£564,228 11 9	£145,000 0 0	
Lagunazo	48,690 0 5	3,690 0 5	45,000 0 0	
By Railways and Shipping Piers in Spain:				
Permanent Way	413,362 11 5	275,574 4 3	137,788 7 2	
Rolling Stock	58,361 10 3	45,969 12 2	12,491 18 1	
Shipping Piers	51,381 16 8	41,031 17 2	13,349 19 6	
By Works, Buildings, Machinery, and Plant:				
In Spain	445,879 18 2	347,970 15 8	97,909 2 6	
In Britain	394,574 8 7	266,640 13 3	127,933 15 4	
By Miscellaneous Assets:				
Patents, Leases, Concession Rights, etc.	398,127 3 1	398,127 3 1		
By Stocks in Trade:				
In Spain (Including Preparatory Works.)	357,846 15 8		357,846 15 8	
In Britain	191,899 11 1		191,899 11 1	
By Debtors on Open Accounts	70,549 17 5		70,549 17 5	
By Bills, Securities, Cash at Bankers, and on hand	411,708 11 4		411,708 11 4	
	£3,554,610 15 10	£1,943,132 17 9	£1,611,477 18 1	

A New Chinese Mint.—The North China Herald, of Shanghai, dated January 31st, 1896, says: Sheng Hsio-jen, the father of Sheng Taotai, has obtained permission from Governor Chao, of this province, to build a mint at Sochow for the coining of dollars and subsidiary money. The works will be inside the Sūmēn gate, and the machinery from Europe is expected to arrive here within the next six weeks. The governor has advanced 50,000 taels for this purpose.

MOND'S COMBINED GAS PRODUCER AND SULPHATE OF AMMONIA RECOVERY PLANT.

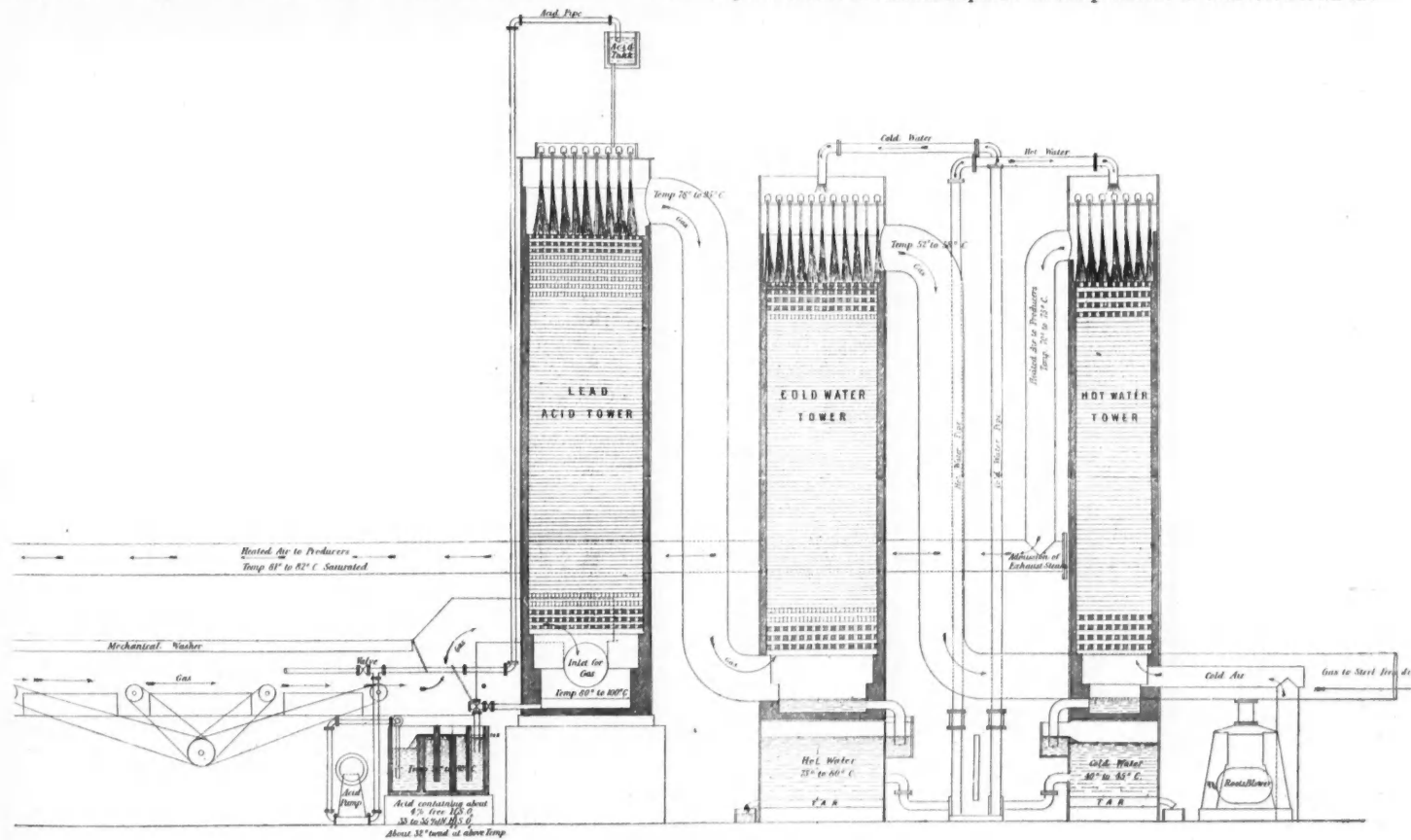
At the chemical works of Brunner, Mond & Co., Northwich, England, there is in operation a plant for the simultaneous generation of producer gas and the manufacture of sulphate of ammonia from the nitrogen in coal. This plant is the invention of Dr. Mond, and is the result of many years' study of the important problem of obtaining large and cheap supplies of sulphate of ammonia. So completely has the problem been worked out that not only is a maximum amount of ammonia obtained from the coal, but a producer gas of high calorific value is generated.

Before commencing to describe the plant in detail, it may be said that every possible point of efficiency and economy has been studied, such as the design of the producer furnace in order to use the cheapest fuel, the provision of scrubbers to remove all dust and tarry matters, the recovery of waste steam and the utilization of the heat of the gas. The accompanying illustration shows in a diagrammatic way the design of the plant.

The experiments of Dr. Mond showed that the yield of ammonia in the producer varied with the temperature and that it was highest when the producer was worked as cool as was compatible with a good combustion of the fuel. It was also found to depend on the amount of steam introduced into the producer, and the most favorable results were obtained by introducing 2½ tons of steam for every ton of coal consumed. Under these circumstances it mattered little what kind or quality of fuel was used, and common slack from the local coal-fields answered perfectly well. About 70% of the nitrogen contained in the coal is recovered, yielding 90 lbs. of sulphate of ammonia to the ton. The fact that so much

returned to the producer. As regards the producer, the lining lasts a very long time and little clinker is made, on account of the low temperature at which it is worked.

After passing through these pipes the producer gas is led through a chamber which is partially filled with water. This water is beaten into spray by revolving beaters, and the spray thus formed washes the dust and soot from the gas. The gas is reduced in temperature in this chamber to about 100° C., and it is further loaded with water vapor from the spray. The gas is then passed through a leaden scrubber which is filled with perforated bricks. This chamber contains the sulphuric acid for absorbing that ammonia. In practice it is found best not to use pure acid, but to keep in circulation a fairly concentrated solution of sulphate of ammonia, say 36% strength, which contains about 2½% of free acid. At regular intervals a certain proportion of this solution is withdrawn and the sulphate of ammonia recovered, the free acid being pumped back. After the gas has passed through the chambers its temperature is as low as 80° C., and as it is not fully saturated with moisture, no condensation takes place. The gas is then passed to a second scrubber constructed of wrought iron and filled with perforated wood blocks. In this it meets a current of cold water which condenses the steam, which heats the cold water to about 78° C. The gas is cooled to 50° C. in this chamber, and passes from it to the various places where it is to be consumed. The hot water in the chamber is pumped into a third scrubber of wrought iron, through which a current of cold air is forced in an opposite direction to the water. This air gets saturated with moisture and becomes heated to about 74° C., and is afterward forced back to the producer. The water leaves this third scrubber cold enough to be used again on the second scrubber. In this way about half the steam required in the producer is recovered from the



MOND'S SULPHATE OF AMMONIA RECOVERY PLANT.

steam had to be used is at first sight against the process, but Dr. Mond has arranged the plant in such a way that a large proportion of the excess steam and its heat is recovered. When it is mentioned that only one-third of the steam used is decomposed and the other two-thirds passes away with the gas it will be seen that the problem of recovering it was by no means simple.

The gas producers are cylindrical in shape and taper at the bottom. In the producer as used in practice about 24 tons of fuel are gasified every 24 hours. The dimensions of the producer are 10 ft. diameter or 21 ft. high. Toward the bottom of the producer casing the sides taper inward and end in a conical grate. This grate has a round opening in the center through which the ashes descend into a water lute. The upper portion of the producer has a cone and hopper for introducing the fuel, and underneath the cone is a bell-shaped casting about 7 ft. long which is kept partially filled with fuel. The casing of the producer consists of two wrought iron shells, and air saturated with steam is blown into the annular space between them. The air and steam after being thus distributed and heated, passes through the conical grate into the fuel. The producer is kept filled up to the bottom of the bell-shaped casting. When fuel is introduced it is first of all distilled as in an ordinary gas retort inside the bell-shaped casting. The gases given off are obliged to force their way downward through the hot fuel, and during their passage the tarry vapors become fixed and give no further trouble. The gas on being taken off from the producer at a temperature of 450° to 500° C. is made to pass up and down a series of wrought iron pipes before going to the washers. These pipes are surrounded by annular casings, which are protected from the air by some non-conducting material. The steam-saturated air coming forward to the producer passes through these annular casings, and is heated in there by the head of the producer gases, and so a considerable amount of heat is

gas, the rest being supplied from the exhaust of steam engines on the premises.

The producer gas in a dry state contains by volume 17% CO₂, 11% CO, 27% hydrogen, 42½% nitrogen, 0.4% olefins, and 1.8% methane. The fuel used is a common kind of slack, and contains 33½% of volatile matter, including water, 55% of non-volatile carbon and 11½% of ash. The calorific value of this gas is stated to be 80% of that of the fuel used, but the exact significance of this figure is not quite clear. At Brunner, Mond & Co.'s works ten of these plants are now in use, and the average cost per ton of sulphate produced is about £4 5s., the value of the gas being, of course, deducted from the cost of the coal. The profit is, therefore, considerable at the present price of £8 10s. per ton. The initial cost of the plant is large, viz., about £20,000 for a plant to produce 4 tons of sulphate of ammonia per day, but the cost is not so great as that of the recovery plant used in connection with blast furnaces.

A "Miners' Inch" Analogous to an Ampere.—A New York exchange having stated that, in engineering phraseology, there is no term for the rate of flow of one gallon per second, which would be the analogue of the ampere, has been corrected by Prof. T. O'Connor Slocane, writing to the *Electrical Review*, London, stating that this assertion is incorrect, inasmuch as the "miner's inch" is a perfect analogy for the ampere. The head of water represents the E. M. F. the aperture, the resistance, the rate of flow (the "miner's inch"), the ampere, as the miner's inch, by which water supply for hydraulic mining and irrigation purposes is very largely measured in the Western States, is the rate of flow that will take place through an orifice in a vertical surface 1 in. square, under a constant head. It is therefore an exact analogy to the ampere.

BESSEMERIZING NICKEL MATTE.*

By H. W. Edwards.

These notes were made from the result of work from 1891 to 1894 when the author had charge of a nickel smelting plant in Sudbury district, consisting of two blast furnaces and a set of Bessemer converters (Manbes molification).

The ore was representative of the district, being composed of massive pyrrhotite magnetic iron pyrites, about 4% nickel when free from gangue and about 2% copper in the form of chalcopyrite. The ore was easily smelted, the gangue being an easily fusible diorite, and when roasted, in most of heaps there was as much as 60% of pyrrhotite with the other minerals accompanying it, the nickel amounting to about 2.4% and copper 1.2%; the sulphur contents of the blast furnace operation would be about 5 or 6%, and the product of the blast furnace being a slag consisting of a moderate silicate of iron, 0.1% nickel, and a matte containing from 10 to 15% nickel, 5 to 7% copper, and 65 to 75% iron sulphide. The furnace was so arranged that the matte ran from the furnace directly to the converter, the length of which was 73 in.; diameter 5 ft. 8 in.; number of tuyeres, 12; diameter of tuyeres, 1 in.; capacity newly lined 1½ tons; with old lining, 3 tons.

The lining of the converters is the principal part on which the economical part of success depends as on the converter lining depends the efficient supply of silica to aid in the formation of a silicate of iron slag.

The following is a table of four descriptions of clays with four qualities of quartz showing the costs of 130 linings made of 13 different mixtures with various kinds of clay and quartz.

No. 1. White sandy clay with some feldspar, slightly fusible at incipient white heat; plasticity moderate; cost per ton, delivered, \$375.

No. 2. A red clay with much oxide of iron, very plastic; softens at a full red heat; cost per ton, delivered, \$4.

No. 3. A gray clay very infusible; plastic; cost per ton, delivered, \$5.

No. 4. Imported from Stonebridge, England, very plastic and very infusible; cost at furnace \$10.

A. Massive milky white quartz with about 20% albite; cost per ton at works, crushed, \$5.50.

B. Silicious tailings from Bruce Mine, cost per ton, delivered, \$2.50.

C. River sand, very fine, 97 to 98% silica; cost per ton, delivered, \$2.

D. Glassy quartz, very pure; cost per ton, delivered, crushed, \$4.

Mixture.	Clay used for 10 linings.		Cost of the clay for 10 linings.	Cost of the quartz for 10 linings.	Number of charges blown on the 10 linings.	Cost per charge blown.		
	Lbs.	Lbs.				For clay.	For quartz.	Total.
Clay No. 1 with Quartz A.....	13,500	37,000	\$25.31	\$64.75	53	\$0.48	\$1.22	\$1.70
" " " " B.....	15,000	41,500	28.12	51.87	66	0.47	0.86	1.33
" " " " C.....	18,500	40,000	34.69	40.00	37*	0.94	1.08	2.02
" " " " D.....	14,000	36,500	26.25	72.00	82	0.32	0.88	1.20
" " 2 " " A.....	12,700	38,000	25.40	66.50	51	0.50	1.30	1.80
" " 2 " " B.....	13,200	41,000	26.40	55.87	39	0.68	1.43	2.11
" " 2 " " C.....	16,000	40,500	32.00	50.62	34	0.94	1.49	2.43
" " 2 " " D.....	13,000	35,000	26.00	76.00	48	0.54	1.58	2.12
" " 3 " " A.....	12,000	39,500	30.60	63.87	81	0.38	0.79	1.17
" " 3 " " B.....	13,500	41,500	34.42	51.87	75	0.46	0.69	1.15
" " 3 " " C.....	12,500	38,000	31.87	76.00	86	0.37	0.88	1.25
" " 4 " " A.....	17,000†	42,000	31.87	52.50	318	0.86	1.42	2.28
" " 4 " " B.....	12,000	43,500	60.00	87.00	98	0.61	0.89	1.50

* Three linings failed altogether on blowing their first charge—want of adhesion.

† In these two cases the clay was mixed to a slurry, and then crushed quartz added. All other mixtures made by mixing dry pulverized clay with crushed quartz.

‡ Estimated weight.

§ Four linings had to be rebuilt before converters left re lining shop, the overhanging parts falling away while drying.

The molten matte is accumulated in the blast furnace in a suitable reservoir, and the converter is placed in position. On tapping the furnace the matte runs into the converter by an iron trough coated with clay. The only objection to this direct method, as opposed to its alternative, casting the matte into pigs and remelting it specially for the converters, arises from the inconvenience of not knowing the relative quantities of nickel, copper and iron sulphides present in the charge. The blowing would be over before one could make any satisfactory assay. Nevertheless, with practice, a fairly regular product was turned out.

The converter, now charged, is wheeled to a bell-mouthed iron chimney, supported on four pillars, where the blowing operation is conducted. Air connection between converter and engine is made by a pair of well-finished flanges fitted with three bolts and thumb screws, one flange fixed upon the twyer-box of the converter, and the other to 3 or 4 ft. of leather hose leading from the air receiver.

Starting with a pressure of air 5 lbs. per square inch, the first stage is marked by brilliant scintillations from the mouth of the converter accompanied by little or no flame or fumes, the agitation being at first very violent, in fact, more violent than later on at 7 lbs. The brilliant display usually lasts five to ten minutes, but is occasionally much prolonged if the amount of sulphide of iron exceeds 70% of the charge, and the action would be more violent in proportion as the initial temperature of the charge is higher, and also to the size of the charge. In such circumstances the blast pressure is reduced, sometimes as low as 3½ lbs. per square inch, and the twyers raised so as to present less resistance. I usually found a height of 30 in. of matte above the twyers gave the best results, but in the case of such violent action as I have just mentioned we sometimes had to work for a while with only 10 in. The quieting down was aided by the addition of cold matte to the charge, sometimes in surprising quantities 30% of the weight of the charge in more than one instance, all of which would be fused by the heat developed.

White Fumes and Flame Appear.—The air pressure is raised to 7 lbs. per square inch, the twyers immersed to their deepest below the surface of the

charge. The temperature of the charge begins to rise rapidly, and part of the sulphur seems to be given off as SO₂, while when the temperature has reached its maximum, or increases but slowly, the proportion of SO₂ appears to diminish or cease. SO₂ is, of course, given off copiously all the time. The flame at first is red; but as the temperature increases it becomes blue or green according to the size and temperature of the charge. The appearance and color of the flame is no indication of what is going on inside the converter; it can be relied upon only for negative indications. So long as the flame is red, or has any red or pink border, and so long as white fumes are mingled with the flame, there is still a considerable amount of iron in the converter as yet unoxidized; but as both of these appearances cease when the operation is but little more than half accomplished, they are not much practical guide. As the operations progress the fumes decrease and finally cease, leaving the flame of a transparent blue or green color which is maintained to the end. The end of the operation is judged rather by a perceptible diminution of temperature, not only of the flame, but also of the particles splashed or blown out of the converter, and by the appearance of these particles, which gradually become more frothy, and at last issue in flakes about the size of the open hand. The twyers are then raised above the level of the charge and the blast stopped. After a few moments' rest, to permit the slag and enriched matte to separate, the slag is emptied off, by rotation of the converter, into cast-iron pots, and the rich matte, so far as possible free from slag, into separate pots. The resulting rich matte usually contains but little sulphide of iron, sometimes less than 2%. The slag consists of silicate of iron, the silica being derived from the quartz of the lining, as before explained. The lining lasts from five to seven charges, when it has to be renewed, that is to say, sufficient quartz and clay rammed in to bring the interior cavity of the converter to its original size. For this it is not necessary to remove any more of the old lining than will give a solid bearing for the new material.

The amount of nickel oxidized is trifling, the copper and nickel in the slag being invariably present in the same proportions as in the original and final matte, showing it to be due merely to grains of matte entangled in the slag.

ANALYSIS OF THE RESULTING PRODUCTS.

	Final Matte.			Slag.		
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Nickel sulphide....	63.8	64.7	64.9	FeO	66.6	67.1
Copper sulphide....	32.4	32.1	33.8	SiO ₂	28.5	27.9
Iron sulphide.....	3.8	3.2	1.3	Cu	1.1	0.8
				Ni	1.9	1.6
				S	.5	.4

Cobalt when present is perfectly scorified with but little oxidation of nickel, forming a very ready means of commercially separating these two metals. Zinc, antimony, and arsenic in particular are completely volatilized. Bismuth, silver and gold are completely concentrated along with the copper and nickel.

In treating a lot of very cupreous ore containing copper about 8% and nickel about 1½%, I succeeded in producing in the converter a crude metallic alloy containing copper 76 and nickel 15%. Another lot from ore slightly different, gave an alloy of 68% copper and 28% nickel. Several carefully arranged experiments with one of similar tenor indicated that with proper modifications there would be no difficulty in regularly producing a crude metallic alloy of half nickel and half copper, or two-thirds nickel and one-third copper. The principal modification I would recommend would be the considerable increase in the size of the converters, say, to five tons per charge in order that there might be a greater quantity of heat developed, so that the increased temperature required by the nickel alloy may be attained.

The slag from the converters is in every instance returned to the blast furnace along with succeeding quantities of burnt ore. As all the slag has to be remelted, it will be evident that any efforts to diminish the proportion of slag produced by the converters, will, if successful, have a very important bearing upon the industrial aspect of the process. It naturally occurs to the mind that a basic, or at least neutral, lining in the converter would be beneficial. Unfortunately my experiences with basic linings were not very successful; and I believe repeated experiments by others, treating copper mattes by this process, have been failures. According to my own experiences one great obstacle would seem to be the retarding of the process itself. For example, a normal charge, estimated to require 50 minutes blowing on the ordinary silicious lining, required 1½ hours on a lining of lime. Such a retardation of the process it will readily be perceived almost halves the capacity of the converter plant while the running expenses for labor and steam power are unaffected.

CONDITIONS OF ZINC MINING AT AURORA, MO.

Sub-sections are divided into lots each 200 ft. sq., which leaves a strip 117 ft. wide on one side and 123 ft. wide on another side, making a total of 36 lots 200 × 200 ft.; 6 lots 200 × 117 ft.; 6 lots 200 × 123 ft.; and 1 lot 123 × 117 ft. Sometimes these lots are cut into quarters and sometimes in halves, depending upon the number of men working or the richness of the deposit.

Taxes are paid by the owners of land and property, and the mining land is assessed four to five times the value of farming land, an 80 acre tract being assessed about \$4,000. The mine owners are not legally liable for accidents. They have no operating expenses except pumping and for this they collect 5% royalty.

The following figures, given by one of the larger operators, give a fair idea of the expenses of running a plant, per diem. Wages: Superintendent, \$3; jigman, \$2.50; engineer, \$1.75; hoister, \$1.25; underground boss, \$1.50; two shovellers, \$1.25 each; 5 miners ("cutters"), \$1.25 each; crusher feeder, \$1.25; "rouabout," \$1.25. Total wages, \$21.25 per day. This mine produces 15 tons of mineral per week ready for market worth about \$250; 150 tons of ore are producing the above 15 tons of mineral or concentrates hoisted from the mine per week. The other expenses per week are: "forsyte" \$15; blacksmithing, \$5; general repairs, \$10; cord wood, \$15; total, \$45. The plant cost \$4,000, including the 45 H. P. boiler and the 40 H. P. engine. Assuming a cost for the property, and adding the interest of invested capital to the other expenses, we see that these mines are working on a fair paying basis.

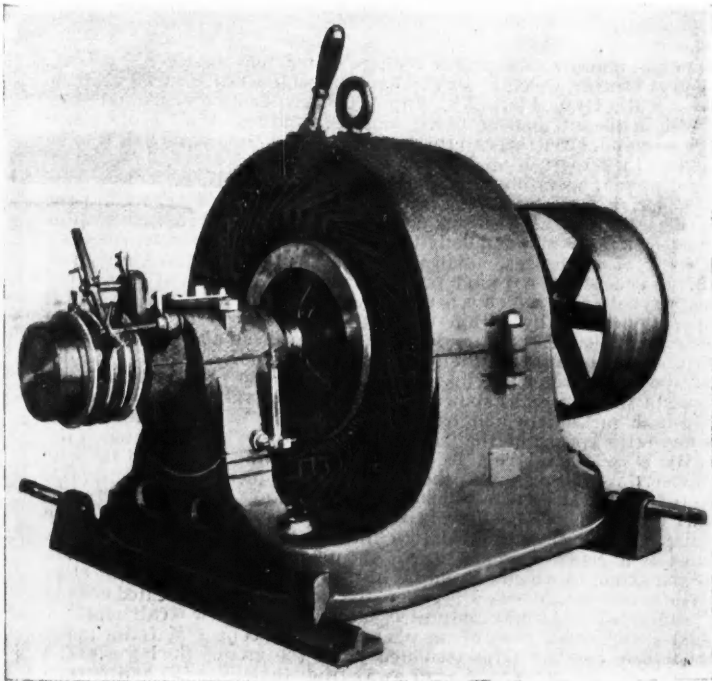
* Abstract of Paper JI. Soc. Chem. Ind.

ELECTRIC POWER TRANSMISSION.

The development of water power converted into energy by the aid of electric transmission for mining purposes is steadily gaining ground. Perhaps the most noticeable in this country are two three-phase mining plants and a polyphase Tesla plant. The two former are those at Silverton, Colo., and at Park City, Utah. That at Silverton is the first three-phase plant installed in the Rocky Mountain regions. It utilizes a water power taken from the Animas River through a 3 x 4 ft. flume, 9,750 ft. long. The electrical installation consists of two 150-kw. generators, driven by two double-nozzle Pelton wheels. The current, at 2,500 volts, is transmitted back up the mountains, a distance of over three miles, to an altitude of 12,300 ft. above sea level, where it is used to operate various mining machinery in the Silver Lake group of mines and to drive the stamps and crushers in the mill. Previous to the installation of this electrical plant the mines were operated by steam, and the coal cost \$3.75 a ton at the mine. It is calculated that an economy of \$36,000 a year will be effected by the use of electricity.

The Ontario mine located near Park City, in Utah, utilizes the power derived from the water of the drain tunnel of the mine—the most expensive tunnel ever constructed by any mining company. It is three miles long and discharges 1,000 cu. ft. of water per minute from its mouth. This water, under a head of 120 ft. drives generators of the General Electric monocyclic type, which furnish current at 2,500 volts for transmission around the mountain to the Ontario and Daly mines, five and a half miles distant, where it drives the mills and lights the surrounding buildings. Current from these machines is also taken to light the neighboring town of Park City.

The San Miguel Gold Mining Company are so well satisfied with the result of operating in Southwest Colorado, near Telluride, by long distance



POLYPHASE TESLA MOTOR.

transmission, that they decided to largely increase their plant for themselves and neighbors, and the new plant is now being installed, the striking features of which we now illustrate. This addition to the plant is supplied by the Westinghouse Company.

Electrical Supplies for South Africa.—Under the classification "Electrical," goods to the value of £2,897 were exported from England to South Africa for the second week in March, made up as follows: Cape Town, £1,117; Algoa Bay, £153; East London, £1,346; Natal, £281.

Conversion of Emery into Corundum.—Mr. Hasslacher has patented an electric process of converting emery into corundum by means of the arc of alternating currents, says the *Trade Journal Review*. As heat and not decomposition is aimed at, continuous currents would be unsuitable. The furnace is made of firebricks and stands on two bridges; the hollow underneath serves as receptacle for the fused mass, there being a small hole in the bottom of the furnace. This hole is covered with a glass plate. The electrodes (carbon rods) are approached to within 1 or 2 in.; the interval is packed with lumps of carbon. The emery, also the finest dust of little use otherwise, is mixed with powdered coal, the amount depending upon the iron oxide in the emery; for 25% of oxide 5% of carbon is reckoned. The coal lumps are soon burned by the oxygen of the iron oxide and the arc forms under hissing. The inner mass begins to melt, the glass plate gives way and a stream of fused corundum flows out. The hard outer crust is then broken with iron rods and new material thus fed to the arc. This addition stops the flow, which starts again after 10 or 15 minutes. The base-plate is strewn with fine emery powder to protect it from the intense heat of the fused mass. The resulting corundum is almost free of water, of which the emery contains about 5%. It is crystalline, colorless, and then resembling quartz, pink or blue; fine, small crystals of sapphires have been found in druses. The current is kept at 250 amperes and 40 or 60 volts.

ORE DEPOSITS OF THE LITTLE ROCKY MOUNTAINS, MONTANA.

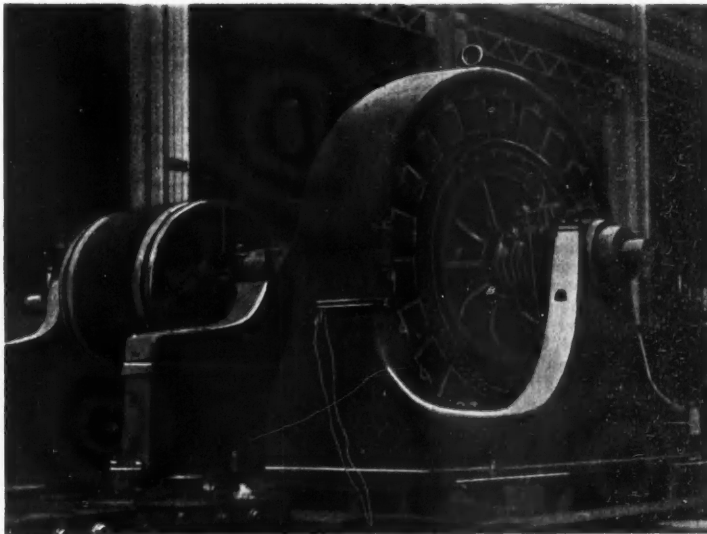
By Walter Harvey Weed.

Within the past few years the isolated mountain tracts rising above the open plains of central Montana have come to the notice of the mining public as regions whose auriferous ore deposits promise to add to the mineral production of this State. One of those most recently prominent has been the Little Rocky Mountains, and as the larger part of the mineral belt of this tract lies within the limits of an Indian reservation, where prospecting can only be surreptitiously prosecuted, and no legal locations of mineral claims can be made, a bill was passed by the last Congress, providing for the appointment of a commission to treat with the Indian tribes owning the lands for a relinquishment of such tracts as are mineral-bearing.

The author was detailed as geologist to report to the commissioners upon the mineral character of these lands and the location of a new boundary line, which should exclude the ore deposits. During a brief visit made to the region for this purpose, a few notes upon the geology and the ore deposits of the region were made, and the following facts may prove of interest to the readers of *The Engineering and Mining Journal*, as the locality is sure to become better known when the region is declared open to location.

The only settlement within the region is the town of Landusky, which sprang into existence in the brief weeks of feverish activity consequent upon the discoveries of gold leads in 1894. The town is built in the upper valley of Rock Creek, and shows some twenty or thirty houses and as many more uncompleted buildings stretching along the main street parallel to the stream; it is surrounded by rather open slopes with scattered pines, above which occasional limestone crags rise abruptly. A mail road crosses the Indian reservation from Harlem on the main transcontinental line of the Great Northern Railway to St. Paul's Mission and to Landusky.

Geology.—The region is a mountainous tract, about 10 miles in greatest length, from southwest to northeast, and somewhat less in width. Deep cut gulches and steep slopes, wooded with lodgepole pines, prevail. The summits are rarely rugged or precipitous, and reach altitudes of about 6,000 ft., or 3,000 ft. above the surrounding plain. This region constitutes an uplift which is similar in nature to that of the Black Hills,



800-H. P. GENERATOR.

though upon a very much smaller scale. A core of gneisses and crystalline schists is surrounded by steeply upturned Paleozoic limestones dipping toward the open plains on every side, the most prominent rocks being the massive white beds of carboniferous limestone, forming a white girdle that is a noticeable feature of the mountain from every point of view. Between the stratified rocks and the crystalline schists there is a great intruded body of igneous rock, varying in nature from syenite porphyry to granite porphyry. This rock caps all the higher summits, but is cut through by the large mountain gulches. It is a peculiar rock, belonging to the high alkali series, and associated with it there is a phonolite of the variety known as tinguaitite.*

The ore deposits of the Little Rocky Mountains are of considerable scientific interest, since they represent a type that has thus far been noted at very few localities in this country—a type that is well known because it prevails at the famous Cripple Creek district of Colorado. While the ore deposits are as yet but little developed, they promise to be actively exploited when the mineral lands which are now within the limits of the Fort Belknap Indian reservation shall be declared open to location. The gold ores are tellurides associated with fluorite, and occur in the altered porphyry. This character of ore (telluride) and its association with phonolitic rocks, is of much interest, for it occurs not only in the Cripple Creek region but in the Black Hills of Dakota and in the Judith Mountains of Montana.

The mineral belt in which the ore deposits occur is a zone of altered mineralized rock, extending in a northeasterly direction to the central ridge of the mountains. Although of variable width, this mineral belt may be considered as about 2,000 ft. across. The ores carry gold and occasionally silver. They consist of brecciated or shattered country rock impregnated, coated, and replaced by quartz, often associated with fluorite and carrying small amounts of telluride, pyrite, and possibly other

* A full account of the geology of this region and its igneous rocks, together with maps and geological cross-sections, will appear in a forthcoming number of the *Journal of Geology* of the University of Chicago.

minerals. The ores do not occur in well defined fissure veins with definite mineral walls. The gold occurs both as a telluride and as free gold. In the altered ore forming the surface of the ore deposits and the "float" of the mineral belt, the gold can be seen to be free, but in many cases it can only be seen after burning the ore. A characteristic ore of the district consists of an intimate mixture of fluorite and quartz, the brilliant purple color of which makes it readily recognizable.

Superficial alteration of the deposits has caused the oxidation, hydration, and leaching of the ore, which consists of a granular, friable, quartz and stained a rusty color by iron. In many of the richest ores, free gold is seen in small spongy masses of a dark coppery color.

The slight amount of development work as yet carried on makes any conjecture as to the mode of occurrence of the ore bodies quite hypothetical. The total absence of dykes, and the fact that no contact deposits have been found points to the origin of the deposits as due to the alteration of shattered zones of the porphyry itself. That there has been some movement and fracturing of the porphyry since its consolidation is proven by the slickensided surfaces seen near the Alabama mine. The presence of fluorite may have some connection with the telluride ores which are the source of the gold. In the mines of the Judith Mountains the richest ores occur associated with fluorite, and the source of the free gold seems to have been the telluride minerals. This association of fluorite with gold has been noted by various observers at Cripple Creek and in Boulder County, Colorado.

The Goldbug mine is the only property which shows any considerable amount of development. It is owned by G. L. Manning and the heirs of Pike Landusky. It was bonded some years ago to the owners of the famous Granite Mountain mine, but was relinquished and is now bonded by another syndicate, who have the ore body prospected, under the superintendence of M. H. Jacobs, formerly of Hailey, Idaho, to whom I am indebted for many courtesies. The Goldbug claims are located upon brecciated porphyry, whose crushed condition permitted the ready passage of mineralizing waters acting upon the feldspathic and basic constituents of the rock and replacing these and filling the seams with quartzose material, which is gold-bearing.

The Goldbug mine is situated just north of and below the divide between Mill Creek and the head of Morton Gulch, about 1½ miles north of the town of Landusky. The ore body appears to run N. 15 E. magnetic, as far as can be determined from the surface outcrops. The main lead has been prospected by open cuts at frequent intervals, showing a width of about 4 ft.; there is a well defined foot wall but no hanging wall, the overlying rock being brecciated porphyry whose fragments are similar in character to the fine-grained quartz porphyry prevailing throughout the mine. The ore body consists of shattered and cracked up porphyry, with stringers and cracks filled with quartz. Even the solid looking rock is found to be impregnated with quartz. The quartziferous material is, however, not always auriferous; a rusty seam occurring near the foot wall has been found to be generally barren. The workings consist of a shaft 40 ft. deep and considerable drifting upon three different seams. The No. 1 tunnel shows quite low grade rock, running about \$4 in gold per ton. No. 3 shows 6 to 8 in. of ore which will average \$100, with ore that can be picked that will run \$300 per ton. The broken character of the rock, however, and the fact that the richer ore occurs in pockets or masses irregularly distributed through the shattered zone, makes the workings somewhat difficult and the exploitation of the property somewhat expensive. A 50-ft. winze sunk down from the level of No. 3 shows a better ore below than it does in the level itself. Near mouth of drift of No. 5 the ore body shows a "blow out" or expansion 25 ft. wide of quite rich ore showing free gold.

The ore shows in the hand specimen a fine breccia of rusty or flesh-colored fragments of altered porphyry, with clear feldspars and greenish quartz and more or less decomposed and altered white porphyry, the interspaces filled with glassy quartz which was originally gray, and in the richest ore is mottled with lead-colored metallic telluride segregations. Small geode cavities and seamings of quartz with rusty surfaces of a dark red or brown color are quite common. The gold is seen associated with the telluride in the dark spots which occur in the body of the ore and near the quartz of the seams and cavities. Fluorite is noticed although it does not form so prominent a feature of the Goldbug ore as it does in the ores from other claims. The large mass of ore from the workings consists of light-colored or white, decomposed porphyry with open fractures and partially filled cavities of quartz. Pyrite occurs sparingly in these ores.

The August mine is the name given to a location upon an ore body found within the limits of the reservation. It is this claim which gave the region a somewhat local notoriety in 1893, as the deposit was worked surreptitiously, and a shaft 65 ft. deep yielding some \$32,000 in actual returns for ore which was sacked and shipped to the Aurora, Ill., smelter. The ore presents the same general characters as that of the Goldbug mine, although it differs considerably in outward appearance. The ore shows considerable telluride, with dark-colored, spongy gold scattered through the mass.

The Alabama mine, situated on a lateral ridge of the main crest near the head of Ruby Gulch, is located in a fissured zone in the porphyry. The ore consists of bright purple fluorite rock carrying telluride and only showing free gold upon burning or roasting in the forge. Near the surface the ores are oxidized, and the fluorite, if not leached entirely out, forms a soft, earthy material. At 75 ft. in depth the ore body shows a solid breccia of a dark purple-gray color in which no free gold is seen, but minute crystals of pyrite and of telluride are seen sprinkled through the mass. The mine is opened by a shaft 100 ft. deep, which shows the ore body to vary from a few inches to 15 in. across, the ore occurring in a vein or lead that is somewhat wider and appears to have definite side walls. A recent shipment of 2½ tons of this ore went 10 oz. of gold and 30 oz. of silver to the ton, netting about \$500 after all expenses were paid.

The Big Chief mine, which is found on the main ridge a few hundred feet above the divide between Ruby Gulch and Lodgepole Creek, is a lead of the same character as the Alabama, and the ore promises to change to the hard purple quartz in depth.

Placer Deposits.—The discovery of the auriferous character of the alluvial gravel of the region caused a stampede here in 1884, when a large amount of work was done and considerable gold dust washed out. The

placer deposits are now only "grub-stake" propositions, and do not yield enough to pay wages; the largest amount taken out by any one person is said to have been \$1,200 as a result of four months' work.

The alluvial deposits about the mountain flanks are of considerable extent and are rich enough to warrant working if a sufficient water supply could be obtained. The scarcity of water was, however, an insurmountable obstacle to the working of the larger bars, where the mountain streams debouch upon the open prairie. The terraces about the mouth of Alder and other large gulches have been prospected by test pits, and many claims have been located. The gravels are from 5 to 50 ft. thick, rest upon black Cretaceous shales, and are well located for working, but the streams are dry the greater part of the year. These gravels are now being worked at the mouth of Camp Creek. Inside the mountain area the recent deposits in the bottom of the narrow V-shaped ravines of the present streams are from 4 to 20 ft. deep. The gravels are largely subangular, consisting of the debris of the adjacent slopes of porphyry and schist. In 1895 a little work was being done in Ruby, Sullivan and Rock Creek gulches.

AN IMPROVED PROCESS OF EXTRACTING GOLD ORES.

Written for the Engineering and Mining Journal by William M. Grosvenor, Jr.

Among causes that have led to the recent surprising increase in the world's gold production, improved methods of treating ores stand foremost in importance. The stamp mill and concentrator have been improved, smelting simplified and rendered more efficient, and, perhaps, most important of all, the cyanide and chlorination processes introduced to meet the difficulties presented by refractory ores. In connection with these, electrolysis has been employed to recover the gold from solution. Instead of the old treatment charges, we to-day find even cyanide mills charging only \$8.50 at Florence, Colo., including rail freight of 50c. to \$1.50.

Recently, another process has been patented and perfected by J. W. Bailey, of Denver, Colo., and a small mill is established for trial near the Denver & Rio Grande switch at Cripple Creek. This experimental plant has been in operation about seven months, handling all kinds of Cripple Creek ores and, after this careful experiment and thorough trial, is to be established wherever desired.

As at present operating, the plant consists of a 20-H. P. Atlas engine and boiler, a 30 V. 50 A. General Electric Company's generator, the mill (Figs. 1 and 2), an electrical dolly tub (Figs. 3 and 4), a concentrator and a retort. The mill and dolly-tub are novelties. The former performs the work of pulverizer, amalgamator, extraction vat and electrolytic bath. It consists of a round outside pan (A), 2 × 5 ft., of 1½ in. iron, round the bottom of which is a mercury groove 4 in. wide and of graded depth. Concentrically within this is a steel wearing plate (e), upon which the muller (H) gyrates, and which is made an almost frictionless thrust bearing by a film of the solution forced into N a little too rapidly to escape by the water feed (c). The bottom of the pan is conically depressed in the center, as shown, to make in the solution reservoir (N) hydrostatic pressure which balances the weight of muller and shaft. Resting in the bottom of the pan, and held in place by set screws, is the die (B), a mild steel ring 2½ × 6 in. in section and 48 in. in internal diameter. Within this rolls the muller (H) rimmed with a removable shoe (C) of mild steel 2½ in. thick and of 45 in. external diameter. The muller in all weighs 2,200 lbs. It is given 300 revolutions per minute by an adaptable eccentric attached to the shaft (L) and it thus excites against B a centrifugal pressure of about 6 tons varying in distribution with the extent to which the pulp is banked up in front of it. The electrolytic action is carried on between the anode (e), a truncated cone of iron supported by paraffin saturated blocks (f), and two cathodes. A similarly supported cone of amalgamated ¼ in. copper M forms upper cathode and mercury (Hg) insulated from the groove the lower. The fender (E) serves to keep the sand away from the pivot (F) and to support the feed plate (b), which also acts as an inner splash plate. E is partially filled with oil for lubrication of the bearing at F. By increasing the pressure in N, the muller can be freed from any packing of sand and a stoppage does not therefore necessitate cleaning out of pulp.

The crushed ore is automatically fed down upon b, whence it is centrifugally thrown outward and passes down over M, the finest particles being immediately subject to amalgamation. The solutions used for extraction are fed into the mill through d under regulated pressure from a tank, either weak potassium cyanide solution with an oxidizing agent added, or stronger sodium chloride solution is used. Thus the extracting solution used varies somewhat both in composition and strength according to the character of ore to be treated. Ores containing little metal beside gold are best extracted by chlorine water formed by electrolysis of the salt solution, 20 lbs. to the ton of ore. Only about ¼ lb. of potassium cyanide is required per ton, since, in this mill, the purpose of the extracting solution is only to dissolve the impalpable auriferous powder. The larger particles are caught by the united action of gravity and electric difference of potential propelling them to the mercury groove. Solution concentration is easily determined by readings of volt and ampere-metres and no skilled labor except that of an engineer is required by the plant.

After falling through the solution, the ore is pulverized between the shoe and die and, by the splash ahead of the muller, is driven down into the mercury for amalgamation. Gravitation takes the heavier particles down to be pulverized or amalgamated, while the rising solution carries up the finely divided rock and discharges it through the overflow and thence to the dolly tub where the time of electrolysis and extraction is prolonged. The presence of nascent oxygen has been found very advantageous in dissolving the gold by cyanide, and this has led Mr. Bailey to introduce some soluble oxidizing agent like potassium permanganate into the extracting solution. The pulverized ores are subjected to four agents simultaneously: gravity, solution, amalgamation and electrolysis. The cyanide solution is partially decomposed by the current, liberating cyanogen at the anode and potassium at the cathode. The latter, with the water residue, forms KOH, serving to cleanse the gold and facilitate amalgamation, while oxygen is liberated to assist in breaking down tellurides or sulphides. The electrical action in presence of KOH renders

amalgamation instantaneous, and the extent of decomposition of the electrolyte is perfectly controlled by current strength, making the treatment easily adaptable to varying contents of free gold. The electrical action has also been found to prevent the mercury from retaining a minutely spheroidal condition and passing out with the overflow.

The dolly tub (Figs. 3 and 4) is designed to further amalgamate the pulp and electrolyze the solution, and particularly to allow further time for leaching. The pulp is fed direct from the mill, as shown, and is swept to the bottom of the tub by the current from the screw. C is a cylinder, shown in section, and is continuous circularly on the side and bottom but with open top. It is supported from above by four narrow wooden blocks (S), which also serve as supports below m m', concentric cylinders alternately anodes and cathodes. C is the anode and Hg cathode of a parallel series. C and m' are made of 1/4-in. iron and m of 1/4-in. amalgamated copper. The pulp passes down inside C and is driven in a downward spiral against the surface of the mercury (Hg). Passing up outside of C and between the paired anodes and cathodes, the pulp repeats the circuit. The tub of the dolly is of wood, as also the four supports. The draw-offs, overflow, shaft, screw and anodes are of iron, and the cylindrical cathodes of 1/4-in. amalgamated copper. Should the character of any ore prove such that one tub fails to complete the extraction, concentration and wet decomposition or passage through a second or even third dolly tub may possibly be required. Roasting is never employed.

Combining, as it does, the advantageous features of the stamp mill, the cyanide or chlorination, and the Siemens-Halske processes, this plant is interesting in its complete automatic and rapid operation. In both mill and dolly tub the action is continuous and, as only the most finely divided gold is left for solution, larger particles being amalgamated, rapid passage through the mill and a single dolly tub usually gives at least 90% complete extraction. The Cripple Creek plant has been handling about 25 tons per day. As a stamp mill it shows great efficiency and durability. A five-stamp battery contains 67 pieces more or less liable to breakage, shoes being an especial cause of trouble and delay. In this mill there is practically nothing to break. The wear on the shoe and die is less than 1/4c. per ton of ore compared with 5 to 10c. in the same capacity stamp mill. This wear is perfectly distributed, as only at long in-

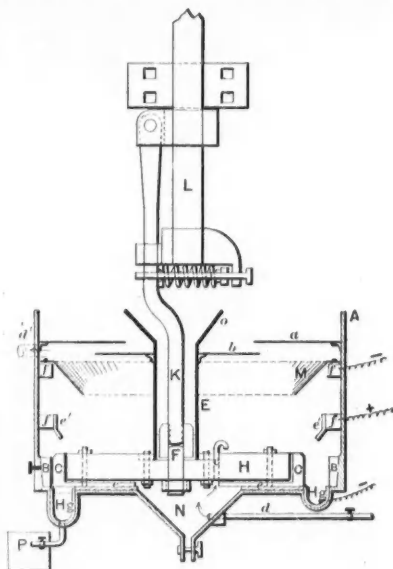


FIG. 1.

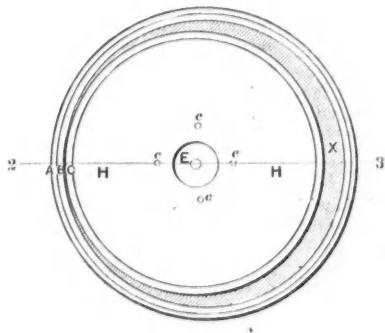


FIG. 2.

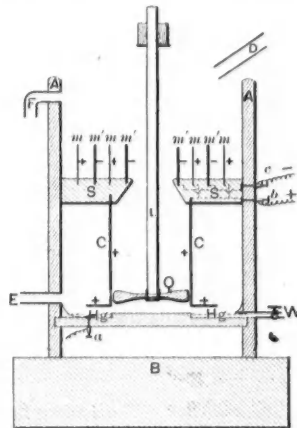


FIG. 3.

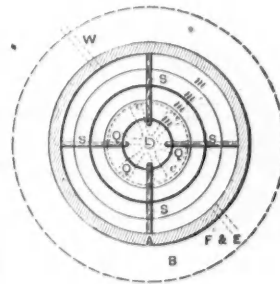


FIG. 4.

tervals can the same points of die and shoe become coincident. As the surfaces are plane and the muller closely follows up the outer ring, and as the pulp is under constant and violent agitation, there is no wearing of grooves or pits and no decrease of grinding surface. The entire plant in operation in Cripple Creek requires a 20 H. P. engine, and crushes over a surface of about 200,000 sq. in. per minute. A 20-stamp battery at 90 drops each per minute and an 8-in. fall would crush over only about 91,000 sq. in. per minute, reducing to 40 mesh about the same amount of ore, and would require about 35 H. P. The equality and fineness of the pulp from the Bailey mill was tested by H. E. Holtoff, of E. P. Ellis & Co., preparatory to their purchase of rights of manufacture for the East. All but 5% passed through 60 mesh; all but 5 1/2% through 80 mesh and all but 6% passed through 100 mesh gratings. Such fine pulverization is possible without loss only when beneath liquid. Dry pulverizing would lose about 5% as dust. As the action of the muller at any point is simple pressure, the objection made to some pulverizers does not apply, the grains being broken to sharp edges where weakest—not rolled or rounded. The Siemens-Halske and ordinary cyanide or chlorination processes require prolonged steeping in order to dissolve out the larger particles of gold. In the new mill these, by their weight, sink against the rising current and, aided by alkalinity of solution and electric action, instantly amalgamate. Lullion extracts have rarely fallen below assay values and, in ores particularly difficult of complete fire assay, containing much zinc or copper, the bullion extract has frequently been found to exceed assay indications.

By the new process a very high efficiency is obtained, and the cost of extraction largely decreased. In the rough experimental plant described ore has been treated for months at a cost of about \$1.50 a ton with coal costing \$5.50 a ton. Only two men were employed and labor cost less than fuel. It would require little more work to run a 100-ton plant as the feeding is automatic. With four 25-ton mills, a Corliss or other modern engine and boiler and coal at \$3.50 to \$4 a ton, extraction would, it is claimed, cost less than \$1, and the use of water power would reduce this to somewhere near 70c.

MINERALS FOUND AT DYSARTVILLE, N. C.

Amphibole.—Actinolite,** hl; asbestos,hl;hornblende, hl; tremolite, hd. Anatase (octahedrite), ta. Apatite, Microlite, hd. Arsenopyrite* (or mispickel), af. Barite, tr; hd 1. Beryl—Aquamarine** (gem), hl; davidsonite, hd; emerald* (gem), hd; goshenite,* hd; ordinary,* hl. Biotite† (black mica), hl. Brockite,* af. Calcite† hn. Cerussite (Carbonate of lead), hd. Chalcopryrite† gb. Chromite (chromic iron), hl. Chrysoberyl* (gem), af. Chrysolite—Light yellowish green, hd; olive green, hd; olivene* (gem), hd; jb 1; peridot** (gem), hd, jb 1. Clays—Fuller's earth, hd; halloysite, hd; kaolin,** hl. Columbite (tantalite),* af. Corundum, altered into mica, ta; blue, sapphire* (gem), af; brown** hl; emery,* (?), hd; red ruby** (gem), af; pink (amethyst, oriental)* (gem), hd; white, sapphire* (gem), af. Crocoite* hd, fg 1. Cuprite, ordinary, hd. Cyanite, hl. Diamond* (gem), hd; fg 1, (31 found, including 1 September 12th, 1895). Dolomite—Crystalized* hd; fg 1; ordinary, Epidote, hd; hl. Ferrous nitrate, ta. Galena—(Lead ore); argentiferous† hd; fg 1; calamine (? as pseudomorph after galena, hd, ordinary† hl. Garnet—Almandite†† (gem), hl; pyrope† (gem), tr; af 1. Gold—Crystalized† hd; dust† tr; nuggets† tr. Granite—Gray* js; haplite† af; pegmatite* hn. Graphite, af. Greenockite, hd. Gypsum, selenite* jb. Hematite—Blac,** (gem), af; brownish red† af; red, af; red ochrous† af; specular, tr. Ilmenite (or titanite iron), menaccanite* hl. Lepidolite (lithia mica),* hd. Limonite—Compact* (gem), af; ochrous,* af; ordinary, af; pseudomorphs after pyrite,† ta. Magnetite—(magnetic iron), granular, coarse,† tr; ordinary,† af. Malachite, Pseudomorphs after cuprite, hd. Molybdenite,† ta; am 1. Monazite—Crysolite,* hl; ordinary,†† hd; turnerite,* af. Muscovite—(white mica), damourite,* (?), hd; ordinary, hl. Oligoclase—Ordinary, af; soda-spodumene,* af; sunstone, hd. Orthoclase—(feldspar), glassy,* (sanidine), js, hd 1; moonstone,* (gem), ta; ordinary, hl. Petalite, castorite, (?), hd. Pharmacosiderite, af. Platinum, hd. Plochlorite—Helmthite,† hd, fg 1; ordinary, hd, jb 1. Psilomelane, Wad, af. Pyrolusite (black oxide of manganese),* af. Pyromorphite—Ordinary, hd, fg 1; pseudomorphs after galena,* hd. Pyrite,** hl. Pyroxenite, spotted "snakestone,"†† hd, hn 1. Quartz—Agate* (gem), hd; amethyst* (gem), af; banded, js; basanite (lydian stone),* ha, jb 1; buhrstone,* hd; crystal, doubly terminated** (gem), hd; ordinary, hl; some with rare and very beautiful inclusions†† (gem), af; flint, hd; granular, hd; itacolumyte (flexible sandstone),** af; rose, hd; smoky (cairn gorm,† gem), hd; yellow (false topaz,† gem), hd. Rutile—In quartz crystal* (gem), tr, jb 1; ordinary,** hl; splendid crystals** (gem), hd. Samarskite,* ta. Sepiolite (meerschau), tr, hd 1. Serpentine, massive, tr. Sillimanite (or fibrolite), hd. Silver,

Auriferous,* tr. Sphalerite—(zinc blende)†, gb; smithsonite, (?) hd. Spinel ruby, orange, red** (gem), tr, hd 1. Spodumene—Hiddenite (gem), af; ordinary, hd. Staurolite, af. Talc—(soapstone), fine granular,* js, hd; indurated, js, hd 1; massive,* hl. Thorite—Calciothorite,† (?), hd; eucrasite, (?) hd; ordinary,* hl. Titanite—Ordinary,** hl; pyromelane, af. Topaz—Ordinary, hd; white* (gem), hd, fg 1; yellow (gem), hd. Tourmaline—Brazilian emerald, green* (gem), af; Brazilian sapphire, blue, af; ordinary black,** af; rubellite, pink* (gem), af. Vermiculite, af. Vivianite, jb. Water—Chalybeate,** js; lithia,** hd; sulphur,* tr. Xenotime,** hl. Zircon—Hyacinth** (gem), hl; ordinary pale brown,* hd; steel colored† (gem), hd, jb 1; syenite, hd; white* (gem), ta. Total number of species, 149.

Species marked with *, very good; **, superior; †, very superior; ††, superb.

The species were found by one or more of the following named persons. To designate particularly the name of the first finder, two or more initials of the name are used. When the mineral was found by one and determined by another, the initials of the determinor are also added, followed by the figure 1:

- ta Thomas S. Ash, mineralogist, No. 2052 Rush street, Philadelphia, Pa. Deceased. List signed and left with H. C. Demming.
- jb J. W. Beath, lapidist, 111 South Tenth street, Philadelphia, Pa.
- gb George F. Becker, geologist, United States Geological Survey, Washington, D. C.
- tb T. K. Bruner, mineralogist, and Secretary State Board of Agriculture, Raleigh, N. C.
- hd Col. Henry C. Demming, mineralogist and general manager properties, Harrisburg, Pa.
- af Alfred Free, Ph. D., mineralogist and geologist, Turner's Falls, Mass.
- fg Dr. F. A. Genth, chemist, mineralogist and geologist, 111 South Tenth street, Philadelphia, Pa. (Deceased.)
- fg Prof. F. A. Genth, Jr., chemist, No. 103 North Front street, Philadelphia, Pa.

hl Prof. H. Carvill Lewis, Professor Mineralogy Academy Natural Sciences, Philadelphia, Pa., and Professor of Geology, Harvard College, Massachusetts. (Since dec-ased.) List made by him on the property, April 17th, 1888, signed and left with H. C. Demming.

am Andrew S. McCreath, chemist, No. 225 Market street, Harrisburg, Pa.

hn H. B. C. Nitze, Assistant State Geologist, North Carolina, Chapel Hill, N. C.

tr Capt. Thomas H. Rice, ex-Superintendent Mines, Buckingham C. H., Va.

js J. Alden Smith, ex-State Geologist, Colorado, Boulder, Colo.

jjs John J. Sprouse, Superintendent Mines, Demming, McDowell County, N. C.

The localities where most of the species were found are on the property of the Marion Improvement Company.

Most of the varieties mentioned have been found by several but the letters are used in connection with the name of the first finder. Take, for instance, the item of gold. Every person named who has been on the properties has found that; but the credit is given to Captain Thomas H. Rice, he being the first.

Where a mineral has been found, and it is doubtful whether another of the same species could be mined, or picked up, it has not been included in the list. One or two minerals found in 1895 have not been classified, and consequently are not in the foregoing list. They do not appear to be described or mentioned in the latest and most complete works on mineralogy.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

ASSUMPTION OF RISK BY MINE EMPLOYEE.—An employee was injured by falling through a hole in an unfinished platform, placed across a section of a salt-mine shaft, near the bottom of the shaft. He had been working for the mining company about nine months, in sinking the shaft and adjusting the timber work, and in making platforms at intervals, had daily traveled up and down the shaft, and was perfectly familiar with the nature of the work. The accident occurred while he, with another employee, was working on a platform where it was dark, and after he, at the request of his companion, had blown out his miner's lamp, provided by the company, and while the platform was lighted only by the candle used by his companion. He testified that he did not know of the hole, but admitted that if he had placed the light near the floor of the platform he could have seen the opening. The Court held that he assumed the risks.—*Sharpsteen vs. Livonia Salt and Mining Company* (38 New York State Reporter, 49). Supreme Court of Appeals, Division, Fourth Department.

MEASURE OF COMPENSATION FOR TAKING MINERAL LANDS FOR PUBLIC USES.—Where, in proceedings to condemn a right of way across land, the evidence shows that part of the land is underlaid with mineral limestone, the extent to which that fact would tend to increase its market value is for the determination of the jury.—*Sanitary District of Chicago vs. Loughran* (43 Northeastern Reporter, 359). Supreme Court of Illinois.

The Walton-Ferguson Chemical Plant.—These works at Niagara Falls will be put in operation early in May. This company will manufacture potash and soda on a large scale by electrical processes, consuming about 1,000 H. P. electrical energy, from the Niagara Falls electric plant. The present installation is one-eighth of the projected plant, and will be enlarged after the works are in operation.

The Lyons-France Power Transmission Scheme.—The Societe Lyonnaise des Forces Motrices du Rhone, which proposes to utilize part of the water-power of the Rhone for the generation of electricity for light and power, has awarded the contracts for part of the plant. The complete plant is expected to produce 20,000 H. P. and will consist of 16 turbines of 1,250 H. P. each. The available fall varies from 30 ft. to 40 ft. The turbines have vertical shafts and are of the reaction type, working with a suction tube, and the generators are connected direct to the vertical turbine shaft. By a special arrangement the large turbines can be made to run at 120 revolutions, while the turbines driving the exciter dynamos run at 250 revolutions. The generators are each to have an output of 1,250 H. P. To start with, 8 turbines of 1,250 H. P. each, with generators, and the necessary exciter dynamos with their turbines, will be erected, the dynamos being made by Brown, Boveri and Co., of Baden, the turbines by the well-known Swiss firm of Escher, Wyss & Co., of Zurich.

The Income of the London Stock Exchange.—If any further proof were required of the fact that the boom on the London Stock Exchange in mining shares, particularly during 1895, was the greatest on record, it would only be necessary to turn to the report of that institution for the 12 months ended March 25th, 1896. During that year the membership was the greatest on record, being 3,660 as compared with 3,421 in the previous year, while the net income was £184,191 as against £122,275 in the year ended March 25th, 1894. The company managing the Exchange is not registered under the limited liability acts, but the capital consists of 20,000 shares on which £12 each has been paid. The dividend paid for the past year is £7 10s. per share, a record figure, while the present quotation of the shares on which £12 has been paid is no less than £195. A sum of nearly £30,000 out of the profits was also carried forward to provide for structural alterations contemplated. In addition to the capital above mentioned, there is an issue of debentures amounting to £250,000 bearing interest at £3½%. This is to be increased by a further issue of £500,000, which is to be devoted to acquiring adjacent property and to so enlarge the Exchange. During the whole of the recent boom, the space at the disposal of the South African mining market was quite inadequate, and even at the present time, when things are comparatively dull, the West Australian market is in a very cramped-up condition.

Recent Experiments in Acetylene.—H. Le Chatelier, a French chemist, in experimenting with acetylene, finds that mixtures with air are explosive when they contain more than 2·8 and less than 65% of acetylene, mixtures of acetylene and oxygen when they contain more than 2·8 and less than 93% of acetylene. The diameter of the tube from which it is ignited is commented upon. In tubes of less diameter than about 40 mm. (1·57 in.), these limits are gradually narrowed until in tubes of 0·5 mm. (0·02 in.) the propagation of the flame ceases altogether. In mixtures of air and acetylene, when the percentage of the latter is less than 7·7, the flame is yellowish brown and feebly luminous, and the products of combustion are carbolic anhydride and water. When the percentage of acetylene is from 7·7 to 17·4 the flame is pale blue with a yellowish-brown edge, and carbolic anhydride, carbonic oxide and water are formed. Between 17·4 and 20% of acetylene cause very imperfect combustion, carbonic oxide, hydrogen, carbon and acetylene being residual products. When over 20% the deposition of soot is very marked, and the flame, though strongly luminous, is of a reddish color. The temperature of ignition is very low, viz., about 480° C., most other combustible gases requiring 600° C. for ignition. The temperature of the flame is very high. Buried with its own volume of oxygen, acetylene gives a temperature of about 4,000° C., or about 1,000° C. more than the oxyhydrogen flame.

Electric Transmission of Power in Mines.—Continuing the correspondence in the *Financial News* which is referred to in our issue of April 11th, Mr. H. K. Baynes, a director of Messrs. Easton, Anderson and Goolden (Limited), writes as follows: "As the successors in business of Messrs. W. T. Goolden & Co. (the contractors for the electrical transmission plant at Moodie's Gold Mining Company), we have read with interest the letter from Mr. W. B. Esson, and cordially endorse his views as to the reliability of electricity as a motive power in mining and other districts. Having supplied electrical plants to many mines, both at home and abroad, including, in Africa alone, the Champ O'Or Deep Level Gold Mining Company, the Cassell Colliery Company, Village Main Reef Gold Mining Company, the Goldfields Deep, Metropolitan Gold Mining Company, Meyer & Charlton Gold Mining Company, Roodepoort Deep Level Gold Mining Company, May Consolidated Gold Mining Company, George Goch Gold Mining Company, Salisbury-Jubilee Joint Mill, Witwatersrand Gold Mining Company, Ferreira Gold Mining Company, Nigel Gold Mining Company, etc., all of which have given the fullest satisfaction, we feel that we are in a position to speak with authority on the subject. To supply, however, any plant, whether the motive power be electricity, steam or anything else, it is necessary to know beforehand the conditions under which it is to work and the amount of power required. Neither of these factors was known in the case of Moodie's. The calculations as to the quantity of power required were prepared at Barberton, and embodied in a specification, and the plant supplied by Messrs. Goolden & Co. was designed to produce, and, in fact (as certified by Moodie's consulting engineer), produces the quantity specified. It now turns out that these calculations were quite incorrect, and that the quantity specified is altogether insufficient for the work required. Thereupon the uninitiated hasten to fall foul of electricity as a motive power, forgetting that as they cannot expect 50 H. P. out of a 5 H. P. steam engine, so they cannot hope to extract from a dynamo or motor more current than it is constructed to supply. They should address their complaints to the gentlemen who are responsible for the miscalculations in question, and not to the contractors who supplied exactly that which they were asked to supply."

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 APRIL 21ST, 1896.

- 558,652. **ROCK BORING MACHINE.** Rudolf Meyer, Mulheim-on-the-Ruhr, Germany. Filed February 6, 1892. Serial No. 420,515. Patented in Germany April 25, 1892, No. 62,028. Combination of a motor-cylinder having an inlet-passage and an annular series of equidistantly-spaced exhaust-passages at one side of the inlet-passage, a piston within the cylinder provided with two sets of alternately-arranged and equidistantly-spaced passages, one set of which constitute supply-passages and extend through the piston from the space in the rear thereof to a point on its periphery near its forward end, while the remaining set, which constitute both supply and exhaust passages, extend through the piston from the space in front thereof to a point on its periphery near the opposite end of the piston, and means for imparting a step-by-step rotary motion to the piston.
- 558,725, 558,726. **PROCESS OF PRODUCING HYDROUS CHLORIDE OF ALUMINIUM.** Frank A. Gooch, New Haven, Conn., Assignor to the Waldo Foundry, Bridgeport, Conn. Filed October 26, 1895. This process consists in treating a suitable aluminous material with dilute hydrochloric acid, separating the resulting solution by filtration from the undissolved residue, introducing into the solution gaseous hydrochloric acid and separating the resulting precipitate.
- 558,747. **PROCESS OF REFINING OIL.** Carlos A. Smith, Cleveland, O., Assignor, by direct and mesne assignments, to the Ohio Oil Improvement Company, same place. Filed September 25th, 1895. This improved process consists in first distilling the oil, then bringing the distillate into contact with metallic lead and carbon, and finally treating with an acid in the usual way.
- 558,803. **ORE CRUSHER.** Hanson Gregory, Jr., Boston, Mass. Filed August 8th, 1895. Combination of a driving shaft surrounded by the bed, boxes or supports connected with the shaft and revolved thereby, shafts journaled in the boxes and movable longitudinally therein, crushing rolls mounted on the shafts, the rolls and shafts being movable outwardly by centrifugal force, and springs arranged to press the rolls and shafts inwardly.

Great Britain.

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

WEEK ENDING APRIL 4TH, 1896.

- 2,736 of 1895. **P. Naef, Argentine, Kansas.** In rotating calcining cylinders, special arrangements for bringing air into intimate contact with the material treated.
- 9,081 of 1895. **H. C. S. Dyer, Newcastle, England.** Eliminating sulphur from pig iron by allowing the iron to cool to a temperature at which the sulphur has a greater affinity for manganese.

PERSONAL.

MR. W. A. SILLIMAN, until recently connected with the Pittsburg & Tennessee Copper Company, has gone to Altoona, Pa.

MR. L. W. ADAMS, mining engineer, has gone to Central America to examine some mining property for a New York syndicate.

MR. J. B. HASTINGS, the well-known mining engineer of Boise City, Idaho, has been in British Columbia on professional business.

MR. G. A. DENNY, mining engineer, has been appointed general manager of the Kierksdorp Proprietary Mines, Limited, in South Africa.

MR. E. DWIGHT KENDALL, of the Kendall Gold and Silver Extraction Company, has gone to North Carolina on professional business to remain for some time.

MR. W. DE L. BENEDICT, consulting mining engineer, of New York, has removed his offices from rooms 617 and 618 to rooms 811 and 812 Welles Building, this city.

MR. H. BRADLEY SMITH has become the senior member of the firm of Smith, Dean & Co., who have just established themselves at Roseland, B. C., for the purpose of carrying on the business of civil and mining engineering.

DR. WILLIAM H. WAHL, the well-known Secretary of the Franklin Institute, has had conferred upon him by the French Government the decoration of Officer of Academy, in recognition of his merits as a scientist, brought to the notice of that Government by services rendered to it, as well as by his connection with the Franklin Institute. Dr. Wahl served as secretary of the Institute from 1870 to 1876, when he resigned to devote his time to the *Polytechnic Review*, which he founded. During this period he served for some time as Professor of Physics in the Boys' High School. He was re-elected as Secretary of the Franklin Institute in January, 1882, remaining in continuous service ever since. He has published several technical books, the chief of which was a work on electro-metallurgy, published in 1883.

MR. CHARLES G. YALE, of San Francisco, Cal., has done much for the mining interests of the Pacific Coast, and has recently been presented with the following engrossed resolutions by the California Miners' Association in recognition of his services to that organization:

WHEREAS, Charles G. Yale was the founder of the California Miners' Association as now constituted; and whereas, he has rendered invaluable services to the association at all times since its organization, as an editor earnestly and intelligently urging measures for its advancement; as a writer for the daily press fearlessly and consistently making its contests, and as a diligent worker upon its various committees; therefore

Resolved, That the gratitude of the California Miners' Association is due to Charles G. Yale for his services, and that its thanks be hereby tendered to him; and

Resolved, That the Secretary of this association be and is hereby directed to furnish the said Charles G. Yale with an engrossed copy of these resolutions, the same to be duly attested by the signatures of the President and Secretary of the association and by the impression of its seal.

OBITUARY.

BENJAMIN A STARR died at Camden, N. J., April 27th, aged 66 years. He was well known among the iron founders and gas manufacturers throughout the country. He was one of the partners with his father, the late Jesse W. Starr, his brother, Jesse W. Starr, Jr., and brother-in-law, B. F. Archer, in the Camden Iron Works, now owned by R. D. Wood & Co.

DAVID H. JEROME, ex-Governor of Michigan, died at Watkins Glen, N. Y., on April 23d, aged 66 years. He had been a sailor, merchant, lumberman, railroad contractor, legislator, governor, a member of the State Constitutional Commission, and an Indian Commissioner. He went to California with the Forty-niners, but returned, and established himself in business in Saginaw in 1853. He built the Saginaw Valley & St. Louis Railroad and was its president and manager until it was merged into the Detroit, Lansing & Northern system.

JOSEPH RICHARDS, died at his home in Port Oram, N. J., on April 24th, aged 62 years. Mr. Richards was born in England and came to this country when 20 years of age, locating in Georgia. He went from there to East Tennessee and then moved to Port Oram about 35 years ago. Mr. Richards was in the employ of the Mt. Pleasant Mining Company from that time on. A practical miner, of wide experience and excellent judgment, it was not long before his employers had recognized his ability and made him Assistant Superintendent, which position he held for a number of years and until he was made Superintendent about 16 years ago. Last July, on account of failing health, he decided to resign, but the company made him consulting engineer. "Captain Joe," as he was familiarly known, commanded the respect and esteem of all who knew him.

SOCIETIES AND TECHNICAL SCHOOLS.

WESTERN SOCIETY OF ENGINEERS.—The next regular meeting will be held on May 6th, when a

paper will be read by Mr. George E. Thomas on "Foundations."

UNITED MINE WORKERS OF AMERICA.—At the meeting held in Columbus, O., last week, the following officers were re-elected: Phil H. Penna, Linton, Ind., president; Cameron Millan, Massillon, O., vice-president; W. C. Pierce, Corning, O., secretary-treasurer. Executive board, W. W. Webb, Kentucky; John Faheny, Pennsylvania; Frederick Dilcher, Ohio; James O'Connor, Illinois; Henry Stephenson, West Virginia; R. A. Davis, Ohio. Patrick McBryde, the retiring secretary, was elected an honorary member.

ENGINEERING ASSOCIATION OF THE SOUTH.—At the meeting of this association at Nashville, Tenn., on April 16th, the committee appointed by the President to report on the communication from Mr. E. L. Corthell, relative to the furthering of more intimate relations between the engineers of the world, reported that in their opinion any action with reference to international relations between engineers should be taken by that society in the United States representing the nation at large, and not a particular section. The question has already been acted on by the American Society of Civil Engineers and the committee therefore believes that no action should be taken by this association. This report was adopted. A paper by Mr. Edward Mead on "Cement Mortars" was read, and considerable discussion took place on it, especially as regards the question of sands to be used, and the "personal equation" of the tester.

MONTANA SOCIETY OF CIVIL ENGINEERS.—An adjourned meeting was held on April 25th, at Helena, Mont. There were present W. A. Haven, Finlay McKee, F. J. Smith, James S. Keerl, A. E. Cumming and James M. Page. Mr. Keerl, of the committee appointed to attempt to secure an amendment to House bill No. 1470, to include the appointment of at least one civil engineer upon a national commission to supervise the design and construction of public buildings, reported that the matter was progressing satisfactorily and that he believed the bill would be so amended that the commission would consist of the supervising architect, two civil engineers and two architects. A letter from Gen. W. A. Haven, resigning his position as trustee of the society, was read. The resignation was accepted and a committee consisting of Keerl, Herron and Page, was appointed to draw up fitting resolutions embodying the regrets of the society upon the departure of Mr. Haven from the State to engage in professional work elsewhere.

IRON AND STEEL INSTITUTE.—The annual meeting of the Institute will be held by permission at the Institution of Civil Engineers, Great George street, Westminster, on the 7th and 8th days of May, 1896. The Bessemer gold medal for 1896 will be presented to Dr. Hermann Wedding, of Berlin. The following is a list of the papers that are expected to be read and discussed: 1. On the Rate of Diffusion of Carbon in Iron, by Prof. W. C. Roberts-Austen, C.B., F.R.S., Member of Council; 2. On Some Alloys with Iron Carbides, by J. S. de Benneville, Philadelphia; 3. On Mond Gas as Applied to Steel Making, by John H. Darby, Brymbo; 4. On Hot-Blast Stoves, by B. J. Hall, Westminster; 5. On the Hardening of Steel, by H. M. Howe, Boton, adjourned discussion; 6. On the Introduction of Standard Methods of Analysis, by the Baron Hans Juptner von Jonstorff, Neuberger, Austria; 7. On the Production of Metallic Bars of any Section by Extrusion, by Perry F. Nursey, London; 8. On Mr. Howe's Researches on the Hardening of Steel, by F. Osmond, Paris; 9. On the Treatment of Magnetic Iron Sand, by E. Metcalf Smith, member of the New Zealand House of Representatives; 10. On the Making of the Middle Lias Ironstone of the Midlands, by E. A. Walford, F. G. S., Banbury. President, Sir David Dale, Bart.; Bennett H. Brough, Secretary.

CIVIL ENGINEERS' CLUB OF CLEVELAND.—At the meeting of this club, held April 14th, a letter from E. S. W. Moore, at Wolverhampton, England, was read, also various communications from D. H. Hurley and others, from Washington, in regard to the metric system. The topic of the evening was "Smoke Prevention," first taken up by Prof. C. F. Mabory, and then by Prof. C. H. Benjamin, and discussed by other members, the conclusions arrived at being that, in avoiding smoke, it was necessary to have sufficient boiler, grate and stack capacity, and to have, on the part of the fireman, sufficient mental capacity. Mechanical stokers and shakers were recommended as saving both in labor and fuel. The standing committees for the year were announced as follows: Finance committee, James Ritchie, F. A. Coburn, Jos. C. Beardley; library committee, A. Lincoln Hyde, John L. Culley, Jas. C. Wallace; programme committee, Wm. H. Searles, chairman; J. R. Oldham, C. F. Shulz, Dayton C. Miller, J. C. Oliver, S. T. Dodd, F. S. Barnum. At the meeting on May 12th Mr. E. A. Sperry will read a paper on Steam engine for direct connected electric generators, and on July 14th Mr. James Ritchie will read one on Inspection of structural steel from the standpoint of the engineer. August 11th, J. D. Varney, Solar work in land surveying and a new mechanical method for doing it.

ASSOCIATION OF ENGINEERS OF VIRGINIA.—The regular informal monthly meeting of the Association was held April 15th, at Roanoke, Va. The House Bill to fix the standards of weights

and measures by the adoption of the Metric System of weights and measures was taken up and discussed, also the Senate Bill to establish engineering experimental stations in connection with the colleges established in the several States. The House Bill, to organize and increase the efficiency of the personnel of the Navy; to increase the influences and number of the corps of Naval Engineers; to induce the scientific institutions to provide a naval engineering reserve for time of wars; to establish a naval engineering experimental station, and to encourage the study of the Mechanic arts and sciences, and particularly that of naval engineering in the technological colleges of the country, was taken up and discussed and on motion the Secretary was instructed to proceed as with the other two bills. The subject for the evening "Engineering Ethics" was called and opened by Prof. L. S. Randolph, of Blacksburg, who showed clearly the necessity for some code as well as the difficulties of making and enforcing it. The discussion was very generally entered into by those present all seeming in favor of establishing some standard for the guidance as well as the protection of the profession. The directors have decided to have the summer meeting at Pulaski, Va., June 29th and 27th. Detailed information of arrangements will be furnished later.

INDUSTRIAL NOTES.

The Buffalo Iron Company has put in blast its No. 2 furnace at Mannie, Tenn.

No. 1 Sheridan Furnace, at Sheridan, Pa., was blown out a few days ago for repairs.

The W. Dewees Wood Company, of McKeesport, Pa., has made shipment of 15 cars of Russian sheet iron to a firm in St. Louis.

The Toledo Tube Works and the Smead Foundry were damaged by fire, April 27th, to the extent of \$55,000, with \$34,000 insurance.

The Colorado Fuel and Iron Company of Denver, Colo., has been awarded the contract for 7,000 tons of new rail by the Union Pacific Railroad Company.

The Pittsburg Locomotive Works, of Allegheny, Pa., has just delivered two engines with 19 x 24-in. cylinders to the Lake Superior & Ishpeming Railroad.

The Johnson Forge Company, Wilmington, Del., after a long shut down, will commence to place its plant in thorough running order at once, and will add new buildings to increase the output of the hammer shop.

The Aeschman Steel Casting Company, Sharon, Pa., has announced a reduction in laborer's wages from \$1.35 to \$1.25 a day. The wages of skilled laborers will also be reduced, but individual contracts will be made.

The Columbia Iron and Steel Works, at Uniontown, Pa., which have been in the hands of a trustee for two years, were purchased last week by Eastern capitalists. The plant will be remodeled and put in operation.

Little Giant Furnace in Allegheny owned by Neal Brothers, of Pittsburg, has been abandoned and will shortly be dismantled. The furnace is a small one and had an annual capacity of 12,000 gross tons of white and mottled pig iron.

The Harrisburg (Pa.) Foundry and Machine Company has received an order to build two 300-H. P. engines for an electrical plant at Braintree, Mass. This company just made a shipment of two 300-H. P. engines to the southern part of Italy.

The Gates Concentrator Plant now being erected by a Chicago company will treat 600 tons of the tailings per day from the Utica, Sickles and Meadow mines at Angels, Calaveras County, Cal. The buildings will cover an area of half an acre.

The Westinghouse Electric and Manufacturing Company, Pittsburg, has started the erection of a big addition to its foundry department. It will be of iron, 60 x 500 ft. The addition will employ about 60 more men. It will be completed by June.

The Falcon Bronze Company, of Youngtown, O., states that it has enough orders on hand to run them for some weeks ahead. The company is at present engaged in filling a large order for brass moldings for the Great Western Tin Plate Company, of Joliet, Ill.

Reports state that the Mannesman Tube Company has leased the old Zylonite (Mass.) plant and has begun to remodel the buildings. The company will build a dam on the Hoosac River and most of the machinery will be run by water-power. The company will employ 600 skilled workmen.

A receiver has recently been refused the Columbus & Hocking Coal and Iron Company by Judge Slough at Columbus, O., who ordered the property restored to the stockholders. It is stated in the decision that the company is abundantly solvent, is not mismanaged, and has not been diverting its funds.

The Monongahela Fire Brick Works, at Monaca

Pa., which were recently purchased by the Park Fire Clay Company, of Rochester, Pa., were started a few days ago. The John Porter Brick Works, at Kenilworth, W. Va., which have also been purchased by the Park Company, have been put in operation.

Advices from Phoenixville, Pa., are that bids are being received for the erection of an immense pipe manufacturing plant at Moore Hall Mill for the American Pipe Manufacturing Company. It is said that the plant will be one of the largest of the kind in the country. It will be about one mile from Phoenixville.

The Chattanooga (Tenn.) Foundry and Pipe Works will erect an addition to cost about \$100,000. A site of 21 acres has been purchased, and foundry 110 x 360, with iron truss roof, will be built at a cost of \$20,000. The equipment will be the latest improved of all kinds, including three great steam shifting cranes to cost about \$10,000 each.

Messrs. Rawson & Morrison, Cambridgeport, Mass., are having plans prepared for a building 60 x 150 ft., three stories high, of brick, for manufacturing machinery. Two 66-in. steel boilers, 17 ft. long; engine of 500 H. P. There will be an elevator for the handling of machinery. The building will be fitted with the latest improved tools for the building of their machinery.

The foundations have been started for the works of the Niagara Electro-Chemical Company, located on the lands of the Cataract Construction Company. The buildings will be—office and laboratory, 75 x 32, two story; main building, 110 x 124, with wing, 66 x 40, both one story. The company has contracted for 1,000 electrical H. P., and will manufacture sodium and peroxide of sodium.

The Iron and Steel Company, of East Chicago, has again gone into the hands of a receiver. John J. Parkhurst, of Chicago, is the President. This action is taken on complaint of James McCloskey, whose claim amounts to \$79. Back of this are others aggregating \$15,000. The other indebtedness will swell the liabilities to \$30,000. General Manager Felt claims the assets will reach \$150,000.

J. Tatnall Lea, of Philadelphia, and Francis C. Gray, of Boston, the assignees of the Glendon Iron Company, have asked for the appointment of appraisers. The Northampton Court appointed John Bacon, of the Eastern Trust Company, and Willard Sawyer, who is the new superintendent of the works. The plant of the Glendon Iron Company represents a capital of \$100,000. The liabilities have been carefully gone over and will not exceed \$270,000.

The Card Electric Company, Mansfield, O., has been awarded by the managers of the Ohio State Reformatory, the contract for two direct-connected multipolar generators, capacity 66 kw. each, speed 250 revolutions per minute, for use in the Reformatory buildings at Mansfield, for lighting purposes. The generators will be direct coupled to Ball engines. Competition in this contract, we are advised, was quite keen and the securing of the contract is regarded as quite an achievement.

The General Electric Company has received a contract from the South American Light, Power and Traction Company of Lima, Peru, for the installation of a 5,000-H. P. electric plant. The dynamos will be erected at the waterfalls, 11 miles from Lima, and the electric power generated will be transmitted to the city where it will be used to operate the surface railways and electric lights and furnish electric power for general use. It is said that this will be the largest electrical installation in South America.

TRADE CATALOGUES.

A handsome catalogue has been issued by E. T. Barnum, of Detroit, Mich. This is a large annual catalogue by a house very well known for their specialties in iron and steel work of every description, from steel jail cells to wire flower pot stands. Their experience in this department of catalogue making results in an amount of information so well gotten up and so clearly illustrated as to be of great value. From their general catalogue special ones, such as for builders, wire and brass goods, fences and office railings, etc., can be selected by those requiring them and will be forwarded upon application.

The Lidgerwood Manufacturing Company has issued a special catalogue, or rather an illustrated description of a new device known as the Lidgerwood Rapid Unloader for unloading dirt, ballast, etc., from flat cars in railroad work. For railroad construction and for repairs it is a most ingenious and handy contrivance for unloading, as steam is taken from the locomotive boiler and a powerful drum with steel cable unloads a whole train of flat cars. This is done by means of a plow, which moves from car to car, sweeping everything off, being operated by the drum and cable before referred to.

The Sykes Steel Roofing Company, of Chicago, Ill., and Niles, O., has issued an annual catalogue for this season. The goods supplied by this house are not confined to steel roofing, as it manufactures not only its own patent standard steam roofing, but four or five other descriptions,

crimped, corrugated, sidings and ceilings. It also deals in paint and cement especially suitable for such construction purposes as will be undertaken by their trade. People who have not used this material before will find in the catalogue a great deal of useful information and many points of interest regarding the different kinds of work and of their construction.

The Union Iron Works of San Francisco have issued catalogue No. 4, dealing mainly with the Union Improved Ore Concentrator. It is well illustrated, showing in one figure the concentrator without sulphuret discharge, second with sulphuret discharge, and third a skeleton of the concentrator, the belt having been removed. The construction of each part of the machine is clearly illustrated in detail, so that anyone accustomed to concentrators of this type can understand the special features and advantages of this without seeing one actually set up. Full instruction is given as to erection and running, setting, weight and price. The rest of the catalogue is occupied with illustrations of the well-known type of stamp mills made by this firm, with union concentrators, combination mill with concentrators and coarse concentrator mill with Union concentrators.

The Link Belt Machinery Company, of Chicago, has issued a new catalogue, No. 21, fully describing the modern methods as applied to the handling of sugar cane and its products. This firm is well known by its excellent work in the past as having invented and adopted some of the best modern methods for elevating and conveying freight, grain, minerals, raw and manufactured products. The catalogue is well illustrated, for instance, that of the refuse conveyor at the Belle Alliance plantation in Louisiana, which carries refuse from the filter press and deposits same in a pile 130 ft. away. Such a conveyor may be constructed of any length or capacity to suit the existing conditions. The illustration of the Link-Belt Filter and Elevator combined, as in use both in the Hawaiian Islands and in Cuba, shows a very ingenious and convenient arrangement. It is impossible to refer to all the excellent illustrations and endless descriptions in this catalogue, but the Endless Freight Carrier as erected by the company for the Chicago Sugar Refining Company, length 435 ft., is sufficiently interesting to draw special attention to. The catalogue is altogether got up in first-class style and the illustrations could not possibly be clearer and more thoroughly fulfill their purpose in conjunction with the descriptions accompanying each. This company is satisfied of the advantages of transmitting power by manilla rope, but they consider that it is unnecessary to go fully into a description of this system and furnish instead some good illustrated instances of its application.

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.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GENERAL MINING NEWS.

ALASKA.

ALASKA MEXICAN GOLD MINING COMPANY.—This company reports its clean-up for the month of March as follows: Period since last return, 31 days; bullion shipment, \$22,019; ore milled, 7,282 tons; sulphurets treated, 126 tons; bullion from sulphurets, \$6,160; working expenses for period, \$13,180; profit for the month, \$8,830.

ALASKA TREADWELL GOLD MINING COMPANY.—The powder magazine of this company on Douglas Island, containing four tons of dynamite, was recently destroyed by a terrific explosion. The property loss is unknown.

ARIZONA.

YUMA COUNTY.

(From Our Special Correspondent.)

LA FORTUNA.—This is one of a group of mines acquired by C. D. Lane and associates, and is located about 25 miles southeast of Yuma and about 12 miles from Gila River. A double compartment shaft is down 200 ft., from which three drifts have been run, showing a large body of free milling ore. The vein is said to be from 10 to 20 ft. in width, and the pannings run good in value. Water is obtained from a well, 60 ft. in depth, located near the Gila River. The 20-stamp mill, which has just been completed, will be operated by a 100-H. P. engine. Each stamp weighs 1,350 lbs.

CALIFORNIA.

CALIFORNIA DEBRIS COMMISSION.—This commission recently granted three permits to hydraulic mine owners to erect impounding dams. These will be the last permits granted until further appropriation is made by the Federal Government. The commission has before it a number of applications

from mine owners who wish to obtain permits to build dams and begin mining.

The permits granted were to the owners of the Strawberry mine near Pleasant Valley in El Dorado County; and the Liberty Hill and Polar Star Mines near Dutch Flat. The Liberty Hill Mine is owned by Timothy Guy Phelps, and the Polar Star by John Spaulding. These two will join in raising an old dam in Bear River and use it in common. It is proposed to hydraulic the Polar Star with 1,000 in. of water under 400 ft. of pressure, and the Liberty Hill with 1,800 in. under 270 ft. of pressure.

AMADOR COUNTY.

(From Our Special Correspondent.)

ARGONAUT.—This mine is located $\frac{3}{4}$ of a mile from Jackson, and adjoins the Kennedy. The shaft is down 1,200 ft. and sinking is still in progress on the hanging wall of soft rock, the foot wall being in hard rock. After sinking 60 ft. more for a sump station will be cut at the 1,200-ft. level, and a cross-cut run for the ledge to the west.

LUCILLE.—This mine and mill, near Plymouth, have been sold under foreclosure for \$45,323 to John E. Lee and others, the judgment creditors.

CALAVERAS COUNTY.

LOCKWOD.—This mine was recently listed on the call board of the Gold Mining Exchange of San Francisco. On examining the property Mr. George E. Hogg, the engineer for the exchange, reports that the mine is situated at West Point, and consists of three United States patented claims, 160 acres of land, two mill sites, a 40-H. P. engine, a four-foot drum, steel cable and hoisting works, one 60-H. P. tubular steel boiler, pumps, air-drills, etc., which are in good condition. Actual development work has been done in the middle of the patented claims, and three shafts are sunk on the property. The main shaft is down 300 ft.; center shaft 160 ft., and south shaft 185 ft. There are six levels from the main shaft. Ore now in mine is at the bottom on the 6th level. When sinking the shaft a stringer was cut 60 ft. above bottom. It has widened 2 ft. and extends length of 6th level. A number of samples taken from gauge assayed \$100.46 in gold.

KERN COUNTY.

(From Our Special Correspondent.)

OLYMPUS.—The foot wall of this mine which is of solid porphyry has been struck 10 ft. from the surface. This shows the ledge to be 10 ft. wide, the first 8 ft. toward the hanging wall averaging about \$40 per ton and the 2 ft. next to the hanging wall averaging apparently more than the rest of the vein. This mine is located at Randsburg. Every foot of ground within a radius of five miles has been located.

GARLACK'S.—This eight-stamp mill at Cow Wells is kept busy running test lots of ore from the different mines. The water supply will be increased by an artesian.

MADERA COUNTY.

(From Our Special Correspondent.)

SAVANNAH.—Mr. Charles W. Haskell, superintendent of this mine, reports that work on the Wideawake tunnel is giving great encouragement. Ore found in stringers prospects fully \$10 a ton 3 ft. below the surface. About 10 tons of quartz are ready for hoisting in shaft No. 1, which will mill well.

NEVADA COUNTY.

FORTUNA & ORLEANS.—A syndicate of San Francisco and Eastern capitalists, represented by Mr. Kellogg, has purchased the Fortuna mine, located on the upper Nevada City road, a short distance beyond Town Talk, says the Grass Valley Tidings and also the Orleans mine, in the Grass Valley district. It is the intention of the purchasers to begin operations at the Fortuna mine without delay, and the Orleans will also be developed with renewed vigor.

PEABODY GOLD MINING COMPANY.—Baron Von Schroeder has reorganized this company of Grass Valley. He is the largest stockholder in the property. The paid-up capital of the company is \$600,000. At an election for directors 43,923 of the 60,000 shares were represented. J. J. O'Farrell, Baron Von Schroeder, B. Natop, E. Peterson and A. H. Ricketts were elected directors. They elected the following officers: President, J. J. O'Farrell; vice-president and treasurer, Baron Von Schroeder, secretary, B. Natop.

(From an Occasional Correspondent.)

SEBASTOPOL.—This mine, in the Grass Valley district, was recently purchased by Gen. Walter Turnbull, who represents a syndicate of wealthy men. The property has been examined and reported upon by Mr. George E. Hogg, examining engineer of the Gold Mining Exchange of San Francisco, Cal. The mine was worked in early times from a strong outcropping ledge down to the water level, about 60 ft. This is the same lode now being worked by the Empire mine, 1,500 ft. to the north, and at a depth of 2,100 ft., having had a continuous ore body for nearly 1,000 ft. and still having high grade ore in the bottom. The Sebastopol Gold Mining Company has been incorporated with the following officers: B. G. Lathrop, president; Walter Turnbull, vice-president; V. L. Turnbull, secretary and treasurer; B. G. Lathrop, Walter Turnbull, V. L. Turnbull, John Landers and George R. Wells, trustees. The capitalization is 300,000 shares at a par value of \$10. An electrical plant will probably be put in and active operations begun shortly. The stock of the com-

6,267; last week 4,567 ovens made six days, 7,785 ovens five days, 300 ovens four days, an average of 529 days as against 539 the week previous. Shipments of coke from the region amounted to 6,822 cars; previous week, 6,773 cars; increase, 49 cars, distributed as follows: To Pittsburg and way points, 2,171 cars; to points East, 1,040 cars; to points west of Pittsburg, 3,611 cars. Prices are unchanged.

Shanghai, China. March 27.
(Special Report of Wheelock & Co.)

Coal.—The low rates of freight still ruling between this port and Japan keep our market for this class of coal in a dull state, and prices low, showing little business during the fortnight. Only a few transactions have taken place in Cardiff. American anthracite is extremely dull; in fact offers, however low, are not obtainable. During the fortnight the market for Sydney Wollongong experienced a severe drop, but in the last few days it recovered, and is now fairly firm. Quotations are as follows for ton lots: American anthracite, 9'00 tael; Australian Wollongong, 9'50 tael; Welsh Cardiff, 10'50 tael. For Japan coal we quote 5'75 tael per ton for Takasima lump, 4'25 tael for Namazuta lump, and 3'00@3'25 tael per ton for other sorts as can be procured.

Kerosene Oil.—There has not been much business transacted in this article during the period under review and prices have dropped considerably, the absence of speculation being conspicuous. We have heard of nothing being done in Russian case or bulk oil. We note the arrival of 70,000 cases of this oil, which was sold previously to landing. Including this cargo our stocks may be estimated at 230,000 cases American and 170,000 Russian. We quote as follows per case: For American Devoe's, 1'69½ tael; Russian Batoum, 1'62½ tael, and Batoum bulk, 1'55½ tael.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 1, 1896.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan., '95.	From Jan., '96.
	May 3, 1895.	May 1, 1896.		
Anthracite.	31 20,097	44 20,250	371,590	538,598
Coke....	119 132,360	139 170,370	2,458,364	2,957,879
Charcoal...	18 3,859	13 5,200	76,530	90,840
Totals ...	171 156,316	196 195,820	2,906,484	3,597,317

The iron market generally has not been very active this week and transactions have been quite limited. Perhaps this is due to the fact—noted briefly last week—that the executive committee of the Steel Billet Combination at its meeting in Pittsburg last Friday seemed to lack the courage of its convictions and decided not to increase prices. Perhaps our advice to try \$25 or \$30 billets as a stimulus to business may be taken later, when the deliveries and resales under old contracts, which furnish all the business now doing, come to an end.

The latest news from the steel combination is that the Ohio Steel Works, at Youngstown, are to be run for two years by a trust, in which the Bethlehem, the Carnegie and the Illinois Steel Companies are represented, the Ohio Company to receive \$500,000 a year. This agreement, as reported by despatches from Youngstown, shows that the combination is determined, if possible, to remove all disturbing elements. The Ohio Company's Works employ some 800 men and have been running steadily since they were completed two years ago. Another despatch says that steps will be taken by parties in interest to enjoin the agreement.

Meantime combinations and rumors of combinations continue to multiply, and if all the plans under discussion are carried out, every branch of the trade will be pooled and competition will be at an end. It is quite possible, however, that history will repeat itself, and that all this pooling may revive the business of starting new plants to be sold out to one or other of the combinations. This has occasionally been known to be a profitable operation, and it has also been known to reach an extent which finally broke down the pool on which it was worked.

Sales of Lake iron ores are reported as quite heavy this week, contracts for some 1,500,000 tons having been closed in Cleveland. There is a rumor of a deal which will put the supply of low phosphorus ores in the hands of a party, which hopes to control in this way the supply of Bessemer pig. Any operation in this direction seems a little dangerous so long as the supply of foreign ores is accessible.

In this connection we may note a report from Ottawa that the exploring parties of the Canadian Geological Survey have located outcroppings of iron ore over an extensive district in Labrador, the superficial examination apparently showing ore of a high grade. The existence of iron ore deposits in the peninsula was reported several years ago, but the discovering party was not able at the time to continue its investigations.

NOTES OF THE WEEK.

Reports are current in Pittsburg of probable cutting on the ore rate from Lake Erie ports, which is now 90c. per ton. The Pittsburg, Shenango & Lake Erie Company is building a branch which will

give it a direct line to Pittsburg, and is said to have promised large concessions to certain interests.

Until last year all the coining dies used in the United States mints were of English steel, either of the Jessop or the Mustel brand. In the summer of 1895 the Pittsburg Tool Steel Company furnished the steel for a set of dies, and this proved to be of such excellent quality that large orders have since been given; the latest was recently shipped to Philadelphia.

New York. May 1.

The fact cannot be disguised that the local market is dull, with the exception of structural iron and cast iron pipe. The small orders, which make up a large share of the local business, have not been coming in freely, and manufacturers are hesitating about putting in stocks of raw material until they can see their way to a better demand for finished work than that existing now. Moreover, most shrewd operators are fully convinced that the market will not now stand the increase of prices required by higher rates for raw iron and steel, and that any attempt to put up quotations will be followed by a sharp drop in sales of their finished products. Demand is not urgent enough to warrant high prices in any direction, and some experiments in this direction have shown the fact very distinctly.

The new electrical work which was promised for summer is still, for the most part, held back. This is chiefly due to the reluctance of most people to put money into new enterprises just now, aided by the conservatism of the banks, which are limiting their loans and looking doubtfully at any but the very best paper. The fact is that the great majority of people do not care to take any risk until the currency question is settled—and settled in the right way.

Pig Iron.—The market is quiet, with light sales, but prices are nominally unchanged. It is quite probable, however, that offers from good parties at a shade below the market are not refused. It is reported that some of the Eastern furnaces are trying to arrange a combination, but it is not easy to see how this can be done. There is too much good Southern iron ready for sale to permit any increase in prices now or for some time to come. It is said that the Maryland Steel Company will put one or two of its stacks on foundry iron, using the Newfoundland ore which it lately bought.

We 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, \$11.50@11.75; No. 2 soft, \$11@11.50; forge, \$10@10.50. All prices are for tidewater delivery.

Cast Iron Pipe.—A contract for gas pipe for Brooklyn is reported let to the Warren Foundry, of Phillipsburg, N. J. Some small contracts are pending, and negotiations are said to be going on for a large order for South America.

Spiegeleisen and Ferro-Manganese.—No new business is noted, and quotations are nominal at \$19.50@20.50 for imported spiegeleisen and \$47@47.50 for ferro.

Steel Billets and Rods.—A few sales of billets are reported by brokers from lots to be delivered on old contracts. Terms are private, but are understood to be below the pool price, which is \$21.75 per ton for New York delivery. Rods are quoted nominally \$27@27.50, with no sales.

Merchant Iron and Steel.—The market is quiet, with only small sales. The expected higher prices for bars have not come. We quote for common bars, 1'15@1'25c.; refined bars, 1'25@1'50c.; soft steel bars, 1'35@1'45c. Other quotations are: Steel hoops, 1'50@1'60c.; steel axles, 1'65@1'80c.; links and pins, 1'65@1'75c.; tire steel, 1'85@2c.; spring steel, 2'05@2'20c. Open hearth machinery steel is 1'45@1'60c.

Plates.—There is some demand for universal plates, but the call for boiler plates has apparently been satisfied. We quote for universal mill plates, 1'45@1'55c. Other quotation are: Tank, 1'45@1'55c.; boiler shell, 1'55@1'65c.; good flange, 1'80@1'90c.; firebox, 2'10@2'50c. Charcoal iron plates are 2'25c. for shell, 2'75c. for flange, and 3'25c. for firebox. Rivets are 3@3'25c. for best iron and 2'15@2'25c. for steel.

Structural Iron and Steel.—There is a steady business in small lots and several large contracts are under negotiation. Prices show no material change. We quote for angles, 1'45@1'55c.; channels, 1'60@1'75c.; tees, 1'65@1'75c.; beams (up to 15-in.), 1'65@1'75c. for large lots and 1'90@2'10c. for small orders.

Steel Rails and Rail Fastenings.—No sales of standard rails are noted here. The business in street rails has fallen off again and is disappointing. The new elevated line of the New York Central from 106th Street to Mott Haven is being laid with steel ties. 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, 1'25@1'35c.; spikes, 1'65@1'70c.; bolts, 1'90@2'05c. for square nuts, and 2'05@2'15c. for hexagon nuts.

Scrap Iron.—The demand for foundry scrap is lighter than for some time past, but prices change very little. We quote for best machinery scrap \$10.50@12 per ton, according to size and quality of

lot; for ordinary mixed foundry scrap, \$9.50@10.50; stove-plate, \$6.50@7.50.

Some half-worn steel rails, 56 lbs. to the yard, suitable for relaying on light track, have been sold for about \$20.50 delivered at Jersey City.

Buffalo, N. Y. April 30.

(Special Report of Rogers, Brown & Co.)

It has been a quiet week locally, the consumption of pig iron, except in the car building line, being below the average. Scrap continuing scarce has made a place for some of the closer grades of iron and so slightly increased the movement of those grades. We quote on cash basis f. o. b. cars Buffalo as follows: No. 1 foundry, strong coke iron, Lake Superior ore, \$13.50; No. 2 foundry, strong coke iron, Lake Superior ore, \$13; Ohio strong softener No. 1, \$13.50; Ohio strong softener No. 2, \$13; Jackson County silvery No. 1, \$15.50; Southern soft No. 1, \$12.40, Southern soft No. 2, \$11.90; Hanging Rock charcoal, \$18; Lake Superior charcoal, \$14.

Chicago. April 29.

(From Our Special Correspondent.)

The quiet of the previous week still prevails in the iron market here, the buying in all lines being of a light character. In pig iron, sales were somewhat smaller than last week, with prices fairly held. In steel rails an aggregate of 6,000 tons was booked and there is enough business coming in and in sight to keep both the South Chicago and Joliet mills of the Illinois Steel Company running steadily. The Illinois Steel Company reports the sale of 1,200 tons of tin-plate bars at \$23.75. In structural material the only contract placed was one of 1,200 tons bridge material by the Great Northern Railroad, the Lassig Bridge and Iron Company of Chicago being the successful bidder. The lake now being opened the receipts of ore at South Chicago are quite large.

Pig Iron.—Nearly 6,000 tons of pig iron was sold by the Northern furnaces during the week, the Southern furnaces having disposed of about half that quantity. Prices appear to be held too well though there is yet a tendency on the part of some Southern dealers to quote slightly below market prices. We quote: Lake Superior charcoal, \$13.50@14; local coke foundry No. 1, \$12.50@13; local coke foundry No. 2, \$12@12.50; local coke foundry No. 3, \$11@12; 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 Silveries, \$14.50@16; Ohio strong softeners, \$15@15.50; Alabama car-wheel, \$16.85@17.35.

Structural Material.—There has been but little business to speak of during the week. Prices are as follows: Beams and channels, 1'65@1'70c.; angles, 1'45@1'50c.; plates, 1'50@1'55c.; tees, 1'65@1'70c. Small lots from stock are quoted ¼c. to ½c. higher.

Bar Iron.—There has been a moderate demand for bars, some of the railroads having contracted for cars during the week. Inquiry is fair, and prospects are for some large buying soon. Common iron is quoted 1'30@1'35c., and refined 1'35@1'40c.

Steel Rails.—Rails are in good demand, though the buying is almost wholly confined to small lots. Quotations are \$29 and upward.

Billets and Rods.—There have been no sales of billets, the market being unusually flat in this line. Rods have sold very well, nearly 10,000 tons having changed hands. Billets are quoted \$21.25 and rods \$29.50@30.50.

Old Rails and Wheels.—A few small sales of old wheels are reported at about \$13.50. Old rails are quoted \$14.50@15.

Cleveland, O. April 30.

(From Our Special Correspondent.)

Iron Ore.—During the past week the sales of Bessemer ores have exceeded 500,000 tons and may have reached well up to the 1,000,000 tons. All at the association prices announced several weeks ago. But the buyers have been the smaller furnacemen. The two largest consumers of Lake Superior iron ores are the Illinois Steel Company and the Carnegie interests. As reported last week the former has purchased a considerable portion of its requirements, but the latter has not yet come into the market.

Conditions this spring are quite different from those which have usually prevailed in the ore trade. The season of lake navigation is now fully open, but comparatively little ore has been sold, perhaps 2,000,000 tons out of an estimated production this year of 10,000,000 tons, including both Bessemer and non-Bessemer. The shippers are unwilling to contract for lake freights on the ore until it has been sold, and thus the season is advancing with much more than the ordinary uncertainty regarding lake tonnage. Ordinarily enough ore is sold when navigation opens to make most of the season contracts.

Besides the Bessemer ore sales noted above, there have also been some transactions in the non-Bessemer. The advance in these latter ores has been proportionately much less than of the former, Bessemer are up \$1.10 over the opening prices of 1895, but the non-Bessemer have scored an advance of only about 50c. Standard non-Bessemer hematite are now selling at \$2.75@2.80.

Lake freights for the first large blocks of ore were contracted for a day or two ago. About 600,000 tons of ore were covered at \$1, for delivery during the short season, or to October 1st, and at \$1.05 for delivery during the full season of navigation. Single or wild charters on ore from Escanoba to Ohio ports

STOCK QUOTATIONS.

BOSTON, MASS.*

Table with columns: NAME OF COMPANY, Location, Par val., Apr. 24, Apr. 25, Apr. 27, Apr. 28, Apr. 29, Apr. 30, Sales. Lists various companies like Alouez, Arnold, Atlantic, etc.

* Official quotations Boston Stock Exchange. + Ex-dividend. Total sales, 56,964.

NEW YORK.*

Table with columns: NAME OF COMPANY, Location, Par val., April 25, April 27, April 28, April 29, April 30, May 1, Sales. Lists various companies like Adams, Ajax, Alamo, etc.

* Official quotations Con. Stock & Petroleum Exchange. Total sales, 16,450.

INDUSTRIAL COAL AND COAL RAILROAD.*

Table with columns: NAME OF COMPANY, Par value, April 25, April 27, April 28, April 29, April 30, May 1, Sales. Lists various companies like Balt. & Ohio, Ches. & Ohio, etc.

* Official quotations N. Y. Stock Exchange. Total shares sold, 79,095.

COLORADO SPRINGS, COLO.†

Table with columns: NAME OF COMPANY, Par val., April 20, April 21, April 22, April 23, April 24, April 25, Sales.† Sales.*. Lists various companies like Ajax, Alamo, etc.

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

ST. LOUIS, MO., STOCKS. Week ending April 29.

Table with columns: NAME OF COMPANY, Company's Office, Par Value, Bld., Asked, Last Dividend. Lists Central Lead, Con. Coal, etc.

SAN FRANCISCO, CAL.*

Table with columns: NAME OF COMPANY, Location, Par. value, Apr. 25, Apr. 27, Apr. 28, Apr. 29, Apr. 30, May 1. Lists Alta, Belcher, Best & Belcher, etc.

* Official telegraphic quotations, San Francisco Stock Exchange.

BALTIMORE, MD.* Week ending April 30.

Table with columns: NAME OF COMPANY, Locn, Par value, Bld., Ask., NAME OF COMPANY, Loca, Par value, Bld., Ask. Lists Balt. M. & S., Conrad Hill, etc.

* Official quotations Baltimore Stock Exchange.

MISCELLANEOUS SECURITIES. April 30.

Table with columns: NAME OF COMPANY, Location, Par Value, Bld., Ask. Lists American Coal, Chattanooga Ore & Iron, etc.

LONDON.

April 17.

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Last dividend, Quotations. Lists various mining companies like Americans, Alaska, De Lamar, etc.

DENVER, COLO.

Table with columns: NAME OF COMPANY, Par value, Apr. 20, Apr. 21, Apr. 22, Apr. 23, Apr. 24, Apr. 25, Sales. Lists companies like Addie C., Agate, Alamo, etc.

PARIS.

Week ending April 10.

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Divs. year, Prices. Lists companies like Acieries de Creusot, Agues Tendras, etc.

PHILADELPHIA, PA.

Table with columns: NAME OF COMPANY, Loca-tion, Par value, April 23, April 24, April 25, April 27, April 28, April 29, Sales. Lists companies like Acety. L.H. & P., Cambria Iron, etc.

MEXICO.

Week ending April 23.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Prices. Lists companies like Amistad y Concordia, Angustias, etc.

VALPARAISO, CHILE.

Fortnight, Mar. 11.

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

SHANGHAI, CHINA.

April 2.

Table with columns: NAME OF COMPANY, Country, No. of shares, Par value, Last dividend, Price. Lists companies like Jelebu Mfg. & Trad., Panjom Mfg. Co., etc.

PITTSBURG, PA.

Week ending April 29.

Table with columns: NAME OF COMPANY, Loca-tion, Par value, Bid, Ask, Sell-ing price. Lists companies like Mansfield, N.Y. & C. Gas Co., etc.

HELENA, MONT.

Week ending April 25.

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., Bald Butte, etc.

DULUTH, MINN.

Week ending April 25.

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

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date and Amount of Last. Includes entries for Adams, Etna, Alaska, etc.

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 \$42,390,000.

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.

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.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

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.

1449 WANTED—ASSAYER AND CHEMIST at gold mine using cyanide process. Have references and experience. Address C. N., ENGINEERING AND MINING JOURNAL.

1450 CHEMIST WANTED FOR A VIRGINIA FURNACE WORKS. Must work very accurate and be able to give proof of his ability. A good position for a good man. Address E. J. S., ENGINEERING AND MINING JOURNAL.

1452 WANTED — AN ACTIVE, AMBITIOUS, young Mining Engineer to act as Assistant in California, British Columbia, and perhaps South Africa. Good recommendations required. Address ACTIVE, 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.

1454 WANTED—A CHEMIST, ONE WHO has had experience in the assay of silver-lead bullion, doree bars and argentiferous copper; a good salary will be paid to the proper man. Address BI-METALL, ENGINEERING AND MINING JOURNAL.

1455 WANTED—AN ASSAYER FOR SILVER department of smelting works. Must have had experience and be able to furnish testimonials as to ability and honesty. Address DENVER, 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.

SITUATIONS WANTED.

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

ASSAYER, REFINER AND SMELTER IS open for engagement. Best of references. Address X. Y. Z., ENGINEERING AND MINING JOURNAL. No. 7, 15, May 9.

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.

EXPERIENCED, PRACTICAL, ACCURATE Chemist and Metallurgist wishes position as Chemist or Assistant in acid works, smelting works, steel works, or oil-st furnace. Low salary. Address PRACTICAL, ENGINEERING AND MINING JOURNAL. No. 17, 408, May 16.

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

CHEMIST (AGE 30), EXPERIENCED IN EXPERIMENTAL 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.

ENGINEERING GRADUATE, 15 YEARS' practical experience with large coal corporations in all the departments of coal mining and trade from preliminary prospecting to mine management and general sales agent, is open for engagement, home or abroad. Can guarantee most economical American methods. Best references. Address L. U., ENGINEERING AND MINING JOURNAL. No. 17, 401, May 23.

METALLURGIST, CHEMIST AND ASSAYER desires position, preferably with smelting company. Competent and experienced furnace manager and rapid and accurate chemist. Proficient and systematic record keeper and is economical. Speaks Spanish. Good references. Address HABIL, ENGINEERING AND MINING JOURNAL. No. 17, 398, May 16th.

AN EXPERIENCED ASSAYER, LATE with Balbach, S. & R. Co., desires position; either West, Mexico or South America. Address H. Z., ENGINEERING AND MINING JOURNAL. No. 17, 473, May 16.

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.

SITUATION WANTED AS CHEMIST AT iron mine, blast furnace or steel works by a chemist of thorough experience and education. Neat, accurate and reliable. Accustomed to conduct work of laboratory in first-class manner. Good references. Address ACCURATE, ENGINEERING AND MINING JOURNAL. No. 17, 412, May 16.

CHEMICAL WORKS MANAGER AND Superintendent of long and practical experience is open for a new engagement. Address WYBITES, ENGINEERING AND MINING JOURNAL. No. 17, 411, May 16.

Contracts Open.

PUMPING ENGINE.—Office Board of Trustees of Water-Works, Sandusky, O.—Sealed proposals will be received at the office of this Board, in the city of Sandusky, O., until the 1st day of May, 1896, for remodeling a 3,000,000-gal. pumping engine now in the pumping station of the water-works of said city, according to specifications therefor, which are on file in the office of said Board. All proposals must be on blanks which may be obtained at the office of the said Board. Each bid must be accompanied by a certified check, drawn to the order of the Secretary of said Water-Works, in the sum of \$300, as surety that if the bid is accepted a contract will be entered into. The right is reserved to reject any or all bids. P. J. CROSEN, President; ADAM KOLB, C. O. DEHNEL, Trustees; C. A. JUDSON, Superintendent.

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., April 29th, 1896.—Sealed proposals will be received at this office until 2 o'clock p. m., on the 21st day of May, 1896, and opened immediately thereafter, for all the labor and materials required for the completion of the superstructure, interior finish, plumbing, etc., of the U. S. Post Office building at Richmond, Ky., in accordance with the drawings and specifications, copies of which may be had at this office or the office of the Superintendent at Richmond, Ky. 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 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 for opening will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked "Proposal for the Completion of the Superstructure, Interior Finish, Plumbing, Etc., of the U. S. Post Office at Richmond, Ky.," and addressed to WM. MARTIN AIKEN, Supervising Architect. Orig.

BRIDGE.—Bids will be received at my office, in Hawkinsville, Ga., until the 8th day of May, 1896, for furnishing material and placing iron or steel viaducts to west side approaches to river bridge, at Hawkinsville, in lieu of present wooden structure. Total length of said approaches is about four hundred (400) feet. Bids are asked on two hundred (200) feet of same, with privilege of whole length. The right to reject any or all bids is reserved. For further particulars address me at Hawkinsville, Ga. P. T. McGRUFF, Ordinary, Polaski County, Ga.

WATER-WORKS.—Sealed proposals addressed to the City Clerk, Bluffton, O., will be received until April 27th, for furnishing material and labor and constructing a system of water-works for Bluffton, O. The work to be done is approximately as follows: 1. Furnishing f. o. b. Bluffton, O., about 245 tons of cast-iron pipe, and about six tons of special castings. 2. Laying of the above pipe, and setting all hydrants, valves and valve boxes. 3. Furnishing f. o. b. cars, Bluffton, O., 38 fire hydrants; also the necessary valves and valve boxes. 4. A pumping station. 5. A steam pumping plant of an easy capacity of 1,000,000 gallons per day, with boilers and all appurtenances. 6. A steel tank 22 ft. in diameter and 30 ft. deep, erected on structural steel tower 50 ft. in height. Bids will be received for the whole or any part of the above work, and the village of Bluffton, O., reserves the right to reject any or all bids. Accompanying each proposal must be a certified check, payable to the order of the City Treasurer of Bluffton, O., as a guarantee to be forfeited if the bidder fails to enter into the contract awarded to him; the amount to be 3% of the amount of the bid, provided no check be less than \$200. Plans can be seen at the office of Sanders & Porter, designing engineers, 9'8 Columbia building, Louisville, Ky., and at the office of W. H. FULLER, Chairman of the Water Works Committee, Bluffton, O. All work to be paid for in cash. W. H. FULLER, Chairman, SANDERS & PORTER, Engineers, Louisville, Ky.

BRIDGE.—Bids will be received at my office in Hawkinsville, Ga., until the 8th day of May, 1896, for furnishing material and placing iron or steel viaducts to west side approaches to river bridge, at Hawkinsville, in lieu of present wooden structure. Total length of said approaches is about four hundred (400) feet. Bids are asked on two hundred (200) feet of same, with privilege of whole length. The right to reject any or all bids is reserved. For further particulars address me at Hawkinsville, Ga. P. T. McGRUFF, Ordinary, Polaski County, Ga.

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., April 29th, 1896.—Sealed proposals will be received at this office until 2 o'clock p. m., on the 26th day of May, 1896, and opened immediately thereafter, for all the labor and materials required for the interior finish, plumbing and approaches, of the U. S. Post Office, Court House and Custom House at Newberne, N. C., in accordance with drawings and specification, copies of which may be had at this office or the office of the Superintendent at New Berne, N. C. 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. Proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposal for Interior Finish Plumbing and Approaches for the U. S. Post Office, Court House and Custom House at New Berne, N. C.," and addressed to WM. MARTIN AIKEN, Supervising Architect. Orig.

STEEL-FRAMED CONSTRUCTION AND REPAIR SHOP at U. S. Naval Station, Port Royal, S. C.—Bureau of Yards and Docks, Navy Department, Washington, D. C.—Separate sealed proposals, in duplicate, for the following object, endorsed proposals for "Construction and Repair Shop," at U. S. Naval Station, Port Royal, S. C., will be received at this Bureau until May 22d, 1896. Specifications and blank forms of proposal will be forwarded upon application to this Bureau or the commandant of the Naval Station, Port Royal, S. C. Bidders are expected to fully inform themselves of the character of the work required, by visiting the station, where plans may be examined, and, if necessary, obtained. A certified check of two thousand (\$2,000) dollars must accompany the proposal as a guarantee that the bidder will execute the required contract after his bid has been accepted. Responsible security will be required for the faithful performance of the contract, and the right is reserved to reject any or all proposals not deemed advantageous to the Government, and to waive defects. E. O. MATTHEWS, Chief of Bureau.

BRIDGE.—Office Commissioners of Roads and Revenues, Fulton County, Georgia, Atlanta, Ga.—Sealed proposals will be received at this office until the 8th day of May, 1896, for furnishing all material and labor and building complete, ready for use, the Bridge over Peachtree Creek on Peachtree road, about five miles from the City of Atlanta, in accordance with plans and specifications prepared by Grant Wilkins, Engineer, copies of which can be had by bidders upon application to the undersigned or to the Engineer. Each bid must be accompanied by a certified check for the sum of Two Hundred and Fifty Dollars, payable to C. A. Collier, Chairman Commissioners of Roads and Revenues of Fulton County. The right is reserved to reject any or all bids. All proposals to be addressed to the undersigned, and must be made upon the blank form for proposal attached to the specifications. ANTON L. KONTZ, Clerk Commissioners Roads and Revenues for Fulton County, Atlanta, Ga.

WATER-WORKS.—Notice is hereby given that until May 18th, 1896, the City Council of the City of Franklin, Ky., will receive sealed bids for the erection of a system of water-works, or any part thereof, according to the plans and specifications of J. A. Holmboe, Engineer, which plans and specifications can be seen after May 1st, 1896, at the office of J. A. Holmboe, 410 Columbia Building, Louisville, Ky., or by calling on JAS. N. FARUE, Mayor, at Franklin, Ky.

THE ENGINEERING AND MINING JOURNAL ADVERTISING RATES. (NON-PAREIL MEASUREMENT.) Table with columns for Lines, Inches, Regular Edition, One Month, Three Months, Six Months, Nine Months, Twelve Months and rates for Front page, Back outside page, Page facing editorials, Page facing market reports, Inside front cover, Inside back cover.

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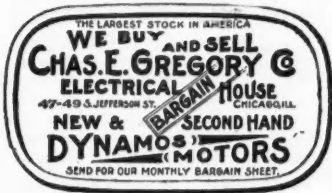
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To close a Trust, the real estate, buildings, machinery, plant, tools, material and shares of stock of **WALLACE & SONS,** will be sold by auction at their office in Ansonia, at noon on Thursday, May 14th, 1896, unless previously disposed of at private sale.

The property includes Brass and Copper Wire Mills, Brass and Copper Rolling Mills, Casting Shop, Lamp and Burner Shops, Pin, Rivet and Chain Machinery, with auxiliary Shops and Buildings, and all now running.

The property also embraces: 1 double tenement, 2-story and extension, on Pleasant St.; 1 double tenement, 2-story, on Fourth St., all at Ansonia; about 741 acres woodland in Newton; about 61 1/2 acres woodland in Ansonia; about 12 acres woodland in Seymour. Also the following shares of stock, viz.: 8,000 shares Parrot Silver & Copper Co. stock; 240 shares American Fish Hook Co. stock.

The manufacturing plant and land and buildings connected with it will be sold in one lot, if started at a bid to be fixed at the sale, which will be less than one-half the value recently appraised by Messrs. Brooker and Plume. Otherwise in lots as per Catalogue.

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Catalogues of the property in detail may be had by addressing **Wallace & Sons,** 29 Chambers St., New York.

The Trustees reserve the right to sell all or any part of the property at private sale before the auction.
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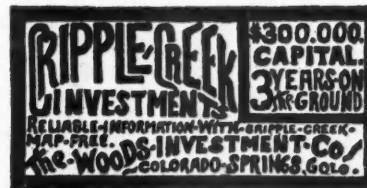
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DIVIDENDS.

VICTOR GOLD MINING COMPANY.

of Cripple Creek, Colo., has declared a dividend (No. 37) of **TEN CENTS** a share on its capital stock (201,000 shares), amounting to \$20,000, payable May 15. Books close at the New York office, No. 66 Broadway, May 9; reopen May 16. Total dividends to date \$565,000.

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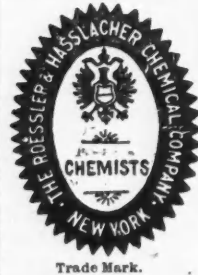
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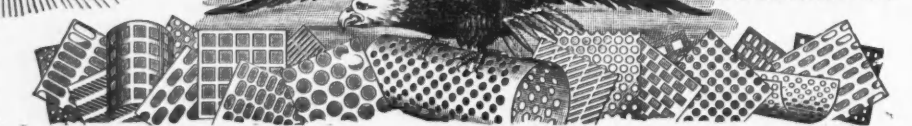
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