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CONTENTS.

	Page.
Underground Photography.....	241
The Hartsfeld Humbug Again.....	241
Blast Furnace Report for September 1st.....	241
Condition of the Iron Trade.....	241
The Providence-Champion Decision.....	R. W. Raymond 242
The Cyanide Assay for Copper.....	243
Books Received.....	243
A. Walrath et al. vs. Champion Mining Company.....	244
Brussels Meeting of the Iron and Steel Institute.....	245
The Walrand Legenisel Steel Process.....	George J. Snelus 246
The Tennessee State Convict Mine.....	L. E. Bryant 247
* The Cascade Water-Wheel.....	248
* Brown's Assay Furnace.....	249
The Fairfield Copper Company.....	Maurice Barnett 249
* A New Time Recorder.....	250
The Indian Coalfields.....	250
* Cornish Tin Mining in Photograph (with Supplement).....	251
Experiments with Zinc Ores in a Blast Furnace.....	H. Aug. Hunicke 251
Patents Relating to Mining and Metallurgy.....	251
Personal, Obituary, Societies, Technical Schools, Industrial.....	252
Notes: Price of Steel Rails in Russia, 243—The Jura-Simplon Railway Tunnel, 243—Coal as Contraband of War, 243—A New Barometer, 247—A Large Dredger, 248—Development of Russian Mineral Districts, 250—Canadian Mica Company, Limited, 250.	

* Illustrated.

MINING NEWS.		FOREIGN NEWS.		Philadelph. 259		London..... 252	
California..... 253	Australia..... 257	Pittsburg..... 259	Philadelphia..... 252	Br. Columbia..... 257	Br. Columbia..... 257	Aspen..... 264	Philadelphia..... 252
Colorado..... 253	Br. Guiana..... 257	METALS..... 260	Aspen..... 264	Florida..... 254	Mexico..... 257	Colorado Springs..... 264	Aspen..... 264
Georgia..... 254	LATEST MINING NEWS..... 257	CHEMICALS AND MINERALS..... 260	Duluth..... 264	Idaho..... 254	MINING STOCKS:	Helena..... 264	Duluth..... 264
Maryland..... 255	MARKETS:	Mining Stocks:	Pittsburg..... 264	Michigan..... 255	COAL:	St. Louis..... 264	Pittsburg..... 264
Minnesota..... 255	New York..... 257	New York..... 261	St. Louis..... 264	Montana..... 255	Boston..... 258	Shanghai..... 264	St. Louis..... 264
Nevada..... 255	Boston..... 258	Boston..... 261	Shanghai..... 264	Oregon..... 256	Buffalo..... 258	Paris..... 264	Shanghai..... 264
Pennsylvania..... 256	Chicago..... 258	San Francisco..... 261	Paris..... 264	South Dakota..... 256	Pittsburg..... 258	Coal Stocks..... 262	Paris..... 264
Tennessee..... 256	IRON:	London..... 261	Ind. and Trust..... 262	Texas..... 256	Assessments..... 254	MINING Co's..... 263	Ind. and Trust..... 262
Utah..... 256	New York..... 259	Meetings..... 261	Current Prices:	Washington..... 256	Dividends..... 261	Chemicals..... 264	Current Prices:
West Virginia..... 256	Chicago..... 259	Stock Quotation:	Minerals..... 264	Wyoming..... 256	Stock Quotation:	Rare Metals..... 264	Minerals..... 264
		New York..... 262	ADVT. INDEX..... 15		Houston..... 262	ADVT. RATES..... 33	ADVT. INDEX..... 15
		San Francisco..... 262			Denver..... 262		
		Baltimore..... 262			Salt Lake City..... 262		

UNDERGROUND PHOTOGRAPHY.

Since noting in these columns that we would be glad to receive from our readers any photographs which they might have of underground workings, we have received quite a number, some of which we hope to reproduce in the near future. In order to treat the subject fully and completely, however, we would like to secure still more, so as to show the various methods adopted in different mines and different sections. We will, therefore, be glad if all those who have such photographs or have opportunities for securing them will send them to us that we may see whether they are suitable for reproducing in our illustrated supplement of mining in photography. We again express our readiness to furnish any information at our command to those who wish to try their hand at such work.

In the St. Louis "Republic" of September 2 there appears an article on the Denverside Smelting and Refining Company, naming Chas. L. Hartsfeld as president; Wm. S. Hodges, vice-president, and Leo J. Scherer secretary and treasurer, and it adds that some of the wealthy citizens of East St. Louis induced Mr. Hartsfeld to form a stock company, which has been incorporated with \$50,000 capital, the officers already named being duly elected.

If these citizens were readers of the "Engineering and Mining Journal" they would save money. The Hartsfeld mentioned has been exposed many times in these columns as a humbug who has left behind him in Newport, Ky., Rome, Ga., in Chicago and in many other places an unbroken line of technical and financial failures.

The St. Louis "Republic" should not be ignorant of Hartsfeld's record, and should warn its readers against parting with their money in his bogus enterprises. Nearly any reputable metallurgist in this country can inform our contemporary as to this technical record, and hundreds of those proverbially easily parted from their money, and who have furnished the money to keep up these humbugs, can give their more or less instructive financial experiences with this man.

The reports of the blast furnaces shows that September opens with a notable increase in the production of pig iron. On August 1st there were 136 furnaces in blast having an aggregate weekly capacity of 116,460 tons, and on September 1st 169 furnaces in blast with a weekly capacity of 149,855 tons. As was the case in August, this increase is due to the cessation of the coal, coke and railroad strikes, as well as the returning business confidence now manifested throughout the country. On September 1st, last year, there were 125 furnaces in blast with a capacity of 183,457 tons, showing an increase for the same period this year of 44 furnaces, and 66,398 tons weekly. The production, therefore, is now considerably in excess of that of the closing months of 1893. The question naturally rises whether prices will be maintained. It will be seen from our market reports, published elsewhere, that during the past few days values have ruled somewhat weaker. It does not seem probable, however, that we shall see prices much lower than obtained this year before the coke strike caused a comparative scarcity of certain grades of iron. On the other hand, owing to improvements in the furnaces and the decreased cost of production, it is not likely that prices will be much higher, even should consumption continue to increase at the present rate. The improvement in the iron market has been and will be only gradual, but perhaps this very fact may prove an element of stability, in that the market will be free from sudden fluctuations, and, hence, corresponding sudden reactions.

THE CONDITION OF THE IRON TRADE.

Mr. Swank's report of the American Iron and Steel Association on the domestic iron trade during 1893 comes at rather a late day, but it is none the less interesting as an historical review of the course of the iron business for the year which ended nine months ago. Usually this report is issued in May, but possibly the uncertainty of tariff legislation, or as Mr. Swank says, "the desire to first complete the Directory of Iron and Steel Works," caused the delay. To atone for the delay, however, the figures of production for the first sixth months of 1894 are given.

The report shows, as had already been stated in the "Mineral Industry," that while the falling off in the production of iron and steel was very heavy, the decline in prices was in much greater proportion, as was also the ore and other elements in the cost of production. Mr. Swank, as in all former reports, avoids touching upon the cost of production.

The most interesting feature of this report is the comparison between the three six-months periods—the first and last halves of 1893 and the first half of 1894—and the variation in the range of prices. In the first half of 1893 our production of pig iron was 4,562,918 tons; in the last half, 2,561,584 tons; and in the first half of 1894, 2,717,983 tons, or very little more than in the half-year period preceding it. In the range of prices the difference is far more marked. Taking the average price of gray forge in Pittsburg, from January to June, 1893, it varied from \$12.30

to \$12.25. From June to December, from \$12.25 to \$10.44: the first marked decline showing in September of that year. In January, 1894, the price was \$9.88, and after dropping to \$9.47 in April, advanced to \$9.78 in June and \$9.94 in July. As the columns of the "Engineering and Mining Journal" show, there has been a still further advance in August.

Probably the most marked decline, however, is shown in the price of steel billets at mills. From January to June, 1893, these varied from \$21.75 in the first named month to \$21.87 in the latter; though there was a slight advance during the intervening months. From June to December the price fell from \$21.75 to \$16.87, the first marked drop coming, as with pig iron, in September. From January to June, 1894, the prices ranged from \$16.10 to \$18.60, falling to \$17.75 in July and reaching \$18 in August, as shown in the market reports of the "Engineering and Mining Journal." In Bessemer pig the decline reached its lowest point, in April, 1894, \$10.49, since when the price has advanced to \$12.60 in July, and as shown in our reports \$12 in August, or about the same as the market price in September and October, 1893. It will be some time before the demand in this country can reach the capacity of production of our existing furnaces, and every one knows that a surplus on the market regulates prices.

The other figures of Mr. Swank's report have already been published and commented upon in the "Mineral Industry" and in the columns of the "Engineering and Mining Journal." In itself, the report exhibits the painstaking care and accuracy of all of Mr. Swank's work, and reflects high credit on him. It is to be regretted that he allows his personal political opinions to absorb a large part of his report and mar its value. Mr. Swank has a perfect right to his very strong views as a partisan politician, but business men, economists and statisticians, will see in the reduction of cost of iron ore and coke and the general exercise of greater economy and improved furnace practice the causes for the great decline in the price of pig iron and steel without having to call in the irrelevant and disputable sentimental effects of partisan politics to account for natural economic phenomena.

The price of iron ore which in 1890 was \$6 per ton for lake Bessemer ores delivered at Cleveland, in 1894 was for the same grades \$2.75, and Mesabi Bessemer ores which entered and broke the market in 1893, sold this year at \$2.50 per ton. Connellsville coke, which in 1890 was \$2.07 per ton (see "Mineral Industry," Vol. I. p. 90), sold in 1893 and 1894 at 85 cents per ton, and there has been a general, though smaller, reduction in wages and in general expenses at the furnaces. The decline in the cost and selling prices of iron ore during the past year are well known to be largely due to the discovery and opening of the great ore quarries of the Mesabi in Minnesota.

THE PROVIDENCE-CHAMPION DECISION.

In another column will be found the full text of a recent decision in the U. S. Circuit Court at San Francisco, in the case of *A. Walrath et al., vs. Champion Mining Company*, as published in the *Mining and Scientific Press* of August 25th. According to the *Press* report Hon. Thomas P. Hawley is the judge, but the opinion was read by Judge Beatty. Whether this is a typographical error, or whether it indicates that both judges heard the argument and concurred in the decision, I do not at present know, nor is the question important to my immediate purpose; for both are entitled to the respect due to experience in mining litigations as well as to unquestioned ability and integrity; and the opinion itself is acute and weighty, whoever was its author. If, as the sequel will show, I cannot accept it as a sound and safe final settlement of the general principle involved in this special case, my dissent is uttered with deference, and in full recognition of the fact that the letter of our present U. S. statute cannot be applied consistently to the complicated conditions of actual practice, and that the attempt to follow its spirit opens a wide field for difference of opinion as to what that spirit is. Moreover, I am not prepared to assert that, in the particular case at bar, the decision has wrought injustice to either party. It is not my purpose, in such discussions as this, to consider local circumstances, except so far as they are involved in the declaration of legal precedents, applicable in other cases.

The present case, though said in the decision to have the same character as the *Wyoming-Champion* case, upon which I commented two weeks ago, seems to me to possess nothing in common with that case, except the circumstance that it involves a patent obtained under the act of 1866. But in this instance, the end lines of the location are parallel, and therefore no question arises under that act. On the other hand, an entirely new question is presented under the present statute, namely that of extralateral rights upon a lode other than the lode located.

The issues are fully set forth in the decision, and need not be repeated here. Upon careful study of the text and diagram, it will appear:

1. That the court decides the lines *ap* and *gh* to be the end-lines of the Providence claim of the complainant, these two lines being parallel, and the apex of the located (Providence) lode crossing both of them. It follows that all the other boundary lines are side-lines.

2. That the ground in controversy is upon a "back vein," which crosses

neither end line, but enters the Providence claim across a side line, and probably departs across another side line; though the court says that question is immaterial.

3. That the Providence claim has the senior title, and, moreover, that the line *fg* is admitted to be the boundary between the conflicting claims.

4. That the complainant, by virtue of that boundary, claimed the line *fgg'* as the northern limit of its extralateral rights on the eastward-dipping vein *xx'*; while the respondent, by virtue of the end-line *gh*, claimed that the extralateral right upon *xx'* should be bounded by *vv'*, drawn parallel to *gh* through the point *v*, where the said lode enters the Providence claim.

5. The decision of the Court appears to be that, by a formal act, the respondent had abandoned that part of the lode *xx'* lying between *gh* and *vv'*, and that the boundary of the extralateral right in dispute must therefore be the broken line *vgh*. But this act of abandonment, as recited in the preliminary statement of the court, surrendered only whatever conflicted with the rights granted by the Providence patent; and the court explicitly declares, in its refusal to approve the complainant's line *fgg'*, that "this abandonment or agreement—or whatever it may be called—did not give to the Providence any greater rights than it previously had." The situation in this respect is therefore precisely as if the respondent did not exist; and we must regard the decision as declaring that the Providence location carries the ownership of the "back vein" in its downward course, not merely to the horizontal extent of its apex within the Providence claim, but beyond that, to the boundary plane *gh*, fixed by the location of the Providence lode.

This decision is based upon a declaration of the U. S. Supreme Court in the *Elgin* case; and it is, in my judgment, perfectly sound, so far as it is a denial of the complainant's claim for a new end-line *fgg'*; but in going further than this, and refusing to limit the complainant's extralateral right on the back vein by the length of the apex of that vein on the Providence claim, the Court has violated a principle far more positive and important than the *obiter dictum* in the *Elgin* case. I mean the fundamental principle, that no construction of the mining law should be permitted to give a locator a greater horizontal length of claim underground than is covered by the surface location.

In the *Flagstaff* case this is distinctly laid down, and declared to be the essential meaning of both the act of 1866 and the present statute. The Supreme Court in that case affirmed the judgment of the court below, and approved its position, "namely, that a mining-claim secures only so much of a lode or vein as it covers along the course of the apex of the vein at or near the surface, no matter how far the location may extend in another direction."

In the *Eureka* case (4 Sawyer), the court, speaking of certain old local mining regulations, said:

"It is true that end lines are not in terms named in the rules of the miners, but they are necessarily implied, and no reasonable construction can be given to them without such implication. What the miners meant by allowing a certain number of feet on a ledge was that each locator might follow his vein for that distance on the course of the ledge and to any depth within that distance. So much of the ledge he was permitted to hold as lay within vertical planes drawn down through the end lines of his location and could be measured anywhere by the feet on the surface. . . . No construction is permissible which would substantially defeat the limitation of quantity on a ledge, which was the most important provision in the whole system of rules.

"The act of 1866 in no respect enlarges the right of the claimant beyond that which the rules of the mining district gave him.

"The act of 1872 preserves to the miner the rights acquired under the Act of 1866 and confers upon him additional rights. . . . The act simply recognized a pre-existing rule applied by miners to a single vein or lode of the locator, and made it applicable to all veins or lodes found within the surface lines."

It seems to me that this principle will inevitably be the controlling one, and the letter of the law will be construed by the United States Supreme Court in accordance with it. If the Supreme Court will not under any circumstances draw a new line such as *vv'* in the diagram before us, and if it continues to hold that the end lines fixed by the position of the located lode must be the boundaries of all the extralateral rights granted to the location, then it may be led to refuse to "back veins" which do not cross those end lines any extralateral right whatever, on the ground that such a right is impossible of definition under the circumstances. This possible conclusion is, perhaps, not unreasonable. The argument so often based upon the just deserts of the locator is wanting here; or, rather, it works the other way. Conceding that the locator may have an equitable claim to extralateral rights upon his located lode, even though it be not strictly located as the law requires, he has no such equitable claim upon another lode accidentally included in his location. The natural claim, indeed, may belong to an adjoining locator. Using the diagram of this case for illustration, but without reference to any of the special transactions between the parties, let us assume that, the day after the Providence location was made on the Providence lode, a locator discovered the apex of another lode on the New Year's Extension, and made a location thereon in proper form, with *fg*, a side-boundary of the Providence, as one end-line, and another end-line parallel thereto. Let

us assume also that this second lode dipped west, instead of east, like the Providence. Whatever might be the effect of a strict application of the law, no one can deny that if it allowed the Providence locator to take away the title west of *fv* of the actual discoverer of the new vein, on the ground that it was a "back vein" of the Providence, it would work a cruel hardship and injustice.

We are continually told that the purpose of the law of the Extralateral Right is to encourage lode mining; and this ground is often urged by advocates of the extremest latitude with regard to that right. It does not seem to occur to them that the encouragement of mining does not consist merely in encouraging the first adventurer and discouraging every following one. The second-comer ought to be able to know what rights he can secure by complying with the conditions of the law; and it would certainly not be unjust to protect him against extralateral intrusion upon all "back-veins," the apexes of which do not cross the end lines of his neighbor. Whether such a construction of the present statute is permissible, I will consider more fully on another occasion. It is sufficient to say here that, in my judgment, whatever may be in the present case the extralateral right of the Providence location to the "back-vein," it cannot cover a greater length below the surface than upon the surface, whether under the present law, or under the Act of 1866, or under miners' regulations prior to any Federal legislation.

The end-lines of the Providence location, as determined by the Providence lode, are parallel; and therefore, as I have already observed, the results of a non-parallelism, permissible under the act of 1866, do not here come into consideration. As to the "back vein," that act gave no rights whatever, and therefore I do not see that its provisions are at all involved in the present case. But they were clearly involved in the *Wyoming-Champion* case, which I reviewed in the "Engineering and Mining Journal" of September 1st, and concerning which I will here offer an additional remark, to guard against misconception of my views.

In the article referred to I said:

"It seems to me that (a) for a location not requiring parallel end-lines, the end-lines must be those crossed by the apex. The Ural location in this case presents no irregularity to be corrected. The lode crosses two boundaries not mutually parallel; but so it would do, no matter where it went; for the location presents no two parallel boundaries. The location is therefore perfectly regular under the old law (b); and if the new law be applied to it (c), the bounding planes of its extralateral rights should be simply drawn through the actual non-parallel end-lines. This, as it happens, would give the claim no extralateral rights whatever. It might have given very large and increasing rights under other circumstances. It is to be presumed that the owners, taking patent, as they did, in 1880, adhered to the old form of their location, with the hope that it might give them some such advantage. If they have gambled for too much and lost all, they must take the consequences."

This reasoning was based on the acceptance by the court of one of the surface-lines of the Ural location as an end-line. If the reader will introduce into the above passage at (a) and (b) the words, "according to the view taken by the court"; and at (c) the word "literally, as the court in part attempts," my meaning will be more clear.

I make this correction here because I do not wish to seem to overlook a possible, not to say probable, view of the effects of non-parallel end-lines, established under the act of 1866. That act, it must be remembered, not only did not require parallel end-lines; it did not mention such things as end-lines at all. The tract covered by the lode-location was limited only by local regulations as to shape and size, and the grant of it conveyed only an easement or prior right to its use for mining purposes. As a natural result, locations under that act were made rather with reference to the convenience of mining than to the course of the lode located. The legal effect of such a location (apart from any rights subsequently conferred by the Act of 1872) is clearly stated in the *Eureka* case as follows:

"It is true . . . that the surface land taken up in connection with a linear location on the ledge or lode is, under the act of 1866, intended solely for the convenient working of the mine, and does not measure the miner's right, either to the linear feet upon its course, or to follow the dips, angles and variations of the vein, or control the direction he shall take. But the *line of location* taken does measure the extent of the miner's right. That must be along the general course, or strike, as it is termed, of the ledge or lode. Lines drawn vertically down through the ledge or lode, at right-angles with a line representing this general course, at the ends of the claimant's line of location, will carve out, so to speak, a section of the ledge or lode, within which he is permitted to work and out of which he cannot pass."

In view of this declaration, it may be questioned whether the casual end-lines of 1866 are to be accepted as the end-lines fixed in 1872 as the boundaries of the extralateral right. According to the letter of the later statute, Yes; but according to its spirit and purpose, quite possibly, No; and, I am inclined to say, certainly not when the two so-called end-lines are not parallel. In that case, however, the question arises, How shall parallel boundaries be established? Judge Hawley, in *Wyoming vs. Champion* answers this question by arbitrarily taking one of the old end-lines as valid, and turning the other one to make it parallel therewith. The intimation in the *Eureka* case seems to be, that for locations under the Act of 1866, with non-parallel end-lines, the court should

accept neither so-called end-line, but draw vertical planes, at right-angles to the general course of the vein, at the two extremities of the linear length of the portion of the apex located. This is what the U. S. Supreme Court, in the *Elgin* case, declared that it would not do; but the *Elgin* case arose wholly under the present statute, and the problem as presented under the Act of 1866 involves new elements, and might receive, consequently, a different solution.

R. W. RAYMOND.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industry 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. All letters should be addressed to the MANAGING EDITOR.

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

The Cyanide Assay for Copper.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In the last issue of your paper Mr. J. D. Audley Smith, writes regarding the cyanide assay for copper. In what he has said I must disagree with him.

The electrolytic method is the ideal as far as accuracy is concerned. And whenever accuracy is the prime consideration, the cyanide process should not be employed, no matter how it may be modified.

The precipitation of copper by means of zinc previous to the titration with cyanide does not constitute an improvement of the method as it gives rise to the formation of alloys of copper and zinc, even if the solution is strongly acid.—(Cfr. A. Volliers and F. Borg, *Compt. Rend.* 116 (1893), 1524-1527.)

Dilute copper solutions yield precipitates containing up to 40 and 50% of zinc according to conditions. These alloys show the color of brass when subjected to strong pressure.—(Cfr. F. Mylius and O. Fromm, *Berliner Bericht* 27 (1894), 633.)

EMIL E. LUNGWITZ.
New York, Sept. 5, 1894.

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.

Catalogue of the Michigan Mining School: 1892-1894. Houghton, Mich.; Published by the Mining School. Pages 215; with map.

The Civil Engineer's Pocket-Book. By John C. Trautwine, Jr. New York; John Wiley & Sons. London; E. & F. N. Spon. Pages 866; revised and copiously illustrated.

Statistics of the American and Foreign Iron Trades for 1893: Annual Statistical Report of the American Iron and Steel Association. Philadelphia, Pa.; published by the Association. Pamphlet; pages 78.

Coal-Dust an Explosive Agent: As Shown by an Examination of the Camerton Explosion. By Donald M. D. Stuart. London; The "Colliery Manager," E. & F. N. Spon. New York; Spon & Chamberlain. Pages, 103; illustrated.

Price of Steel Rails in Russia.—According to the British Vice-Consul at Kieff, towards the end of 1893 the Southwestern Railway, whose general offices are at Kieff, placed an order with the South Russian Dnieper Works for 8,046 tons of steel rails at the price of £11 per ton.

The Jura Simplon Railway Tunnel.—The scheme submitted to the Jura-Simplon Railway Company for making a tunnel through the Simplon has been approved in principle by the Swiss Federal Council, which will now submit it to the Italian Government. According to the terms of the contract the tunnel is to be finished in five and a-half years with a single line of rails, and is to be so constructed as to admit of its being eventually widened for a second line of rails. The cost of the first undertaking is 54,500,000f., while the second line will involve an additional expenditure of 15,000,000f.

Coal as Contraband of War.—London "Coal and Iron" says that as there is every prospect that the war between China and Japan will be fought out to the end, it is a matter of some regret that Sir E. Grey's reply to Mr. Storey as to whether coal was to be regarded as contraband of war or not was vague and indefinite in its terms. Already several cargoes of coal have been ordered in England on account of one or other of the belligerents, but until the question as to what is contraband of war is settled, merchants and shippers run a considerable risk in sending coal cargoes to China or Japan. The price of coal at the treaty ports has rapidly advanced, and it is certain that if the war should be prolonged, as there is reason to believe it will be, the demand for supplies will become so urgent as to tempt shippers to run the risk of the capture and forfeiture of their cargoes. We assume, of course, that coal will be declared contraband, though on this point considerable doubt prevails. Mr. Storey put a very simple question to the Under-Secretary of State for Foreign Affairs on the subject, but Sir E. Grey, with excessive cautiousness, as it seems to us, evaded giving an answer to the question. All he would say was that "it would be a dangerous and unusual course for Her Majesty's Government to undertake to define by a general statement what is and what is not contraband of war. For instance, coal has been held not to be contraband of war as a general rule, but it is possible that it might in certain cases become so. Her Majesty's Government, of course, adhere to the doctrine, which they have heretofore maintained, that it is not for the belligerent to decide what is and what is not contraband of war, regardless of the well-established rights of neutrals." Now it is well known that in the United States, and probably elsewhere, both China and Japan have been making large purchases of provisions, etc., and if it is permissible to supply such articles as these without incurring high pains and penalties, surely coal ought to enjoy a similar exemption. This is a matter upon which the Foreign Office might easily have assumed a stronger attitude, but this apparently is not the view of Lord Kimberley. As the matter stands it is probable that, in consequence of the indecision of the Foreign Office, other countries will step in and reap the benefit which ought to accrue to our own traders.

A. WALBATH ET AL. VS. CHAMPION MINING COMPANY.*

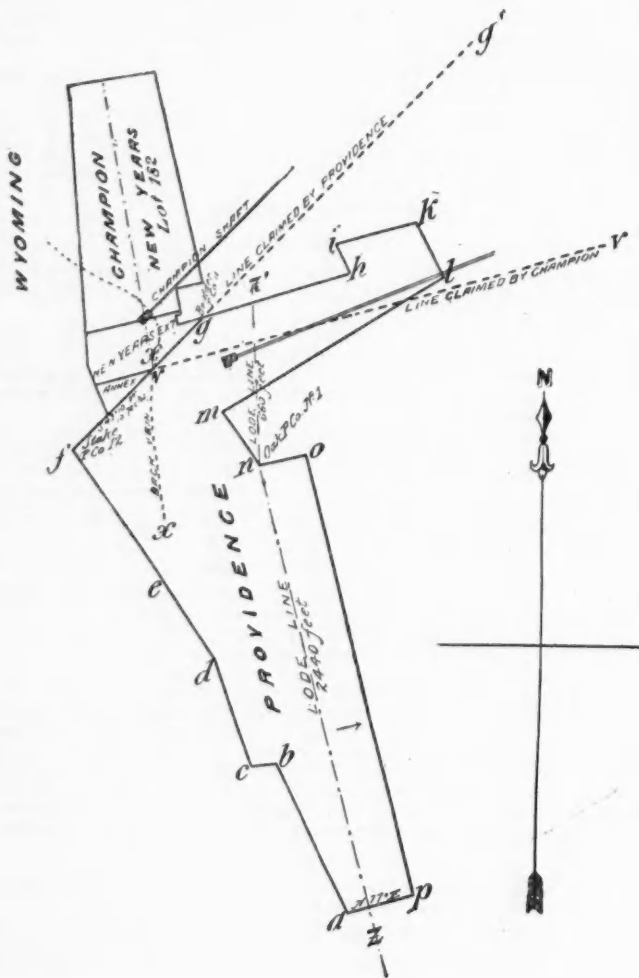
The following decision was read by Judge Beatty in San Francisco, on August 13th, in the Circuit Court of the United States. It is published in full, together with a diagram of the disputed ground:

This action is of the same character as the Con. Wyoming-Champion, just decided, and may be said to be a companion case, as it involves the title to a small segment of mining ground of the "contact" vein situate farther south.

The Providence mine was located in July, 1857, in conformity with the local rules and regulations of the miners in the mining district where the claim is located. On the 28th of April, 1871, a patent was obtained from the government of the United States for 3,100 lin. ft. of the Providence lode and for certain surface ground of irregular shape and form. This patent was issued under the provisions of the Act of Congress of July, 1866, and the grant was "restricted to one vein, ledge or lode," and to the surface ground particularly described by metes and bounds.

Complainant derives his title to the Providence lode under said patent, as a cotenant.

The respondent is the owner of the mining claims and ground known as the "New Years" and "New Years Extension." Its right to these claims was acquired subsequent to the Act of Congress of 1872, and is evidenced by a receipt and certificate of purchase from the United States Land Office, which is the equivalent of a patent. The original location of the New Years Extension on its southeasterly side overlapped upon the surface of the Providence mine, in the form of a triangle.



Scale 8 Chains to one Inch.

In 1884, the owners of the Providence objected to this overlap upon their patented ground, and the result of this objection was that the respondent caused a relocation to be made, by its superintendent, abandoning such portions of the lode and surface ground as were within the patented surface lines of the Providence. The notice of location of the New Years Extension—omitting certain portions—reads as follows: "The lode line of this claim, as originally located and which I hereby relocate, is described as follows: Commencing at a point on the northerly bank of Deer creek, which point is 80 feet S. 11 deg. 45 minutes east of the mouth of the New Years tunnel, and running thence along the line of the lode toward the N. E. corner of the Providence mill, about S. 46 deg. 15 minutes east, 300 feet, more or less, to a point and stake on the northerly line of the Providence mine patented, designated as mineral lot No. 40 for the south end of said lode line. . . . And whereas, part of this claim, as originally described and as hereby relocated, conflicts with the rights granted by the letters patent of said Providence mine. . . . now, therefore, so much of this claim, both for lode and surface ground, as originally designated, conflicted or now conflicts with any portion of the surface or lode claims or rights granted by said patent is and are hereby abandoned. Which portion of this claim so abandoned is described as follows: All that portion of the above described New Years Extension claim for surface and lode, which lies south of the northern boundary of said Providence mine which runs north 43 deg. 10 minutes east, across the south-eastern corner of this claim."

Numerous maps, diagrams and models were offered by the respective
* "Mining and Scientific Press."

parties. The above diagram is deemed sufficient to illustrate and explain the contention of the respective parties:

The lines *a, b, c, d, e, f, g, h, i, k, l, m, n, o, p*, represent the lines described in the patent of the Providence. The lode line from *z* to *z'* running in a northerly and southerly direction represents the Providence lode described in the patent. This lode is in granite and is called the "granite lode"; its dip is to the east. The lode delineated on the diagram and marked *x x'* is a separate and independent lode from the granite, and is called by complainant a "back vein," and by respondent the "contact" vein, between slate and granite walls. This lode is the same as was designated in the Con. Wyoming vs. Champion, as the Ural or "contact" vein. It will be noticed that in its course upon its strike it comes into the New Years claim across the Ural side line—marked Wyoming in the diagram—and passes through the New Years in a southerly direction to the northerly line of the New Years extension, when it changes its direction to a southerly course and extends through the New Years Extension and across the line *fg* of the Providence surface line and extends through the Providence ground to the point *e*, as delineated on the diagram. Its direction beyond that point has not been ascertained and is entirely problematical and, as I think, is wholly immaterial. If it continues in the same direction it would cross the line of the Providence between *d* and *f* near the point *e*; but for aught that appears in the evidence it may extend through the Providence ground and cross the line *ap*. Its dip—like the Providence—is to the east.

The Providence lode as patented extends northerly about thirty feet across and beyond the line *gh*, and about — feet southerly beyond the south line *ap* of the surface location. No portion of the surface ground is in dispute. There is no controversy with reference to the Providence lode. The only controversy between the parties is in relation to the "contact" or "back" vein. What portion of this vein in its downward course is complainant entitled to? Which line is the northerly end line of the Providence ground through which the vertical plane is to be drawn downward with reference to the contact vein?

Complainant claims that the line *fg*, on the diagram is the northerly line of the Providence with reference to this lode, and that this line should be extended to *g'*, and so on indefinitely downward. Respondent claims that the line should be drawn from the point where the lode crosses the southerly line of the New Years Extension, or annex covering the same ground from *v* to *v'*, marked on the diagram as the "line claimed by Champion."

As there is no dispute between the parties as to the right of complainant to the Providence lode, it is unnecessary to discuss that question, except so far as it may tend to illustrate or explain the principle that is to be applied to his right to the contact vein. The Providence lode was located, as before stated, prior to the act of 1866, under the rules, regulations and customs of the miners in the district where the mining claim is situated. The locators were only required to designate the lode in their notice of location. The lode was the principal thing. The surface ground was a mere incident thereto for the convenient working thereof. The notice of location designated the number of feet that was claimed upon the lode, and the locators were entitled to that number of feet, if allowed by local rules, in whatever direction the lode run, and to all its dips, spurs, angles and variations. The subsequent acts of Congress did not interfere with these rights, but were in all respects confirmatory thereof. The Eureka Case, 4 Saw., 323; Wilhelm vs. Sylvester, 35 Pac. Rep., 997.

The act of 1866 provided a method whereby the owners of mining claims, located prior to the passage of the act, who had complied with these local customs, rules and regulations, might, upon certain conditions, receive a patent therefor from the Government of the United States. Parties applying for patents were required, among other things, to "file in the local land office a diagram of the same, so extended laterally or otherwise as to conform to the local laws, customs and rules of miners, and to enter such tract and receive a patent therefor," etc., etc. Under the act of 1866 parallelism of end lines was not required, but by the act of 1872 parallelism of end lines is made essential, a survey of the surface ground must be made before it can be patented, and the surface lines of such survey should be marked upon the ground whether patented under the law of 1866 or of 1872. The intent of both acts, in this respect, is substantially to the effect that the mining locations made thereunder should be along the lode lengthwise, and the surface boundaries should be marked upon the claim. It was not intended by either act that the locator would have any right to follow the lode upon its strike beyond the surface lines of his location. The term "location," as used in both acts, refers to the surface ground as well as to the vein or lode. The lode claim, whatever its nature, character or extent, is to be limited to the survey of the surface location, and the title to the lode upon its strike is not given to any portion thereof which departs beyond the surface lines of the location.

In Mining Co. vs. Tarbot, 98 U. S. 463, familiarly called the Flagstaff Case, the Supreme Court of the United States declared that under the act of 1866, as well as under the act of 1872, the location of a mining claim upon a lode or vein should be made along the same lengthwise of the course of its apex, at or near the surface, and in the course of its opinion said: "The act of 1872 is more explicit in its terms; but the intent is undoubtedly the same, as it respects end lines and side lines and the right to follow the dip outside of the latter. We think that the intent of both statutes is that mining locations on lodes or veins shall be made thereon lengthwise, in the general direction of such veins or lodes on the surface of the earth where they are discoverable, and that the end lines are to cross the lode and extend perpendicularly downward, and to be continued in their own direction either way horizontally; and that the right to follow the dip outside of the side lines is based on the hypothesis that the direction of these lines corresponds substantially with the course of the lode or vein at its apex on or near the surface." See also Iron M. Co. vs. Elgin M. Co., 118 U. S. 248; The Eureka Case, 4 Saw. 323; McCormick vs. Varnes, 2 Utah 355; 9 Mor. M. R. 505.

The patent to the Providence mine was confined to the Providence lode and to the surface ground as surveyed, and marked on the diagram filed in the Land Office. It granted no right to the owners of the Providence to the "back" vein. It was a grant to the Providence lode only, and in express terms excluded all others. The effect of the act of 1872 was to grant to the owners of the Providence surface location all other "veins, lodes and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically in whatever course or direction they might run." In Wilhelm vs. Sylvester, 35 Pac. Rep. 997, the Supreme Court of California in discussing this question, after quoting from Section 2322 of the Revised Statutes, said: "This language is clear and explicit, and, in designating the property rights of locators, is in no wise ambiguous or uncertain. It expressly, and in language which needs no construction, grants to such locators every ledge or lode the top or apex of which lies within the surface lines of the location; that is, such part of the ledge as lies within such lines. And there is no limitation or exception of any such ledge on account of the direction it may run. It may be parallel with the originally discovered ledge, or may approach it at right angles, or at an obtuse angle, or at an acute angle; it may intersect it or not, and still it may be clearly within the language of the said section."

The act of 1872, in granting all other veins that were within the surface lines of previous locations, did not create any new lines for such veins, nor invest the Court with any authority to make new end lines for such other

veins. And it is apparent from an examination of the statute that the Court has no power to make a new location for every vein that may be found within the surface lines of the location and thereby enlarge the rights of the original locators.

When the end lines of a mining location are once fixed, they bound the extralateral rights to all the lodes that are thereafter found within the surface lines of the location.

It necessarily follows that the end lines of the Providence survey must be considered by the Court as the end lines of any and all other lodes or veins which lie "inside of such surface lines." Otherwise endless confusion would arise in the construction of the statute. End lines would have to be constructed in different directions if the separate lodes or veins found within the surface lines did not run parallel with each other; and the result would be that these lines extended might give to the owners of the claims a greater length along the lode as it extended downward than they had upon the surface.

If the same end lines which bind the extralateral rights of the Providence surface survey apply to the contact vein and to all other veins, if any are hereafter found, then no such difficulty can arise. This is the rule that applies to all locations made after the act of 1872, and it ought not to be presumed that Congress—by its grant to prior locators—intended to give greater rights to them than were given and granted to subsequent locators under the same act.

It is settled by the decision of the Supreme Court of the United States in *Iron S. M. Co. vs. Elgin M. Co.* that the same end lines bound all extralateral rights as to all veins or lodes within the surface boundaries of the claim. Justice Field, in delivering the opinion of the Court, speaking of the rights of locators of mining ground to follow the lode in its depth, said: "It often happens that the top or apex of more than one vein lies within such surface lines, and the veins may have different courses and dips, yet his right to follow them outside of the side lines of the location must be bound by planes drawn vertically through the same end lines. The planes of the end lines cannot be drawn at right angle to the courses of all the veins if they are not identical."

In the present case the end lines of the Providence—*ap* and *gh*—are conceded to be substantially parallel with each other, and that the Providence lode in its course lengthwise passes these end lines. Complainant's contention would take the "back" or "contact" vein outside of the plane of the northerly end line of the Providence drawn downward vertically and give to him extralateral rights not granted by the patent nor given to him by the granting provisions of the act of 1872.

But, in this connection, it is argued by complainant that respondent is estopped from asserting any claim to any vein or lode lying southerly from the line *fg*, because (1) in its relocation of the New Years Extension claim it recognized and designated that line as the "northerly end line of the Providence line," and expressly abandoned all that portion of the original New Years Extension claim "for surface and lode which lies south of the northern boundary line of said Providence mine, which runs north 43 deg. 10 min. east, across the southeastern corner of this claim"; (2) Testimony was offered and admitted against the objection of respondent, tending to show a further estoppel which was to the effect that before the Champion shaft was started the plans therefor were submitted, by the then superintendent, to the Board of Directors of respondent and approved by it, and that the shaft was sunk, in pursuance of such plans, parallel with the line *fg*, extended in the direction of *g*, and that the superintendent had conversations, about that time, with complainant and his brother—a co-owner in the Providence—and stated that he would never interfere with that line and would never cross it, and that this line was practically agreed upon by them at that time as the boundary line between the two claims.

This testimony, giving it full scope and effect, is not sufficient to create an equitable estoppel.

The corporation is not bound by such declarations of its superintendent made without the scope of his agency or authority from the corporation. If respondent was given the line for which it contends it would take that portion of the lode which is expressly abandoned by its relocation. The abandonment, which is binding upon it, was to any and all lodes within the surface boundaries of the Providence location and survey; but this abandonment or agreement—or whatever it may be called—did not give to the Providence any greater rights than it previously had. The acquiescence and agreement between the parties amounted to nothing more than a recognition of both parties that the line *fg* was the boundary line between the two companies.

There is nothing in the facts of this case which gives to complainant any right to extend that line—as a boundary line—any farther than the point *g*, at which point it comes to line *gh* which, as before stated, is the northerly end line of the Providence surface location, and beyond which, in a vertical line drawn downward, the complainant had no right to any part or portion of the "back" vein either by virtue of the Providence location patent act of 1872, or any agreement or estoppel between the parties. Let a decree be drawn designating the boundary plane fixing the rights of the parties in conformity with the views expressed in this opinion, for a perpetual injunction, and for an accounting, if so desired; each party to pay their own costs.

BRUSSELS MEETING OF THE IRON AND STEEL INSTITUTE.

By our Special Correspondent.

The Brussels meeting of the Iron and Steel Institute will be remembered especially for the great numbers in which the members of this society flocked to Belgium's beautiful capital, for its excursion and for its social features—by most people especially for these last. Current estimates, or perhaps it were safe to say gossip, put the total number of attendants at 700, 500 Britons, 100 Germans, and 100 ladies. The numbers may be far wrong, but it is certain that the number of attendants was very great.

There were but two sessions, and short ones at that; however, papers of decided interest were presented, and were discussed rather briefly but well. There were in all ten papers, all save one of which were printed and distributed beforehand. Some of them were read by title only, from some extracts were read, and none was read in full.

On Monday evening, August 20th, the Institute was received in the most delightful manner by the municipal authorities of Brussels in the beautiful City Hall, and in the very room, it is rumored, in which "There was a sound of revelry by night"; but which was the "Windowed niche of that high hall" where "sat Belgium's chieftain," I could not learn. The wonderful beauty of the room, its historic associations, the delightful singing of the Royal Orpheon Society and the generous hospitality of our hosts made an impression not easily effaced.

On Tuesday morning, after the formal but graceful reception by Professor Cillon, the chairman of the Reception Committee, that eloquent metallurgist read a paper on the Iron and Steel Industries of Belgium, which was followed by an extremely interesting one on the Mining In-

dustry of Belgium, by M. A. Briart, president of the Society of Engineers of Liege.

How different the Belgian conditions are from our own may be seen from his description of the upper coal measures, the only really productive ones in Belgium. In the Mons district, where the coal measures are the thickest and the coal seams the most numerous, there are at least 125 seams in a thickness of 7,085 ft. The basin of Hainaut and Charleroi contains about 75 workable seams, and that of Liege about 60. But these seams are in general very thin. At Hainaut the total thickness of coal is some 230 ft., so that some 3% of the strata consist of coal. The thickest of these seams is not more than 5 ft. 6 in. thick, the thinnest is only 10 in. thick, and the average thickness is only some 20 in. The thinness of the seams, coupled with the weakness of the inclosing rocks, will probably, in M. Briart's opinion, always prevent the use of coal-cutting machinery. Like difficulties oppose the use of machinery in place of animal power in other branches of work underground.

M. Briart describes briefly but clearly the sinking of two very difficult Belgian shafts, one by the Kind-Chandron process, the other by the Poetsch process. The former, at Ghlin, after sinking through 951 ft. chiefly consisting of clay, sand, gravel and more or less compact chalk, had to pass 48 ft. of quicksand and gravel. The tubbing, which weighs 5,000 tons, was finally rested on the coal-bearing rocks at a depth of 1,063 ft., where it had to bear a pressure of more than 30 atmospheres.

The other shaft, sunk by the Poetsch freezing process at Houssu, had to pass, apparently, at a great depth, through 36 ft. of quicksand, which, when reached, flowed at the rate of 3,520 gallons per hour, and rose to the height of 23 ft.

He then describes the mode of working at great depths in the Belgian collieries, mentioning shafts 3,750 ft., 3,800 ft. and 3,000 ft. in depth, from one of which an incline has been driven to a depth of 3,950 ft., the greatest depth thus far reached in the Belgian coalfields. He points out that quite apart from the greater power needed for the hoisting engine, it is difficult to make a large output because the shafts are necessarily narrow. This difficulty has been met at the Marchienne colliery by using 10 and 12-decked cages, which, with the empty tubs, weigh 13,200 and 15,400 lbs., and carry loads of 11,000 and of 13,200 lbs., respectively. With a shaft 3,000 ft. deep, two minutes are occupied in hoisting and 80 seconds in changing, so that the total length of the trip is only 3 minutes and 20 seconds.

He then discusses ably the fire-damp question, holding that safety-lamps offer only relative and sometimes doubtful security, and that the real safeguard is to remove the gas rapidly from the workings. He admits that the Pateau fan, which, with other appliances, has been running beside the Guibal fan, seems to be the more efficient of the two, and next touches on the enormous and sudden outburst of fire-damp in the Belgian collieries, in quantities so vast that their removal by simple ventilation is out of the question. Their average volume has been estimated at 106,000 cu. ft. per minute; What, he asks, must then be their initial volume?

The best means of meeting this fearful difficulty he believes to be running boreholes in advance at every working face, so as to drain the gas. But this and the other expedients which he mentions he admits are insufficient palliatives.

Sir Lowthian Bell next read extracts from a supplementary paper on the use of caustic lime in the blast furnace, in his well-known logical and cogent method of presentation, incidentally discussing the use of superheated air. He discusses the influence of the sudden elevation of the blast-temperature, which occurs when we change stoves, on the regularity of the working of the furnace, finding, both by process of reasoning and by the evidence of experience, that it probably causes no serious variation of the temperature either of the hearth or of the escaping gases.

Taking up again the question of the use of caustic lime, he points out how imperfectly lime is usually calcined, and says that among 36 samples of burnt lime he found as a minimum 23.34% and as a maximum 37.85% of carbonic acid, or not so much less than the raw limestone itself, which, even if pure, contains only 44% of carbonic acid. He then gives the results of protracted competitive trials of raw and burnt lime in furnaces 80 ft. high and with a capacity of 20,000 cu. ft. These trials showed on an average a saving of 1.87 parts of coke per 20 of pig iron made, or of 8.55% of the coke, by substituting burnt for raw lime. But this saving was balanced by the cost of the coal needed for burning the lime; and when to this we added the cost of the labor and the wear and tear of the kiln, the balance is really slightly in favor of using raw limestone.

Thus he corroborates his earlier inference that, though there was a decided saving in using burnt lime instead of raw limestone in short furnaces, 48 or 50 ft. high, yet in higher furnaces, such as those of 80 ft., no real economy was effected by the use of burnt lime.

The wonderful force and vigor of this Dean of the Institute, and the ease with which he read his paper and replied to the interesting discussion which followed it, heightened the effect of the paper itself, a serious undertaking even for one in his full prime and without the burden of vast interests on his shoulders.

Mr. David Evans reported that his experience agreed with Sir Lowthian's conclusions. He, too, had found that while the use of burnt lime was economical in case of 45-ft. furnaces, it saved nothing in case of 80-ft., 85-ft. or 95-ft. ones.

Mr. Julian Kennedy gave, as an interesting feature of modern American blast-furnace practice, the use of smaller throats and flatter boshes than heretofore, and the free use of water-cooled plates, say 15 in. apart, to preserve the shape of the interior of the furnace.

Mr. Woods had found that the use of burnt lime not only saved coke in the blast furnace, but gave richer and hotter gases, an important matter if boiler power be barely sufficient. He further had found that, if the limestone be burnt, not in special kilns by itself, but mixed with the iron ore in the kilns in which the latter is burnt, it does not require the use of any additional fuel. That is to say, by keeping the kiln open it improves its working so much that no more coal is needed for calcining ore plus limestone than for calcining limestone alone.

To this Sir Lowthian replied that experiments had already been undertaken at his works to ascertain whether limestone could be calcined more cheaply along with the iron ore than when treated alone.

Mr. Greiner made the interesting announcement that in calcining Spanish spathic iron ore, less than 1% of coke was needed; that indeed, the operation was really exothermic, because the iron, in further oxidizing

from the ferrous state in which it exists in the spathic ore, develops more heat than is consumed in driving off the carbonic acid. At times special steps had to be taken to keep the temperature down.

Mr. Charles Cochrane sent an arithmetical and voluminous criticism of Sir Lowthian's paper, controverting it. To this I hope to give the time needed for mastering it, and I may sum it up in a later letter. H.

THE WALRAND LEGENISEL STEEL PROCESS.*

By George J. Snelus.

The primary object of this process was to avoid the difficulty of want of fluidity in small converter charges. Mr. Legenisel began his experiments in 1884 with a small converter of 5 cwt., erected at his foundry in Paris. Being a large producer of malleable castings, he sought to extend his operation by adding steel castings, but he met with no success, owing to the difficulty of keeping the metal fluid. Mr. Walrand joined Mr. Legenisel in 1891, and after many experiments, which were practical failures, the idea suggested itself of blowing the metal in the ordinary way till the flame dropped, then turning down, and, after adding a quantity of fluid ferro-silicon, blowing again for a short period, producing, as in the basic process, an afterblow, during which a large amount of heat is generated by the rapid combustion of the added silicon, with the further advantage, that as the silicon burns to a solid, the metal is left free from gas, and what gas it did contain is more easily eliminated by the

substances added, such as aluminum, are more effective and remain in the final steel; 5th, that in consequence of the great fluidity of the metal, much more time and facility is given for casting operations.

In the paper the author describes tests which he witnessed in Paris and also at Hagen, where the process has been used extensively.

At Paris they have two small converters, one for 300-kilo. charges and one for 600 kilos. Both vessels are turned down by hand power. The blast is taken from the city pressure service, being passed through a reducing valve to reduce the pressure from 5 atmospheres to 1 to 2 atmospheres. A mixture of English pig iron is employed. The cost at present is about \$18 per ton (2,000 lbs.). Coke costs \$6.40 per ton, and the selling price of steel castings is about \$8 per cwt. The pig iron is melted in a small cupola, and brought in a ladle by an overhead crane to the vessel. The ferro-silicon is melted in a very small cupola of ingenious construction, the blast being heated, the melted metal dropping into a heated crucible as it melts, and being weighed before use. There are usually six small tuyeres in the small vessel, eight in the large vessel. These are made at Le Creusot, but the quality of the fireclay is not equal to English. They last 7 to 8 blows in the small vessel, 10 to 12 in the large vessel. One thousand charges from the same lining have been run in the large converter.

Mr. Walrand finds a loss of 5% on the iron melted in the cupola, 10 to 12% loss of metal in the converter. About 0.5% silicon is lost in melting the ferro-silicon. The ferro-manganese added is melted in a crucible, and the aluminum is put in in small pieces during pouring and casting.

TESTS OF CAST PIECES of Metal for Steel Castings made in a small Bessemer Apparatus of 600 Kilos. Capacity (= 12 Out.), by the WALRAND-LEGENISEL PROCESS, at the Hager Steel Works, Hagen in Westphalia.

Date of the Test.	Where Made	Shop No. of Blow.	Distances between the Centres on Tensile Pieces.	Diameters of the Test-piece.	Its corresponding Section =	Total Breaking Load.	Kilograms per Square Inch.	Tons per Square Inch.	Final Length where formerly			Elongation per Cent. in			Final Diameter.	Contraction of Area per Cent.	Angle to which a Gold wirework Strip 16 in. x 1 in. x 1 in. bent round a 2-inch Bar.	Approximate limits of Tensile Strength within which it was Sought to Work.	REMARKS.		
									200 mm. = 8 inch.	100 mm. = 4 inch.	50 mm. = 2 inch.	200 mm. = 8 inch.	100 mm. = 4 inch.	50 mm. = 2 inch.						P. Cent.	Per Cent.	Inches.	Sq. In.	P. Cent.	Degrees.
Nov. 26, 1894, Hagen in Westphalia.	Hagen in Westphalia.	51.	100 mm. = 4 inches and	17.1 mm. = 660 inches	230 sq. mm. = 342 sq. in.	10,250	44.5	26.17	124	64	...	24	28	583	267	27	95 unbroken	42-48 kilos. per sq. mm.	Fibrous, dull, silky fracture. The first piece was also slightly crystalline in its fracture. Slight flaw in the second piece due to a slag particle.		
			50 mm. = 2 inches for both	16.45 mm. = 622 inches	212 sq. mm. = 304 sq. in.	9,650	45.6	26.8	118	59	...	18	...	575	296	15	95 unbroken	=26.5-30.35 tons per sq. inch			
Dec. 5, 1894, Hagen in Westphalia.	Hagen in Westphalia.	54.	100 mm. = 4 inches and	12.8	129	6,300	47.8	30.4	117	61.5	...	17	23	11.4	102	21	95 uncracked	45-50 kilos. per sq. mm.	The fracture of these two pieces showed a dull, silky fibre. Both were not altogether free from a trace of slag.		
			50 mm. = 2 inches for both	17.85	250	11,950	47.6	30.4	121	62	...	21	24	15.6	190	23.6	95 uncracked	=28.5-31.75 tons per sq. inch			
		55.	100 mm. = 4 inches and	17.4	238	12,650	53.1	33.6	112	57	...	12	14	16.4	211	11.3	76 broke, showing slight flaw	55-60 kilos. per sq. mm.	Both of these fractures were partly fibrous and partly crystalline, the latter appearance preponderating.		
50 mm. = 2 inches for both	17.06	226	12,400	54.4	34.5	115.5	...	15.5	...	15.7	193.5	15.3	90 then broke	70-75 kilos. per sq. mm.							
56.	100 mm. = 4 inches and	Test-piece altogether defective.														19 then broke	70-75 kilos. per sq. mm.	Both of these fractures showed a fine crystalline grain.			
50 mm. = 2 inches for both	17.75	247	17,000	68.8	43.68	...	57	...	14	16.9	224	9.5	16 then broke	=44.5-47.5 tons per sq. inch							
Jan. 18, 1894, Hagen in Westphalia.	Corten Foundry	57.	8	798	Square In. 5	14.73	46.5	29.46	9.5	One piece only was tested that burst round the bar for an angle of 132° uncracked	45-50 kilos. per sq. mm. =28.5-31.75 tons per sq. in.	The defective 8-inch piece was taken from the centre of the test-block. The second should have given a good result, but was disappointing. Its fracture was crystalline. All the other fractures were wholly fibrous.
			4	798	5	14.88	47.0	29.76	...	5	...	...	25	...	621	303	39.4		
		2	798	5	15.40	48.6	30.80	...	2.5	...	...	32	640	3217	35.7	...	...	...
		58.	8	798	5	17.25	54.5	34.5	8.75	12	...	650	332	33.6	Bent round an angle of 100° uncracked	60 kilos. per sq. mm. =38 tons per sq. inch	The fractures of these three pieces were but to a slight extent crystalline, showing for the most part a silky, fibrous appearance.	
		4	798	5	17.96	56.7	35.92	...	4.5	...	...	13	...	685	368	26.4	...	...	
59.	8	798	5	21.42	67.6	43.84	8.75	...	...	...	11	...	740	430	14	Broke at an angle of 67.5°	70-75 kilos. per sq. mm. =44.5-47.5 tons per sq. inch	Fine crystalline appearance in fracture. All these pieces had a slight flaw
4	798	5	21.40	67.8	43.98	...	4.5	...	...	8.2	...	753	445	11	...	...			
2	798	5	21.0	66.3	42.00	...	2.5	...	...	...	10	750	441	11.8	...	...			

greater fluidity of the metal. This idea of getting more fluid metal by an afterblow in which the substance burnt should produce a solid, so as to reduce the occluded gases in the bath, was entertained by the writer some ten years ago, and a large number of blows were made at the West Cumberland Works by turning down the vessel at the drop of the flame, then adding epiegelisen and blowing again for some two minutes, to burn out the added manganese. The metal was found to be undoubtedly more fluid and freer from gas cavities than ordinary metal, but the difference was not so great as to warrant continuing the process.

Silicon has two distinct advantages over manganese for this purpose: It generates a much greater quantity of heat unit for unit; the time to terminate the afterblow is better marked by the flame indication when silicon is used.

The Walrand process consists in simply adding to the metal at the end of the ordinary blow a definite quantity of melted ferro-silicon, then making the afterblow, turning down when the extra silicon has been burnt out, and adding the ordinary final additions of ferro-manganese, etc., as circumstances require. The advantage is, 1st, that you can use an ordinary Bessemer pig iron with 2 to 3% silicon, thus entering a steel comparatively free of silicon; 2d, that the combustion of the added silicon produces such a large amount of heat at the right time, and so rapidly, that the metal becomes very fluid; 3d, that as the silicon burns to a solid, it leaves the metal comparatively free of gas, and the steel is sound and free from gas cavities; 4th, that in consequence of the metal being so fluid and already free from oxide of iron, the ferro-manganese or other

In working, the appearance of the flame to the naked eye seems to be the best guide for finishing the blow. The flame of this afterblow gave almost a clear spectrum, only the sodium and potassium lines being clearly visible, a few green lines occasionally visible. In the test witnessed 305 kilograms of pig iron was used. After blowing 22½ minutes the vessel was turned down, and 15 kilograms ferro-silicon added. Practically the whole of the silicon and carbon and manganese in this was burnt out in 1 minute 18 seconds. Then 12 kilograms ferro-manganese containing 30% manganese was added, and to the ladles of metal as drawn from the vessel aluminum was added at rate of 500 grams per 1,000 kilograms. Sometimes an extra allowance was added. The metal was drawn from the converter into ordinary foundry ladles at three or four operations, and the last casting was made nearly 20 minutes after the blow was finished, the steel being perfectly fluid then, there being no ladle skull. The steel ran quietly into the molds, with not the least sign of boiling, sparking, or evolution of gas, the contraction apparently being just that due to change from fluid to solid state. The steel is of quite soft quality, and does not contain an excess of silicon.

At Hagen the plant consists of two small converters of 600 kilograms (12 cwt.) capacity each. It is, however, possible to deal with 750 kilograms (15 cwt.). The space across the shop is arranged for two small cupolas, of which one is at present erected, along with a windlass and hoist; the windlass being worked by a rope from the engine working the Roots blower in the engine room adjoining. In this engine room is the blowing engine for the converters. When the work of the foundry necessitates the utilization of both converters at once, the engine will be completed to a compound vertical. At present, only one converter being

* Abstract of paper read before the Iron and Steel Institute of Great Britain.

used, the high-pressure portion of the engine is alone finished. Adjoining the engine room is the boiler room, containing a water tube boiler working at six atmospheres. An overhead traveling crane, worked by hand, traverses the shop. The casting shop is 68 ft. in length, 43 ft. wide. The engine room is 24 ft. by 22 ft. and the boiler house 35 ft. 6 in. by 22 ft. The converters and bottoms are rammed in the usual way. The cupola is of the Lührman-Greiner type, which is meeting with considerable success in Germany. The blowing engine, when the low pressure half is erected, will be a compound engine, vertical, with the air cylinders above the steam. The engine works at a steam pressure of 90 lbs.; diameter of high-pressure cylinders 400 mm. (15½ in.), diameter of low-pressure cylinders will be 550 mm. (21½), stroke 600 mm. (23½), diameter of air cylinder 650 mm. (25½ in.). The engine delivers the air at a pressure of 1½ to 2 atmospheres. Between the blowing engine and the converter is arranged an air accumulator or equalizer, with a safety valve to blow off at two atmospheres.

At Hagen they have made such progress with the process that they are able to produce castings at will (within reasonable limits), having predetermined tensile strength, and at the author's visit three casts were made: 1st, for mild steel; 2d, for intermediate steel; 3d, for hard steel. The very elaborate table of tests given herewith shows the results obtained.

At Hagen it is the practice to finally harden the steel by an addition of ferro-silicon with ferro-manganese, and they depend more upon the silicon than the carbon for getting the desired strength. For many purposes, and especially for castings, such steel is no doubt very useful, but the author doubts whether it is suitable for use where it may have to stand sudden shock. This departure from ordinary practice is interesting, but, as the Paris experiments show, it is no part of Mr. Walrand's process, but has been worked out at Hagen, and the very high tensile tests obtained and certainty of results are very remarkable.

With regard to the cost of the process, this will vary with the locality and conditions of working. The additional cost of the ferro-silicon is small, and can easily be calculated by those having a knowledge of the Bessemer process. The cost of the plant at Hagen, including boiler, blowing engines and cupola, was about \$17,500. In most foundries, buildings, cupolas, steam service, etc., would be available, and the main items of cost would be the blowing-engine and converter. The mechanical turning-gear for converters used at Paris, Le Creusot, and Hagen is simple and inexpensive, and answers admirably. The advantage to an ironfounder to be able to make steel castings cheaply, just when wanted, as easily as those of cast iron, and even in green sand, is so apparent that in all probability no foundry of importance will in future be considered as properly equipped without a Bessemer converter.

Although the chief aim of the inventors of this process has been to facilitate the manufacture of steel castings suitable for ordinary iron foundries, it by no means follows that it is not applicable to other purposes; and the author believes that it will be useful in all cases where quality of product is of more importance than a slight extra cost. If for instance it is possible by this process to make a sound soft steel of uniform quality without blow-holes, why should it not reinstate the Bessemer process for the manufacture of plates? In examining a vast number of fractures of tensile tests of plate steel, the author has rarely failed, with a powerful lens, to detect indications of want of continuity in the metal, due to gas cavities, even in samples of Siemens steel; and all such defects must involve irregularity, and possibly failure; so that if this process will largely eliminate gas cavities and give a sounder steel, the slight extra cost of the process should be more than compensated by the improved quality of the material. It is also possible by this process, with careful attention to the quality of the materials employed, to make steel of all grades of hardness equal in quality to crucible steel.

Though a French invention, the process has been taken up in Germany, where its use is extending.

THE TENNESSEE STATE CONVICT MINE.

Written for the Engineering and Mining Journal by L. E. Bryant.

Owing to troubles which had been brewing a long time between the free and convict miners, and which culminated in the Coal Creek war of two years ago, the present administration in Tennessee has sought to eliminate the primary causes of such a condition of things by employing its own convicts on its own land in the production of coal, instead of leasing them to contractors to be employed by the side of the free laborers, who have always regarded them as a menace to their best interests and organization.

The first step toward this end was accomplished by the Penitentiary Act of 1893, appropriating the necessary funds and appointing a committee to investigate any and all coal lands offered to the State as suitable ground on which to commence operations. After a careful inspection the committee very justly decided on 9,000 acres of land about 20 miles north of Harri-man, in Morgan county, to which a railroad is building. The coal measures on this property reach an exaggerated development compared with the more southwestern and better known coal territory of the State: no less than nine workable seams occurring above drainage on some portions of the property, leaving fully 2,000 ft. of lower measure rocks still to be explored.

Two of the veins are more favorably situated for working than the rest, and as they are of a quality to recommend them for mining, operations will first be commenced in them. The lower one, which ranges from 3 to 4 ft. in thickness, makes an admirable coke, while the higher one is more especially suited for steam and domestic purposes. This latter vein often reaches 6 ft. in thickness and mines in large, bright lumps.

An analysis of the lower coal shows:

	Lower vein coal,	Coke,	Upper vein coal,
	%.	%.	%.
Fixed carbon.....	62.31	91.23	58.78
Volatile hydrocarb., etc.	32.32	.....	33.29
Ash.....	5.37	7.13	7.13
Moisture.....	.....	0.42	.....
Sulphur.....	0.91	0.89	0.91
Phosphorus.....	0.003	0.01	0.01

The commission contemplate going into business on a large and thoroughly modern scale; the three-heading system with 40 to 45 ft. rooms will probably be adopted, the conditions being favorable. The screening plant will be of the latest design for large capacity, and all coals below 2 in. will be washed and the sizes hand picked. As much of the product will be put into coke and high-class domestic coals as possible, these grades permitting farther shipment than the cheaper steam coals and consequently command a wider market. The beehive oven will be used in the coking plant; and beside the usual furnace and foundry article, especial attention will probably be given to the production of crushed coke for base burning anthracite stoves, as this branch of the coke industry is quite promising in the South.

In working the convicts, quite a change from the ordinary method in use in this district will, in all probability, be introduced. It has been the custom to task the convict to a certain number of cars or tons of coal per day, relying on him to lay his track, set his props, mine, shoot and load his coal, and deliver it on the entry. This is quite too much responsibility for the ordinary free miner, where one wants a mine kept in good condition and the mining laws are strict. The evils resulting from this are found to be badly laid track, badly set props, and as a rule twice as many as needed, coal not mined at all, but simply shot to pieces, and, finally, loaded up with all the slate, sulphur and other refuse at hand that would help fill up the requisite number of cars for the task. The only way heretofore in use to prevent these things has been by whipping, the efficacy of which has never been proved, and its effects on the mental conditions of convicts, even if they are mostly black, can hardly be imagined by a layman.

It is now proposed to systematize the work as much as possible and relieve the convicts of all the responsibility possible and at the same time make it as nearly impossible as one can for them to do any of the things spoken of as objectionable above.

No attempt will be made to use coal-cutting machinery, but the best of the men able to handle a pick will be selected and used just as if they were machines. They will undercut coal and do nothing else, and be formed in gangs on each entry under free bosses if necessary and convict ones if found practicable. Tasks of so many feet per day will probably be introduced, but the penalty for not completing them in the eight or nine hours allowed will be overwork until it is done. After these men have cut the coal a free boss, with probably half-a-dozen assistants, will bore and shoot it, and an inspection of the working places will follow this, when, if everything is safe, the great mass of convicts will be turned into the rooms and the coal loaded in the presence of convict inspector bosses if possible and free if necessary, whose duty it will be to see that the men do a reasonable day's work and load the coal clean. After this crew has finished, the timbermen and track layers will follow and put the rooms in shape for the next operation.

It has been found dangerous in many camps to give powder to the convicts in the proportions of one or two shots per day, as in many cases they use only about half of it, and secret the balance for some pyrotechnic display, which while often innocently meant, is sometimes directed toward the roof of the mine, in order to cause a cave-in and give a holiday until the fall is cleaned. Anarchistic plots are not unheard of either, but the main benefit to be derived from this provision for curbing the issuance of explosives will undoubtedly be a more merchantable article of coal. Such a system as this makes it possible to establish a series of grades, as rewards of fidelity and good work, and this fact may be taken advantage of if it is found practicable. The outside laborers, inside bosses, timbermen, tracklayers, coal cutters and loading inspectors could be formed into a privileged class, as it were, whose rewards would be shorter hours of labor and some distinctive badge. Whether or not these incentives alone would do to keep up the requisite amount of enthusiasm is immaterial, for if the system depended on that alone a small extra monetary consideration would do the work. Such is the plan that has been adopted by the State Commission, who go into the work, realizing its magnitude and possibilities, both for success and failure. But if conservative and economic management will assure pecuniary success, as it would in any private enterprise on this tract of land, how much more reason have the commission to expect a reasonable return from the same causes, with the quantity of labor they have at hand? The elements of chance are in this operation as elsewhere. The trouble will come in getting rid of the coal without having clashes with local mines. The question of cost of production is the thing least to fear.

Sanitary arrangements of the latest known design will be used in the dormitories for the men, and what has heretofore been almost impossible will be attempted, that is, to keep the convicts clean. Those who have had any acquaintance with the subject will know that this will probably cause more trouble than all the other regulations together.

A New Barometer.—An open scale barometer, showing minute variations of pressure has been invented by Mr. C. O. Bartrum, of London. It consists of a tube between 4 ft. and 5 ft. long, terminating in a cistern. The lower half contains mercury, and the upper a light fluid which forms the manometric index. About its middle the tube is expanded into a bulb about 3 in. long, in which the two fluids meet. It is plain that a rise of mercury in the bulb will cause a much greater rise of the light fluid in the narrower upper tube, the amount depending on the sectional area of the bulb as compared with that of the upper tube. If the diameters of the bulb and cistern be each 1.5 in. and that of the upper tube 0.02 in., then an increase of 1 in. in pressure, as shown by a mercurial barometer, will appear on the scale as 8.2 in., or, in other words, the scale is more than eight times as open as that of an ordinary barometer. Small changes of pressure can therefore be read with ease. The liquid in the upper part is methyl salicylate, a substance with a specific gravity about one-twelfth that of mercury, and a very small vapor tension at ordinary temperatures. The last point is important, as on it depends the excellence of the vacuum, and, consequently, of the instrument, for which the maker claims great sensitiveness and accuracy of reading to 1/200th of an inch. It can be made with as open a scale as a glycerine barometer, which is five or six times as long, and is, moreover, liable to become inaccurate in course of time on account of the vacuum being impaired by the infiltration of air through the glycerine. From this defect Bartrum's instrument is said to be free.

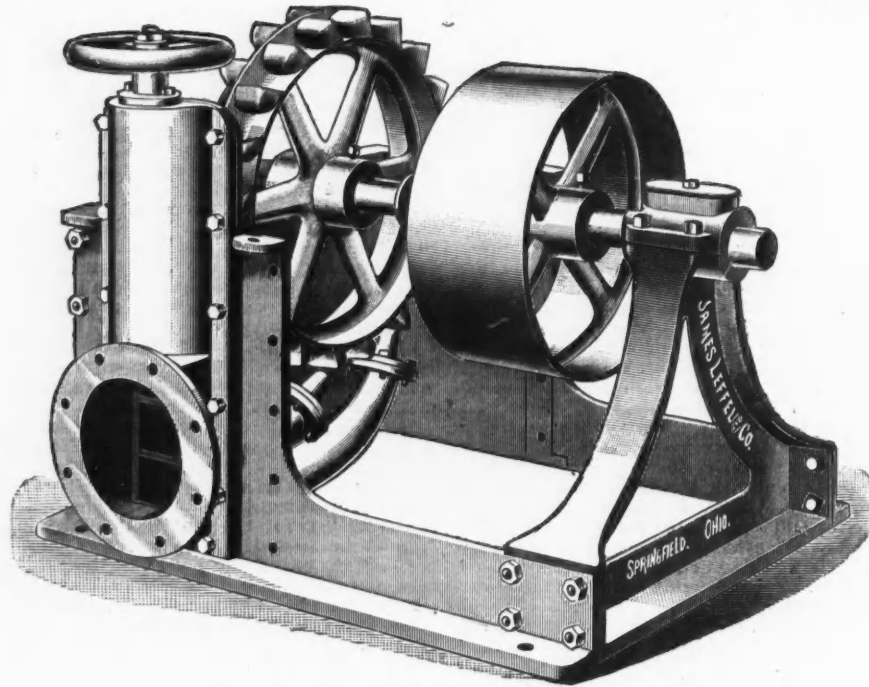
THE CASCADE WATER-WHEEL.

When a turbine wheel cannot be applied to advantage an impulse or reaction wheel is necessary. These wheels are simple in construction and, because of their slower speed, are better suited when a very high head of water is used.

A new wheel of this type, manufactured by James Leffel & Co., Springfield, O., is shown in the accompanying illustrations. This wheel is made with triple nozzles.

In the triple wheel it will be observed that a vertical gate stem and gate are used, covering two partitions between three openings in the valve. If desired to run only one nozzle the gate can be raised one-third, or if more power is required, the second nozzle can be put in service by raising the valve higher. The jets are so arranged that they can be moved so as to adjust them to the proper inclination so as to strike the buckets to the best advantage. Either of the nozzles can be removed and other sizes substituted.

The wheel has two sets of buckets placed on each side of a sharp con-

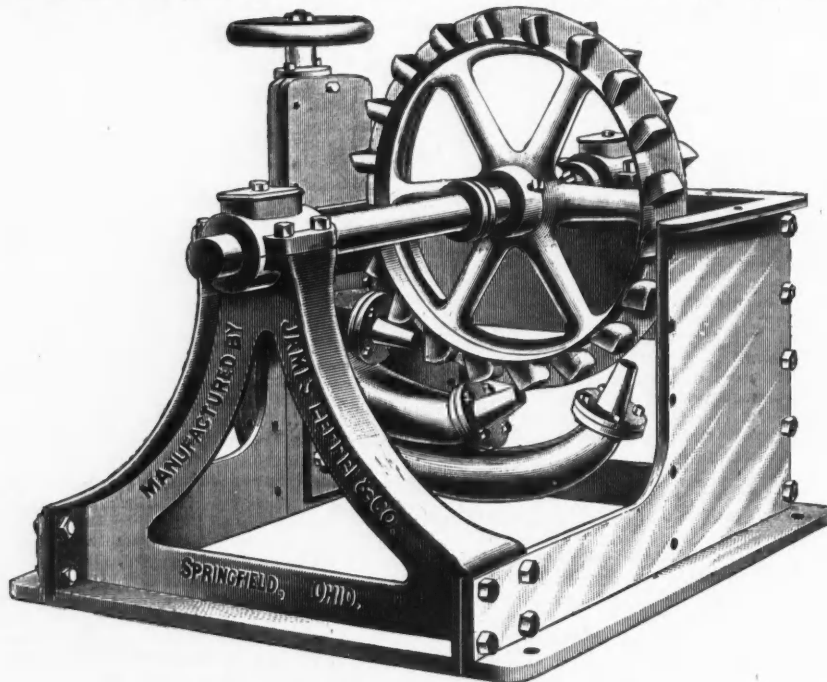


FRONT VIEW TRIPLE NOZZLE CASCADE WHEEL.

Admitting the water to a wheel through one, two or more tips or nozzles does not decrease the useful effect of water; but the percentage remains the same, whether one or more or a half dozen should be used. Each nozzle increases the power in the direct proportion of the increase of their number, requiring a proportional increase in the quantity of water. This

continuous dividing ridge projecting in front of the buckets and dividing the jet of water so that one-half strikes on each side. As the buckets on each side alternate with each other the wheel receives the shocks regularly and has a steady motion.

The mounting is ordinarily an iron frame such as shown in the cut, but



REAR VIEW TRIPLE NOZZLE CASCADE WHEEL.

is an advantage of importance, since there is scarcely any stream that does not vary considerably during a season. Various sizes of nozzles can be conveniently substituted at any time to suit the changing condition of water supply at all seasons and at all stages.

An advantage in the wheel is its slower motion than turbines under high heads. With but slight changes or modifications it can be so adapted in size as to obtain almost any required speed, it being merely a matter of diameter, number of buckets and size of nozzle; the velocity of the wheel, of course, depending upon the head pressure, and the speed upon the diameter, thus changing the number of revolutions, with every change in diameter of the wheel for the same head. They are easily and frequently applied to dynamos direct without the use of belting or gearing. This is also true as to their application to centrifugal pumps, and occasional other machinery.

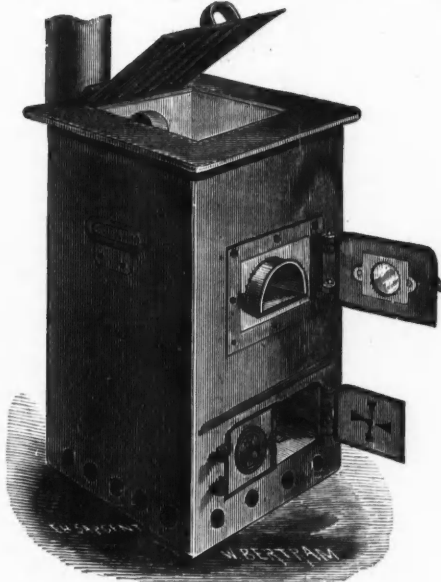
when desired the wheel can be placed on a wooden frame so as to facilitate transportation in rough regions. A 38-in. wheel with a 60-ft. head makes 158 revolutions, using 32 cu. ft. of water and giving 3 H. P.

A Large Dredger.—Messrs. Simons & Co., of Renfrew, England, recently launched what is claimed to be the largest dredger afloat. This, the "Percy Sanderson," is for the European Danube Commission. It is built of steel, the hopper compartments are to hold 1,300 tons of dredgings—the hull being divided into 10 compartments. The buckets are capable of dredging to the depth of 25 ft.; the length of the dredger is 227 ft., and two sets of triple expansion engines are to drive twin propellers, while the loaded speed of the dredger will be at least eight knots per hour. The vessel is to be lit by electricity.

BROWN'S ASSAY FURNACE.

This furnace is one of the convenient forms in which simplicity and usefulness are combined with durability.

It consists of an almost square sheet iron frame 28 in. high, 14 in. deep and 16 in. wide, lined with firebrick in sections, the interior being smooth and straight from top to bottom. The cover is cast iron and is ridged to lessen the danger of cracking. The muffle door is cast iron, fitted with a circular opening, filled with mica, that the operations going on within the muffle may be seen when the door is closed. The draft doors are also of cast iron, and are provided with wheel openings to further regulate the draft. The circular holes at bottom are in all four sides of the furnace, and serve to keep it cool. The corners of the castings are rounded to prevent breaking. The muffle rests equally upon the firebrick in front and in the rear, leaving a space of 1½ in. between the end of the muffle



BROWN'S ASSAY FURNACE.

and the brick to allow the passage of fumes; also a space for fuel of 4 in. on each side of the muffle. The grate is formed of cast iron bars 10 in. long, 1 in. wide, 9 in. number, resting upon a cast iron frame. The space below the true bottom is to be filled with firebrick or sand or other material convenient. The chimney hole is 5 in. in diameter, thus accommodating a stove pipe of same dimensions. The bottom of this hole is 17 in. from the true bottom of the furnace, and 8 in. from the bottom level of the muffle. There is a handle upon each side of the furnace to allow for more convenient handling. The furnace will take a J-muffle 12 in. long, 6 in. wide, and 4 in. high. It weighs 155 lbs. The construction permits it to be used either for muffle work or as a crucible furnace. It is made by E. H. Sargent & Co., of Chicago.

THE FAIRFIELD COPPER COMPANY.

Written for the Engineering and Mining Journal by Maurice Barnett.

About three years ago a party of New York capitalists determined to investigate the accuracy of some reports, made by an old time promoter, concerning the occurrence of large bodies of cuprite and carbonate of copper ore said to exist in that part of the Humboldt Range of mountains lying between the Carson Sink and the Buena Vista valley. As a preliminary step in the way of ascertaining facts they sent the late Mr. Ernest V. Clemens (then superintendent of the Delavergne Refrigerating Machine Works) to report upon the district in question, urging upon him the necessity of the most careful examination. Mr. Clemens' report was favorable. As it, moreover, seemed to confirm the statements of other engineers who had previously reported upon the property—especially with regard to the existence of oxidized ores—it was planned to organize a company, purchase the property, erect works and sell argentiferous pig copper. The company that was thus organized was called the White Cloud Copper Mining Company, and it proceeded at once to build a smelter.

In January of last year, when the smelter was said to be ready for operations, the writer was sent there instructed to take out ore and smelt it "right up to the full capacity of the furnace." The writer reported that the mines were not in shape to take out, continuously, any large quantity of ore, and that, save upon the surface, the ore would be found to be sulphureted. The report furthermore advised the directors to give up hope of turning out pig copper, but to go ahead and open up their properties. This was done. After 15 months of exploration and development work, supplemented by a long run of the furnace, the company found that it possessed large bodies of ore capable by intermixture, without the use of flux, of being smelted into a good grade of argentiferous matte. About this time Edw. L. Smith, president of the Electrolytic Copper Refining Company, of Ansonia, became a stockholder in the company, and urged upon the directors of the latter organization the necessity of building converters for the treatment of their matte. The directors were not slow to see the advantage of such an enterprise. Everything considered, it was deemed advisable to organize a new company. When it was decided to locate the works in Fairfield County, Connecticut, it was decided simultaneously to call the organization the Fairfield Copper Company.

In this way the company in question became an accomplished fact and started upon the construction of its works. While the primary object of the company was the conversion of White Cloud mattes and the inci-

dental treatment of all other ores and mattes that could be purchased, the business has so developed as to make the treatment of White Cloud mattes incidental and the output of other mines under its control primary. Beyond this it may be said that the location of the works at a point where Connellsville coke can be had at Chicago prices; where wages are as low as in any other section of the country; and where the quartz that is to be used for relining the converters is auriferous and purchasable without reference to its precious contents—make the outlook for the company hopeful in the extreme. At present rapid progress is being made in the erection of the buildings. The bolts for the engines, converters, etc., are all set and awaiting their load. If the machinery arrives on time the works ought to be in operation during November.

By permission of Mr. E. L. Smith, treasurer of the Fairfield Copper Company, the following description of the plant is offered: The works are located at Monroe, Conn., a station on the Berkshire division of the New York, New Haven & Hartford Railroad. By means of a switch-back a spur of the railroad is carried to the level of the feed floor of the remelting and slag furnaces, entering the yard about 45 ft. to the rear of the buildings. The intervening space is utilized for the storage of matte, coke, ores and quartz. In a similar way a track is run to the loading platform in front of the casting shop, 36 ft. below the upper track. The situation of the works on a hillside has made possible a convenient arrangement for getting "empties" at the loading platform without paying switching charges; for by an extension of both upper and lower tracks at some distance beyond the works, an empty car is brought from the upper to the lower track simply by gravity.

The general plans of the works were prepared by L. C. Trent & Co., of Salt Lake City. As at first planned it was intended to make all the buildings of iron, but it has since been decided to put in the engine and boiler room, the casting shop and the sampling mill in wood. The converting department is an iron building 98 ft. long by 53 ft. wide, and was made by the Berlin Bridge Company. As at present designed, the plant will start up with a capacity of 30 tons of matte a day. While the machinery for additional capacity is not to be placed until needed, still by putting in duplicate foundations for compounding the engines later on, very little time will be consumed in adding to the capacity when circumstances warrant the company in so doing.

It can be said with pardonable pride that the works comprise some of the best ideas that have thus far been worked out in this direction in the metallurgy of copper. The charging floor is all of iron, and the remelting furnace is hung by means of its cast iron deck plate to the I-beams that support the floor. A crucible on wheels moving on light rails set in the tapping floor provides for the easy replacement of the crucible by an extra, when the former is burned out. In front of the remelting furnace, at equal distance from the center line of same, are the converters somewhat larger than average size, and capable of carrying charges of about 8,000 lbs. each. These are operated by hydraulic gearing, making them independent of the motive power of the works. The means toward this are a double plunger pump, and a 15-in. accumulator working under a hydrostatic pressure of 150 lbs. One of the features of the converters is a hydraulic jack, placed permanently under the converters for lifting them off the trunnions whenever they need re-lining. The free shells are carried on trucks to that end of the building where the quartz pulverizer and mixing machine are located, and there lifted off their carriage by a 12-ton hydraulic crane. It will thus be seen that the removal and replacement of shells will be a matter of no special difficulty. The stream of matte from the remelting furnace is carried by the usual spout, and is deflected into either converter by circular turns at the end of the launder. Ample space at the back of the converter is secured by having them discharge their fume, not into the conventional flue, but into a 3-ft. sheet iron pipe, provided with a hood and lined with fire-brick, which connects with the main flue behind the building. The molten contents of the converters will be poured into tilting cars and run into the casting shop, where the copper will be discharged into the reverberatory furnaces for working up into anodes for electrolyzing purposes. The writer is not familiar with any works in the country where this is done, and believes it constitutes as important an improvement in the economy of converting works as that of remelting the matte from the ore furnaces before it has lost its heat—a suggestion made by Mr. Chas. Wade Stickney, in his contribution to THE MINERAL INDUSTRY.

The sampling mill, which was designed jointly by Mr. Frank Smith and the writer, is aimed to make the sampling as perfect as it can be made by the use of automatic appliances. All of the ore and matte is first crushed through a rock breaker, and a certain part of the whole stream of crushed ore deflected for a certain interval by an automatic shutter of the Taylor & Brunton order. The tenth thus taken out is recrushed, and again the entire stream is deflected for a certain time in the same manner. The tenth of the first tenth passes through geared rolls, and is elevated to a screen which returns to the rolls all particles not crushed to appropriate size. The screened material passes into a hopper, when the whole stream is once more deflected for a certain length of time by means of a constant sampler, such as is used and recommended by Ledoux & Co. in sampling fine ores. This sample, or one-thousandth part of any special consignment, is then brought down to appropriate size by careful quartering until it is ready for the Assay Office. It will be seen that the aim is to sample all the ore rather than any aliquot portion, and between each reduction of the sample to crush it finer for the sake of greater accuracy. The discarded portions are elevated in every case to bins in the upper part of the sampling mill and then run out in Hunt dumping cars and discharged into the storage bins between the building and the upper railroad track. The location of the small track 8 ft. above the ore floor will give storage room for supplies of matte and coke up to 1,000 tons.

The motive power for the pressure blowers, the sampling mill and quartz machinery will consist of one 12 x 36 Corliss engine of the style of Reynolds improved, made by the E. P. Allis Company, of Milwaukee. The blowing engine which is being built by the same makers is a duplex engine of the Corliss type, with a 16 in. steam cylinder, a 42 in. air cylinder, and a 36 in. stroke. These will be compounded when it becomes necessary to increase the capacity of the works. The steam plant will consist of a battery of return tubular boilers 66 in. x 16 ft. long.

While all the details of flue and dust chamber have not yet been worked out, it will suffice to say that the flues will be built above ground to allow for the cooling and deposition of volatilized material. Near the stack

where the gases will have become cool, parallel plates of sheet iron (coated with a compound of silicate of soda, and sulphate of baryta) will be suspended—similar to the arrangements worked out on the Lahn by the Ems Smelting Company. It is thus hoped to reduce volatilization to a minimum. Mechanical dust that has fallen will be held in place by light walls built up from the bottom of the flue at stated intervals. A stack 145 ft. high will give draught enough to keep the buildings free from fume.

This in brief is the plant as it is at present being constructed. While it would be exceedingly interesting to publish details, the writer is precluded from doing this. One point not spoken of is a round furnace 42 in. in diameter, to be used for reworking converter slags, and any ores that can be purchased and treated to advantage. This adjoins the remelting furnace, and is placed at the same elevation as the latter. The slag and remelting furnace are not provided with hoods, but are connected underneath the feed floor with the main flue. It is needless to state that the utmost care is being exercised in the construction of the works. All masonry walls are made extra heavy and grouted with cement. The subfoundations and foundations proper of the engines are likewise grouted with cement. A difference of level of 32 ft. between feeding floor of remelting furnace and level of casting shop and loading platform will obviate the necessity of elevating material in its progress from matte into copper anodes. The output of the works will be shipped to Ansonia, where it will be treated by the Electrolytic Copper Refining Company. This company has a large electrolytic establishment as well as a refinery for gold and silver slimes. The location of the Fairfield Copper Company plant, within 11 miles of Ansonia, places its output in the Naugatuck valley, wherein are located the large manufacturing concerns which work up the greater part of the lake and electrolytic copper produced in this country.

A NEW TIME RECORDER.

The New National Time Recorder Company, of Milwaukee, Wis., has put on the market a new recorder which it calls "The American." Cut No. 1 shows the complete recorder, which will take a 21-in. record

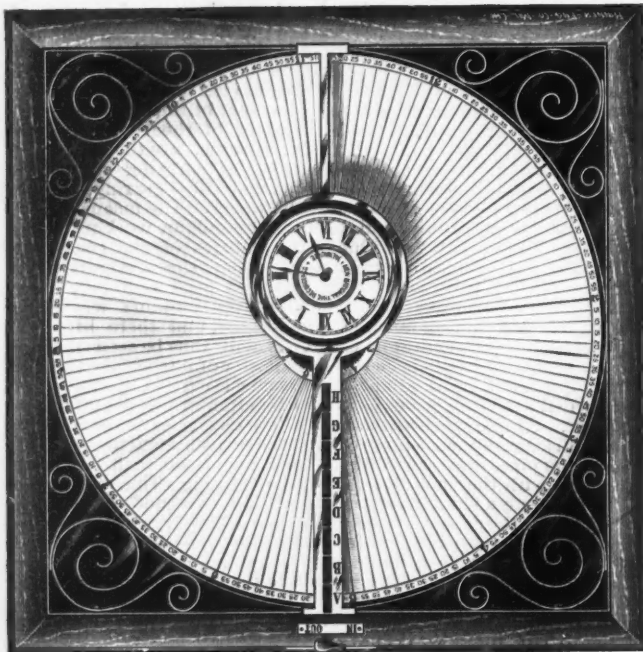


FIG. 1.

A NEW TIME RECORDER.

dial. Cut No. 2 shows a portion of the record dial after a day's registration has been made. The heavy lines are the hour lines and the lighter ones five-minute lines. Thus it may be seen any time during the day by the employer or any one interested that No. 2 is 15 minutes late, No. 9 ten minutes late, and No. 10 is absent, not being registered.

By an ingenious arrangement the numbers come consecutively on the record dial and the key, or check (Fig. 3), will enter only the hole for which it is intended. A slight pressure on the key will ring the bell and indicate that a registration has been made. The arrival of employees is indicated by the numbers appearing in red and the departure in blue. This is accomplished by moving a small lever above the keyholes at the front of the clock, either to IN or OUT. This lever shifts the record ribbon through which the registrations are made. The recorder will register 500 employees.

THE INDIAN COALFIELDS.

A correspondent of "Indian Engineering," referring to the Mogulserai-Daltonganj Railway, in India, says: A few years past Dr. Saise was selected for the purpose of an investigation of the coalfield at Daltonganj (Palamao). The result of his investigation showed that the producing capacity of the field was very remarkable, and that it could supply over 160,000,000 tons of good coal. It was also found, from careful analysis, that the character of the coal was better than that of Umaria, and probably as good for locomotive purposes as that of Karharbari coal, and this was corroborated by the engine trials on the East Indian Railway. It may be noted that when this coalfield is connected by rail with Mogulserai, its coal will supplant the Bengal coal from Karharbari and Raniganj for all stations beyond Patna, and the value of the line as a coal line

will soon be established. The distances to the nearest points of the Bengal and Daltonganj fields are noted below.

	Miles.
Via East Indian Railway to Giridi, Karharbari Coal field.....	309
" Koel Valley to Sukhoah, Daltonganj.....	141
Difference in favor of Daltonganj.....	168

Taking into consideration the fact of the superiority of the Daltonganj coal to that of the Umaria field, and its more favorable situation as compared with that from Karharbari, the annual possible demand might be roughly estimated as follows:

	Tons.
For part of East Indian Railway, Mogulserai.....	50,000
Oudh and Rohilkhand Railway.....	50,000
" Metre-gauge Railway north of the Ganges.....	30,000
Miscellaneous Demand (mills, etc.).....	20,000
Add Demands from the Indian Midland, the Rajputana-Malwa and other North-Western railways about.....	70,000
Total.....	220,000

If these figures are considered as a fair forecast the gross receipts from the coal traffic alone at 4 pies per ton on 141 miles will be Rs. 646,250 per annum, and allowing for local goods and passenger traffic the total gross receipts will probably come to Rs. 1,281,250.

We should not overlook the competition between the Daltonganj and Umaria coal for the supply of railways above Mogulserai. The latter coal is at present being taken in large quantities by the G. I. P. Railway and the Indian Midland. The former is taking about 2,900 tons, and the latter 4,000 tons per mensem. The result of the trial made in 1889, with this coal on the Oudh-Rohilkhand Railway, showed that, as compared with the Bengal coal, the latter gives a consumption 34.64% less per vehicle-mile, and 54.55% less per train-mile than the Umaria coal, and has led to the exclusive use of the Bengal coal over the whole line. It is noteworthy that the price of the Umaria locomotive coal at pit's mouth is about Rs. 5.8 per ton, whereas the price of Bengal locomotive coal, delivered into wagons, is about Rs. 3 per ton; and there is no reason to suppose that the price of the Daltonganj coal should exceed this figure. In regard to the Indian Midland Railway, the distance between Umaria and Manickpur is

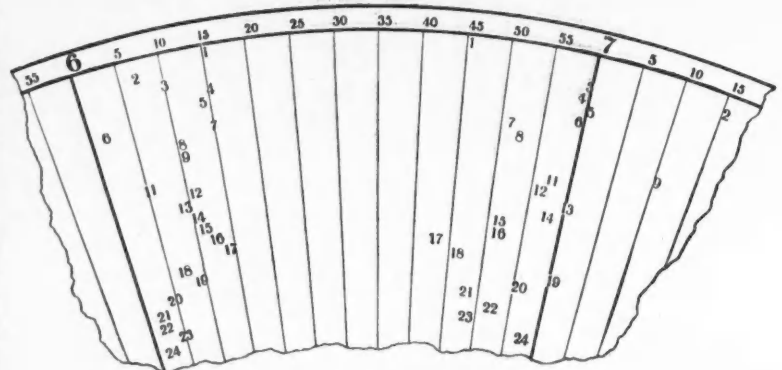


FIG. 2.

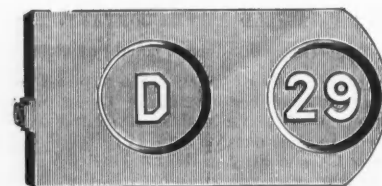


FIG. 3.

146 miles, while that from Daltonganj coalfield to Manickpur will be 298 a difference of 152 miles in favor of Umaria coal, which, at a rate of 4 pies per ton-mile, represents Rs. 3.2 per ton.

Development of Russian Mineral Districts.—The mineral district of Krivoi Rag in south Russia has received further attention from the Imperial Government, and a branch line of railway, running close alongside the mines and quarries, has recently been opened, thus greatly facilitating the transport of the various minerals raised from the workings, amounting in the case of iron ore to 800,000 tons a year.

Canadian Mica Company, Limited.—This company has been registered in London, with a capital of £90,000 in £1 shares. Object, to acquire, by purchase or otherwise, certain mines and other properties and interests in properties held as freehold or in common socage in the county of Frontenac, in the province of Ontario, and in the counties of Saguenay and Ottawa, in the province of Quebec, and certain mining and other concessions relating thereto, and to develop and turn to account the same. The first signatories are: G. A. Kino, Streatham House, Allyn Park, West Dulwich, one share; J. Robertson, 73 Rosendale-road, West Dulwich, one share; R. H. Willats, 66 Holborn-viaduct, E. C., one share; A. G. Larker, 6 Kestrel-avenue, Herne Hill, S. E., one share; F. Spencer, Northwood, Hendon, N. W., one share; W. Spencer, Northwood, Hendon, N. W., one share; F. Page, 76 Cadogan Terrace, Victoria Park, N. E., one share. There shall not be less than three nor more than five directors; the first to be elected by the signatories to the memorandum of association. Qualification, £250. Remuneration, £500 per annum, divisible.



14. HEANE, LOOKING WEST, BLUE HILLS MINE.



15. THE 412, DOLCOATH MINE.

CORNISH TIN MINING IN PHOTOGRAPH.

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CORNISH TIN MINING IN PHOTOGRAPH.

WITH SUPPLEMENT.

We continue this week our series of illustrating underground working in the tin mines of Cornwall. Fig. 14 has, through a typographical error, been given the title "Heane, Looking West, Blue Hills Mine." This should have been "Heave," as it represents one of those interesting, and to the engineer most undesirable, faults which will occur in the best regulated veins. This picture was taken between the 50 and 60 fathom levels in the Blue Hills mine, and shows the faulting vein, which consists almost entirely of white quartz containing pyrite and a little copper, extending from behind the top of the prop in a slanting direction toward the low left corner. The men on the right side of the illustration are boring a hole in the lode underneath the footwall of the faulting vein.

Fig. 14 shows the 412 fathom level in the Dolcoath mine. The lode here is very rich and of unusual width, and as the walls are treacherous massive timbering is required. Since this photograph was taken a disastrous accident occurred in this level in which seven men lost their lives. The stull collapsed while being strengthened, the large timbers being crushed and splintered. These stulls are about 18 in. square and 33 to 34 ft. long, fixed 2 or 3 ft. apart and at an angle of 45 to 48°.

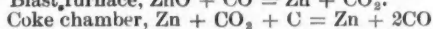
EXPERIMENTS WITH ZINC ORES IN A BLAST FURNACE.

Written for the Engineering and Mining Journal by H. Aug. Hunicks, E. M., M. S.

Many attempts have been made to treat zinc ores in some form of blast furnace, but none has so far been successful. The author has made extensive experiments in this direction, and although not successful in any practical sense, the results may be found interesting. The data given for a blast furnace process were as follows: Melting point of zinc, 412°; boiling point of zinc, 1,040°; at or above 1,300° (reduction temperature of zinc oxide, as given by Kerl), $ZnO + CO = Zn + CO_2$; at or below 1,300°, $Zn + CO_2 = ZnO + CO$; at a "red" heat, $CO_2 + C = 2CO$.

The following process was devised: The roasted zinc ore and fuel were separately heated to as nearly 1,300° as was possible and then charged alternately into a cupola furnace where reduction took place almost instantaneously, the gases formed (Zn , CO and CO_2 with N) were transferred to a chamber charged with hot coke and finally into a receiver.

From the given data it was expected to accomplish in this way the following reactions:



Receiver: Metallic zinc and the carbonic oxide escaping through flues.

That these reactions do not take place invariably, and that even when they do take place metallic zinc is not always formed, I shall endeavor to show

The apparatus employed was a small roasting furnace of about 80 sq. ft. hearth area to heat the already roasted zinc ore. Two kilns of about 40 cu. ft. capacity, with natural draft, were used to heat the coke both for the cupola furnace and the coke chamber. These pre-heating furnaces were built on a level with the top of a cupola furnace of 30 in. diameter and 5 to 5½ ft. effective height, provided with four 3-in. tuyeres and a hopper and bell, thereby securely closing the furnace. A flue below the charging door led into a chamber built directly against the furnace, having charging and discharging doors at top and bottom and an upper and lower flue for the gases. This flue led into a chamber provided with a water-jacket, thence into a number of simple flue-dust chambers. Neither the coke chamber nor the water-jacket condenser was used in every experiment.

Some 30 experiments were made, some with promising results, others wholly negative. These results may be classed under three heads: I. Production of zinc oxide. II. Production of zinc in the form of "blue powder." III. Production of zinc in a marketable form.

The first result is the more general when certain conditions are not observed. It will result when the charge does not enter the furnace at a sufficiently high temperature; secondly, when, without reference to the relative amounts of zinc, carbonic oxide and carbonic acid, no sudden chilling is applied; thirdly, when, even by an almost complete exclusion of carbonic acid, the zinc vapor is diluted to too great an extent and no sudden chilling is applied.

The second result can always be obtained with exactness, when the charge enters the furnace at the proper temperature and an excess of carbonic oxide is generated, not only when the gases and zinc vapor are suddenly cooler, otherwise zinc oxide is formed.

The third result can only be obtained when the charge enters the furnace at the proper temperature and the zinc vapors are present in excess and are subsequently not cooled too suddenly. When the vapors are suddenly chilled "blue powder" is formed.

On examining the different patents taken out in the past 30 years it will be found that all worthy of consideration endeavor to reduce the carbonic acid formed by the reduction of zinc oxide by carbonic oxide back to carbonic oxide by means of carbon. It has been the general belief that carbonic acid is the interfering element, and that by its complete reduction to carbonic oxide all difficulties could easily be overcome. This has never been fully proved by experiment. Nor has it been shown that the reaction between carbonic acid and carbon takes place in the manner generally stated, viz., $CO_2 + C = 2CO$. From the results of my experiments I have doubts as to the complete reduction of carbonic acid by carbon.

Now, if this is not possible, is it possible to obtain zinc from its ores by a blast furnace process?

As a result of my inquiry and in conformity with the results of my experiments, I will consider the reactions between zinc, carbonic oxide and carbonic acid (all in a gaseous state) under three heads:

I. When zinc is in excess no reaction takes place, and metallic zinc may be condensed from this mixture.

II. When carbonic oxide is in excess, "blue powder" may be formed when the zinc vapors are suddenly cooled, but when the zinc vapors are slowly cooled zinc oxide is formed.

III. When carbonic acid is in excess the zinc vapor is oxidized completely to zinc oxide.

Those reactions refer to temperatures below that at which carbonic oxide reduces zinc oxide (about 1,300°). It will be observed that the reactions are not dependent upon temperature alone, but upon the relative amount of zinc, carbonic oxide and carbonic acid.

When carbonic acid is present in excess in the gases, it is impossible to produce metallic zinc, but "blue powder" is formed, and that only when suddenly chilled. This result is only brought about with extreme care and at a great expense. When zinc vapor is present in excess* we get a very satisfactory result so far as the quality of the metal produced is concerned. It is a result that cannot be obtained by continuous running, but only by the intermittent accumulation of heat before bringing about the desired reaction. In this way I have succeeded in getting metallic zinc in a perfect form.

The reactions between zinc, carbonic oxide and carbonic acid are so exceedingly complicated that it is impossible to establish a complete history of them. I have only endeavored to explain in a general way the results of my experiments and the conditions prevailing at the time.

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.

TUESDAY, SEPTEMBER 4TH, 1894.

- 525,325. Molding Box for Artificial Stone. Richard Avenarius, Gausalgesheim, Germany. A combination of a cylinder steam chamber with a system of molding boxes.
- 525,341. Compound Rotary Steam Engine. William G. Florence and John H. Bennett, Newark, N. J. A rotating drum, having a series of radial sliding pistons.
- 525,352. Amalgamator. Alexis C. McDonald, Granite, Mont. Combination of two oppositely-revolving cones, one of which has a spiral elevator attached, its lower end dipping in mercury.
- 525,358. Gas Engine. Fred C. Olin, Dunkirk, N. Y. The usual form, with the tubular exhaust valve and an automatic electric igniter, consisting of an insulated electrode with an oscillating arm.
- 525,373. Power Mechanism for Pumps, etc. Jacob Wagner, Rimini, Mont., Assignor of one-half to Nikolaus Wagner, same place. A wheel with pins on its circumference and revolved by a lever having two arms from the fulcrum of the wheel.
- 525,380. Apparatus for Manufacturing Hydrogen Gas. Perry Yarrington, Boston, Mass. Combination of a tank having perforations, with washing arrangement.
- 525,385. Pipe Drilling Device. James E. Feeley, Malden, Mass. A frame containing a drill shaft, combined with an adjustable drill spindle.
- 525,398. Concave for Stone or Ore Crushers. Isaac M. Van Wagner, Fairview, N. J. Assignor to the Gates Iron Works, Chicago, Ill. Combination of soft wrought or malleable iron in gyratory shows crusher with a concave formed of hard metal ring sections belted together.
- 525,399. Furnace. Robert H. Yeoman, Omaha, Neb. Horizontal cylinder in an air heating furnace.
- 525,401. Stone Crusher. John J. Brewis, Chicago, Ill. Assignor to the Gates Iron Works, same place. A crusher with a hollow shaft engaging the gear of a gyrating shaft.
- 525,402, 525,403. Stone Crusher. Charles L. Carman, Chicago, Ill., Assignor to the Gates Iron Works, same place. A crusher with the driving gear opposite openings in the frame, and containing a bracket on which the driving gear is rotably mounted.
- 525,404. Bearing for Gyratory Shafts or other Analogous Mechanism. Charles L. Carman, Chicago, Assignor to the Gates Iron Works, same place. Supporting blocks, consisting of channel seats having inclined contact surfaces.
- 525,405. Inclined Diaphragm of Gyratory Stone Breakers. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. An inclined diaphragm having a tubular extension through which the bearing passes.
- 525,406. Stone Crusher. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. Combination of a crusher with an adjustable discharge chute.
- 525,407. Method of and Means for Securing Stone Crusher Heads to Shafts. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. A gyrating shaft having the tapered portion provided with key seats.
- 525,408. Gyrating Crusher. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. A shell provided with a movable lining of horizontal rings having vertical channels.
- 525,409. Gyratory Stone Breaker. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. A bearing for a ball beneath the upright taper shafts.
- 525,410. Bearing for Gyrating Shafts for Stone Breakers or other Machines. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. A frame and crushing concave, with a bearing box above the latter and a support for the gyratory shaft.
- 525,411. Sealing Lubricating and Bearing Support for Gyrating Screens, etc. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works. Combination of supporting plates, with a dust sealing flange containing fluid.
- 525,412. Apparatus for Casting Journal Boxes. Philetus W. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. A mandril for casting metal surfaces in journal boxes.
- 525,413. Gyrating Crusher. Albert J. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place. Combination of a shell, an eccentric box and gearing so arranged that the eccentric box maintains an independent axis.
- 525,419. Frame and Hopper for Gyratory Stone Crushers. Avery E. Hoyt, Chicago, Ill., Assignor to the Gates Iron Works, same place. A hopper formed of sections or rings arranged on different planes, and one section forming a combination of the other.
- 525,431. Water Wheel. Albert F. Sparks, Springfield, O., Assignor to the James Leffel & Company, same place.
- 525,440. Water Wheel. Francis M. Bookwalter and William W. Tyler, Springfield, O. Assignors to the James Leffel & Company, same place. A wheel in which a water diverter is set between the nozzle and buckets.
- 525,443. Gyrating Crusher. Charles L. Carman, Elmer E. Harna and Philetus W. Gates, Chicago, Ill., Assignors to the Gates Iron Works, same place.
- 525,471. Method of Tinning Iron Castings. August Schaag, Berlin, Germany. Coating electrolytically with alloy of iron and metal and then dipping in mother tin.
- 525,551; 525,552. Feed Water Heater. Henry G. Keasbey, Ambler, Pa. A shell with partitions forming water chambers and provided with pipes through which heat from boiler passes to chamber at end and thence to chimney.
- 525,553. Steam Boiler. Henry G. Keasbey, Ambler, Pa. Made on same principle as above feed water heater.
- 525,538; 525,559. Rotary Engine. Frank M. Mackey, Williamsport, Pa., Assignor of four-fifths to Charles C. Gibson and Daniel F. Ring, same place. Combination of armular high and low-pressure cylinder of equal sectional area and different diameter.
- 525,567. Apparatus for Wiping Galvanized Tubes. Thomas L. Thomas and Joseph B. Hillman, Princes End, near Tipton, England. Two pair of crimping dies, one set in advance of the other, arranged so they may be pressed against the pipe.

* I have used the general term "excess" in preference to any definite relation between zinc, carbonic oxide and carbonic acid in chemical equivalents or percentages. It should be interpreted more as a measure of molecular attraction whether due to the affinity of like or unlike molecules.

PERSONALS.

Mr. John W. Davis has been appointed superintendent of the plant of the Cleveland Steel Casting Company, which was built in 1894. He has been manager for over two years of the Aschman Steel Casting Company, Sharon, Pa.

Dr. A. R. Ledoux, receiver of the Harney Peak Tin Mining, Milling and Manufacturing Company, has just returned from an inspection of the company's property in South Dakota. Dr. Ledoux expresses himself as encouraged to believe that under proper management there is a possibility of making a remunerative enterprise out of this unfortunate venture. There is considerable interest in gold mining in the vicinity of Hill City and other localities where the tin company has property, and upon some of its tin claims gold is also found, but as yet without any effort at development. Even if the tin mines cannot be made to pay, there is a possibility of getting a fair return for a reasonable capital from the working of gold ores. The company owns a tract of country some 15 miles long by 9 miles wide, covered by fine lumber, and a number of ranches, which are being profitably cultivated.

OBITUARY.

James Andrew Bryden, superintendent of the Pennsylvania Coal Company at Pittston, Pa., was killed on September 10th by an explosion of gas in No. 4 slope.

The friends of Mr. Louis Janin, the well-known Californian mining engineer, will learn with deep sympathy of the affliction which has fallen upon him in the death of his younger son, Eugene, who fell a victim to malignant typhoid fever, after a short illness, at Minas Prietas, Sonora, August 20th. He was but 23 years old, and his sudden death, after only seven weeks of practice in his first professional position, ended a career full of promise. The formal obituary notice in a local journal closes with a sentence as full of significance as of pathos: "He was a joy to his parents every hour of his life."

R. W. R.

Herman von Helmholtz died at Berlin on September 8th. The eminent German scientist was born in Potsdam, August 31st, 1821, son of a professor in the gymnasium of that town. After he finished the medical course of the military institute at Berlin he was attached for a time to the staff of one of the Berlin hospitals, and then returned to Potsdam as an army surgeon. In 1845 he was appointed to the chair of anatomy in the Academy of Fine Arts in Berlin, whence, in 1855, he removed to Königsberg, residing there three years as professor of physiology. From Königsberg he went to Heidelberg, there also lecturing on physiology. Then he was appointed to a similar position in Berlin, where he resided until his death. He received two public recognitions of merit, the Copley medal, bestowed by the Royal Society of London on December 1st, 1873, in recognition of his services to science, and the decree of the Emperor of Germany, whereby he was raised to the "status of nobility" in 1883. His works principally refer to the physiological conditions of the impressions of the senses. Among the best known are: "On the Preservation of Forces" (1874), "Manual of Physiological Optics" (1856), and "Theory of the Impressions of Sound" (1882). More than 120 of his scientific papers have been read before the Royal Society, and he was a voluminous contributor to scientific magazines.

Liernur Bey.—An obituary notice, just received, advises me of the sudden death, at Carlsbad, Germany, on the 20th of August, in his 37th year, of George A. Liernur, officially known in the Egyptian service as Liernur Bey, whose acquaintance I made three years ago, at the Barrage of the Nile, near Cairo.

Mr. Liernur was born in one of the Southern States of this country, and was, I believe, at the time of my visit to Egypt, the only American engineer in the civil service of that country, his colleagues and superiors being English officers, mostly taken from the Indian Service, that admirable engineer and administrator, Sir Colin Scott Moncrieff, at their head. It speaks much for the ability of the young American that he was not only retained, but advanced, in such a company of experts. The honors and decorations which he received from the Khedive (he was an officer of the Order of Osmanieh, and wore the Star of Egypt) count for little in the judgment of an engineer and democrat like myself, in comparison with the substantial recognition of professional ability and personal worth implied in his appointment as engineer-director under the Ministry of Public Works, and director of the Barrage of the Nile. Such responsibilities were not empty distinctions conferred by a monarch, but recognitions of tried and proved character, proceeding from an impartial and competent chief. A whole constellation of "Stars of Egypt," or other ornamental luminaries, on a man's breast would not have influenced Scott-Moncrieff to make him director of the Barrage.

I have spoken of this position as a recognition of personal worth, as well as professional skill; and this statement has more than a conventional force. In my article on "The Redemption of Egypt" ("Engineering and Mining Journal," April 11th, 1891), I emphasized the fact that the English régime in that country has saved and regenerated its natural re-

sources by a rare combination of engineering skill with personal integrity and disinterestedness. The reconstruction of irrigating systems has gone hand in hand with a sternly equitable distribution of water; and either element would have failed without the other. Their combined effect is shown in the astonishing fact that Egypt is now not only paying interest on the colossal debts incurred by former despotic profligacy, but producing a considerable annual surplus, available for internal improvements.

As I showed in that article, the useful effect of the Barrage and the whole connected irrigation system of Egypt could only be secured by an honest administration on the part of the resident engineers (as distinguished from the previous system of eminent experts making plans at Cairo, and corrupt officials scattered through the country); but the requirements of the Barrage itself were still more severe. That great work, when the English engineers took it in hand, was a dilapidated and useless wreck, ruined from the beginning by dishonest execution, performed with the connivance, or permitted by the carelessness, of subordinate officials. Its restoration to a certain measure of effectiveness was an achievement more remarkable, in some respects, than would have been its successful construction at the first attempt. But being thus precariously restored, it can be maintained only by incessant vigilance and skill. As I wrote in 1891:

"The permanence of the work itself is scarcely a matter of calculation. It must be microscopically watched, day and night; the smallest incipient cracks and the signs of the digging of the Nile under the floors must be detected and remedied, and the strain upon the structure must be closely observed."

I will remember that Liernur Bey, who was then the resident engineer, and who received my party with cordial hospitality, declined our invitation to Cairo, only a dozen miles away, because he was not willing to be absent even for a few hours from the Barrage, where "something might happen" at any moment. After what I had learned from a study of the structure under his guidance, I was not surprised at his anxious sense of continuous responsibility; and I do not hesitate now to say that, in my judgment, every year through which the Barrage of the Nile has endured since, has been the testimony of a triumph of engineering not less meritorious, and probably much more incessantly laborious, than the design and construction of a new work. I do not know to what disease Liernur Bey has now fallen a victim in the prime of his young manhood; but I should not be surprised to find that he had broken down at his post in the Delta, under the stress of this continuous pressure.

It was Liernur, by the way, who conducted the survey and borings in the Wady Ryan, that depression in the Fayoum province to which Mr. Cope Whitehouse first called public attention. The results of his exploration confirmed Mr. Whitehouse's assertion that the basis is lower in its deepest part than the level of the Mediterranean. At the same time, they proved, I think beyond any question, that this depression was not the locality of the famous Lake Moeris, celebrated by Herodotus. Liernur showed that the waters of the Nile could never have entered it, for the simple reason that not a trace of Nile mud can be found in it. But this part of the Whitehouse scheme had really nothing to do with his proposal to utilize the Wady Ryan as a reservoir, though it served to attract popular attention to that proposal, by investing it with classic and archaeological interest, and by giving it the air of a conservative restoration of the ancient order of things, rather than a revolutionary innovation. Liernur, like his English colleagues, while putting no faith in the Lake Moeris theory, was inclined to favor the reservoir plan, as a great work, to be undertaken when the means should be available and more pressing improvements should have been executed.

Since my return from Egypt, I have maintained an occasional and very pleasant correspondence with Liernur Bey, who manifested great interest in the progress of American practice in irrigation. I feel his death as the loss of a personal friend; and I am sure the Egyptian Service will feel it as the departure of an accomplished and trustworthy officer not easily to be replaced.

R. W. RAYMOND.

SOCIETIES AND TECHNICAL SCHOOLS.

Technical Society of the Pacific Coast.—The last regular meeting of this society was held in San Francisco, Cal., on September 7th. Mr. H. T. Bestor read a paper entitled "City Tenements," which was followed by another, by Mr. R. L. Dunn, entitled "The Relation of Transportation to Production."

New York Railroad Club.—The first meeting of the season will take place at 12 West Thirty-first street, New York City, on September 20th, 1894. Mr. W. W. Wheatly will read a paper entitled "How Can the Present Methods of Rating Train Loads be Improved?"

Mr. Wheatly has been making some original investigations, and will present some interesting facts for the consideration of those interested in economical railroad operation. Motive-power and transportation officers are especially requested to be present and to bring their friends.

Central Railway Club.—A meeting of this club will be held at the Hotel Iroquois, Buffalo, N. Y., September 26th. The secretary writes to us that discussion on Mr. Morford's paper on "Terminal Yards,"

which appeared in the proceedings of the club, will be open. Committees will report on the following subjects: "Best construction and practice in locomotive driving boxes, including consideration of the comparative merits of solid bronze boxes compared with cast iron or cast steel with bronze lining and with cast iron or cast steel with ribs of bronze having soft metal strips;" "The best practice and recommendations as to maintaining passenger equipment in good condition between successive shoppings for general overhauling."

Members are requested to send to the secretary subjects or questions they would like to have presented for discussion at the meeting.

INDUSTRIAL NOTES.

Hattie Ensley furnace, at Sheffield, Ala., has gone into blast and is now making 130 tons. J. H. Scott is manager.

The Union Chain Works, Pittsburg, Pa., has been chartered with a capital of \$25,000. The directors are Paul Hacke, W. S. Prugh and W. C. Reiter.

On September 9th a serious fire broke out in the building of the Cleveland Rolling Mill Company in Cleveland O. Three buildings were consumed, the total loss amounting to about \$15,000.

The Centennial-Eureka Company, of Utah, has recently ordered from Fraser & Chalmers an 18 x 30 in. Riedler duplex air compressor, driven by an 18 and 28 x 30-in. compound Corliss condensing engine.

The cableway interests of the Lidgerwood Manufacturing Company will, after September 1st, be represented in Chicago by Mr. Frank B. Knight, formerly assistant engineer at the New York headquarters. Mr. Knight will be located in the Old Colony Building.

At the new coal shaft which is being sunk on the Aransas Pass Railway, three and a half miles south of Rockdale, Tex., by Mr. Leonard Isaacs and others, a vein of coal has been struck at a depth of 35 ft. The vein is under a splendid roof of hard slate and will be easily mined.

The big Vulcan steam shovel at Mountain Iron smashed all previous records for this mine, and the range too, last Monday, when 143 cars were loaded in 10 hours, says the "Mining Journal." Between two and three hours were lost in delays, caused by waiting for cars and other stops.

The Tampico Terminal Coal Company at East St. Louis, Ill., has been incorporated with a capitalized stock of \$100,000 to carry on a general merchandise business with Mexico, more particularly coal and coke. The incorporators are L. A. Engel, Thomas Bagley and Cornelius Vandervort.

The Colorado Fuel and Iron Company has elected the following board of directors: J. C. Osgood, H. R. Wolcott, Dennis Sullivan, W. R. James, C. H. Toll, J. A. Kebler, A. C. Cass, D. C. Beaman, W. L. Graham, Paul Morton, E. Thalman and G. H. Prentice, the last succeeding C. F. Meek.

The Inverness Coal Mining Company has been organized at Portland, Me., for the purpose of conducting a mining and general coal business, and has filed certificate of incorporation. Capital stock, \$1,000,000. President, W. N. Lawson, of Newton, Mass.; treasurer, A. C. Jones, of Boston.

The Berlin Iron Bridge Company, of East Berlin, Conn., has received the contract for an annealing, room building for the Naugatuck Malleable Iron Company, at Naugatuck, Conn. The building is 94 ft. wide and 175 ft. long, with brick walls and iron roof trusses covered with corrugated iron.

The Pennsylvania Iron and Steel Company has been incorporated under the laws of the State of Washington to engage in a general manufacturing business at Edmonds, Snohomish county. The authorized capital stock is \$100,000. The incorporators are A. D. Eshelman, J. M. Boyd, Ellis Morrison and George R. Fisher.

The United States Tire Company, of New York City, was incorporated at Albany to manufacture tires, wheels, bicycles and other vehicles. Capital, \$500,000; and directors: Raphael H. Wolff, Caleb H. Hillman and Leopold Wallach, of New York City; Abram Lent Smith and George H. Chinnock, of Brooklyn, and Chas. L. Buck, of San Francisco.

The Ashland Iron and Steel Company's blast furnace at Ashland, Wis., started up September 2d after an idleness of six months. Nearly all of the old force has been taken back. This again opens the charcoal industry in northern Wisconsin, as the Ashland furnace is the largest charcoal furnace in the world, and produces 125 tons charcoal iron per day.

The management of the Union Pacific has posted on its bulletin boards the following: "On account of the personal strife engendered by partisanship it has been decided to ask all employees of the Union Pacific Company to refrain from active participation in politics. Should any employee desire to accept the nomination for any office he will be requested to resign from the service of the company."

The employees of No. 1 mill of the Reading Stone Works, at Reading, Pa., have resumed work on full

time this week. For the past five months the employees of the entire plant have been working only four and five days a week. In mill No. 1 the employees will work 10 hours a day, and, quite likely, overtime will be necessary. The firm will operate its Millmont plant five days a week. This department has been running three and four days a week during the past year.

The largest steel plate ever rolled was successfully made at the Wellman Iron and Steel Works at Chester, Pa., on Sept. 6, in the presence of a number of steel experts from Philadelphia and elsewhere. The ingot of open-hearth steel, weighing over 21,000 lbs., was molded a few days ago, and was placed in the heating furnace to be made ready for rolling on Wednesday. It was kept there for over 36 hours, and when taken from the furnace was placed on the high table back of the rolls. When finally completed the rolling was a thorough success. The plate measured 450 in. long, or 37½ ft., by 130 in. wide, or nearly 11 ft., while its thickness was 1½ in. The finished plate, sheared to its proper size, will be 427 in. long by 120 in. wide.

The Cole furnaces at Sheffield, Ala., which were bought in by Gordon, Strobel & Laureau, Limited, of Philadelphia, under a mechanic's lien, were owned by the Alabama & Tennessee Coal, Iron and Railroad Company. The furnaces, three in number, are 18 x 75 ft., with three 20 x 65 ft. stoves each, and seven blowing engines with 84-in. air cylinder. The plant is equipped with a battery of Babcock & Wilcox boilers. It has been idle for a long time owing to the low price of iron. While in operation ores were secured from Tennessee and Russellville, Ala., and coke from various Tennessee and Alabama mines. Recently the plant has been purchased from Gordon, Strobel & Laureau by parties who expect to put it in operation when the iron trade justifies it. Ore will be secured from the same points as heretofore, and coke from Birmingham, Ala. It is possible that the coal seam at Townley can be developed with a view to supplying fuel. As Colbert shoals on the Tennessee river have been materially improved by the Government, there is now no serious obstacle to sending pig iron by water to points on the lower Tennessee or Mississippi river, giving the plant, in common with others in that district, an advantage in freight rates over Birmingham. It is reported that the purchasers are E. W. Cole, of Nashville, Tenn., and J. C. Neeley and Napoleon Hill, of Memphis, Tenn., all of whom were heavily interested in the original company.

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.

CALIFORNIA.

Butte County.

Hurleton District.—The mining outlook was never brighter in the vicinity of Hurleton than at present, says the Oroville "Register." A great deal of prospecting is being done and several new mines are being opened.

A large ledge was uncovered in the Dutch Ravine mine a short time ago, about 7 ft. wide. The rock carries a large amount of sulphurets, and present indications are favorable. For more than a year Mr. Stow has had a force of men prospecting here and a great deal of work has been done. A double compartment shaft 9 x 5 has been sunk 165 ft. from the bottom of which nearly 1,000 ft. of drifts and cross-cuts have been run, mostly through blasting ground. Several chutes of good ore have been cut through, but they were not deemed large enough to justify the erection of a mill. If the present chute of ore proves to be extensive, a mill will be erected.

Dr. Gibson has a large crew of men at work at the Phoenix. The new rock breaker has been put in place and the mill is running on full time. They have a large body of ore from which they are stopping, and are also sinking in the shaft. The Phoenix has been a paying mine from the start. W. W. McMillan, the locator and former owner, crushed about two hundred tons of rock in an arrastra, from which he realized over \$8,000. W. W. McMillan, Jr., is in about 100 ft. with his new tunnel in the Resumption and is taking out good ore. Several men are at work on the new strike on the McNair place and it is reported as being very rich. Development work is still progressing at the Pactolian.

Lovelock District.—The Napa & Solano mine employs 6 men. The output of the mine is from \$2.50 to \$10 per day to the man. At the Palace mine they are running a bedrock tunnel on an incline. To facilitate matters they have laid a hydraulic pipe to the face of the tunnel for the purpose of removing the rock after blasting instead of by the usual methods. At the Johnny Dicks mine

on the little West Branch of Butte Creek, there is a deposit of gravel 300 ft. wide, says the Oroville "Register." Six men are employed there. Wm. Hupp, of Inskip, Alex. Carpenter and Ira Wetherby are opening a mine at the head of Inskip Gulch which is said to prospect \$1 to the pan. At the Salsbury mine Steve Henderson is reported to have taken out last week \$100 per day. Mr. McVay, at his quartz mine one-quarter mile west of Inskip, is crushing the rock by means of an arrastra. Will Glover also has an arrastra in operation and it is currently reported that the mine is paying well.

Calaveras County.

The San Andreas "Prospect" reports active work on the Leonard and McFall mines, and several other properties, which is imparting a better feeling in that section.

Lone Star.—A rich strike was made in the Lone Star mine, at West Point, last week. It is said that a 14 ft. vein was uncovered.

Montreal Mining Co.—Operations were begun last week by this Montreal company on the mining property recently purchased just across the river from Robinson's Ferry. Forty men have already been put to work.

Del Norte County.

Myrtle Creek.—Myrtle Creek has for years produced large quantities of gold. The Del Norte "Record" says: It is well known that the ground from the beach to the eastern boundary of the county contains gold. Men are now engaged in working the beds of creeks east of here on a small scale and are making good wages.

Mono County.

Bodie Consolidated Mining Company.—The official letter from the Bodie Consolidated mine, dated September 2d, says: During the past week we have hoisted 52 tons of ore, 47 tons from the stope above the north drift from No. 1 crosscut and 5 tons from the north drift from No. 1 winze, 40 ft. below the 300 level. The ore was of about the same grade as what we have been milling this last week. The ore stope above the 300 level is looking well. Have stopped work on the north drift from No. 1 winze, 40 ft. below the 300 level, and started a south drift from the same point. Commenced crushing ore in the Bodie mill on August 27th and crushed 118 tons. Average battery sample assay, \$98.38 per ton; tailings, \$5.47 per ton. The mill has been kept running steadily since starting up.

Nevada County.

Harmony.—At this mine, in the Nevada City district, the incline is being sunk 30 ft., where it is intended to drift off to the old west ground that has always been rich. In sinking this incline a fine ledge was struck. The rock shows galena and sulphurets.

A correspondent of the Grass Valley "Union" says: There is not another district in Nevada county which has brighter prospects than Graniteville or Eureka, the quartz properties there being of extensive proportions. The Culverson, National and California mines are good properties. The latter, particularly, is known to be rich. Twelve miles above Graniteville is located the English Mountain mine, which, from present indications, will prove to be one of the best properties in the county. The ledge is a mammoth one, being about 20 ft. in width.

Sierra County.

Empire.—The new owners of this mine in Gold Valley are going to work with a will. There are now about 40 men working at that place. No attempt will be made to erect chlorination works this fall, as the season is too far advanced, but the company will devote its time to the fixing up of the sawmill, cutting lumber and prospecting the mine.

Phoenix, Sierra City.—At these mines the superintendent is employing 38 men and working a 10-stamp mill, which will soon be increased to 20 stamps. A 40-stamp mill is also being built at the Gold Valley mines near there, and much work is being done in and about other gold mines.

Trinity County.

Altoona Quicksilver Mining Company.—The case of this company against the Integral Quicksilver Mining Company, involving valuable ditch property in Trinity County, is on trial in the Circuit Court in San Francisco.

COLORADO.

Mineral surveys approved by the United States Surveyor-General for Colorado during the week ending September 1st: No. 8,868, Pueblo, Big Chief and Big Mike lodes; No. 8,933, Pueblo, Monday; No. 8,970, Pueblo, Clover Leaf; No. 9,059, Pueblo, Little Ellen; No. 8,891, Leadville, Ingomar, Immo, Ivo and Dodo lodes; No. 9,010, Pueblo, Louis R. and Hog Back lodes; No. 8,879, Pueblo, Bessie Y.; No. 9,011, Pueblo, Emerald and Bond lodes; No. 9,019, Pueblo, Lillie; No. 8,973, Gunnison, Iron Cap and Iron Band lodes; No. 9,007, Pueblo, Judson placer; No. 9,025, Garfield, Little Cloud; No. 9,031, Gunnison, North Star; No. 9,014, Leadville, Small Spot; No. 9,023, Pueblo, Cripple Creek and Pannick lodes; No. 9,026, Leadville, Golconda; No. 6,892, 2d Am. Leadville, Archer; No. 8,118 Am., Pueblo, Cooper placer.

Boulder County.

Reports from Boulder state that interest in mining is growing and the influx of capital for the development of the gold mines of Boulder is increasing. New machinery for treating the ore is being taken to the several camps. Machinery is being

erected over the Baron mine as rapidly as possible, and when complete and in running order the property will again turn out high-grade telluride ore.

At Cardinal the Golden Queen is operated by Capt. C. T. Trollope with good success. The ore runs from \$150 to \$190 per ton with a fairly sized vein exposed. The Jack Pot employs 6 men in opening out stoping ground for their mill, which it is claimed will be ready to treat the mineral in the early spring.

The Little Caribou mill is not running on Eagle Bird ore, but doing good work in the mine for future returns. The Belcher mine, a silver property at Caribou, is run by W. Irwin. He has driven a cross-cut 30 ft. south and has cut a vein of low-grade ore which does not pay to handle. On this vein a level has been run 30 ft. on its trend with fairly good success.

Bloomer.—An expert has been looking over the Bloomer group of six mines for an Eastern company. This property is situated on Left Hand, near the head of the gulch. The property is only a prospective one, yet it shows good veins of free milling ore. Messrs. Duncan and Bloomer, the owners, have a 12-ton daily capacity Huntington mill.

Nil Desperandum.—Harry Wilson, of Denver, has taken a lease on the Nil Desperandum at Sunshine near the Cleveland vein. This property has been run by the owner for many years without any help.

Sunshine.—This mine is doing well under lease. The Richmond is another good mine which produces large quantities of high-grade sylvanite. This property is operated by leasers, who have agreed not to stope out any mineral now exposed in the several levels, but will drift for the mineral they take out of the mine. There are over 50 miners engaged in breaking mineral, running cross-cuts and drifting for other veins known to exist. This has been and is one of the great telluride mines of Boulder County.

Clear Creek County.

There were shipped from Georgetown during August 60 cars of ore, 1,683,600 lbs., valued at about \$84,000, of which 24 cars went to Pueblo, 32 to Denver and 4 to Argo. This shows a gain over the same month of last year of 6 six cars and about \$15,000. Empire shipped during the same period 8 cars containing 243,000 lbs. of ore, valued at about \$12,150. This was about the same shipment as was made in July, and a gain over the same month of 1893 of 6 cars, or about \$9,000.

(From an Occasional Correspondent.)

The condition of the mining industry in this county is as good as could be expected under existing conditions. Gold mining being much more popular now than silver mining, even though it may not pay any better, there is much activity in all sections where that metal is to be found. Consequently the lower part of this county, in the vicinity of Idaho Springs, is netting about as much profit as it produced a year and a half ago. But in the upper part, near Georgetown and Silver Plume, where the value is almost entirely in silver and lead, the production of ore, as compared with 15 or 18 months ago, is probably about one-half, and brings not more than one-third the money for ore at that time. The price of lead is a much more important item in this county than is generally supposed. We have several mines which are affected more by a decline of 1c. per lb. in lead than by a decline of 40c. per oz. in silver.

Colorado Central Mining Company.—Very little is doing at this mine. The ore in the lower levels has so far proved to be very low in grade. The low price of silver and litigation as to the title of a portion of the mine are sufficient to prevent anything like extensive development work for the present.

Diamond Tunnel.—After being out of ore in paying quantities for a number of months this mine has again encountered a good body which grows better on development.

Newton Mining Company.—The new 30-stamp mill of this company was started on September 3d, the machinery consisting of 30 stamps, 6 Gilpin County tables, tubular boiler, and 50 H. P. Corliss engine. Sampling machinery is to be added to the mill with the intention of doing a general ore buying business.

Pelican-Dives.—This property continues in good ore and is by far the best producer in this county. Instead of being worked out, as was supposed a few years ago, it promises to give good returns for some time to come.

Silver Age Mill.—Under the present management this mill is doing a good business. A considerable quantity of Gilpin County ore is now being milled by this company, it having been demonstrated that much of the ore heretofore treated by the stamp mills of that county will give much better returns by concentration.

El Paso County—Cripple Creek District.

(From our Special Correspondent.)

The shaft on the Bertha B. has been sunk 200 ft. and a crosscut is being driven to intersect the Moose vein.

Plymouth Rock continues to open up well. The Morning Star, one of the Calumet Mining Company's properties, situated on Bull Hill, is being worked under lease, and from a shaft sunk 25 ft. deep over \$1,100 worth of bullion has been obtained and an equal amount of concentrates. The Burns, the other property of the company, is about to resume work under the same lessee. There are large

quantities of milling ore blocked out, but it is the intention to sink an additional 60 ft.

Anaconda Mining Company.—The Excelsior, one of the properties of this company, is now being worked under lease and some rich ore is being mined. The shaft has been sunk to a depth of 190 ft., but the present workings are confined to the 100-ft. level.

Gold and Globe Mill.—The directors of this company recently held a meeting at their office in Colorado Springs to consider the advisability of erecting a 50-ton chlorination plant. The 40-stamp mill is now confined to amalgamation and concentration, and is kept busy on custom ores, although the percentage saved does not quite reach 90%, but with chlorination added, such a percentage can be easily attained. The Lawrence Chlorination Works and the Brodie Cyanide Process pay 95% of the assay value, charging \$12 for treatment, and are kept busy on custom ores.

Independence.—This property, situated on Battle Mountain, is the marvel of the camp. In August the output of shipping ore was 800 tons, the lowest car load lot assaying over 3½ oz. per ton. This amount was hoisted by a one-horse whim from the 70-ft. level. The coming week will witness the new hoisting plant at work; this plant is the largest in the camp. The new shaft is down 100 ft. and has three compartments.

Summit Mining Company.—The Globe, one of the locations of this company, situated on Globe Hill, has recently opened a vein for 200 ft. in length, averaging over 20 ft. wide, assaying from \$10 to \$20 per ton. This vein is now being mined with plow and scraper, as was the case at the Deerhorn some two years ago.

Victor.—The second grade ore from this mine for the past 8 months has averaged \$400 per ton. Last month the shipments were 130 tons—93 tons second grade and the balance third class, netting \$35 per ton. The mine employs 65 men.

Gilpin County.

Overland Gold Placer Company.—Mr. G. P. Blair, of Central City, has purchased for this company, which was recently incorporated in London, Eng., the Nancy Lee group of mines at Pine Creek for \$15,000. As soon as the necessary transfers can be made work will be commenced. A large force of miners will be employed, and development work carried on in a systematic manner.

Juab County.

Mammoth Mining and Milling Company.—Progress is being made with the enlargement of the plant of this company, and the announcement has been made that the company would have its new machinery placed and ready for operation by the 20th of October. This increase in the size of the plant will give 20 more stamps.

Pitkin County.

Mollie Gibson Consolidated Mining and Milling Company.—It is reported that another big body of ore has been discovered in the Mollie Gibson and that it averages 200 oz. to the ton. This is said to account for the present activity in the stock.

Saguache County.

A press dispatch from Colorado Springs says that N. C. Creede, for whom Creede was named, has sold his remaining interest in his mining property at that place to D. H. Moffat, of Denver, and his associates.

Lake County.

(From our Special Correspondent.)

Bon Air.—The large pumping plant is doing good work in draining this shaft, better known as the old Star of Hope shaft. As known ore bodies exist the Bon Air will be on the shipping list just as soon as the drainage work is completed.

Doris and C. M. Fraction.—On the former important development is being done and some ore is being mined; on the latter the shaft will be sunk farther, after which drifting will be done to catch the Doris ore shute. The ore is a good grade of carbonates and runs well in gold.

Jay-Harvard Mining Company.—There are prospects of an early resumption of work on the Harvard and other properties of this company. The ore shute of the Bangkok, it is thought, extends into this ground.

Maid & Henriett.—Most of the ore shipped from the Maid of Erin shaft is mined by lessees, although the company is taking out some carbonate. Several lessees are in good ore. The main shaft of the Maid of Erin is down 916 ft., and is in Cambrian quartz.

Marian.—Small shipments of a clean sulphide ore are being made, but are not very heavy on account of the low price of their class of iron ore. A new hoisting machine has been placed in position during the past week.

Matchless.—In addition to sinking the shaft to the third contact important development work is being carried on in the old workings, which resulted in the opening up of a good body of carbonate ore running 180 oz. silver to the ton.

Rex Mining Company.—The new shaft known as the Keystone is going down steadily with two shifts at work. As was expected quite a flow of water has been met with, but this is being easily handled by the No. 7 Cameron sinker.

Sliver.—It is believed that the ore chute of the Union will also be encountered in the Sliver ground. This necessitates the sinking of the shaft much

deeper; but this will be done at once. A new plant of machinery is being put in place.

Thesplan.—A winze already over 100 ft. deep is being sunk to encounter the second contact. The first contact has already been thoroughly explored.

Union Leasing and Mining Company.—Considerable work is being done by this company, 100 tons of a good grade ore are shipped daily and in addition important deadwork is doing. A second class of ore, running fairly well in silver and high in zinc, is at present being thrown on the dump.

Yak Mining Company.—The big tunnel is being driven ahead, but most attention is being paid to the mining of the lower-grade ore which is being treated by the company's new mill, which was rebuilt this summer at a cost of \$10,000. The new cyanide mill is soon to be erected; this process will be introduced for the first time.

FLORIDA.

The following list of phosphate mines operating in August is given by the "South Floridian":

PEBBLE PHOSPHATE COMPANIES.

Pharr Company, Bartow, mining.
Homeland Company, Homeland, mining.
Florida Phosphate Company, Limited, Phosphoria, mining.
Virginia-Florida Phosphate Company, Fort Meade, mining.
Whittaker Phosphate Company, Homeland, mining.
Fort Meade Company, Fort Meade, mining.
National Peace River Company, Bowling Green, mining.
De Soto Company, Zolfo Spring, mining.
Peace River Company, Arcadia, mining.
Arcadia Company, Arcadia, mining.
Charlotte Harbor, Fort Ogden, mining.
Gulf Phosphate Company, Cleveland, mining.
Alafia River Company, Turkey Creek, mining.
Tampa Company, Peru, mining.
Lake Hancock, Bartow, mining.
Massachusetts Company, Acme, mining.
Bone Valley, Bartow, mining.
Land Pebble Company, Pebble Dale, making repairs.

Marietta Company, Fort Meade, mining.
Pebble Phosphate Company, Mariana, mining.
Eureka Phosphate Company.

HARD ROCK MINES.

Dunellon and Inverness Section.

Piedmont Company, Dunellon, working.
Marion Company, Renfro, working.
Dunnellon Company, Renfro, working.
Hubbard & Evans, Dunellon, working.
Ocala and Blue River, Elliston, working.
Hartshorn, Elliston, working.
Florida Phosphate Company, Hernando County, working.
Netherlands, Pemberton, working.
Istachatta mines, Istachatta, working.
Early Bird mines, Early Bird, working.
Bonnie May mines, Pemberton, soft rock.
Belview mines, Bellwood, soft rock.
Chicago & Florida, Early Bird, working.
Floral City Mines, Floral City, working.
Illinois Company, Early Bird, working.
Alachua Company, Rock Springs, working.
Standard Company, working.

Anthony's Section.

Campagne des Phosphates de France, Anthony, working.
Stranathan Company, Anthony, working.
Maryland Phosphate Company, Anthony, working.
Linder Phosphate Company, Anthony, working.

Alachua County Section.

High Springs Company, near High Springs, mining.
Stanley & Lumm, near Springs, mining.
Excelsiors, near Springs, not mining.
Fort White Company, Fort White, mining.
Dr. Camp, Alachua County, mining.
Sims & Wright, Alachua County, mining.
Osceola Company, Albion, mining.
Piedmont Company, Gainesville, mining.
Globe Phosphate Company, Hernando, mining.
Florida Syndicate, Hernando, mining.
Black River Phosphate Company, Clay County, mining.

GEORGIA.

Haralson County.

Camille Mine.—Owned by Messrs. Carpenter & Shaw, of Natchez, Miss., has been bonded by Messrs. Fisher & French, of the Creighton Mining and Milling Company, of Cherokee County, this State, where that company have been and are still operating the Franklin mine, which Mr. Fisher has been managing until he came here to test this property with a view of purchasing. The Camille was first worked some 40 or 50 years ago, but work was stopped when the ore became sulphureted. During the boom days in the 80's the property was purchased by the present owners, who expended \$50,000 at least for machinery, comprising a twenty stamp Fraser & Chalmers mill, eight Frue vanner concentrators, chlorination plant, hoist, air compressor, engines and boilers, as well as about the same amount in mining operations. Since 1890 the mine has not been worked, except at irregular intervals by lessees or holders of options. For one cause or another every effort made in the past has resulted in failure to operate the mine profitably, and to-day the expensive chlorinating plant is still

in the same condition as shipped from the factory. Mr. Fisher has pumped the mine dry, and is thoroughly prospecting the ore body to determine extent, grade and permanency. Two incline shafts were sunk by old managements, on the ore body, which has a northeast and southwest strike, and a southeast dip at an angle of about 45°. A depth of 150 ft. on the dip was attained, at which point the ore body was found to lie almost flat, and a fissure filled with barren, glassy quartz was encountered cutting the stratified ore body, as well as the country rock, which is a slate of that semi-crystalline variety described by Dr. Eugene A. Smith, State Geologist of Alabama, as "Talladega." The ore body consists of strata of highly sulphureted quartz, quite thin and irregular both as regards structure and grade. The old record of samples taken daily from the workings show that the ore at that time yielded from \$23 a ton down to a trace in gold, and the variations occurred in the same headings so irregularly that it is impossible to estimate the average value with certainty for any distance along the ore body. Since Mr. Fisher has been prospecting he has sunk a vertical shaft for the purpose of testing the ore body in virgin ground, because he found such unsatisfactory results from ore taken from the old workings, 200 tons of which he milled. In sinking this, at about 30 ft. from the surface, an ore body was crosscut, which showed by sampling as high as \$190 a ton for a few inches near the hanging wall; but a cross section from 10 ft. of vein stone yielded only \$23 a ton. It is for the purpose of thoroughly prospecting this ore body that the vertical shaft is being sunk deeper, and crosscuts will be run from it at regular intervals to the ore body to determine the maintenance of its continuity as depth is attained. This ore body is apparently on the same lead as the Anna Howe, in the Arbacoochee district, in Alabama; although no occurrence of gold is found on the lead between these mines, which are some 15 miles distant from each other, the last-named being to the S.W., and both occurring in the same formation of country rock as well as containing the same character of ore and possessing the same irregular characteristics with regard to structure and grade.

IDAHO.

Boise County.

Boise Basin Mines.—The following notes of development are given by the Idaho "Statesman": The new mill for the Edna Company will soon be erected. It will crush 24 tons of ore per day. Wells Brothers' mine, at the head of Deer Creek, is developing into a good gold property. They now have men at work getting out 200 tons of ore, which will be reduced in the South Africa mill. The South Africa Company is not running the mill now, as the men are all at work running drifts so as to open the mine thoroughly. In the west drift rich ore was struck recently. The tunnel running into open up stoping ground in the Illinois mine, Gambrian district, is progressing with good speed. The Elmira Company, of Banner, is still running the tunnel between the Golden Gate and Banner mines. At short intervals the Banner vein is cut, and shows up well. Ore is now coming out of the Golden Gate, which is about 15 ft. from the Banner.

Hidden Treasure.—It is reported that this property, in the Neal district, lately yielded an average of over \$30 per ton on 100 tons of ore treated in the Ainslie mill.

Homestake.—Charles Balbach secured \$3,000 from three weeks' run on ore from the Homestake. He says 18 tons of ore is being crushed a day, the returns averaging about \$1,000 a week. Mr. Balbach says he has a quantity of concentrates on hand, but they are too low grade to warrant shipping. He is making arrangements to handle them at the mine.

Horseshoe Bend.—The Union Pacific has been investigating this coal property, and its experts express themselves as pleased with the result of their researches. An analysis of the coal showed it contained 1.22% more combustible matter than the Union Pacific coal standard requires. The analysis made was as follows: moisture, 6.82; volatile combustible, 41.2; fixed carbon, 40.02; ash, 11.96. Coal had also been discovered on Big Creek, in Long Valley.

Caster County.

It is reported that W. A. Clark, of Montana, has commenced to overhaul the copper smelter at Huston. The old plant has been thoroughly overhauled and a new 40-stamp stack added.

Idaho County.

Seven Devils.—A party of Eastern men, consisting of Jacob Beon, James Maloy and Samuel McClure, of Stillwater and St. Paul; Mr. Ketchum, of Chicago; Robert H. Paul, of La Crosse, Wis.; Robert W. Bissell, of Duquesne, Pa., and the English expert Simmons, accompanied by George Peck, the prospector, have been examining this property.

Lemhi County.

Arnett Creek Gold Mining Company.—This company is operating the Italian group of mines near Salmon City, has recently completed a 10-stamp mill. On a trial run of 65 tons of ore \$900, it is said, was obtained.

De Lamar Mining Company, Limited.—The superintendent's report for July shows that the mill was shut down on the 4th and a part of the 5th. The following shows the work during the month. Table of work performed for July, 1894: Wet tons crushed, 3,715.66 tons; dry tons crushed, 3,337.50 tons; assay

value of the pulp, \$26.72; gold, \$22.08; silver, \$4.04; assay value of the tailings, \$5.02; gold, \$4.43; silver, 59c.; percentage saved, total, 81.22%; doré bars produced, 21 bars; pure gold produced, 2,739.036 oz.; fine silver produced, 26,172.69 oz.; value of gold produced, \$54,780.72; value of silver produced, \$15,708.60; total, \$70,484.32; ore shipped during the month, \$5,500; surplus on sales of bullion, \$1,288.92; miscellaneous revenue, \$821.40; total, \$78,094.64; expenses for the month, \$34,499.85; estimated profit for the month, \$43,594.79.

Owyhee County.

Lincoln Mills.—This mill at Silver City has been thoroughly refitted and started September 4th on tip top ore. Ten stamps are running.

MARYLAND.

Messrs. Thomas Pollock, Samuel Brown, James Craze, W. B. McMillan, John Abbott and Nathaniel Somerville, miners of the George's Creek Coal and Iron Company, Lonaconing, have received diplomas of honorable mention from the Board of Lady Managers of the World's Fair for "skill as expert artisans" in mining the big lump of coal exhibited at the great exposition.

MICHIGAN.

Iron—Gogebic Range.

Norrie Mine.—The Metropolitan Iron & Land Company, operating the Norrie, East Norrie and Pabst mines, has inaugurated a new system of paying its men. The 1,200 employes of this company, or so many of them as desire it, go to the office and receive \$15 for each August labor. The balance of their earnings will be paid the men on September 15th, and hereafter this company will settle its pay rolls under this system on the 1st and 15th of each month. The action of the Metropolitan people in inaugurating a twice a month pay meets with hearty approval. The other companies of the Gogebic range will likely adopt the system. About a year ago this company stopped the work of sinking the row of deep shafts that are to be put down in the hanging and two which have been started. It is now considering the question of resuming work on them the coming winter. The one near the East Norrie mine, known as the Curry shaft, is down about 600 ft., and the one at the head of Suffolk street about 400 ft. They must be sunk an estimate of 1,500 ft. before striking the vein, says the Ironwood "Times." President S. S. Curry, of the Metropolitan, has been in Chicago negotiating for the purchase of a new hoisting plant for the East Norrie mine. The mine has reached a depth of about 900 ft., which is the capacity of the plant now in use, and the present plans are to purchase machinery that will double the present capacity and allow a depth of 1,800 ft. to be attained. Contracts have not yet been let for the machinery, but it is intended to have the work done the coming fall and winter.

Iron—Menominee Range.

Chapin Mine.—Miners working on contract at the Chapin mine are making from \$1.50 to \$1.90 per day.

Chapin Mine.—The "Range-Tribune" says, if, as now seems certain, M. A. Hanna & Co., of Cleveland, secure control of the Chapin mine, it will not be surprised if a deal was made with Mr. Kimberly that would result in the operation of the Chapin, Ludington and Hamilton under one management. The ore of these mines is of about the same grade, and, while non-Bessemer, is particularly valuable as a mix for fine Bessemer, such as is now mined on the Mesabi, the two ores fusing in a furnace at the same degree of heat. The mines could be operated under one management much more economically than separately, and would make money for all concerned.

Claire Mine.—There is some talk of a resumption of operations at the Claire, and it is reported that a sale of 25,000 tons of ore has been made. Not long ago Seager, of Lansing, sold the property upon which this mine is located for \$1,000 to T. M. Davis, who in turn sold it to the Briar Hill Coal and Iron Company for \$80,000. It has since changed hands several times and is now owned by Angus Smith, of Milwaukee.

Pewabic Company.—This company has let the contract to the Iron Mountain Electric Light and Power Company for the wiring of their mine and buildings for an incandescent plant consisting of 320 lamps. The plant will be a perfect one in every respect, and it is expected to have the same in operation in a few weeks.

MINNESOTA.

Mesabi Range.

(From our Special Correspondent.)

Biwabik.—Mining is now going on in both cuttings of this property, and big work is anticipated. It is hoped to be able to reach as high as 200 cars daily, but this is improbable at present; six cargoes have been shipped in the last three days.

Canton.—Mining at shaft "A" has been discontinued because of sinking to a greater depth. Work at this shaft will be resumed in about a month.

Hale.—This mine is shipping steadily now, averaging from 600 to 700 tons daily. The machine loaded as high as 1,000 tons in one day recently.

Lake Superior Consolidated Mining Company.—About 90,000 yds. of earth were moved in stripping at the Mountain Iron and Rathbun last month, besides over 25,000 by the road getting into the Rathbun.

Longyear.—Test pits are being sunk immediately north of the Mahoning mine, and it is understood that mining will be under way at some of the Longyear discoveries before spring.

Mahoning Ore Company.—Extensive stripping operations are to begin soon at this mine. There is a body of ore, about 1,200 ft. wide and over half a mile long, on which the stripping will not average more than 18 ft. Mining men who have examined the property, on which nearly 150 test pits are in ore, are greatly impressed by it.

St. Louis County.

(From our Special Correspondent.)

Ore shipments from the mines of the Minnesota Iron Company this year, up to September 1st, were as follows: Minnesota mines, 305,128 tons; Chandler, 411,726; total from Vermilion range, 716,854. From Mesabi: Canton, 195,629; Auburn, 22,780; Norman, 22,195. Total for Minnesota Iron Company, 958,462 gross tons. Other Mesabi shipments have been as follows: Hale, 6,779 tons; Franklin, about 84,000; Mountain Iron, about 390,000; Oliver, about 335,000. Total both ranges, 1,774,500 gross tons. The August shipments of the Duluth and Iron Range road were 204,322 tons.

Arguments on a petition for a receiver for the Standard Ore Company were again heard and again continued last Saturday. Price McKinney, assignee of Corrigan, Ives & Co., was one of the chief petitioners against the receivership.

The stamp mill of the Bevier Mining and Milling Company, at Rainy Lake, is closed down for repairs, but will be started this week. The present mill is to be turned over for a custom mill and a larger one built for the company in a more convenient location. Large amounts of mineralized quartz veins are being located on the lake and its vicinity, and while arrangements have made for no more mills than that spoken of, several are likely to go in when the winter permits hauling on the ice.

Consolidated Company.—A suit has been begun against the Consolidated Company by Wm. and John McKinley, and James Charnley, of Chicago, in which they demand \$620,000 damages on account of alleged false and fraudulent statements made to them by the defendants, on the strength of which they were induced to sell for Consolidated stock their interests in the McKinley mine, on the Mesabi. The main claims are that it was represented to them that all mines going into the Consolidated were going on an equal basis, the amount of ore in sight being the basis; that no bonds were to be used in paying for mines, and that Consolidated stock on a par basis was the sense of all negotiations. They allege that while these and other statements were made to them negotiations on entirely different basis were in progress for buying mines in Minnesota, Wisconsin and Cuba. It is claimed that several other suits, affecting the formation of the Consolidated Company, are soon to be brought, among them one in which John D. Rockefeller will be made the individual defendant.

Vermilion Range.

(From our Special Correspondent.)

Minnesota Iron Company.—Explorations at the Armstrong property, already referred to here, are so far advanced that the company will develop the property as a mine this winter, and will do the work on a large scale.

Pioneer Iron Company.—Work, which has been almost suspended at this mine most of the summer, will be resumed on a good basis soon. The main three compartment shaft, now down 650 ft., will be sunk another 100 ft., and new surface improvements made, so that early in the new year active mining and stock piling can be started. There are very few new properties on any of the ranges more strongly backed than the Pioneer, and it can be made a big mine in all probability.

MONTANA.

Cascade County.

Whip-poor-will.—Charles Swanson has secured a lease on this mine and has put a force of men to work getting out ore, which will be shipped to the Great Falls smelters.

Jefferson County.

Abraham Mine.—This is the property of H. L. Moore, T. D. Bassett and H. D. Tripp, says the Basin "Times." The shaft is 59 ft. in depth, and at the bottom there is 7 ft. of pyritic ore, containing gold, silver, copper and lead. The richest of the ore lies in the center of the ledge and runs regularly with it, being about 2 ft. 8 in. Assays from ore taken from the apex of the vein have gone from \$7.50 in gold to 15 oz. in silver, while in the bottom, where they are working at present, assays have been returned of \$25 in gold to 76 oz. in silver to the ton.

Basin & Bay State Company.—This company, says the Basin "Times," is completing its works as rapidly as possible. Seventy men are employed on the construction and in developing the east and west shafts of the Katie. This company is operating other properties, but the Katie is the one of the most prominence at present, being situated right in the town of Basin and is the east extension of the Hope vein. The shafthouse is now about completed. The foundation is of heavy masonry, the stone for which was taken from the Wortman quarry, six miles east of Basin. At the base of the structure it is 36 x 115 ft., and to the eave of the roof is something over 50 ft. The timbers for the gallois frame are of Oregon fir and will be what is termed a fou

post frame, the largest stick being 40 ft. in length. They are now in the shafthouse ready for raising when the roof is on and other portions of the building are in proper condition.

At first they will run a single deck cage, but as the shaft is a three compartment to the 5', should it be found that the hoisting capacity will not be capable of keeping the concentrator supplied, a second cage can be put in the compartment that is now being used for a pump shaft.

There are two 100 H. P. boilers, 66 in. in diameter by 16 ft. in length, and two more of the same size are to arrive. Both the east and west shafts have been completed to the 300 ft. levels. The stations have been cut and drifting commenced along the trend of the vein. It is the intention of the company to drift west more rapidly than east for the purpose of better ventilation, as one of the shafts will be a downcast and the other an upcast. By having connection between all levels at once it provides a means of escape in case of fire or flood, and will prevent such an accident as occurred in the Silver Bow mine, where so many men lost their lives.

Lewis & Clarke County.

Royal.—A chute of high-grade ore 2½ ft. in width was encountered in one of the lower levels recently, and from later developments gives promise of being one of the richest yet struck in the mine. The mill, which was started up Saturday, is running on good ore, and regular monthly dividends will be directly resumed, says the "New Northwest." It is estimated the pay ore now in sight is sufficient to keep the 10-stamp plant running continuously for two years.

Meagher County.

Benton Group.—Superintendent Barker denies the report of a rich strike in those mines. The property, Mr. Barker says, shows up well and to the satisfaction of the owners, but no fabulously rich pocket has been discovered that he knows of.

Silver Bow County.

East Grey Rock.—John McGuinness & Co. are leasing on this ground, and have put up a whim to work it.

Hesperus Lode.—Silas F. King and John Ducie have commenced an action in the District Court against E. Allen and 107 others to obtain a judgment for possession of the noted Hesperus lode, and for \$10,000 damages, besides special damages in the sum of \$700 a month from February 18th, 1893, as the value of rents and profits. The 108 defendants in the new suit are squatters who are alleged to have been in unlawful possession only since February 8th of last year, and in most instances jumped into the places vacated by others against whom judgment had been rendered a year or two ago.

Italian Placer.—This claim, which lies 3½ miles north of Burlington, in Brown's gulch, has been located by W. C., James M., W. S. and L. Van Orton.

Lexington Mine.—Development work will be continued this winter, and if silver is right next spring the mine will be worked to its full capacity. At a recent meeting of the stockholders of the company the following officers were elected: President, D. Lenny; vice-president, G. H. Goodrich; secretary and treasurer, W. H. Harrison; superintendent, Duncan McDonald; directors, D. Lenny, E. G. Hanson, Allan Pierce, J. Sweeney, S. Pierce, George S. Bailey and William Ulm.

Monitor Mine.—This property, which is a full claim located in the Kemper addition, was purchased recently by the Anaconda company for \$67,000. The principal owners of the ground were William T. Lewis and T. D. Perry, but eight or ten others held small interests. The sale had been pending for several months, but the deeds were not signed before.

The Italian Lode.—This claim, covering ground in the same locality as the Italian Placer, has been located by W. C. Orton, and the Contest lode by Lenore Brouse.

The Legal Tender Lode.—This claim has been located at the junction of First Chance and French gulches by W. N. Allen and others.

West Eveline.—Buse & Co., who are operating this property, are stopping some good ore.

NEVADA.

Esmeralda County.

Silver Star District.—Work on the Douglas Company's mill is progressing. It is expected that the mill will start next week. J. B. Paul has a lease on the General claim and is taking out \$35 ore. In the Hardscrabble mine the ledge is the full size of the tunnel. The ore is being piled up awaiting the starting of the mill. The ore, according to the Hawthorne "Bulletin," will average about \$50. In the Oneida mine work was suspended last week for two days on account of bad air, but a blower and air pipes have been put in and both shifts are working regularly now. The vein continues about the same in size, averaging from \$100 to \$125 per ton. In the west drift from the shaft alongside of the pay vein, there is a vein of quartzite material, about 5 ft. wide, heavily impregnated with sulphurets and carrying some free gold, the average value being \$12 to \$15. The Kinkead mill is running on ore from the Oneida at present.

Storey County—Comstock Lode.

Following are extracts from the latest weekly official letters of the superintendents of Comstock mining companies:

The Morgan mill will start again on September 15th. The bullion yield of the mine for the fiscal month of August was \$139,998.92, of which \$80,906.82 was silver, and \$59,092.12 gold.

Belcher.—On the 850 level the northeast winze is down 51 ft. The bottom shows clay and quartz. On the 1,000 level the main north lateral drift has been cleaned out and retimbered for a distance of 428 ft. from the incline station. We have hoisted during the week 10 tons of fair-grade ore.

Chollar.—West crosscut No. 2, 75 ft. south of north line on the 100 ft. level, was extended to a total length of 452 ft.; face in porphyry. We have completed cleaning and repairing the north drift, 450 level, and started a west crosscut 30 ft. south of our north boundary; face in quartz of low assay value.

Consolidated California & Virginia.—In continuing the work of stoping in the ore body to the west and south and upward to the ninth floor—one floor above the sill floor of this level—we have extracted during the week 350 carloads of ore—about 317 tons—the average assay value of which, per mine car samples, was \$63.25 per ton. The stopes look well. On the 1,700 level—22 ft. below the south drift No. 3—the south drift has been extended 10 ft., in ore which will average \$70 per ton; total length of drift, 66 ft.; face in porphyry and quartz assaying \$30 per ton. **1,000 Level.**—The north drift from the crosscut run west from the bottom of the winze, down 28 ft., which was sunk on the east side of the main drift 280 ft. south from the shaft station, has been advanced to a total length of 50 ft.; continuing in a porphyry and quartz formation of a low assay value. The west crosscut started from the main drift, 345 ft. south from the shaft station, has been advanced to a total length of 230 ft.; continuing in porphyry and quartz. Have shipped to the Morgan mill during the week 103 tons and 130 lbs. of ore, the average assay value of which (per railroad car sample) was \$43.16 per ton. The average assay value (per battery sample) of all the ore worked at that mill during the week (362 tons, 810 lbs.) was \$55.86 per ton. Bullion shipped to the Carson Mint—assay value—\$86,029.46.

Justice.—The branch drift from the Justice drain tunnel was advanced 20 ft.; face continues in fair-grade ore. At a point 60 ft. back from the face of this drift we have commenced stoping upward, following the ore. During the week we have extracted 50 tons of ore. Average assay value, as per car samples, \$23 per ton, nearly all gold. Have shipped to the Dazet mill, at Silver City, about 100 tons of ore, which is now being worked.

Kentuck.—The winze started from the east crosscut, 1,100 level, is down 19 ft., and is in quartz showing bunches of pay ore. **1,200 Level.**—The north drift from the Jacket incline is now in 179 ft. and continues in low-grade ore.

Occidental.—From the several openings above the 400 level we extracted about 15 tons of ore of the average assay value of \$37 per ton. The west crosscut started near No. 3 upraise, on the 500 level, is now in 110 ft.; face in hard porphyry with seams of ore.

Potosi.—West crosscut No. 4, 450-ft. level has been advanced to a total length of 191 ft.; face is in quartz and porphyry of no practical value. The main north drift, 450-ft. level, was extended to a total length of 610 ft.; face in porphyry. Minor repairs on air connections are under way.

Savage.—On the 1,000 level in the north drift, started from the east drift, we continue to extract fair grade on the sill floor upward to the third floor. On the 1,050 level at a point 30 ft. north of the south boundary we have started a west crosscut and advanced 10 ft.; face in low-grade quartz. We have also completed a large working station at this level east of the shaft. On the 1,100 level the north lateral drift from the station was advanced to a total length of 907 ft.; face is in the same formation as last reported. The west crosscut started 20 ft. back from the face of this drift, was advanced 10 ft.; total length 57 ft.; face in porphyry and quartz. During the week we have hoisted 59 cars of ore from the 1,000 level. Car samples average \$21.35 per ton.

Segregated Belcher.—The mine continues to yield a small quantity of fair-grade ore from the 1,100 level, and the prospecting operations will soon be increased.

Union Shaft.—The Sierra Nevada north lateral drift from the west drift, 1,520 ft. west of shaft, 900 level, has been advanced to a total length of 647 ft.; face in hard porphyry. The Union Consolidated south lateral drift, from the west drift, 1,520 ft. west of shaft, 900 level, has been advanced to a total length of 310 ft.; face in porphyry.

West Consolidated Virginia & California.—During the past week we have been engaged in repairs at the station and the north drift. The west crosscut run from a point 320 ft. north of the 1,100 level station, has been extended 16 ft., and the material run through is of a favorable nature and is composed of quartz, lime and feldspar, some of which assayed in gold, per ton, \$276, and in silver \$2.50. The crosscut is now in a total distance of 1,146 ft. The face is in the same material as that above described.

White Pine County.

Belle Gold Mining and Milling Company, of Salt Lake City, has been incorporated with a capital of \$1,000,000, divided into 200,000 shares, at \$5 each. The incorporators are F. Rehrman, E. E. Howell, J. M. Howell, George Peal, W. W. Phillips, William Schade and James Donnelly, with William Schade

as president. The company will operate the Baby Ellen, Joe Dandy, Fanny, Rattle Snake and Splendid mining claims, situated in Osceola mining district.

OREGON.

Baker County.

Robbins-Elkhorn.—It is stated by the Baker City "Democrat" that the miners have struck for higher wages. Their demand has been refused and the mine closed until new men can be secured.

PENNSYLVANIA.

Anthracite Coal.

A dispatch from Tremont, in the western end of Schuylkill County, says that the Philadelphia and Reading Company has leased to Samuel A. Losch a tract of coal lands embracing 600 acres, between Rausch Creek and Lorberry, and including several first-class collieries. The coal mined on the tract is known as Lorberry, and is of superior quality.

Kuyle Bros., who some time ago received a contract to strip a large piece of coal land at Eckley for the Cross Creek Coal Company, began operations on September 8th. The stripping will give employment to about 300 men.

A. Pardee & Co.'s No. 6 colliery has been shut down for an indefinite period. The foreman and superintendent were transferred to other operations, and indications point to a long term of idleness at that plant.

An explosion of gas occurred on September 11th in the workings of the Centralia colliery, at Centralia, owned by Lewis A. Riley & Company. A number of men were entombed. Some lives were lost.

Lehigh & Wilkesbarre Coal Company.—This company will soon begin the construction of a large reservoir a mile west of Honey Brook. It will be built large enough to hold 2,000,000 galls. and will supply all the company's collieries.

Pennsylvania Coal Company.—A terrific explosion of gas occurred in No. 4 slope of the Pennsylvania Coal Company, at Pittston, on September 10th. There were 100 men at work in the colliery, but they all managed to escape to the surface with the exception of Superintendent Andrew Bryden, who was in the mine at the time on a tour of inspection. His body was badly burned.

Philadelphia & Reading Coal and Iron Company.—This company is about to erect a 9 x 38 pump on the grounds of the Anthracite Powder Company, which will be used to force the water up to the Keystone washery and the Potts colliery at Locust Dale.

SOUTH DAKOTA.

Clark County.

South Dakota Mining Company.—A strike of \$30 ore has been made on the Katie lode, one of the claims owned by the company. The shoot was uncovered a few feet beneath the surface and shows a 3-ft. breast. On the various claims in that vicinity, including the Gunnison group, the company is now working some 30 men. At Garden City development work is in progress, with Oscar Waller in charge.

LAWRENCE COUNTY.

Black Hills Gold & Silver Extraction, Mining and Milling Company.—This company will shut down the cyanide mill for a fortnight to make changes that will increase the capacity of the works, says the Deadwood "Times." Six new screens will be put in. The screw conveyors now in use for conveying the pulp from the rolls will be done away with, the pulverized ore falling direct from the rolls into a pit, and then elevated to the bins by the belt elevator furnished with 10-in. buckets. When these changes are made the plant will resume operations and be run to its full capacity.

TENNESSEE.

Campbell County.

Proctor Coal Company.—This mine is shipping its entire output to Northern markets. When the new line from Jellico to the Cincinnati Southern Railroad, near Burgin, is completed the district will have better facilities for reaching Louisville and Ohio River points.

UTAH.

Beaver County.

Copperopolis.—This company is busy getting ready for the suit with the Hercules Mining Company operating the Champlain and Phoenix, which will come up in the District Court on October 1st. The Copperopolis is only working 14 men and those mostly on development.

Eureka Hill.—This mine has started up again with a small force, and it is expected to be running full in a short time. The new mill was also put in fine working order. It will soon be in full operation.

Horn Silver Mining Company.—The second shipment of concentrates from this company's new plant at Frisco was received in Salt Lake City last week, and sent to the Germania smelter. The lot was made up of 75 tons of rich concentrates, and hereafter the company expects to ship such consignments about every other day.

Juab County.

Bullion-Beck and Champion Mining Company.—A shipment of 100 tons of Bullion-Beck ore was made from the sampler to the lead mill at Bingham on September 8th, and the ore will be treated this

week. This test is being made for the purpose of determining the character of mill the company should put up. The mine is producing over 60 tons daily.

MILLARD COUNTY.

The Blue Cap and Juniatt marble and onyx mines at Detroit, owned by R. A. McBride and C. Anderson, have been bonded for \$5,000 to Fred H. Brainard, of Fort Scott. The bond runs until April 1st, 1895. J. S. Giles and Joshua Greenwood have some very fine onyx claims adjoining this property.

Ibex.—Mr. John Williams, manager of the Ibex mine and smelter, has made arrangements for the construction of a railroad switch from the Union Pacific main line to the smelter at Leamington, says the Salt Lake "Tribune." Mr. Williams says the mine is making a good showing and the development tunnel is now in 210 ft. The company has erected a new boarding-house, superintendent's office and storehouse, and is making other substantial improvements.

SALT LAKE COUNTY.

Shipments of ore and bullion from Salt Lake City for the week ending September 1st were: Bullion, 599,944 lbs.; copper matte, 26,660 lbs.; silver and lead ores, 1,049,765 lbs.

The receipts of ore in Salt Lake City during the week ended September 8th were to the aggregate value of \$7,600; the shipments of bullion were to the value of \$44,031, with an additional shipment of \$8,800 in gold bars and \$17,500 in cyanide. These figures fall considerably below those of the preceding week.

The shipments of Pennsylvania bullion aggregated \$19,571; of Hanauer bullion, \$9,750; of Germania bullion, \$20,700.

SUMMIT COUNTY.

Daly Mining Company.—This company last week shipped 15 bars of bullion aggregating 18,500 oz. of fine silver.

Ontario Mining Company.—This company last week shipped 47 bars, 21,000 oz. of fine silver. As has been the case for some months the metal was shipped west. There now remains but 400 ft. of ground between the face of the Ontario drain tunnel and the workings of the mine, and according to the Salt Lake "Tribune," Superintendent Chambers says that the connection can be made during the early part of November, if not sooner. The ground at the face continues soft, but fair progress is being made, 70 ft. being made during the week. As the tunnel lengthens out and the face comes nearer the workings of the mine there is a perceptible decrease in the water in the shaft and the strokes of the Cornish pump are being shortened.

WASHINGTON.

Okanogan County.

Boundary Creek Mines.—H. C. Walters, president of the Spokane & Great Northern Mining Company, reports work on the mines as progressing satisfactorily.

Ora Mines.—Two shifts of men are at work in these mines, says the "Spokesman-Review." Bids have been solicited for a tunnel 1,000 ft. long to crosscut the ledge 600 ft. below the upper workings. The company hopes to have this completed by the 1st of January. Peter Berg, recently from Wisconsin, and now resident superintendent, opened up a 5-ft. vein of fine ore last Saturday, after drifting through 25 ft. of barren ground. He is pleased with the property and so reports to his Eastern associates, they having recently acquired a half interest with Judge Barney and other local mining men.

Stevens County.

Hunters Creek Region.—It is reported that the discoveries here are proving of more importance than was at first expected. The owners of the Cleveland mine have put a large force of men at work on the property, and will ship ore within the present month. They will send the ore overland in wagons by way of the new wagon road to Springdale, and thence to the smelter. Herbert Lang, the representative of the Selby Smelting and Lead Company, of San Francisco, one of the largest refining establishments on the coast, has made arrangements to take the present supply of ore from the Cleveland company. The ore is silver lead.

WEST VIRGINIA.

Mercer County.

The Flat-Top United Coke Company of Bramwell, W. Va., has been organized to handle the coke product of the Pocahontas field. Over 20 operators have already taken stock in the new company, and others have agreed to join. Many of the coke plants that are represented have contracts running into 1895, so that the business will start gradually. The general sales agent has not yet been appointed, but the company is prepared to fill orders for coke.

WYOMING.

The Rocky Mountain coal mines, belonging to the Southern Pacific, at Bed Canyon, after an enforced idleness of a few months, are being operated again, having commenced production a few days ago. The present output is fair, but the prospect is that in a very short time it will run up to about 600 tons of coal per day.

Carbon County.

Advices from Rawlins report considerable excitement over the recent discoveries in the Four Mile placer district on Snake River in the southern part

of Carbon County. A great deal of development work has been done there this season. Several Colorado and California parties have recently located claims there. The Gold Valley Company, an Aspen concern, will construct a ditch tapping Snake River near Dixon.

FOREIGN MINING NEWS.

AUSTRALIA.
New South Wales.

Broken Hills Proprietary Company, Limited.—The report of the directors of this company has been issued for the half year ending 31st May. Among other matters they report that the refinery works have been a great success. The saving which has been effected is not so apparent in the cost per ton of bullion treated, which has, however, been reduced by 2s. 9½d. per ton, for the reason that the whole of the bullion when produced is subjected to a preliminary metallurgical operation at the smelters, the result of which is to partially refine the greater portion of it. The balance, which then carries almost the whole of the impurities, is treated at the refinery, where the process is consequently a more lengthy and costly one; but this course is more economical than shipping the bullion direct to London in its original state. About 165 tons of antimonial metal—a valuable asset—has thus been saved, the greater part of which would otherwise have been lost. Work in connection with the extension of the refinery is now well in hand. The directors have completed the purchase of two additional blocks of 20 acres each, adjoining and parallel to the company's main leases on the west side, and known as the Underlay Blocks. The price paid was £100. The majority of these outside leases were secured for the purpose of increasing our water reserves, and are connected with the main leases by lines of pipes; the remainder, including the Brisbane Blocks and Underlay Blocks, in order to afford more space for the various plants, which it has been found necessary to remove, owing to the extension of the quarries, and rearrangement of other buildings, which were becoming cramped as originally constructed, thus hampering operations. The old concentration plant has been entirely demolished, and the new building, with the necessary machinery, including those parts which had to be renewed and obtained from abroad, is rapidly approaching completion, and a portion should be available and in full working order during the ensuing six months. It has been found necessary to make some important alterations in regard to the leaching plant, which are in course of being carried out. The general manager is at present engaged in formulating a scheme whereby the copper and lead matte, of which a considerable quantity is produced each half-year, may be successfully and economically treated. Several ore developments of importance have been met with, chiefly owing to the open cut proving the existence of bodies of rich ore which might never have been discovered had it not been for the removal of the outcrop. The result of these developments has been to make the weekly yields very irregular, which at times have increased abnormally. Shareholders should therefore not be alarmed when the yield falls below the general average, as it is impossible in the management of a mine of such magnitude to maintain uniformity in the weekly output, if actual yields are to be reported, without incurring considerable expense in handling the ore. The open cut now practically extends from one end of the mine to the other, and although considerable benefits have already been obtained from the new system, yet so far these have not been appreciable to the fullest extent. A large amount of dead work has had of necessity to be undertaken, so that the quarries may be opened systematically and in such shape as to admit of their being carried down to the depth it is proposed, viz., 300 ft. So far the greatest depth reached is about 100 ft., and not more than 30 ft. in some portions of the ground. The reserve fund, which was increased this half-year by the addition of £15,000, now amounts to £125,000, at which it now stands, and although shareholders authorized the Board to build this reserve up to £250,000, yet, owing to the exceedingly low market value of the company's commodities, they have decided for the present to delay increasing it further, pending developments as to the future of silver. The liquid assets of the company, less outstanding liabilities, amounted to a net sum of £485,535 4s. 1d. The net profit for the half-year amounts to £397,378, out of which sum £288,000 has been paid in dividends, £24,000 as a bonus, and £15,000 carried to the reserve fund. The loss through the fall in the price of silver has been considerable, but by the exercise of close and careful supervision expenses have been kept down to the lowest point. The cost of production per ton of ore treated for the half-year has been £2 12s. 6d.

BRITISH COLUMBIA.

Cariboo Mine.—This property on Rock Creek, belonging to Monaghan, King & Smith, of Spokane, Hayden Lake and Portland, recently shipped to Spokane a 254-oz. gold brick assaying \$13.50 per oz. It contains some silver.

Trail Creek District.

Le Roi.—This mine at Trail Creek is working vigorously, says the "Spokesman-Review." It has a 10-drill air compressor now on the way from the east. Thirty men are employed continuously, and

the ore is being taken out as rapidly as the teams can haul it to the landing. Three carloads a week are being shipped. The mine is now down 300 ft., and from that level drifting is being done.

BRITISH GUIANA.

The returns of gold entered at the office of the department of mines, Demerara, for the week ending August 11th amounted to 1,814 oz., on which the royalties paid were \$1,632. For the preceding week the returns were 2,576 oz., and the royalties \$2,318. By the steamship "Solent," which sailed on August 9th, there was shipped 5,044 oz., valued at \$90,022; for the year up to that date, the total output amounts to 68,014 oz., valued at \$1,193,356.

MEXICO.

Prior to the going into effect of the new Tariff Bill, it is said that in the Mexican Central Railway yards in Ciudad Juarez, Mexico, there were more than 300 cars loaded with silver lead ores waiting for shipment to the States.

LATE NEWS.

A press dispatch from Pana, Ill., says there is some talk of a strike among the miners of that section.

Royal Gold and Silver Mining Company, of Granite County, Montana, shipped 200 tons of concentrates to the East Helena smelter last week, which are reported to have assayed \$90 in gold and \$10 in silver to the ton. This is the saving effected by the Frue vanners in a nine months' run.

The Madison Car Works, of St. Louis, Mo., after being idle since July 1, 1893, when the company made an assignment, have reorganized, with L. M. Rumsey as president, and resumed operations. Nearly 600 men are employed, and when the works are running to their full capacity 1,000 men will be given work.

Franklin Institute.—A stated meeting will be held on Wednesday, September 19th, at 8 p. m., at which Mr. Alfred Goldstein will read a paper on "A Standard System of Automatic Fire Alarm Protection." A series of photographs of the recently completed Tower Bridge, at London, and some notable examples of aluminum castings made by W. S. Cooper, and other matters of interest will be presented.

Again the ocean record has been broken by the steamship "Lucania," which made the trip from New York to Queenstown in five days eight hours and thirty-eight minutes. This is the same time in which her best westward run has been made, though on this trip she covered 23 miles more. The "Lucania" now holds the record for the quickest eastward and westward trips, the highest average hourly speed record, 21.89 knots made last June, and the longest days' run, 500 knots, made in October, 1893.

The Anaconda "Standard" says B. M. Stivers, of New York; Prof. A. Potter and John Boyle, of St. Louis, are examining the Gilt Edge mine, Fergus County, Mont. This property was sold on September 7th for claims held by the Montana Hardware Company, the Power Mercantile Company and Geo. T. Chambers & Co., which had been assigned to Austin W. Warr. The claims amounted to about \$10,000. The property sold for \$11,250. It is understood that a new company, consisting of Messrs. Donovan, Mosherer, Provand and others, of Anaconda, will be organized and improvements added to the mill.

The iron ore business of Lake Superior mines for the season to date has been as follows: Gogebic range, 1,230,000 gross tons; Mesabi, 1,000,000 tons; Vermilion, 800,000 tons; Marquette and Menominee, 1,810,000; total, 4,930,000 gross tons, against a total season's business for 1893 of 5,860,000 tons, water shipments. One ore road, the Duluth & Iron Range, last month handled 204,000 gross tons, and 999,000 tons in the season to September 1st. The Great Chapin mine, on the Menominee range, at one time the leading producer in the entire region, is to be sold under mortgage foreclosure next month, on a debt aggregating about \$750,000, the stockholders not being able to work it at a profit.

The following are given as the shipments of phosphate rock from Punta Gorda, Florida, during the month of August: August 2d, Comer, Hull & Co., 1,813 tons for Glasgow; August 9th, Pease River Phosphate Company, 3,150 tons for Hamburg; August 10th, Comer, Hull & Co., 2,550 tons for Bristol; August 11th, Comer, Hull & Co., 3,000 tons for King's Lynn; August 22d, Florida Consolidated Phosphate Company, 960 tons for New Orleans; Pease River Phosphate Company, 2,250 tons for Felixstowe; August 26th, Pease River Phosphate Company, 950 tons for New York; Comer, Hull & Co., 2,250 tons for Gorston; total, domestic, 1,910 tons; foreign, 15,313 tons; grand total, 17,223 tons.

The scale of wages under which the miners of Basin, Montana, have been working ever since mining became an industry in that district, says the Butte "Inter-Mountain," has not been up to the union rate as paid in Butte. They have received

\$3.50 per day, but the carmen and shovelers got less, and on night shift they worked full ten hours, with no eight-hour shift on Saturday nights. After some little discussion by the union, it was decided to make a demand for a raise, which was done last week, and after several meetings, in which the directors of the Hope figured prominently, it was agreed that the night shift, after September 1st, would work but nine hours and eight hours on Saturday nights, the day shift to continue working ten hours as usual for the seven days in a week, and all hands below are to receive the same wages of \$3.50 per day.

The "Inter-Mountain," Butte, Mont., gives the following notes concerning local mines: It is rumored that the Anaconda company will shortly resume operations on the J I C or Ground Squirrel mine, and that a three-compartment shaft will be developed between the J I C and the Monitor.

High Ore No. 2.—The High Ore No. 2 shaft is shut down pending the placing of a larger engine in position. This engine will have a capacity of 5,000 ft. and will be the largest hoisting engine in the world. The shaft has reached the 580-ft. mark, and the new machinery will be capable of developing it to the 1,200-ft. level, where it is expected the ledge will be cut.

The Lexington mill shut down on the 9th for an indefinite period, and it is possible that the mine will also close down shortly.

A rich strike was made recently in the Blue Jay mine, one of the Butte & Boston properties, located south of the Parrot. The strike was made at the 500-ft. level, and some rich ore is now being shipped to the smelter. It is understood that arrangements are being made for the erection of larger machinery and a shafthouse.

Some 400 men are employed at both shafts of the Mountain Consolidated. At the new shaft sinking only is in progress, the shaft now having attained a depth of 575 ft.

Thomas Starbird, of the Golden Sunlight group of mines at Whitehall, was in Butte recently and made a visit of inspection to the Corliss pump in the Leonard shaft, at Meaderville. It is said the Golden Sunlight Company will adopt this style of pump when development work justifies it.

A 75 x 50 shafthouse is rapidly nearing completion at the Gold Hill shaft, which has now attained a depth of 50 ft. Edwin Edwards, of Burlington, is now foreman of the property, Mr. Shovel having resigned to accept a position at the Alice.

The Saturday night at Basin has recently been bonded to a party of Butte men, says the Basin "Times." A two-compartment shaft will be developed, and it is possible that the much talked of Cataract road will be built as far as that property this season.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 14.

Statement of shipments of anthracite coal (approximated) for week ending September 8th, 1894, compared with the corresponding period last year:

Regions:	Tons.	Tons.	Difference.
Wyoming region	352,578	403,504	Dec. 50,926
Lehigh region	115,224	131,179	Dec. 14,955
Schuylkill region	167,251	204,704	Dec. 37,453
Totals	635,053	739,387	Dec. 103,334

Totals for year to date. 26,735,644 28,463,007 Dec. 1,727,366

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending September 8th and year from January 1st:

Shipped East and North:	1894.		1893.	
	Week.	Year.	Week.	Year.
Phila. & Erie R. R.	893	50,515	883	58,883
Cumberland, Md.	80,607	1,875,736	80,607	2,807,599
Barclay, Pa.	†	14,625	†	37,314
Broad Top, Pa.	4,987	245,640	4,987	437,143
Clearfield, Pa.	81,504	1,694,774	81,504	2,721,104
Allegheny, Pa.	29,763	767,539	29,763	839,961
Beech Creek, Pa.	†	†	†	2,075,066
Pocahontas Flat Top.	†	2,199,297	†	1,894,378
Kanawha, W. Va.	†	1,650,021	†	2,243,898
Totals	197,794	8,408,147	197,794	13,065,346

† To September 1st.

† Returns not received.

Shipped West:	1894.		1893.	
	Week.	Year.	Week.	Year.
Pittsburg, Pa.	25,159	934,353	25,159	849,452
Westmoreland, Pa.	38,206	1,077,947	38,206	1,352,207
Monongahela, Pa.	15,576	478,290	15,576	479,206
Totals	79,301	2,441,139	79,301	2,660,865

Grand totals

Anthracite.

The present condition of the anthracite coal trade is far from encouraging. It is not that the market is any duller than it has been for the past month or six weeks, but that it has continued as dull as it was, and this prolonged period of inactivity has produced a more or less unsettled feeling which will be found somewhat difficult to overcome unless the producers reach some agreement to maintain prices better than they have been doing of late.

So far as the market itself is concerned we fail to note any difference from last week or from two or three weeks ago. There is no new business to report, and all rumors to the contrary notwithstanding, prices are no lower than they have been of late. As we have repeatedly pointed out in this column, the majority of the sales at extremely low figures, such as for instance \$3@3.15 for stove, have been of "stock" coal, which could have not been disposed of

save at these low prices. The people who circulate such reports unjustly neglect to qualify them by mentioning the grade of coal sold, and thus the impression gains ground that all coals are selling at such prices. The trade is in a bad enough condition without the necessity of further aggravating it by such needlessly pessimistic reports.

Freshly mined coal of good grades can not be bought at the figures given in one or two papers. To our own knowledge good stove coal has sold during the week for \$3.50. It is a difficult matter to quote prices which shall fairly represent the market, as in the absence of any business of consequence such a thing as actual prices is impossible to obtain. However, we should say that fair quotations, if anything rather low, would be to day: Stove, \$3.25@3.35; chestnut and egg, \$3.20@3.30; broken, \$3.15@3.25. The highest grades, of course, command higher prices, just as an odd cargo of rusty or slaty coal might sell for less.

During the past few days, excepting during the brief warm spell, retail dealers in this city have done a better business and their coal has moved more freely than for some time. They have not bought much coal, however, and this is encouraging to the producers, since by the depletion of stocks in dealers' yards and by the continuance of the policy of restriction better prices ought, in the natural order of things, to obtain a month hence. Certainly, no one expects that there will be a scarcity of coal at any time this year, but the sales agents are unanimous in declaring that we shall not be treated again to the stupid and demoralizing overproduction of June or even July.

On the other hand dealers and other consumers here seem to believe that any increase in the demand will be followed by a corresponding increase in the production, which will render impossible any great advance in prices, since all the producers will be eager to sell their coal to offset the period of depression through which we are passing. Therefore consumers affect to believe that there is no need to make haste in replenishing stocks which are not yet low enough to cause them any anxiety. The market of late has been all in the buyers' favor. Whether it will continue to be so much longer it is difficult to say.

There will be no semi-monthly meeting this month. Sales agents say that they will restrict the output for September as agreed upon, and that there is no necessity for any meeting just now. The figures of product on printed at the head of this column will show that the restriction is being adhered to very well. The agents of all the important companies, without a single exception, are emphatic in their statements that it will continue throughout the present month; and there really seems to be no reason to doubt their assertion. They say that they will play a waiting game, and that when consumers are forced by the cold weather into purchasing coal they will find that they will have to pay higher prices. As to that, however, there is much to be said on both sides.

The Reading Railroad reports that its coal shipment (estimated) for last week, ending September 8th, was 200,000 tons, of which 19,000 tons were sent to Port Richmond, and 14,000 tons were sent to New York waters.

Bituminous.

The soft coal trade in the East is getting into a dull and lethargic condition. Consumers generally, whose stocks were depleted by the stoppage of shipments during the strike, are pretty well filled up now, and the trade for prompt shipments is dull. Whatever business is doing now is principally on old contracts and orders from regular customers; but these are not enough to keep all shippers active. A few orders are being shipped for winter stocks to shoal water points, but this part of the trade has hardly commenced as yet. Producers are now looking forward to the beginning of the regular fall trade shipments. Some of the lower grades of coal are competing for the little business that there is, but miners of the better grades are inclined to curtail production rather than to make lower figures in meeting these competitors. The production in all regions up to this time has been extremely heavy, some of the regions producing more than ever before. It is anticipated, as we have pointed out above, that this output will be reduced in the near future.

There is no change in prices to report. The occasional cutting by a few parties has not affected the general market. Prices are \$2.50 to \$3.00 alongside, New York harbor, according to grade.

The all-rail trade is in more or less the same condition as the tide water trade; that is, dull and heavy, with shipments being reduced. Transportation up to a few days ago was excellent, but there has lately been a slight delay in forwarding coal, and there are small blockades at some points along the main line roads, but it is thought that they are only temporary. The car supply is good. The roads, indeed, supply more than is really required by producers. There is still an embargo upon some points off the lines of the larger carriers.

In the vessel market there are generally large numbers of vessels at the point of discharge with cargoes of ice aboard on which the unloading is very slow, thus delaying their arrival at the shipping piers. Some shippers, however, have a great many vessels awaiting coal to arrive, but, altogether, they are scarce for immediate wants. There seems to be some delay in loading at the shipping ports from the fact that coal is being held back on the road by the slight blockades above referred to. We quote the following ocean freight rates from Philadelphia: To

Boston, Salem and Portland, 65@70c.; Providence, New Bedford, New Haven and the others sound ports, 60@65c.; Portsmouth, Bath, Gardiner and Bangor, 70@75c., and towage where usual; Wareham, 85c.; Newburyport, 75@80c.

Boston.

Sept. 13.

(From our Special Correspondent.)

There has been very little doing in anthracite coal in this market during the week. The key to the situation is the retail coal dealer, who it is well known is selling very little indeed. Until business improves with him and materially a continuation of this dullness can be expected.

Trade in bituminous has not improved during the week. Some few manufacturers are buying, but so many are shut down that trade is very dull. The same prices are quoted on coal delivered on board as reported last week: Cumberland, \$3.25; Pocahontas and New River, \$3.20@3.25; and Clearfield, \$3@3.10.

Freight rates have not changed any during the week and are as follows: From New York, 40@45c.; from Philadelphia, 65c.; from Baltimore, 75c.; from Newport News and Norfolk, 70c. Rates to Sound ports are 5c. over these rates as vessels prefer coming here.

In a retail way business is only moderate. We quote: Stove, \$5.25; nut, \$5.25; egg, \$5; furnace, \$5; Franklin stove, \$7; Lehigh egg, \$5.25; Lehigh furnace, \$5.25; soft coal, \$3.50@3.75.

Buffalo.

Sept. 13.

(From our Special Correspondent.)

No new features in the Buffalo trade in anthracite and bituminous coal, and quotations are unchanged. Lake freights on coal westward remain as per last week's figures, with no indications of an advance or increased movement. A couple of news items and the statistics for August are at your service.

Mr. Richard P. Jov, of Detroit, has written a warning letter relative to what he considers will be the effect on the level of the lakes when the water channel from Chicago to the Mississippi River is completed. He says "those possessed of common sense must see that unless there is some way to increase the inflow of water into the lakes, the level in time must be lowered."

The shipments of coal from this port westward by lake from September 2d to 8th both days inclusive aggregated only 55,050 net tons, distributed as follows: 16,650 tons to Chicago, 4,900 tons to Milwaukee, 12,700 tons to Duluth, 1,000 tons to Gladstone, 1,350 tons to Manitowoc, 2,000 tons to Superior, 400 tons to Marine City, 2,000 tons to Port Arthur, 450 tons to Saginaw, 1,000 tons to Kenosha, 300 tons to Kelly Island, 600 tons to Mackinaw, 7,000 tons to miscellaneous ports from Tonawanda, and 4,700 tons to Toledo. The rates of freight were 50c. to Chicago, Milwaukee, Sault Ste. Marie, Mackinaw and Manitowoc, 55c. to Kenosha and Racine, 30c. to Duluth and Gladstone, 35c. to Toledo, 40c. to Marine City, 35c. to Port Arthur, Saginaw and Kelly Island. Closing quiet and steady.

The deadlock between coal shippers and vessel men which has existed for many days at Cleveland has terminated, and the latter came off victorious. Fifty cents is the rate now being paid for carrying soft coal from upper Lake Erie ports to Duluth, Superior, Ashland, etc.

The following statistics were prepared by Mr. William Thurstone, secretary of the Merchants' Exchange, showing the coal trade of Buffalo thus far this year in comparison to preceding years. Railroad receipts and shipments of coal at Buffalo are not reported, by request. Receipts of coal by lake thus far this year, none. Shipments of coal westward by lake for the month of August, 253,988 net tons, as compared with 252,945 tons in 1893 and 247,562 tons in 1892; for the season to September 1st, 1,299,067 net tons, as compared with 1,440,074 tons in 1893 and 1,420,347 tons in 1892. The receipts of coal by canal for month of August, 11,102 net tons, as compared with 13,757 tons in 1893 and 6,145 tons in 1892; receipts for season up to September 1st, 16,186 net tons, as compared with 39,429 tons in 1893 and 11,436 tons in 1892. The shipment by canal for month of August, 3,011 net tons, as compared with 2,285 tons in 1893 and 3,545 tons in 1892; shipments for season up to September 1st, 5,413 net tons as compared with 12,024 tons in 1893 and 18,764 tons in 1892. The aggregate shipments of coal by lake thus far this season show a decrease of 141,007 net tons as compared with 1893, and a decrease of 121,280 net tons as compared with 1892. The rates of freight during the month of August from Buffalo were as follows to places named: 45@50c. to Chicago and Milwaukee, 50c. to Racine and Green Bay, 30c. to Duluth and Lake Superior ports, 25c. to Toledo and Detroit and 35c. to Saginaw and Bay City. A year since the rates for August were 50@30c. to Chicago, 45@30c. to Milwaukee, 30@20c. to Duluth and Lake Superior ports, 40@30c. to Green Bay, 30c. to Toledo, 30@25c. to Detroit, 50c. to Racine, 40c. to Saginaw and 35@30c. to Bay City. The distribution of the coal shipped thus far this season to September 1st was, to the following places: 551,177 tons to Chicago, 320,244 tons to Milwaukee, 13,450 tons to Marquette, 18,480 tons to Manitowoc, 3,600 tons to Sault Ste. Marie, 950 tons to Alpena, 300 tons to Benton Harbor, 2,810 tons to Lake Linden, 107,989 tons to Duluth, 2,700 tons to Kenosha, 1,450 tons to Washburn, 600 tons to Sand Beach, 3,950 tons to Ashland, 109,304 tons to West Superior, 31,835 tons to Green Bay, 900 tons to Manistique, 1,300 tons to Kincardine, 1,150 tons to Ludington, 400 tons

to St. Ignace, 14,000 tons to Gladstone, 6,526 tons to Detroit, 3,490 tons to Sheboygan, 2,190 tons to Cheboygan, 1,300 tons to Muskegon, 58,410 tons to Toledo, 13,609 tons to Bay City, 1,275 tons to Grand Haven, 650 tons to Owen Sound, 60 tons to Traverse City, 16,770 tons to Racine, 8,905 tons to Hancock, 1,300 to Houghton, 17,150 tons to miscellaneous ports not reported in detail, 12,605 tons to Saginaw, 5,016 tons to Fort William, 1,650 tons to St. Clair, 700 tons to Sarnia, 8,590 tons to Pt. Huron, 1,407 tons to Windsor, 1,290 tons to Hamilton and 650 tons to Michigan City. Total for the season, 1,299,067 net tons.

Chicago.

Sept. 12.

(From our Special Correspondent.)

There is yet no increased demand for either hard or soft coal in Chicago. The past week has been an unusually wet one, and this fact may have had a tendency to hinder buyers from purchasing. There are great quantities of coal in and about Chicago and large amounts are coming in each day via water and rail. Retailers, who are usually at this time of the year large buyers, are taking little and yet their stocks are, as a rule, very low in proportion to a good business year. Manufacturers are following the hand-to-mouth policy, appearing thereby to be placing as little money into coal supplies as the present time as can possibly be done. Very few of the larger manufacturing concerns have laid in any great supply of coal and the conditions point toward this hand-to-mouth consumption the remainder of the season. That expectations have not been realized is shown by the heavy shipments of coal to Chicago by the lakes. The tonnage for August via the lakes has equaled, if not surpassed, August of last year; but this coal finds a poor market. The unusually low rates for shipping coal by water have undoubtedly been the reason for so large quantities being sent in, but without even a fair demand it seems strange the coal continues to come forward in such heavy shipments. Prices in both hard and soft coal are yet at outs.

Prices on anthracite coal are for grate \$5.25; egg, stove and chestnut, \$5.50.

For bituminous prices are, f. o. b. Chicago: Youghiogheny, \$3.15; Raymond, \$3.50; India Block, \$2.5; hawnee, \$2.90; Pocahontas, \$3.75; Blossburg, \$3.90; New Kentucky, \$2.75.

Coke.—Connellsville coke is gaining each day in tonnage to Chicago, but West Virginia and Kentucky yet supply the main demand.

Price of Connellsville is \$5 per ton and that of West Virginia and Kentucky \$3.50@4.

Pittsburg.

Sept. 14.

(From our Special Correspondent.)

Coal.—The demand is improving slowly; prices show no quotable change. The stock of coal loaded is large; all that is required to send out a "big run" of coal is a good stage of water. The shipment by water was as follows: For Cincinnati, 3,442,000 bushels; for Louisville, 6,888,000 bushels; total, 9,330,000 bushels. Fortunately the lower markets were well stocked. The present low water has extended over a period of six months, which is something that, fortunately, doesn't occur very often. At this writing there is no prospect of a rise. Most of the river and railroad mines are in operation. Pittsburg coal is selling at Louisville \$3 per ton, stock light; at Cincinnati the price is \$2.75 per ton.

Connellsville Coke.—Trade continues active, coke plenty; shipments the largest for a long time. The coke strike has ceased to be a factor in the trade; the result was that 22 furnaces are in blast in the Shenango and Making regions, where a short time ago they were all idle. The enterprise of coke producers is undeniable. When water became scarce the question was, What will the coke men do? They will have to shut down. Not so, the trouble was largely overcome by the coke men putting down artesian wells and a supply of water was the result. Cars are becoming scarce and a sufficient number was difficult to obtain. The demand for coke is on the increase, week's operations estimated production, 132,000 tons, against 126,000 tons the preceding week. Shipments to Pittsburg, 1,741 cars; East, 1,365 cars; to points West, 3,510 cars; total, 6,616 cars. Prices are so uncertain that quotations have no value; for instance, the circular quotes furnace coke atovens, \$1; foundry, \$1.15; crushed, \$1.40. Furnace coke for immediate delivery commands \$1.10@1.60; no furnace coke is being sold in open market under \$1.50@1.60.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 14, 1894.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From		From	
	Sept. 15, 1893.	Sept. 14, 1894.	Jan., '93.	Jan., '94.	Jan., '93.	Jan., '94.
	F'ces	Tons.	F'ces.	Tons.	Tons.	Tons.
Anthracite.	43	20,382	36	19,548	1,128,524	583,843
Coke.....	54	57,076	111	125,365	4,446,295	3,183,569
Charcoal...	28	5,993	22	4,942	313,506	117,121
Totals....	125	83,457	169	149,855	5,888,325	3,914,533

Pig Iron.—We must continue to report an iron market unchanged as to general features. There has been no appreciable increase in the demand from consumers in this vicinity, who are still buying only about a month's supplies at a time. From other centers our reports are to the effect that the marked increase in the production has had a more

or less depressing effect upon prices, which are now slightly weaker. In this market, however, we fail to observe any change one way or another upon values; they remain as they have ruled for the past few weeks.

There are certainly signs of returning business activity which cannot fail to have a beneficial effect on the iron as on other markets. The increase in production may render unlikely any advance in prices for some time to come, but there is little reason to believe that we shall experience any considerable decline. The improvement which has been to anxiously hoped for, will be gradual, but perhaps the very slowness with which it comes will lend an element of stability to the market in that it will be free from sudden reactions.

The uncertainty which has prevailed of late months in regards to freight rates from the South has been increased by the announcement that on and after October 1st the rail and water rate from Birmingham will be \$4 instead of \$3.50, as at present. Rates have been changed several times this summer; in one instance they were changed within four days of a previous announcement. It remains to be seen whether the Southern railroads will benefit by this latest move, which will handicap the Southern furnaces in their competition with well-equipped modern Eastern furnaces. Southern furnace agents here have been notified not to accept any contracts for orders to be shipped after October 1st, unless special arrangements are made. There is an abundance of iron of all grades, but the instability of freight rates brings about an uncertainty as to prices which precludes heavy business. Quotations at tidewater are as follows: Northern brands, No. 1, \$12.25@13; No. 2, \$11.25@12.50; gray forge, \$10.25@11. Southern irons, No. 1, \$11.75@12.50; No. 2, \$10.75@11.50; No. 1 soft F., \$10.75@11.50; No. 2 soft F., \$10.25@11.25.

Billets and Rods.—Buyers continue to regard the current price of \$19 for billets as being too high and they are still refraining from buying unless absolutely forced to do so. Quotations remain nominal: Domestic billets, \$19@20; wire rods, domestic, \$27@27.50; foreign rods, \$39@40.

Manufactured Iron and Steel.—A few small orders have been placed during the past week, but the volume of business is still smaller than was hoped for. There are practically no changes in prices, and we quote this week: Angles, 1'30@1'40c.; axles, scrap, 1'40@1'60c.; delivered; steel, 1'40@1'55c.; bars, common, 1'15@1'30c.; refined, 1'25@1'40c.; on dock; beams, up to 15 in., 1'40@1'50c.; channels, 1'40@1'50c.; on dock; steel hoops, 1'45@1'60c.; delivered; links and pins, 1'40@1'65c.; plates, flange, 1'60c.@1'80c.; fire-box, 1'80@2'10c.; marine, 2'45@2'70c.; sheared, 1'80c.; shell, 1'40@1'60c.; tank, 1'30@1'40c.; universal mill, 1'25@1'40c.; tees, 1'50@1'60c., all on dock.

Merchant Steel.—There has been an encouraging improvement in the merchant steel market. Orders are more plentiful and the demand is increasing. There is not much change in prices. We quote this week: Tool steel, 5'55@6'25c.; tire steel, 1'50@1'60c.; toe calk, 1'70@1'90c.; Bessemer machinery, 1'25@1'50c.; open-hearth machinery, 1'85@2c.; open-hearth carriage spring, 1'70@1'90c.; crucible spring, 3'40@3'65c.

Old Material.—There is very little doing in this market. Quotations are nominally as follows: Old steel rails, \$9.75@10.00; old iron tees, \$10.50@11.50 per ton; New York rail road scrap, \$11.50@12 per ton delivered at mill, and yard scrap at \$10; wrought turnings, delivered at mill, \$8.50@9; No. 1 wrought scrap at \$9.50@10.50 from yard, and machinery cast scrap \$9@10; old wrought tubes and pipe, \$6.50@7; old car wheel, \$9.50@10.50 New York; cast borings, \$8@8.50 delivered at mill.

Rail Fastenings.—We do not hear of any business in rail fastenings. We quote this week: Fish and angle plates, 1'20@1'40c. at mill; spikes, 1'50@1'75c.; bolts and square nuts, 2@2.25c.; hexagonal nuts 2'10@2'30c., delivered.

Spiegeleisen and Ferromanganese.—This market is quiet. Prices are now: 20% spiegeleisen, \$20.5@21; and 80% ferromanganese, \$50.50@51.

Steel Rails.—There has been more business done in steel rails during the past week, owing to an increased demand for relaying purposes. A fair business has also been done in girder rails. Standard section remain nominally \$24 at the mill and \$24.80 at tidewater.

Tubes and Pipe.—There is nothing new to report in this market and there is no change in prices. Ruling discounts are: On 1 1/2 in., and smaller, 60, 10 and 5 for plain black pipe, and 50, 10 and 5 for galvanized; for 1 1/2 in. and larger, 70, 10 and 5 for black, and 60, 10 and 5 for galvanized.

Chicago. Sept. 12.
(From our Special Correspondent.)

The past week has not shown up so brightly as its predecessor; sales in all but a couple of lines having lessened slightly. The run of small orders keeps up fairly well, and there is no prospect of any heavy buying the remainder of this year. Most of the business obtained nowadays is done by good hard work on the part of solicitors. One firm remarked that for every ton of material it had sold during the past year its agents had covered a mile as the railways go. An illustration of the decreased business this year may be had from the fact that in August, 1892, the Illinois Steel Company's aggregate

sales of soft steel and rails footed up nearly 300,000 tons, some of the orders being for very large quantities; but since August 1st of this year to date the total sales of soft steel and rails have not exceeded 40,000 tons of each. In the 80,000 tons of material sold by this company since August 1st the largest single sale was one of 5,000 tons steel rails, and it may also be remarked that it took more orders to complete the 80,000 sales than it did to make the 300,000 in 1892.

Pig Iron.—The aggregate sales of pig iron for the week were slightly below previous one, though the volume of inquiries has increased materially, and which may lead to a larger business the coming weeks. The sales continue for quantities from carload to 500 tons, and the largest sale of the week was one of 600 tons Northern iron. There has been no change in prices, though one firm declares it is getting business at an advance of 25c. per ton. Southern iron sales continue limited, the demand being confined chiefly to sales of carload lots. In two years the sales of Southern iron in Chicago have fallen off fully 75%. To day the price of Northern iron is from 25 to 7c. less than the Southern, and with such odds against them the Southern furnaces will either have to abandon business here altogether or meet the Northern rate. Prices remain as last week, which are per gross ton f. o. b. Chicago: Lake Superior charcoal, \$14.25@14.75; Lake Superior coke No. 1, \$10.25@10.50; No. 2, \$10.00@10.25; No. 3, \$9.50@9.75; Jackson County silveries, \$11.50@15; Southern coke foundry No. 1, \$11.25@11.50; No. 2, \$11@11.25; No. 3, \$10.50@10.75; Southern coke, soft, No. 1, \$10.75@11; No. 2, \$10.50@10.75; Southern car-wheel iron, \$17.50@18; Southern silveries No. 1, \$11.50@12; No. 2, \$11.50@12; Tennessee charcoal No. 2, \$14@14.50; Bessemer, \$11.50; Ohio strong softeners, \$12.75@13.25.

Structural Material.—Business is mainly for bridge material, and is likely to be for some time yet. Quotations are f. o. b. Chicago: Angles, 1'45@1'50c.; tees, 1'50@1'60c.; universal plates, 1'50@1'55c.; beams and channels, 1'50@1'60c.

Plates.—Demand for plates about equals previous week. There is a good steady stream of orders and inquiries enough to bespeak a continued good business. Prices are: Flange steel, 1'65@1'75c.; fire-box steel, 3'50@4'50c.; tank steel, 1'40@1'50c.; boiler tubes, 70 to 75% discount.

Merchant Steel.—A fair business has been transacted, and a few good sized contracts have been placed. Quotations are, carload lots: Smooth finished machinery, 1'80@1'90c.; tire steel, 1'70@1'80c.; Bessemer bars, 1'45@1'55c.; toe calks, 2'05@2'15c.; crucible spring, 3'40@3'65c.; tool steel 6 1/2c. and upward; specials, 12@20c.

Galvanized Sheet Iron.—Business has been rather slow during the week, though inquiries are numerous. Prices remain, 75, 10 and 5% off for mill shipments.

Black Sheet Iron.—Business continues fair, though a slightly decreased demand is observed from previous week. Shipments are mostly from mill at 2 3/4 for No. 27.

Bar Iron.—Some good sized contracts have been closed and conditions look favorable for other large orders coming in soon. Sales of small quantities are numerous and inquiry is good. Quotations are for common iron 1'05@1'10c. and for steel 1'25@1'30c.

Billets.—The week past has doubtless furnished a greater tonnage of sales than any other for some time, yet the orders are for small lots, the largest not exceeding a few hundred tons. From August 1st to date the Illinois Steel Company has booked orders for 40,000 tons, and had it not been for the low price of billets it is asserted that not over half of that amount would have been secured. Apparently there is not much profit in billets at \$18, and it would seem as though the steel company is just taking the business to keep its mills running. Prices remain \$18@18.25.

Steel Rails.—A good week is noted in rails, the tonnage being rather beyond last. Sales continue for quantities from 100 to 2,000 tons. There has been a decided increase in the number of inquiries, which may result in some fine orders being booked soon. Quotations are, \$25@27.

Old Rails and Wheels.—Old iron rails have had a little more call, and wheels have had some inquiry. Old iron rails are selling at \$10.50; old steel rails, \$7.50@10, and wheels \$10.25@10.50.

Scrap.—A few small sales constitute the week's business. Quotations are: Forge \$8.50@9; cast iron borings, \$3.50@4; wrought iron turnings, \$4@4.50; axle turnings, \$6@6.50; mixed steel, \$5@5.50; tires, \$12.50@13; iron axles, \$13.

Pittsburg. Sept. 13.
(From our Special Correspondent.)

Raw Iron and Steel.—This is Grand Army week, the soldiers have possession of the town and business to a certain extent will be a secondary consideration. Business was moderate in volume and prices rather inclined to heaviness. Something of hesitation has developed in the iron and steel trade, and the tendency toward improvement is hardly as pronounced as it was a short time ago. Sharp competition for certain grades of iron and steel prevent the advance that was expected on the opening of the fall trade, and the volume of orders has not yet become large enough to give employment to the capacity for operation. In pig iron some reports of

cutting are current, but it does not appear to be anything more serious than the customary shading that is indulged in at all times. On the whole the trade is in much better condition than it was and the heavier consumption encourages producers to regard the future as one of promise. Nevertheless, while certain consumers are not disposed to take advantage of present low prices, keeping business within narrow limits and confining transactions to small and frequent sales, on the other hand there are certain parties who view the situation entirely different, and have about made up their minds that there is little prospect for lower prices, at least in the near future. Unless well authenticated reports fail there will be some liberal transactions in both iron and steel before September passes away. Time will decide which party's views were correct. Pig iron prices are about the same; certain leading descriptions are still scarce and command outside prices. Production is large and so is consumption; there are yet several large contracts of steel billets and Bessemer pig to be filled the next two months, beside the amount required to meet the current demands. Mahoning and Shenango Valley furnaces are producing a large amount of iron and steel; many are sold well ahead. Youngstown blast furnace owners and managers held a meeting Saturday afternoon, and reported, "While we would be very willing to advance wages if we could, there is absolutely nothing in the present situation that would warrant it."

COKE SMELTED LAKE AND NATIVE ORE.		1,000 Billets, late delivery, at mill....	
Tons.	Cash.	300 Billets, spot at mill.....	17.00
3,000 Bessemer, Sept., Oct.....	\$11.65		18.00
2,000 Bessemer, Sept., Oct.....	11.70	SKELP IRON.	
1,000 Bessemer, Sept., Oct.....	11.70	500 Sheared iron, 1'37 1/4 4 m	
1,000 Bessemer, Sept., Oct.....	11.60	450 Wide gr' ved. 1'25 4 m	
1,000 Bessemer, Sept., Oct.....	11.65	380 Nar. gr' ved. 1'25 4 m	
500 Bessemer, Sept., Oct.....	11.65	SKELP STEEL.	
500 Bessemer, Sept., Oct.....	11.70	700 Sheared iron, 1'27 1/4 4 m	
500 Bessemer, Sept., Oct.....	11.75	500 Nar' w gr' ved. 1'10 4 m.	
500 Gray Forge.....	10.00	350 Wide gr' ved. 1'10 4 m.	
500 Gray Forge, spot, City furnace.....	11.25	SPELTER.	
500 Bessemer, late delivery.....	11.50	150 Per 100 lbs.....	3.35
300 No. 1 Foundry.....	12.15	50 Per 100 lbs.....	3.36
300 No. 1 Foundry.....	12.20	50 Per 100 lbs.....	3.32
250 Bessemer.....	11.75	MUCK BAR.	
200 No. 2 Foundry.....	11.50	500 Neutral, Sept.....	19.35
100 No. 1 Silvery.....	14.00	200 " " " " " " " "	19.35
50 No. 2 Silvery.....	12.50	BLOOMS, BILLETS, BAR ENDS.	
50 No. 1 Foundry, all up.....	12.75	850 Billets, Bar, delivered.....	11.50
CHARCOAL.		STEEL WIRE RODS.	
100 Cold Blast.....	23.50	450 5-gauge American, at mill.....	24.50
100 Cold Blast.....	23.50	FERRO-MANGANESE.	
50 Warm Blast.....	16.50	200 80% delivered.....	51.60
50 No. 2 Foundry.....	16.50	STEEL SHEET BARS.	
50 Cold Blast.....	23.70	600 At mill.....	23.00
50 No. 2 Foundry.....	16.60	SCRAP MATERIAL.	
25 Extra Charcoal.....	28.00	300 No. 1 R. R. wrought scrap, net.....	10.2
BLOOMS, BILLETS AND SLABS.		200 Cast scrap, gross.....	8.75
Tons.	Cash.	100 Soft steel, net.....	9.5
3,000 Billets, Oct., Nov. at mill.....	\$17.50		
2,000 Billets, Sept. to Jan., at mill.....	17.00		
1,000 Billets, Oct. at mill.....	17.40		

Philadelphia. Sept. 14.
(From our Special Correspondent.)

Pig Iron.—The sudden expansion in the production of crude iron in two months from 85,000 tons per week to over 150,000 tons per week has had an unsettling effect on prices, especially among the few large buyers who are endeavoring to place contracts to run to the close of the year. A quiet assurance, it is said, has been received that Southern freight rates will be advanced enough to protect home furnaces. The chief dealings this week have been in forge at \$10.25, which is lower than some brands brought three weeks ago. No. 1 foundry is moderately active at \$12.50@13; No. 2, \$11.50; Bessemer, \$13.25.

Muck Bars.—Consumers are now satisfied that a little more delay will bring muck bars down to \$18.50, where they are ready to order freely.

Steel Billets.—The lowest prices made for October delivery, so far as heard, is \$19. This is \$1 more than Eastern consumers expect to pay for winter deliveries. Buyers will continue the same policy for the next few weeks and buy as little as possible. Prompt deliveries are quoted at \$19.50.

Merchant Iron.—We had a few weeks' activity and it is now followed by a lull. Manufacturers are scrambling for what little business is going. It looks to the trade as though the people at large were waiting to see the effect of the new duties. A car building order of 450 box cars has been given out at Lebanon, and there will be a scramble for that iron.

Nails.—The nail trade is fair and deliveries are made at \$1.

Skelp.—More skelp orders are coming in and manufacturers are in a very good frame of mind. Grooved, 1'25@1'30c.

Sheets.—This week's business has been poor up to today. Customers started in well last week, but after a few large orders were placed the demand fell off.

Merchant Steel.—The steelmakers are all doing a fair business in Eastern mills, because of the general resumption of shopwork.

Plate and Tank.—The plate mills are much better employed than would be inferred from shop reports at 1'35 for heavy plate to 1'60 for flange.

Structural Material.—To-day's reports are that the bulk of business is made up of small orders. The Pennsylvania Railroad Company will give out orders soon for material for a bridge on its P. W. & R. line.

Steel Rails.—Girder rail orders continue to come in freely. Repairing requirements are increasing. Standard sections, \$24.

Old Rails.—There has been a sudden increase of supply, but prices for iron do not recede from \$11.50 @ \$12.

Scrap.—Melting steel, \$10.50; machinery cast, \$10; old car wheels, \$10.

METAL MARKET.

NEW YORK, Friday Evening, Sept. 14, 1894.

Gold and Silver.

Prices of Silver per Ounce Troy.

September	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.	September	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.
8	4'85½				12	4'85½	29½	64½	4'96
10	4'85½	29½	64½	4'90	13	4'85½	29½	63¾	4'90
11	4'85½	29½	64½	4'97	14	4'85½	29½	64½	4'96

Gold and Silver Exports and Imports of the United States, at all Ports, for July, 1894, and for Seven Months to July 31st, 1894, 1893.

	Gold.		Silver.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
July	\$14,230,201	\$1,429,171	\$3,214,385	\$1,354,350	E \$14,661,065
1894	85,150,380	12,874,914	26,928,700	5,938,669	E 33,265,167
1893	73,892,150	17,709,656	24,577,065	10,590,189	E 70,169,870

The statement includes all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports at New York, Week Ending September 8th, 1894, and for Years from January 1st, 1894, 1893, 1892.

Week	Gold.		Silver.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1894	\$65,000	\$17,093	\$603,900	\$62,682	E \$589,125
1893	82,427,435	13,922,998	24,832,825	1,156,628	E 92,200,634
1892	69,335,316	55,977,782	23,126,779	1,805,504	E 31,688,302
1891	58,691,073	6,530,756	16,145,141	1,788,496	E 66,519,965

During the five days ending September 13th the imports and exports of gold and silver from the port of New York were as follows: Imports, gold, \$188,184; silver, \$16,628. Exports, gold, none; silver, \$423,401. Of the silver exported, \$61,250 was in Mexican coin, \$45,350 of which went to London, and \$15,900 to the West Indies; \$5,225 was in Peruvian coin, and went to South America. The remaining \$356,926 was in American coin and bullion, all of which went to London.

NOTES OF THE WEEK.

The statement of the United States Treasury on Thursday, September 13th, shows balances in excess of outstanding certificates as below, comparison being made with the corresponding day of last week:

	Sept. 6.	Sept. 13.	Changes.
Gold	\$55,887,847	\$56,528,479	L. \$640,632
Silver	18,690,524	14,900,279	D. 1,700,245
Legal tenders	24,107,829	23,647,508	D. 460,321
Treasury notes, etc.	28,830,540	29,570,158	L. 739,618

Total..... \$125,426,240 \$124,646,424 D. \$780,318
Government deposits with national banks on September 13th amounted to \$11,372,225, a decrease of \$412,590 during the week.

The exports of breadstuffs for August and the eight months ending August 31st show a sharp decline. The report just issued by the Chief of the Bureau of Statistics shows the following values:

	1893.	1894.
Breadstuffs		
August	\$22,640,348	\$10,851,336
Eight months ended Aug. 31.	129,361,102	85,348,714
Provisions		
August	15,472,359	15,920,185
Eight months ended Aug. 31.	103,198,509	122,737,409
Mineral oils		
August	4,084,215	3,665,011
Eight months ended Aug. 31.	27,099,461	25,618,520
Cotton		
August	3,482,200	3,239,149
Eleven months ended August.	190,784,140	208,116,771

It is estimated by bank officers that the net shipment of currency this week from New York to the interior was about \$1,000,000. The bulk of these remittances have gone to Chicago, the balance to New Orleans and other Southern points.

The Treasury's official "ten days" statement, issued September 11th, gives the custom receipts at

the port of New York for the first ten days in September at \$3,844,219 as against \$2,468,206 last September for the corresponding period, and \$2,589,399 for the first ten days of August of this year. The receipts of gold for customs at the port of New York, where two-thirds of the customs revenues of the United States are collected, continue so small that they cannot be computed, and are stated at 0%. Silver coin 0%; gold certificates, 0%; silver certificates, 23.4%; United States notes, 40.1%; and United States Treasury, 36.5%. The gain of \$1,000,000 by the Treasury in the last month has come almost entirely from the West, the reserve at the close of business on the 11th standing at \$56,104,000.

Advices from Scotland state that the strike of the coal miners has terminated in the men agreeing to return to work at their old wages. In the time the men were idle over 6,000,000 tons of coal would have been mined, and the wages each week would have amounted to about £90,000, a total of over £900,000 since the strike began. Nothing could more clearly emphasize the folly of the strike. The men have been living on contributions secured from various branches of the miners' union, and after all of their show of determination have come out with nothing more than they had before they went out.

The Bank of England reports increase in bullion for the week of £46,643. Proportion of reserve to liability is 70.51%, against 70.25 last week, and 52.56 a year ago. The statement's details were as follows, with changes for the week:

Total reserve	£31,120,000	I.	£236,000
Notes reserved	28,731,800	I.	178,000
Notes in circulation	25,530,000	D.	190,000
Public deposits	4,026,100	D.	412,000
Other deposits	39,947,800	I.	558,000
Government securities	11,539,000	D.	200,000
Other securities	19,632,100	I.	140,000

The bank's gold holdings now compare as follows with the same date one and two years ago:

	1894.	1893.	1892.
Gold	£39,890,521	£26,890,001	£27,779,493

The bank of France reports as follows:

	Francs.	Dec.	Francs.
Gold holdings	1,906,825,000	Dec.	525,000
Silver holdings	1,259,775,000	Dec.	5,300,000
Notes in circulation	3,366,841,700	Inc.	4,250,000
Bills discounted	375,400,000	Inc.	15,375,000
Treasury account	143,670,000	Inc.	1,850,000

The bank's sterling holdings of gold and silver at date make the following comparison:

	1894.	1893.	1892.
Gold	£76,230,850	£67,306,112	£96,939,000
Silver	50,395,400	50,827,733	51,644,000

The Egyptian Government has issued an invitation to architects of all countries to submit designs for a museum to cost \$300,000. The accepted design will receive a prize of \$3,000, and \$2,000 will be divided among the next four designs. Details can be secured from the Minister of Public Works at Cairo. This is a good chance for American architects, as the Khedive has expressed himself as anxious to have them compete, since he admires the boldness and beauty of their designs.

Exports of silver from London to the East for the year up to August 31st are given by Messrs. Pixley & Abell's circular as below:

	1893.	1894.	Changes.
India	£4,939,452	£3,791,015	D. £1,148,437
China	834,013	2,093,373	I. 1,259,360
The Straits	960,340	907,446	D. 52,894
Total	£6,733,805	£6,791,834	I. £58,029

Shipments for the week ending August 31st were £75,000 to Bombay, £27,500 to China, £25,000 to Japan, and £10,000 to Calcutta.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars	\$52½	\$52¾
Peruvian soles and Chilean pesos	51½	52½
Victoria sovereigns	4.86	4.89
Twenty francs	3.86	3.90
Twenty marks	4.76	4.83
Spanish 25 pesetas	4.78	4.83

Fine silver bullion here, 64½@65½; fine silver bullion, London, 29½d.

Other Metals.

Copper.—Owing to the general improvement in business at large and to a brisk demand for copper, of which but little is offered, the market has grown very much firmer, and now no Lake copper is to be had at below 9½, and very little at that, as some of the larger producers are either entirely out of the market or asking 9½c. Electrolytic copper must be quoted at 9½, and casting at from 9 to 9½.

If one is to judge from the amount of copper that is now available for early delivery the consumption of metal, and especially for wire making purposes, must have increased considerably of late.

Abroad, also, there has been an improvement as G. M. B's opened at £39 17s. 6s., and kept advancing all the week until, at the close, the highest figures, i. e. £40 17s. 6d. for spot and £41 5s. for three

months prompt, were recorded. The better demand for copper indicates a resumption of operations there, as well as here, and if the demand for American fine copper continues the home market must be benefited, especially as the persistent offering from certain quarters has ceased, at least at the extremely low prices recently named.

Exports of copper from Baltimore for the week ending September 13th are reported by our special correspondent as follows:

Rotterdam—Ohio	6,958 ingots	112,000 lbs.
"	105 cakes	22,352 "
Liverpool—Sedgemoor (in transit from Tampico, Mexico)	Copper ore	204,000 "

Other metals exported during the week were: 305 bundles tin scrap, 73,000 lbs., to Rotterdam.

Copper Exports.—The exports of copper from the port of New York during the week ending September 15th, as reported by the New York Metal Exchange, were as follows:

Rotterdam—Marsdam	Plates	130 tons
"	Pigs	175 "
"	Bars	30 "
"	Cakes	10 "
"	Ingots	15 "
Havre—La Normandie	Bars	8 "
"	Ingots	125 "
Russia—Galileo	Ingots	309 "
Bremen—Saale	Pigs	50 "
"	Ingots	35 "
Marseilles—Britannia	Ingots	3 "
London—Europe	Bars	100 "
"	Pigs	50 "
Hamburg—Amalfi	Ingots	100 "
Liverpool—Tauric	igs	150 "
"	Plates	23 "
Antwerp—Waesland	Ingots	100 "
Bremen—Elbe	Cakes	10 "
Rotterdam—Veendam	Ingots	100 "
"	Bars	110 "
"	Plates	14 "
Liverpool—Lucania	Pigs	125 "

Tin, on the spot, has been almost entirely lacking, and the price has consequently been run up very fast. As high as 16½c. has been paid, and this by dealers who, in turn, had to make their profit, while later deliveries were selling at almost half a cent a pound less. Even the receipt of nearly two hundred tons by one steamer did not afford sufficient relief, as all was wanted to fill old orders, so that the new ones are likely to cause a still greater advance. We have to quote spot at 16½, October at 16, and November at 15 95.

The London market has been advancing throughout the latter part of the week, although the tendency in the beginning was downward, and the close is at £72 for spot and £72 2s. 6d. for future.

Messrs. De Monchy & Havelaar's circular gives the following statement of the position of tin in Holland on August 31st: Supply for eight months, 9,773 tons; deliveries, eight months, 8,031 tons; stock in warehouse, 3,208 tons; stock afloat, 2,207 tons; unsold stock, 6,327 tons.

The exports of tin from Holland for the seven months ending July 31st were 6,669 tons, against 7,057 tons last year and 6,250 tons in 1892.

The British Board of Trade returns give the following statement for the seven months to July 31st: foreign tin imported, 21,572 tons; tin exported, 14,072, of which 3,445 tons were British and 10,627 tons foreign tin.

Lead.—The market for this article is very weak, indeed, and prices decline from day to day, and have now reached the low level of 3½ New York and 2'97½ St. Louis. Naturally, the decline does not cause consumers to anticipate their wants, which they may do now that such a very low price has been reached. The foreign markets are steady.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: "Lead dull at the late decline, spot lead continues rather scarce and worth from \$3 to \$3.05 per hundred pounds. October lead can be had in large quantities at 2'95c. Buyers are very apathetic and don't seem at all anxious to anticipate their wants for future requirements."

Quicksilver.—Quotations remain at \$36 for New York and \$6 9s. @ £6 10s. for London.

Spelter has undergone no change during the past week. The price remains \$3.45 in New York.

Antimony is in fairly good demand at 7½c. for Hallett's, 8½c. for L. X., and 9½c. for Cookson's. Abroad, good ordinaries are quoted at £15 7s. 6d., and specials at £15 12s. 6d.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Sept. 14.

Heavy Chemicals.—There has been a marked improvement in the inquiry for most of the heavy chemicals during the past week, brought about both by the reduction of prices incident to the new tariff laws, and also by the starting up of more glass works. Caustic soda has been in better demand at the reduced prices. For carbonated soda ash and alkali there has also been more inquiry, and several sales are reported, both for immediate and for future delivery. A better business is doing in sal soda at unchanged prices. Bleaching powder remains quiet. Foreign caustic is now quoted as follows: 60%, 2½@2¼c.; 70%, 2½@2¼c.; 74%, 2'15@2'27½c.; 76%, 2'35@2'60c. The Solvay Process Company has also reduced prices and now quotes: 60%, 2'20@2'25c.; 70%, 2'15@2'20c.; 74%, 2'20@2'25c. There has been a better inquiry for both carbonated soda ash and alkali. Bleaching powder

continues quiet. Quotations are as follows: Carbonated soda ash, 90@1c.; Alkali, 90@97½c.; bleaching powder, 1½@1¼c.

Acids.—A slightly better business is reported in the acid market, the jobbing demand having increased somewhat. Prices, however, show no change of importance, and we quote this week: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more; Acetic, in barrels, \$1.40@1.60; muriatic, 18°, 80c.@1; 20°, 90c.@1.10; 22°, \$1@1.25; nitric, 40°, \$4; 42°, \$4.50@4.75; sulphuric, 75c.@1; chamber acid, \$6 per ton. Mixed acids according to mixture, oxalic, \$6.50@7.50 per 100 lbs. Blue vitriol is quoted at \$3.50@3.62½; glycerine for nitroglycerine, 11½@12½c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone continues very quiet. Quotations are: Best un-mixed seconds on the spot, \$17; best thirds, \$1 less. Future shipments, \$16 for seconds and \$1 less for thirds.

Fertilizing Chemicals.—There is no change to report in this market. Buyers, owing to the higher prices for the ammoniates, are holding off and are not buying as much as was expected. Prices show but little change this week and we quote: Sulphate of ammonia gas liquor \$3.75, and \$3.45 for bone. Dried blood, \$2.40 per unit for high grade and \$2.25@2.35 for low grade. Azotine, \$2.25@2.30. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 60c. per unit at seller's works in bulk. Dissolved boneblack, 17% to 18% P₂O₅, 90c. per unit. Acidulated fish scrap, \$15@16, and dried scrap nominally \$25 f. o. b. fish factory. Tankage, high grade, \$23@24; low grade, \$21.50@22. Bone tankage, \$23.50@24; bone meal, \$24@25.50.

In lots of 50 tons on contracts we quote: Double manure salts, 48-53% (basis of 48%); New York and Boston, \$1.12; Philadelphia, \$1.14½; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.17. High grade manure salts, 90-95% and 96-99% (basis 90%), respectively: New York and Boston, \$2.07@2.11; Philadelphia, \$2.09½@2.13½. Charleston, Savannah, Wilmington, N. C., and New Orleans, \$2.12@2.16.

Phosphate Rock.—Quotations at Charleston, S. C., are: \$4@4.25 for standard land, kiln dried rock; ground rock, in buyer's bags \$5.50@5.60, in seller's bags \$1 higher. Acid phosphate remains at \$6.25@6.50.

A meeting of the stockholders of the Chicora Fertilizer Company was held this week in Charleston, S. C. The Atlantic Phosphate Works, which were recently bought by Mr. George A. Wagener, the general manager of the Chicora, were turned over to the company, and will be run in conjunction with its other works under the same management. The works are now being put in thorough order and the acid chambers rebuilt. The brands of this plant will be for sale in the coming season. At the meeting the capital stock was increased \$200,000, making the capital \$500,000. All of the new stock was subscribed for by the present stockholders in the company.

Muriate of Potash.—In lots of 50 tons, quotations are as follows: 80-85% and minimum 95% (basis 80%), respectively: New York and Boston, \$1.78@1.91; Philadelphia, \$1.80½@1.83½; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.83½@1.86.

Kainit.—Prices for kainit (minimum 23%) in cargo lots for 1894 delivery are as follows for invoice and actual weights respectively: New York, Boston and Philadelphia, \$9@9.25; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$9.75@10. For sylvinit, 27-35%, prices are as follows, per cent. per gross ton, invoice weight: New York, Boston and Philadelphia, 37½c.; Charleston, Savannah, Wilmington, N. C., and New Orleans, 41c. Actual weight, 1c. more per cent.

Nitrate of Soda.—This market continues quiet. Spot quotations are: \$2.15@2.17½.

LIVERPOOL.

Sept. 5.

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

A better inquiry is reported for chemicals for delivery over 1895, but on the spot there is not much going on, although at the same time there is a slight improvement in the demand for prompt shipment. Soda ash quiet for Leblanc makes, and nearest spot range of values is about as follows: Caustic ash, 48%, £3 15s.@£4 per ton; 57 and 58%, £4 10s.@£4 15s. per ton. Carb. Ash, 48%, £3 5s.@£3 15s. per ton; 58%, £3 15s.@£4, per ton, net cash. Ammonia Ash, 58%, is more inquired for and steady at £3 10s.@£3 12s. 6d. per ton, net cash, for tierces, and 5s. less for bags. Soda crystals are dull and easier at £2 10s.@£2 12s. 6d. per ton, less 5%. Caustic Soda is lower for some markets, and rather more doing at the reduction. Quotations vary considerably according to export market, and range is about as follows: 60%, £3 15s.@£7 15s. per ton; 70%, £7 15s.@£8 15s. per ton; 74%, £8 15s.@£9 15s. per ton; 76%, £9 15s.@£10 15s. per ton, net cash. For parcels under 10 tons 5s. per ton extra is charged.

Bleaching Powder is in moderate request, quotations varying according to export market from £7 5s. to £8 per ton, net cash, for hardwood packages. Chlorate of Potash flat, and spot quotations are quite nominal at about 6d.@6½d. per lb. Bicarb. Soda is rather quiet, but prices remain firm at £6 15s. per ton, less 2½% for 1 cwt. kegs, with usual allowances for larger packages. Sulphate of Ammonia

dull at £13 17s. 6d.@£14 2s. 6d. per ton, less 2½% for good gray 24 to 25%, in double bags f. o. b. here, according to quality. Nitrate of Soda inactive but steady at £9 5s.@£9 7s. 6d. per ton, less 2½% for double bags f. o. b. here, as to quality. Carb. Ammonia: Lump, 3¼d. per lb.; powdered, 4d. per lb., less 2½%.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburgh, St. Louis, London and Paris, see pages 262 and 264.]

NEW YORK, Friday Evening, Sept. 14.

The mining stock market during the past week has been even duller than usual, and to those who have followed our weekly reports during the past year this statement will make clear how very dull it must have been. Total sales for the week amounted to only 3,400 shares. The trading was entirely lacking in features of interest, having been confined chiefly to the usual small sales of Comstocks. There is no demand for any particular stock, and the public apparently is oblivious of the existence of a mining stock market in this city.

The Comstocks have been very quiet during the past two days, most of the sales having taken place during the early part of the week. Consolidated California & Virginia shows the heaviest transactions, 600 shares having been sold at \$4.20@4.45. Gould & Curry was traded in to the extent of 400 shares at 65@85c. Yellow Jacket opened at 70c., advanced to 80c. and declined to 73c.; only 300 shares changed hands during the week at these prices. Of Sierra Nevada, 200 shares were sold at \$1.25@1.45. Other sales were, 100 shares of Mexican at \$1.25; 500 shares of Union Consolidated at 70@80c.; 400 shares of Utah at 11c., and 100 shares of Hale & Norcross at 50c.

The California stocks have been neglected during the week. Of the Bodie group, Bodie Consolidated shows a sale of 100 shares and Bulwer one of 200 shares at 19c.

Of the Colorado stocks the only one to show any sales this week is Little Chief, of which 500 shares changed hands at 15c. The following mining companies report having had balances on hand September 1st: Alpha Consolidated, \$5,031; Alta, \$1,061; Andes, \$16,228; Belcher, \$4,700; Best & Belcher, \$13,400; Bodie Consolidated, \$28,898; Bulwer Consolidated, \$5,124; Church, \$24,957; Caledonia, \$5,994; Challenge Consolidated, \$1,066; Chollar, \$1,059; Consolidated California & Virginia, \$93,142 in cash, and bullion valued at \$23,600, with further shipments to arrive; Consolidated New York, \$2,859; Crown Point, \$9,356; Exchequer, \$3,637; East Sierra Nevada, \$1,156; Gould & Curry, \$13,978; Hale & Norcross, \$18,788; Julia Consolidated, \$608; Justice, \$36; Kentucky Consolidated, \$1,718; Lady Washington, \$16; Mexican, \$16,942; Mono, \$1,677; Nevada Queen, \$658; Ophir, \$4,670; Overman, \$7,947; Occidental Consolidated, \$533; Savage, \$15,195; Seg. Belcher, \$7,939; Sierra Nevada, \$22,844; Silver Hill, \$205; Standard Consolidated, \$28,974 in cash and \$15,503 in unsold bullion; Syndicate, \$901; Scorpion, \$314; Union Consolidated, \$12,332; Utah Consolidated, \$638.

The following mining companies report having had an indebtedness September 1st: Belle Isle, \$1,268; Commonwealth, \$18,232; Grand Prize, \$588; North Belle Isle, \$2,037; North Commonwealth, \$2,352; Potosi, \$192.

The new Mining Exchange, at Colorado Springs, Colo., was opened on September 4th. Thirteen stocks are thus far listed. Sales were light. R. J. Bolles, the president, made a speech calling the attention of the members to the rules adopted for their government, and invited a general discussion of the articles and explained various matters as they were called up by the members on points of information.

BOSTON.

Sept. 13.

(From our Special Correspondent.)

The market this week has been largely confined to the Montana stocks, which have shown considerable strength and an advance in prices. Boston & Montana after selling at \$26½ in the early dealings advanced to \$28½, with later sales at \$28½. Butte & Boston, while quite strong, did not show much advance; the reason for this is found in the report that the holdings of the Davis estate, about 90,000 shares, would be distributed in a few weeks to the parties now owning them, and the fear that they might be thrown upon the market. The stock declined early in the week to \$9½, but rallied later to \$10½@11½. The improvement in the metal market the past few days has imparted a more hopeful feeling among holders of the copper shares and an advance in the whole market is confidently predicted.

The Lake Superior stocks have ruled unusually dull and transactions very light. Not a share of Calumet & Hecla was marketed this week; \$290 is bid and \$295 asked for it. There were a few transactions in Tamarack, which advanced from \$160 to \$162, and was in demand at the latter price.

Quincy was also in demand at \$90, at which price all the sales were made.

The script sold at \$30@35 in moderate amounts. Osceola sold at \$23½ for 50 shares early in the week, but later declined to \$23 for 25 shares, which comprise all the dealings.

Kearsarge advanced from \$6 to \$6½ for a single 100 shares, and was offered at \$7.

Franklin sold at \$10 for 100 shares, later declined to \$9½ for 50 shares, with sales of 25 shares at \$9. The stock is quite heavy, being offered at \$9½ and no bid.

Small lots of Tamarack, Jr., sold at \$10@11. 3 P. M.—At the call this afternoon Boston & Montana advanced to \$29, and Butte & Boston to \$10½. A small lot of Calumet & Hecla sold at \$283.

Wolverine sold at \$2½ for 600 shares, the first sale for the week.

The market closed quite strong, with good buying orders in sight.

SAN FRANCISCO.

BY TELEGRAPH.

SAN FRANCISCO, Sept. 14.—The opening quotations today are as follows: Best & Belcher, \$1.30; Bodie, \$1.50; Belle Isle, 10c.; Bulwer, 18c.; Chollar, 43c.; Consolidated California & Virginia, \$4.20; Eureka Consolidated, 25c.; Gould & Curry, 72c.; Hale & Norcross, 60c.; Mexican, \$1.25; Mono, 26c.; Navajo, 10c.; Ophir, \$2.65; Savage, 65c.; Sierra Nevada, \$1.15; Union Consolidated, 74c.; Yellow Jacket, 60c.

LONDON.

Aug. 30.

(From our Special Correspondent.)

The sudden boom in silver has not had much effect in improving the demand for silver mining shares, because the boom is generally ascribed to speculative purchases on the part of those who expect some advantage to arise from the China-Japan war. Just why such an advantage should be expected is not quite clear, so that there does not appear to be much hope that this advance in the price of silver will be maintained for long. The effect on silver mining stocks has been just perceptible and no more. Jay Hawks, Elkhorns, Montanas and New Gustons have moved up fractionally with the presence of buyers who thought silver was on the point of permanently recovering.

Alaska-Treadwells are still moving upward and now stand at £4, or fully £1 higher than two months ago. The stock is attracting much more attention than formerly among the general public, who never believed any good of \$3 ore, so that we shall not be surprised if the price creeps gradually up to par, £5.

Harquahalas continue to fall and now stand at 6s., as compared with 8s a month ago, and 18s. six months since. The periodical reports from the mine are a series of disappointments, for the ore becomes leaner and more irregular as time goes on. There is very little doing in the stock, and there does not appear to be much speculative buying.

Golden Leafs have had a fresh accession of life during the past fortnight, owing to there being some likelihood of a new property being acquired shortly. It will be remembered that toward the end of last year negotiations were made to acquire a share in some new property, the purchase consideration to be the valuable plant of the company which was standing idle on useless properties. It appears that a property has been found on these terms and that negotiations will be completed at no distant date.

Mesquital del Oros are getting deep into the mire. The contents of the ore treated are getting smaller and smaller with depth, so that the chances of paying off the mortgage debentures are very remote. Consequently the stock has sunk to an almost nominal value.

Writing on July 31st, the manager of the Holcomb Valley mine reports that part of the additional pumping plant is in place and that he is now able regularly to treat 300 cubic yards per day of 10 hours. In a short time this amount will be increased to 400 cubic yards. This news has given desponding holders fresh heart, and the quotation of the stock has recovered from 6d. to 9d.

The Springdale Gold Milling and Mining Company, Colorado, has declared an interim dividend of 2d. on each 4s. share. The New Colorado Silver Mining Company has made a loss of £2,150 as the result of the working during the year ended May 31st last. The cause of the loss is, of course, the depreciation in silver.

The Idaho Exploring Company is now ready to float the subsidiary company to acquire a new property at Coolgardie. The success of the flotation is practically assured already, and there is quite a little rush on the part of the public to become shareholders in the Idaho company before the new company is formed.

DIVIDENDS.

Bald Butte Mining Company paid dividend No. 29 of 5%, \$12,500, September 5th, at the office of the company in Helena, Mont.

Golden Eagle Mining Company paid September 5th dividend No. 1 of 2½c. per share, at the office of the company in Leadville, Colo.

MEETINGS.

Horn Silver Mining Company, at the office of the company, in Salt Lake City, Utah, October 2d, at 12 o'clock noon.

Tamarack Mining Company will hold its annual meeting at the company's office, Boston, Mass., October 4th, at 11 a. m. Transfer books close September 22d.

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, dates from Sept. 8 to Sept. 14, and Sales. Includes companies like Belcher, Bells Isle, Bodie Cons., etc.

*Ex-dividend. †Dealt in at New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 2,400. Non-dividend shares sold, 1,600. Total shares sold, 3,400.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, dates from Sept. 7 to Sept. 13, and Sales. Includes companies like Atlantic, Brecco, Bost. & Mont., etc.

Dividend shares sold, 2,509. Non-dividend shares sold, 6,476. Total shares sold, 8,985.

COAL AND COAL RAILROAD STOCKS.

Table with columns for Names of Stocks, dates from Sept. 8 to Sept. 14, and Sales. Includes Am. Coal, Balt. & Ohio, Buff. R. & P., etc.

*For week commencing Sept. 7 and ending Sept. 13. Total shares sold, 64,986.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Name of Stocks, dates from Sept. 8 to Sept. 14, and Sales. Includes Adams Express, Am. Cotton Oil, etc.

COLORADO.

Table with columns for Name of Company, dates from Sept. 7 to Sept. 14, and Sales. Includes Alloues, Arnold, Astec, etc.

MARYLAND.

Table with columns for Name of Company, dates from Sept. 7 to Sept. 14, and Sales. Includes Balt. & N. C., Big Vein Coal, etc.

PENNSYLVANIA.

Table with columns for Name of Company, dates from Sept. 7 to Sept. 14, and Sales. Includes Cambria, Central Coal & C., etc.

UTAH.

Table with columns for Name of Company, dates from Sept. 7 to Sept. 14, and Sales. Includes Alliance, Anchor, Bullion-Beck and Champ'n, etc.

CALIFORNIA.

Table with columns for Name of Stocks, dates from Sept. 7 to Sept. 14, and Sales. Includes Alpha, Aita, Belcher, etc.

FOREIGN.

Table with columns for Name of Stocks, dates from Sept. 7 to Sept. 14, and Sales. Includes Alaska-Treadwell, Alaska Ter., etc.

COLORADO. Aspen. Sept. 8. Price. Argentum-Junata... \$0.70 Aspen Contact... .35 Aspen Deep Mining... .0446 West Friend... .05 Bi-Metallic... .04 Rushwacker... .05 Della S... .85 Gold Valley Placer... .10 Little Annie... .04 Mollie Gibson... 1.00 P... .04 Sheep Mountain T. & Mg. Co... .25 Smuggler... 2.40 St. Joe & Mineral Farm... .15 W. S. Paymaster... .10 West Aspen Mountain... .10

Colorado Springs. Sept. 7. Cripple Crk (gold): High. Low. Sales. Alamo... .01 .01 Anaconda Gold... .24 .21 1/2 Anchoria Leland... .09 .09 Antlers-Park-Regt... .01 .01 Aola... .01 .01 Blue Bell... .02 1/2 .02 1/2 Calumet... .02 1/4 .01 3/4 Cripple Creek Con... .02 .01 Creede & Cripple C... .01 1/4 .01 Del Monte... .05 1/2 .05 Elkton... .67 1/2 .65 Fannie Rawlings (S. & G.) Leadville... .13 .06 1/2 Gold and Globe... .01 .04 Gold King... .09 .09 Ida May... .10 .10 Ingham... .10 .10 Isabella... .15 .13 Jack Pot... .02 1/4 .02 Lemhi... .34 .33 Lottie Gibson... .01 1/4 .01 1/4 *Moose... .75 .75 *Mount Ross... .04 1/4 .03 1/4 Pharmacist... .09 .06 *Portland... .36 .34 Summit... .16 .14 1/2 Specimen... .01 .01 *Union... .18 1/2 .13 Victor... 3.00 3.00 Work... .03 .02 World... .02 .02 * Dividend payers. We omit sales this week.

PENNSYLVANIA. Pittsburgh. Sept. 12. Bid. Asked. Allegheny County Light... 86 Bridgewater Gas... 48 Chartiers Block Coal... 35 Chartiers Valley Gas... 10 Fisher Oil... 57 1/2

Hazlewood Oil Co... 20 Hidalgo Mining Co... 4 Luster Mining Co... 13 14 Manufacturers' Gas... 33 Monongahela Nav. Co... 70 Monongahela Water... 30 1/4 Nat. Gas Co. of W. Va... 25 N. Y. & Cleve. Gas Coal... 48 Olive Valley Gas... 23 1/2 People's Nat. Gas... 26 People's Pipeage Co... 13 1/4 Pennsylvania Gas... 10 Philadelphia Co... 19 1/4 Pittsburg Gas Co... 75 Pittsb. Plate Glass Co... 140 160 Stand. Undergr. Cable Co... 88 Tuna Oil... 8 U. S. Glass Co. pref... 23 Westinghouse Air Brake... 120 122 1/2 Westing'gse Elect... 1st prf 52 1/4 " " 2d " 35 1/4 " " com... 23 Wheeling Gas... 18 1/2

MISSOURI. St. Louis. Sept. 11. Closing quotations: Bid. Asked. Adams... \$0.40 American & Nettle, Colo... .25 \$0.30 Bi-Metallic, Mont... 2.60 3.00 Elizabeth, Mont... .15 .20 Granite Mountain, Mont... 1.25 1.75 Hope... 2.50 Leo... .01 1/4 .02 Small Hopes... .50

MONTANA. Helena. Sept. 6. (Specially Reported by S. K. Davis.) Bid. Asked. Bald Butte (Mont)... \$4.25 \$4.75 Benton Group (Neilhart), Mont... 25 .30 Combination (Phillips'g), Mont... 40 .60 Double Eagle (Spotted Horse Maiden)... 2.50 Helena & Frisco... 1.00 Iron Mountain (Missoula), Mont... 45 .50 Ontario (Deer Lodge Co)... 1.00 1.25 Piegan (Marysville), Mont... 10 .15 Poorman (Coeur d'Alene), Idaho... 25 .30

MINNESOTA. Duluth. Sept. 11. LISTED STOCKS. Par. Bid. Ask'd. Biwabik M. Iron Co... 100 \$20.00 24.00 Cincinnati Iron Co... 25 .25 .30 Clark Iron Co... 100 .60 Great Northern Min. Co... 100 2.75 3.50 Kanawha Iron Co... 100 .10 .20

Keystone Iron Co... 40 Lake Superior Iron Co... 25 2.50 Lincoln Iron Co... 50 Mesaba Moun. Iron Co... 100 14.00 17.03 Minneapolis Iron Co... 100 .02 .15 Mountain Iron Co... 100 50.00 65.00 Shaw Iron Co... 100 2.50 3.00 Security Land & Exp. Co. 10 10.00 15.00

UNLISTED STOCKS. Adams Iron Co... 10 \$7.00 \$9.00 Ashland Iron Co... 25 40.00 Buckeye Iron Co... 100 2.50 Buffalo Land & Exp. Co... 1 20.00 26.00 Chandler Iron Co... 100 15 .30 Cleveland Cliffs Iron Co... 100 20.00 40.00 Chicago Iron Co... 100 .20 .30 Detroit Iron Co... 25 .01 .02 Elmira Land & Iron Co... 100 .05 .25 Great Western Mining Co... 100 1.90 2.25 Homestead Iron Co... 25 .00 1/4 .02 Internat'l Development... 10 22.50 Jackson Iron Co... 25 60.00 Lake Supr. (Marquette)... 25 20.00 27.00 McCaskill Mining Co... 10 .01 .03 Mesaba C. L. & Ex. Co... 10 6.00 Mesaba Chief Iron Co... 100 1.75 2.00 Mesaba Iron Co... 30 .20 Metropolitan L. & L. Co... 25 50.00 70.00 Northern Light Iron Co... 100 .25 Ohio Mining Co... 100 5.00 8.00 Ophir, gold & Steel Co... 10 1.00 Penn. Iron & Steel Co... 100 .04 .10 Pioneer Iron Co... 25 1.00 Pittsburg & Lake A. Co... 100 110.00 125.00 Putnam Iron Co... 100 .89

FOREIGN. Shanghai, China. Aug. 3. (Special Report by J. H. Bissett & Co.) Taels. Hong Kong Electric Co... 3.54 Jelebu Mg. & Trading Co., Ltd... 4.20 Punjom Mining Co., Ltd... 5.11 pref... 1.39 Raub Allan G. Mg. Co., Ltd... 3.29 Shanghai Gas Co... 210.00 Sheridan Con. Mg. Co., Colo... 2.00

Paris, France. Sept. 1. Acieries de Creusot... 2,110.00 " de Irminy... 1,740.00 " Fives-Lille... 680.00 " de France... 620.00 " de la Marine... 848.75 " de St. Etienne... 1,230.00 Aguas Tendas... 459.00 Anzin (coal)... 4,425.00 Callao... 19.75 Cape Copper... 37.50 Carmaux... 1,210.00

Champ d'Or... 65.75 De Beers Consolidated... 417.50 Dombrowa... 460.00 Huanchaca... 171.25 Jerez-Lanteira... 7.50 parus... 3.00 Kebao... 560.00 Laurium, Greece... 552.90 Lexington, Mont... 28.00 parts... 0.75 Malfidano (new shares)... 750.00 Mokta-el-Hadid... 890.00 Nickel, New Caledonia... 358.90 Phosphates de France... 412.35 Placers Haute Italie... 200.00 Pontgibaud... 200.00 Rio d'Anto, Spain... 373.75 Robinson (Transvaal)... 176.25 Soufres Romaines... 182.25 Tharsis, Spain... 117.25 Transvaal Coal... 17.50 Uruguay... 19.00 Vieille-Montagne, Belgium... 483.75

ASSESSMENTS. COMPANY. No. Divd. in office. Day of sale. Amt. per sh're. Bay State M. & D. Co., Cal... 22 Sept. 29 Oct. 21 .03 Betsworth Con. G. M. Co., Cal... 7 Sept. 25 Oct. 11 .62 Bullion, Nev... 43 Sept. 13 Oct. 4 .15 Bunker Hill M. Co., S. Dak... 6 Sept. 22 Oct. 16 .01 Chollar M. Co., Nev... 39 Sept. 13 Oct. 4 .20 Gold P't Con. G. & S. Mg. Co., Cal... 22 Sept. 24 Oct. 13 .12 Gould & C'rry, Nev... 74 Aug. 30 Sept. 21 .15 Gray Eagle, Cal... 37 Aug. 21 Sept. 21 .05 King Solomon M. Co., Cal... 2 Sept. 24 Oct. 19 .01 Monarch G. M. Co., S. Dak... 11 Sept. 24 Oct. 13 .03 Ophir S. M. Co., Nev... 63 Oct. 9 Oct. 29 .25 Potosi, Nev... 42 Sept. 6 Sept. 27 .25 St. John Qu'z M. Co., Cal... 12 Sept. 13 Sept. 29 .05 Savage, Nev... 84 Aug. 30 Sept. 19 .20 Seabury Calkins Cons. M. Co., S. D... 17 Oct. 1 Oct. 18 .01 Silver King M. Co., Ariz... 11 Sept. 11 Oct. 2 .30 Teirakoff C. G. M. Co., Cal... 12 Aug. 24 Sept. 20 .02 Yellow Jacket S. M. Co., Nev... 57 Sept. 5 Oct. 10 .25

CURRENT PRICES. These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, chem. pure... 17@19 Commercial, in bbls. and cys... 01 1/4 @ 02 Carbonic, liquefied, # lb... 18@25 Chromic, chem pure, # lb... 1.00 for batteries... 40 Hydrobromic, dilute, U. S. P... 25@30 Hydrocyanic, U. S. P... 45@50 Hydrofluoric... 20@30 Alcohol-95%, # gal... \$3.30@32.40 Absolute... \$3.80 Ammoniated... \$2.80 Alum-Lump, # cwt... \$1.75@1.85 Ground, # cwt... \$1.35@1.90 Powdered, # lb... .04@.05 Lump # ton, Liverpool... 45 Alumina Chloride-Pure, # lb... \$1.25 Amalgamating solution, # lb... .80 Sulphate, # cwt... \$1.90@2.50 Ammonia-Sal., in bbl. lots, # b... .07 1/2 @ .08 Carbonate, # lb., English and German, 07 1/2 @ .08 Muriate, white, in bbls., # b... .08 1/4 Aqua Ammonia-(in cys) 3" # b... .09 @ .01 20" # b... .04 @ .05 26" # b... .04 1/2 @ .05 Antimony-Oxymur, # lb... 10@11 1/4 Regulus, # lb... 10@11 1/4 Argols-Red, powdered, # lb... .15 Arsenic-White, powdered # lb... .08 @ .09 Red # lb... .06 @ .07 Yellow... .06 @ .07 White at Plymouth, # ton... \$12 @ 20 Asbestos-Canadian, # ton... \$50 @ 80 Italian, # ton, c. l. f. L'pool... \$18 @ 20 Ashes-Pot, 1st sort, # lb... .47 @ .55 Pearl... .05 1/2 @ .06 1/2 Asphaltum-Prime Cuban, # lb... .04 @ .05 Hard Cuban, # ton... \$28.00 @ \$30.00 Trinidad, refined, # ton... \$30.00 @ \$35.00 Egyptian and Syrian, # lb... .05 @ .07 1/4 Californian, at mine, # ton \$12.00 @ \$26.00 at San Francisco, # ton \$15.00 @ \$29.00 Barium-Carbonate, pure, # lb... .45 Carbonate, commercial, # lb... .05 @ .10 Chlorate, crystal, # lb... .75 Chloride, commercial, # lb... .05 @ .10 pure, # lb... .10 Iodide, # lb... .40 Nitrate, # lb... .06 1/2 @ .07 Sulph., Am. prime white, # ton \$17.50 @ \$19 Sulph., foreign, floated, # ton... \$21 @ \$24 Sulph., off color, # ton... \$11.50 @ \$15.00 Carb. lump, f. o. b. L'pool, # ton... 28 No. 1, Casks, Runcorn, " " 24 10 0 No. 2, basz. Runcorn, " " 43 15 0 Bauxite # ton... \$5 @ \$6 Bichromate of Potash-Scotch, # lb... .11 @ .12 American, # lb... .11 @ .12 Bichromate of Soda # lb... .09 1/2 @ .10 Borax-Refined, # lb., in car lots... .08 @ .09 San Francisco... .08 @ .08 1/2 Con vented, in car lots... .07 1/2 @ .08 Refined, Liverpool # ton... 22 Bromine # lb... 36 @ 35 Cadmium Minion-# lb... 32 @ 30

Cadmium Iodide-# lb... \$5.50 Chalk-# ton... \$1.50 @ \$2.25 Precipitated, # lb... .04 @ .06 China Clay-English, # ton... \$13 @ \$18.00 Domestic, # ton... \$9 @ \$11 Chlorine Water-# lb... .10 Chrome Yellow-# lb... 10@25 Chrome Iron Ore-# ton, San Francisco... \$10.00 Chromalum-Pure, # lb... 35@40 Commercial, # lb... .02 1/2 Cobalt-Oxide, # lb... \$1.60 @ \$1.70 Copper-Sulph. English Wks, ton \$20 @ \$21 Vitriol (blue), ordinary, # lb... .03 1/4 @ .03 1/2 extra... .40 Nitrate, # lb... .04 Copper-Common, # 100 lbs... 35@36 Best, # 100 lbs... \$1.35 @ \$1.50 Liverpool, # ton, in casks... \$22 @ \$23 Corundum-Powdered, # lb... .04 1/4 @ .09 Flour, # lb... .03 Cryolite-Pow., # lb., bbl. lots... .07 @ .08 Emery-Grain, # lb. (5 kg)... .04 @ .05 Flour, # lb... .02 1/4 @ .04 Epsom Salt-# lb... .01 @ .01 1/4 Feldspar-Ground, # ton... \$6.00 @ \$10.00 Crude... \$2.00 @ \$3.00 Fluorspar-Powder, No. 1, # ton \$20 @ \$30 Lump, at mine... \$6 @ \$8 French Chalk-Fuller's Earth-Lump, # ton... \$16 @ \$20 Glauber's Salt-in bbls., # b... .01 @ .01 1/4 Glass-Ground, # lb... .09 @ .10 Gold-Chloride, pure, crystals, # oz... \$12.00 pure, 15 gr., c. v., # doz... \$5.40 liquid, 15 gr., g... \$5.50 Chloride and sodium, # oz... \$6.00 15 gr., c. v., # doz... \$2.75 Oxide, # oz... \$2.25 Gypsum-Calcined, # bbl... \$1.35 @ \$1.50 Land Plaster Iodine-Resublimed, # oz... 30 @ 33 Iridium-Oxide # lb... \$90 Iron-Nitrate, 40°, # lb... .01 @ .01 1/4 47°, # lb... .02 @ .02 1/4 Kaolin-See China Clay. Lead-Red, American, # lb... .06 1/2 @ .07 1/2 White, American, in oil, # lb... .06 1/4 @ .07 1/2 White, English, # lb., in oil... .08 1/4 @ .09 Acetate, or sugar of, white... .06 @ .06 1/2 Granulated... .09 @ .12 Nitrate... .09 @ .12 Lime Acetate-Am. Brown... \$90 @ 95 Gray \$1.75 @ \$1.87 1/2 Litharge-Powdered, # lb... .05 1/4 @ .07 1/2 English flake, # lb... .06 @ .09 1/2 Magnesite-Crude, # ton of 1,015 kilos... \$14.75 Calcined, # ton of 2,240 lbs... \$22.00 Brick, # ton of 2,240 lbs... \$47.50 Manganese-Ore, per unit... 23 @ 28 Oxide, ground, # lb... .02 1/4 @ .06 1/2 Mercuric Chloride-Corrosive Sublim. tel # lb... \$3 @ 34 Powdered # lb... \$1.25 @ \$1.50 Marble Dust-# bbl... \$1.25 @ \$1.50 Metallic Paint-Brown # ton \$30 @ \$35 Red... \$30 @ \$35 Mica-In sheets according to size. 1st quality, # lb... 25 @ 30.00

Mineral Wool-Ordinary slag... .01 1/4 Ordinary rock... .02 1/4 Ground, # ton... .04 @ .06 Naphtha-Black... \$10.00 Nitre Cake-# ton... \$10.00 Oshre-Rochelle, # lb... .01 1/4 @ .01 1/2 Washed Nat Ox'rd, Lump, # lb... .06 1/4 @ .06 1/2 Washed Nat Ox'rd, Powder, # lb... .07 @ .07 1/2 Golden, # lb... .03 @ .05 Domestic, # ton... \$12 @ \$20 Oils, Mineral-Cylinder, light filtered, # gal... .14 @ .16 Dark filtered, # gal... .10 @ .13 Extra cold test, # gal... .20 @ .24 Dark steam refined, # gal... .07 1/4 @ .12 Phosphorus-# lb... 5 @ 5.50 Precip., red, # lb... 80 @ 85 white, # lb... 85 @ 90 Platonic Chloride-Dry, # oz... \$7 Plum-bago-Ceylon, # lb... .04 @ .05 American, # lb... .05 @ .07 Potassium-Cyanide, # lb., C. P... .52 67%, # lb... .40 mining... .28 @ .30 Bromide, domestic, # lb... .28 @ .32 Chlorate, English, # lb... .18 @ .18 1/4 Chlorate, powdered, English, # lb... .18 1/4 @ .19 Carbonate, # lb., by casks, 82%... .04 1/2 @ .05 Caustic, # lb., pure slick... .05 1/4 @ .06 Iodide, # lb... \$2.58 @ \$2.80 Nitrate, refined, # lb... .05 @ .08 Bichromate, # lb... 10 @ 11 1/4 Yellow Prussiate, # lb... 24 1/2 @ 25 c. contr. 25c. single casks. Red Prussiate, # lb... 35 @ 45 Fulmic Stone-Select lumps, # lb... \$15 @ 15 Original cks., # lb... .01 1/4 @ .02 Powdered, pure, # lb... .01 1/4 @ .01 1/4 Pyrites-Non-sulphureous, p. units... 10 @ 11 Quarts-Ground, # ton... \$1.00 @ \$1.00 Rotten Stone, Powdered, # lb... .03 1/4 @ .03 1/2 Lump, # lb... .06 @ .07 Original cks., # lb... .04 1/4 @ .05 1/2 Rubbing stone, # lb... .03 1/4 @ .04 Sal Ammoniac-lump, in bbls., # b... \$0 1/4 Salt-Liverpool, ground, # sack... 70 Domestic, fine, # ton... \$7 @ \$7.50 Common, fine, # ton... \$4.50 @ \$5 Turk's Island, # bush... 25 @ 28 Salt Cake-# ton... \$10.00 @ \$15.00 Salt-peter-Crude, # lb... .03 1/4 @ .04 Soapstone-Ground, # ton... \$6 @ \$7 Block and slab according to size. Sodium-Prussiate, # lb... 22 @ 24 Phosphate, # lb... .04 @ .05 Stannate, # lb... .08 @ .12 Tungstate, # lb... .30 @ .35 Hyposulphite, # cwt., in casks \$1.70 @ \$1.80 Strontium-Nitrate, # lb... .08 1/4 @ .08 Sulphur-Roll, # lb... .01 1/4 @ .02 1/4 Sylvinit, 27@35%, S.O.P., per unit... 3.75 Talc-Ground French, # lb... .01 1/4 @ .01 1/4 American No. 1, # lb... .01 1/4 @ .01 1/4 American No. 2... .06 Terra Alba-French, # lb... .65 @ .80 English, # lb... .55 @ .80 American, No. 1, # lb... .60 @ .80 American, No. 2, # lb... .40 @ .80

Tin-Crystals, in kegs or bbls... \$14 @ \$15 Muriate, silver feathered or flossed... .07 @ .13 Double or strong, # lb... 10 @ 15 Oxymur, or nitro... .18 Vermillion-Imp. English, # lb... .10 Am. quicksilver, bulk... .57 @ .60 Am. quicksilver, bags... .58 @ .60 Chinese... .85 @ \$1.00 Trieste... .90 @ .95 American... 1.14 @ 1.19 Zinc White-Am. Dry, # lb... .04 1/4 @ .06 Antwerp, Red Seal, # lb... .06 1/4 @ .07 Paris, Red Seal, # lb... .07 @ .08 Muriate solution... .06 Sulphate crystals in bbls., # b... .03 @ .03 1/2 THE RAREER METALS. The prices given below are the prices in Germany, and are per gramme except where otherwise stated: Arsenic (metallic), per kilo... \$0.25 Barium (ex amalgam), # lb... 2.12 (per electrol)... 7.75 Bismuth (metallic), per kilo... 6.25 Cadmium (metallic)... 2.75 Calcium (per electrol)... 5.25 Cerium (pulv.)... 2.25 (fusum in globulis)... 5.4 Chromium (fus.)... .40 (cryst)... .75 Cobalt (metallic), per kilo... 10.00 (pure), per kilo... 40.06 Didymium (pulv.)... 5.1 Erbium-Yttrium (oxyd)... 10.00 Gallium (cryst.)... 100.00 Germanium (fus.)... 37.50 (pulv.)... 35.00 Glucium (pulv.)... 7.00 (cryst)... 10.75 Iridium... 5.00 Iridium (fusum)... 1.25 Lanthanum (pulv.)... 6.00 (per electrol)... 11.00 Lithium (in glob.)... 5.00 (wire)... 6.25 Manganese (fusum)... .25 Molybdenum (pulv.)... 12 1/2 Niobium (pulv.)... 4.25 Osmium... .06 Palladium (wire)... 1.00 Potassium (metal), per kilo... 27.50 Rhodium... 1.63 Ruthenium... 2.50 Scandium... 6.25 Selenium (cryst.)... .50 (precipitates)... .62 1/2 Strontium (per electrol)... 7.25 (ex amalgam)... 3.25 Tantalum... 4.75 Tellurium (fusum)... .50 (precipitates)... .22 1/2 Thallium... .03 1/2 Titanium... 1.13 Tungsten (pure)... 1.00 Uranium... 1.00 Vanadium... 4.00

RAILROAD MATTERS.

Mr. Harrie E. Ansley, heretofore acting treasurer of the Southern Railroad Company, has been appointed treasurer, with offices at Washington, D. C.

Mr. O. P. McCarthy, general passenger agent of the Baltimore & Ohio Southwestern, has resigned, and John M. Chesbrough, assistant general passenger agent of the Vandalia, has been appointed to succeed him.

Mr. H. W. Fuller, general passenger agent of the Chesapeake & Ohio, who was severely injured in a railroad accident in Virginia about six weeks ago, is getting better slowly, and hopes to be out on crutches within a few weeks.

Mr. Bissell Wilson has been appointed district passenger agent of the Missouri Pacific and St. Louis, Iron Mountain & Southern railways, with headquarters at 1399 South Clark street, Chicago. He succeeds Mr. J. E. Ennis, who has been transferred to the land department.

Mr. D. H. Conklin, who has been general manager of the South Atlantic & Ohio Railroad in eastern Tennessee since 1891, has resigned that office, and the directors of the company have taken occasion in announcing his retirement to issue a complimentary circular expressing appreciation of his service as general manager of the company.

A railway concession for the shortest direct line from the Gulf of Mexico to the City of Mexico is likely soon to be offered to D. B. Wentworth and Richard S. Coe, of Boston. The line passes through a fertile region, with a large forest of precious woods, and touches extensive asphalt deposits. The concession allows the line to connect with any other railway in the republic.

Col. Aldace F. Walker, the new receiver of the Atchison, Topeka & Santa Fe Railroad, arrived in New York from Antwerp on September 3d, and immediately assumed his duties as receiver of the Atchison Railroad. He proposes to remain in New York for some time familiarizing himself with the present condition of the property. Then he will go over the railroad with the other receivers and the principal officers of the company, and after completing the inspection of the property he will probably make his headquarters in New York City.

The Executive Committee of the Southern Railway and Steamship Association held its final session August 25th. Although important roads have not yet signed the articles of agreement for the ensuing year, it is evident, from expressions of the officials representing the lines that have signed, that the association is stronger than heretofore. The following officers were elected: President, Joseph E. Brown, of Atlanta; vice-president, J. W. Thomas, of Nashville; commissioner, E. S. Strahlman, of Atlanta; Board of Arbitration, John Straven of Savannah, Thomas H. Carter of Virginia, and J. W. Grew of Augusta; secretary, W. L. McGill, of Atlanta. To-day there is to be a meeting of the traffic managers of the Southern Railway, the Louisville & Nashville Railway, the Central Railroad of Georgia and the Western & Atlantic Railroad to consider matters of interest to those lines.

At a meeting of the Trans-Jersey Ship and Canal Commission in Philadelphia, August 28th, it was decided to adopt the report of Lewis M. Haupt, engineer in charge, and put parties in the field to survey two proposed routes for the sluiceway. Mr. Haupt found that it would be commercially unprofitable to build a canal from Philadelphia to Raritan Bay at tidewater, as there is a general elevation of 100 ft. He suggests two 25-ft. elevated lift locks. The Delaware and Raritan rivers were said to be the only available sources of supply, and two routes were suggested, both starting from Bordentown—one going through the Raritan River and Bay and the other reaching the sea by way of Monmouth Junction and Raritan Bay. The first has railroad crossings and a surface 52 ft. above the sea level, and the second has no railroad crossings, but would encounter a height of 90 ft. to get over.

Two passenger trains on the Chesapeake & Ohio Railway have been provided with electric tail lights by the chief electrician, Mr. W. S. Greene. A parlor and observation car is attached to the train that leaves Cincinnati about noon each day, the car being dropped at Hinton and returning to Cincinnati next day. The two observation cars that are required to give this service are lighted by incandescent lamps. The electric wires are run to the tail light brackets and one connection is made through the bracket and the other through the

lamp base, which fits in the base of the regular lamp casing replacing the cup which usually holds the oil and wick. If for any reason the electric lamp cannot be used the oil lamp may be substituted in the same casing. The electric lights are very bright. The two cars are also provided in the observation end with electric fans, which are operated by the same batteries that give the current for lighting.



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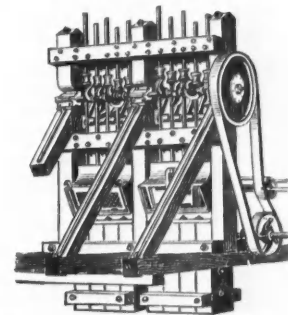
It has in its employ mining engineers whose reports it will guarantee, and desires to act as the Western agent of individuals or syndicates in the selection and purchase of mining property, doing the work on a commission. It will also advise on the operation of such, or other property of this class.

The company is in a position to properly guarantee any statement or report made by it, and solicits work of the character described, confident that with its exceptional facilities it can render valuable service to non-resident mine owners and investors.

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(-) Indicates every other week or monthly advertisements.

Table with 4 columns of advertiser names and page numbers, organized alphabetically by section (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, Y). Includes entries like 'Detroit Copper Mining Co', 'Abbott, Wheelock & Co', 'Kennedy, Julian', 'Positions Vacant', etc.

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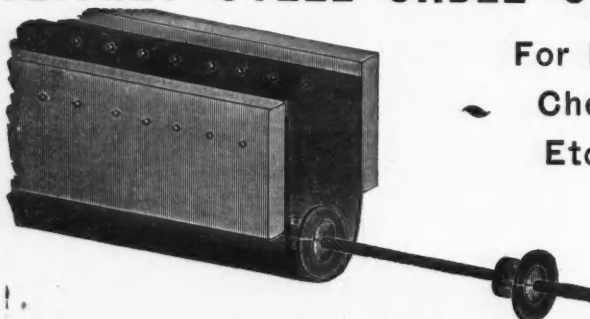
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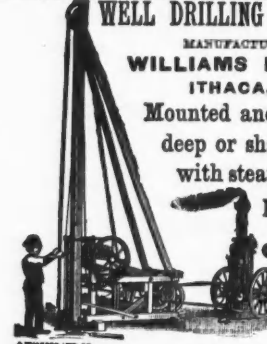
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METALLURGIST OF WIDE EXPERIENCE in the building and operation of concentrating works, lead and copper smelting works, copper converting works, silver refineries, etc., will be at liberty in a few months to make new engagement. Should like to correspond with any company requiring a superintendent either for the construction of new works or the operation of existing works. Terms very moderate. Address CONSTRUCTION, ENGINEERING AND MINING JOURNAL. No. 16,839, Sept. 22.

GRADUATE MECHANICAL ENGINEER and draughtsman, Jr. member American Society Mechanical Engineers, is open to engagement. Experience in rolling mill, mining and general machinery. References. Address D. W. C., ENGINEERING AND MINING JOURNAL. No. 16,972, Oct. 13.

CHEMIST—YOUNG ANALYST OF EXPERIENCE and thorough training offers his services for expenses only. Wants work and wishes to show what he can do. Had charge of men and is not a novice. Address X, ENGINEERING AND MINING JOURNAL. No. 16,974, Oct. 13.

A PRACTICAL CHEMIST OF SCHOOLING and experience wants position in works. Write to R. 59, American Exchange, Sansone street, San Francisco, Cal. No. 16,973, Oct. 20.

ASSAYER.—SITUATION AS ASSAYER OR amalgamator wanted by a young man. Speaks Spanish. Will go anywhere. Experience gained in Mexican and American gold mines. Address M. R. L., ENGINEERING AND MINING JOURNAL. No. 16,977, Oct. 13.

WANTED—POSITION AS SUPERINTENDENT or Mine Foreman by Mining Engineer and Surveyor. Twenty-three years' practical experience in United States and England; at present holding responsible position. Has necessary certificates. Address T. C., P. O. Box 195, Plymouth, Luzerne County, Pa. No. 16,976, Sept. 22.

A GRADUATE OF SCHOOL OF MINES, Columbia College, chemist and assayer, with the best of references, seeks a position of any kind where his knowledge will be of use to him. Will accept a very small salary to start with and is willing to go anywhere. Address F. M., ENGINEERING AND MINING JOURNAL. No. 16,995, Sept. 22.

WANTED—POSITION BY COMPETENT mechanical and architectural draughtsman; best of references furnished. Address H. F. W. ARNER, 17 East Thirty-fourth street, Bayonne, N. J. No. 16,978, Sept. 22.

Contracts Open.

U. S. ENGINEER OFFICE, BOSTON, MASS.—Sealed proposals for the delivery of Rubble-stone in the south jetty at Newburyport Harbor, Mass., will be received here until Oct. 4, 1894. All information furnished on application. S. M. MANSFIELD, Lieut. Colonel Engineers.

U. S. ENGINEER OFFICE, BOSTON, MASS.—Sealed proposals for delivery of rubble stone in breakwater at Gloucester Harbor, Mass., will be received here until October 4th, 1894. All information furnished on application. S. M. MANSFIELD, Lieut.-Colonel Engineers.

U. S. ENGINEER OFFICE, BURLINGTON, VT.—Sealed proposals in triplicate for repairs to Burlington Breakwater, Vt., will be received here until October 5th, 1894. Full information furnished on application to SMITH S. LEACH, Captain Engineers.

U. S. ENGINEER OFFICE, BURLINGTON, VT.—Sealed proposals in triplicate for dredging in Ogdensburg Harbor, N. Y., will be received here until October 5th, 1894. Full information furnished on application to SMITH S. LEACH, Captain Engineers.

WATER-WORKS.—Sealed proposals to build Water-Works in the City of Greenville, Miss., will be received by the Clerk up to Oct. 2, 1894. Upon the franchise system. Specifications on file with the City Clerk.

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IRON.—Office of the Lighthouse Engineer, Fifth District, Baltimore, Md.—Proposals will be received at this office until the 26th day of September, 1894, for furnishing the materials and labor of all kinds necessary for the completion and delivery of the metal work of the Solomons Lump Light Station, Maryland. Plans, specifications, forms of proposal and other information may be obtained on application to this office. ERIC BERGLAND, Captain of Engineers, U. S. A., Lighthouse Engineer.

DREDGING.—U. S. Engineer Office, Burling- ton, Vt.—Sealed proposals in triplicate for dredging in Great Chazy River, N. Y., will be received here until October 5th, 1894. Full information furnished on application to SMITH S. LEACH, Captain Engineers.

ROCK EXCAVATION.—U. S. Engineer Office, Burlington, Vt.—Sealed proposals in triplicate for rock excavation in Otter Creek, Vt., will be received here until October 5th, 1894. Full information furnished on application to SMITH S. LEACH, Capt. Engrs.

DREDGING.—U. S. Engineer Office, 601 Eigh- teenth Street N. W., Washington, D. C.—Sealed proposals for dredging at Nomini and Lower Machodoc Creeks, Va., will be received here until October 4th, 1894. All information furnished on application. CHAS. E. L. B. DAVIS, Major Engrs.

IRON-WORK.—U. S. Engineer Office, Charle- ston-Kanawha, W. Va.—Sealed proposals for iron-work for movable dams on the Great Kanawha River, embracing about 635,000 pounds of wrought iron and 337,000 pounds of cast iron, will be received at this office until September 27th, 1894. Specifications, blank forms and all available information furnished on application to ADDISON M. SCOTT, Resident Engineer, at the above office. WM. P. CRAIGHILL, Colonel Corps of Engineers.

WROUGHT AND CAST IRON.—West Vir- ginia.—Sealed proposals for iron-work for the movable dams on the Great Kanawha river, embracing about 635,000 lbs. of wrought iron and 337,000 lbs. of cast iron, will be received until Sept. 27, 1894. Specifications, blank forms and all available information furnished on application to ADDISON M. SCOTT, Resident Engineer, Charleston-Kanawha, W. Va.

ARTESIAN WELL.—Illinois.—Sealed proposals will be received by the City Clerk of the City of Wenona, Ill., for an artesian well, according to the specifications therefor now on file until Monday, October 1st, 1894. The right is reserved to reject any and all proposals. Copies of specifications will be furnished on application to C. E. ERWIN, City Clerk, City of Wenona, or to GEO. C. MORGAN, 49 Major block, Chicago. C. E. ERWIN, City Clerk.

WATER-WORKS.—Sealed proposals to build water-works in the city of Greenville, Miss., will be received by the Clerk until October 2d, 1894. Upon the franchise system. Specifications on file with the City Clerk.

PUMPING ENGINES.—Department of Public Works, Chicago.—Sealed proposals will be received by the city of Chicago until October 11th, 1894, for two vertical compound pumping engines, each engine having a capacity of 15,000,000 U. S. gallons of water in 24 hours, with the necessary boilers and all appurtenances ready for daily use, to be erected at the Chicago avenue pumping station, in the City of Chicago. According to plans and specifications on file in the office of the Department of Public Works of said city. Proposals must be made out upon blanks furnished at said office and be addressed to said department, indorsed "Proposals for Vertical Compound Pumping Engines." H. J. JONES, Commissioner of Public Works.

DAM.—Sealed proposals for constructing a dam, a retaining wall and a pump pit together, with foundation piers for vertical pump, will be received at the office of the undersigned until October 3d, 1894. Plans and specifications can be seen at the office of the undersigned. Specifications and forms of proposal will be furnished upon application. Proposals must be inclosed in envelopes, sealed and marked "Proposal for New Water Supply," and addressed to the Board of Water Commissioners, care of R. W. Havens, City Engineer, Dallas, Tex. R. W. HAVENS, City Engineer.

U. S. ENGINEER OFFICE, BOSTON, MASS.— Sealed proposals for dredging in Powwow River, Massachusetts, will be received here until October 4th, 1894. All information furnished on application. S. M. MANSFIELD, Lieut.-Colonel Engineers.

Continued on page 19.

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Continued from page 18.

WATER-WORKS.—Sealed proposals will be received at the office of the City Clerk of Tomah, Wis., until October 1st, 1894, for the erection of a complete system of water-works, including pumping station, tower, pumping machinery, boilers, heater and feed pump, with all attachments, fittings and trimmings, pipes and specials, hydrants, valves and valve boxes, and materials of every kind for the construction of said water-works, all complete as per plans and specifications, which may be seen on and after September 21st, 1894, at the office of H. J. Skinner, City Clerk, Tomah, Wis.; or at the office of Geo. Cadogan Morgan, Engineer, 49 Major Block, Chicago. All proposals must be addressed to the Hon. Thos. McCaul, Mayor, and Common Council, care H. J. Skinner, City Clerk, Tomah, Wis., and marked "Proposals for Water-works." H. J. SKINNER, City Clerk.

WATER-POWER CANAL.—Sealed proposals will be received by the Niagara Power and Development Company until October 1st, 1894, for the construction of a power canal. The work will be let in eight sections, each 5,000 ft. in length. The amount of material to be removed is estimated at 1,300,000 cu. yds. of earth and 4,300,000 cu. yds. of rock, chiefly lime stone. The contractor on any section will be expected to remove therefrom an average amount of not less than 2,000 cu. yds per day. Plans, specifications and blank forms of bids may be had on application to the Chief Engineer, E. C. Reynolds, Model City, Niagara County, N. Y. **THE NIAGARA POWER AND DEVELOPMENT COMPANY,** Model City, Niagara County, N. Y.

STEEL FORGINGS.—Sealed proposals, in duplicate, will be received until October 1st, 1894, for supplying the Ordnance Department, U. S. Army, with five sets each, more or less, of steel forgings of American manufacture for 8 and 10-in. guns and two sets for 12-in. guns. All information furnished upon application to Brig.-Gen. D. W. FLAGLER, Chief of Ordnance, Washington, D. C.

WATER-WORKS.—Greenville, Miss.—Sealed proposals to build water-works will be received by the City Clerk until October 2d upon the franchise system. Specifications on file with the City Clerk.

PIPE, CASTINGS, ETC.—Sealed proposals will be received by the Building Committee of Beaver Falls, Pa., Council, until October 2d, as follows: For 2.80 tons cast iron water pipe and special castings; 230 fire hydrants; 205 valves and valve boxes; the laying of 2 miles of 4 to 16-in. pipe. For the sinking of a sufficient number of tubular wells to obtain a 6,000,000 gallon supply of water. **PUMPS.**—Also, until October 16th, for two 3,000,000 gallon pumps, and for the building of a 6,000,000 gallon reservoir. **FILTERING PLANT.**—Also, until November 6th, a complete filtering plant, with a capacity of 3,000,000 gallons in 24 hours, and buildings to contain the pumps, boilers and filtering plant. Plans may be seen and detail specifications for the above-mentioned work and material can be obtained of the Borough Clerk, W. W. Kerr, and also at the office of the engineers, James H. Harlow & Co., Times Building, Pittsburgh, Pa., and Wilkingsburg, Pa., two weeks previous to the above dates. **SAMUEL CREESE,** Chairman; **H. F. DILLON,** **L. S. LUTTON,** **A. O. MEYERS,** **TITUS WELSH,** Building Committee. **JAMES H. HARLOW & CO.,** Engineers.

HORIZONTAL PUMPING.—Office of the Department of Public Works, Chicago.—Sealed proposals will be received by the city of Chicago until October 11th, 1894, for two horizontal compound condensing pumping engines, each engine having a capacity of 14,000,000 U. S. gallons of water in twenty-four hours, with the necessary boilers and all appurtenances ready for daily use, one engine to be erected at the Sixty-eighth street pumping station and one engine to be erected at the Lake View pumping station, in the city of Chicago. According to plans and specifications on file in the office of the Department of Public Works in said city. Proposals must be made out upon blanks furnished at said office, and be addressed to said department, indorsed "Proposals for Horizontal Pumping Engines." **H. J. JONES,** Commissioner of Public Works.

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