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Table with 3 columns: Mining News (Alabama to Washington), Foreign (Brit. Columbia to Mexico), Mining Stock (New York, Boston, San Francisco), Markets (New York, Boston, San Francisco), Metals (New York, Buffalo, Chicago, Philadelphia, Pittsburg), Chemicals and Minerals, Current Prices (Chemicals, Minerals, Rarer Metals), and Advt. Index.

THERE is reason to believe that the great injury which the appointment of Senator J. P. JONES, the head of the infamous Comstock mill ring, would do to the cause we seek to promote in the approaching international silver conference, has at last met with recognition in high places, and Senator JONES will probably retire from the Commission, and that another, and, we trust, more creditable, representative will take his place. It is understood that Senator JONES' private business has suddenly become so exacting that he cannot possibly absent himself for some time to come. If the President were to appoint Mr. E. O. LEECH, the able Director of the Mint, as a representative on the Commission, he would greatly strengthen our position and improve the now doubtful prospect of convincing the representatives of foreign governments that it is to their interest, not less than to that of the United States, to agree upon a course that will ward off the impending disaster, due to the enormous depreciation of silver.

THE anthracite octopus is still reaching out for higher and higher prices for coal; its appetite increases as it devours its prey. On shipments of say 42,000,000 tons this year, and a probable average increase in selling prices of \$0.75 per ton, the public will have paid \$32,000,000 to satisfy this appetite.

What is a fair price for anthracite, and how would an unfair price affect the prosperity of other industries and of the nation, are natural and pertinent questions.

When the control of the bituminous coals coming to tidewater is perfected, as there is reason to expect will be the case before long, there will be nothing to hinder the enactment of high prices for that article, and still higher prices for anthracite.

The "economies" in the management of the roads and of the coal trade incident to combination are not now much talked of as the source of the companies' profits; in fact, where one has the power, it is easier to make profits by decreeing an advance in the price of coal than by painful reductions in cherished extravagances of management.

These subjects are attracting not a little attention, and may well repay investigation.

It has been recently stated by an engineer in an address to college students that the pecuniary reward of engineering practice is much less than that of other professions where equal ability is called into play.

Physicians and lawyers, as a rule, the speaker said, are in receipt of much larger annual income than their fellow scientist, the practicing engineer. This may be true when marked exceptions are considered, but the industrial opportunities of the mining, civil or mechanical engineer must not be overlooked, nor should the possibility of profitable inventions be undervalued. Either may make the professional engineer's fortune, while the lawyer or doctor has no such opportunity. Neither are brought into such close connection with the actual affairs of business.

The discovery of chloroform, ether or of any of the means of producing anaesthesia, undoubtedly the greatest medical discoveries of the present time, made no fortunes for the discoverers; indeed the names of these benefactors to humanity are almost forgotten. But the names of the great engineers who not only have benefited the world, but have made large fortunes, are household words. As an instance of what we have said, the words of an eminent and wealthy mining engineer may be quoted:

"I have practiced my profession for 25 years," said he, "and my receipts from professional fees have been in the neighborhood of only \$150,000, while my expenses, for I have kept my accounts exactly, have been within a few thousand dollars of this."

There are many engineers remarkably successful financially and professionally who could duplicate this experience, and who, like this one, are yet well satisfied with the net results of their profession. There is no profession which offers so many opportunities, to the aspirant as that of the engineer.

THE COST OF COAL MINING.

The cost of producing coal in the Pocahontas district of Virginia is given on another page from a census bulletin by Mr. JAS. D. WEEKS. This cost is put down at 72 1/2 cents a ton of 2,240 lbs., including 10 cents royalty, and is made up of 37 1/2 cents a ton for mining and 25 cents for deadwork and hauling. This latter item is extremely high. About one-half of it is counted, under less advantageous conditions, a sufficient margin. In the Pocahontas mine the hauling is done with a locomotive, which takes the coal on the main gangways and hauls it at a very low cost (said to average 6 cents a ton) to the railroad tipples. As deadwork in so large a bed is done for the most part at very little over "breast" prices, it is difficult to see where even 12 1/2 cents instead of 25 could be absorbed in these items.

It is interesting to compare this cost with that in mining large beds in Nova Scotia, the only competitive foreign field. At these collieries the cost in 1890 was and now is about \$1.20 to \$1.50 a ton of 2,240 lbs.; or about double the cost at Pocahontas, and at most of the Cumberland, Md., and Clearfield, Pa., collieries. The following itemized cost sheet for one

of the large Nova Scotia collieries in May, 1892, shows how this cost is made up.

Month of May, 1892.		Month of May, 1892.	
Department.	Cost per ton. Cents.	Department.	Cost per ton. Cents.
Underground:		Expenses:	
Cutting and loading.....	47.91	Coal used at works.....	2.48
Tardage and butts.....	4.81	Office at mines.....	4.06
Overmen and deputies.....	2.84	Office at St. John.....	1.76
Roadmen.....	1.63	Royalty, at 10 cents.....	9.29
Bottomers.....	1.44		
Drivers, tappers and cage runners.....	6.40		17.59
Pump, stable and furnace men.....	1.95	Construction and repairs:	
Shiftmen.....	7.41	Labor, sinking.....	3.73
Stone drift.....	2.06		
	76.45	Stores:	
Surface:		Pit timber.....	5.97
Foreman.....	.77	Oils and waste.....	.87
Banksmen.....	2.89	Engine and machinist supplies ..	.44
Screenmen.....	4.41	Sundries.....	1.35
Engine and firemen.....	4.52	Hay, oats and feed	2.10
Watch and stablemen.....	1.31	Freight and express.....	.19
Blacksmiths.....	2.22		10.92
Carpenters.....	1.35		
Laborers.....	2.83	Cost per ton.....	\$1.2933
Trucking.....	.31		
	120.64		

There are still cheaper collieries than the Pocahontas in this country; in fact, there are those where the total cost, exclusive of royalty, is below 40 cents a ton, and where the miner is paid for cutting and loading and "putting" to the gangway only 25 cents a ton and earns at that very high wages. There is, therefore, quite enough protection provided by nature without the intervention of tariff to make our coal mining safe against Nova Scotia or any other country, and to give our industries the advantage of the cheapest fuel in the world—unless, indeed, the prices be advanced by artificial means, such as combinations and "corners." We shall revert to this interesting subject again, and give the details of cost of producing coal in this country and in other parts of the world.

LABOR AND ORDER.

In preceding articles I have sufficiently emphasized the importance of punishing violations of law committed in the name of "labor." Some remarks will now be offered concerning the prevention and resistance of violence, such as often accompanies "labor" disturbances. We are justly enthusiastic in praise of the loyalty, alacrity, patience and courage exhibited by the citizen soldiers of Pennsylvania and New York, when called to protect life and property. In this State, there is but one discordant note in the general approbation bestowed upon the Governor and the patriotic National Guard. Some of the "labor leaders" have ventured the cavil, that Governor FLOWER called out too many troops. Only 500 strikers, they say, at any time; and 8,000 soldiers sent to Buffalo! It would not be worth while to refute this silly criticism, if it did not involve considerations likely to arise again—in fact, characteristic of such occasions—which deserve comment.

1. In all such cases, when violence breaks out, it is disclaimed by the leaders of "organized labor," and charged to a dangerous element of the population with which they are not connected, and which they say they cannot control. Such an element unquestionably exists, and must be taken into account. In cities like Buffalo, it may be numbered by thousands, including as it does all the professional rogues and ruffians, who find either plunder or pleasure in destructive mischief, together with the ignorant, who are excited by vague desires of revenge for fancied social wrongs. If, as Mr. SWEENEY protested, the strikers had nothing to do with the lawless violence, pray what had the number of strikers to do with the means necessary for preventing and suppressing violence?

2. The work of our troops at Buffalo did not consist in the quelling of an actual riot, or in interference of any kind with a strike, but in patrolling some 600 miles of railway tracks, contained in an area of 70 square miles. At any unprotected point of this vast complex, life and property were in peril from scoundrels who, undeterred by Mr. SWEENEY'S disapproval, were bent on burning cars, misplacing switches, pulling out coupling pins, placing obstructions on tracks, and the like. The 8,000 soldiers were kept busy enough, until that midnight when the strike was "declared off." They began to go home the next day; for the outlaws whom Mr. SWEENEY could not control in any other way, instantly became harmless when he issued that order. But whether there were thousands of them or only a couple of hundred, the protection of the property exposed was not excessive.

3. At the beginning of the strike, and continuously down to the very last hour, the leaders boasted that they could, and if "necessary" would, tie up through sympathetic strikes every railroad in the State; and the final act of the performance was a secret conference with the heads of several other labor organizations, professedly held to decide whether this should be done. True, Mr. SWEENEY failed to persuade the other leaders, and their good sense prevented the extension of the trouble. But should the Governor of the State have waited, before massing troops at Buffalo, until it had become impossible to transport them?

4. Finally, there is no doubt that the prompt display of overwhelming

power cowed the disorderly element, and prevented bloody collision. What might easily have become an open riot, in the presence of a smaller force, became at once a mere series of petty individual offenses. Our boys received, here and there, what one of them called his "baptism of fire-brick"; but we are all glad they experienced nothing worse; and we do not sympathize with those who profess that it would have been better to send a smaller number of soldiers, so that there could have been a fair fight! Whenever the National Guard is called upon, both wisdom and humanity require that it should appear in such imposing strength at the outset as to prevent, if possible, any fighting at all.

These considerations, as I have said, apply to nearly all cases of extended strikes, involving scattered and exposed property. But the satisfaction with which we contemplate the outcome in the Buffalo matter cannot obscure our conviction that the use of State troops as private watchmen is not going to be practicable as a general rule. The impressive object lesson given at Buffalo cannot be repeated indefinitely. The means are too costly. In a word, we are brought face to face with the economical conditions which have led, in history, to the employment of mercenary bands of professional soldiers, or the creation of standing armies. A standing army of State police (like the Coal and Iron Police of Pennsylvania) is perhaps the least objectionable device of that kind. But for the simple work of guarding property against individual incendiaries, thieves and marauders, the very best means is that which our fathers contemplated when they guaranteed to every citizen the right to bear arms. Why should not railway companies, so long as there is no organized and open riot, protect their own cars, tracks and shops, hiring their own watchmen to do it?

This is what the New York Central & Hudson River Railroad Company did in the last great strike upon its lines. But the other day, when again (though less extensively) threatened, it instantly appealed to the State. The reason is, that in the meantime the "anti-Pinkerton" law had been passed. As corporations are the creatures of the legislature, and have no rights except what are conferred by statute and may be by statute taken away, it is doubtless not unconstitutional to forbid their doing what individual owners of property are unconditionally authorized to do. And certainly corporations are not likely to contest the matter. It is altogether too great a benefit to them. They can now fold their hands and hold the State responsible. But how the taxpayers will like this favor shown (under the pretense of a stern prohibition) toward corporations, remains to be seen. Not improbably, there will be some disposition to inquire what grounds existed for the anti-Pinkerton legislation, as well as to consider its actual and probable effects.

Such an inquiry might divide itself into three branches: 1. Is there anything necessarily injurious to society in the employment of private watchmen by corporations? 2. If such a course is permissible, is there any reason *a priori* for forbidding a corporation to do what an individual property owner can do, when in need of extra watchmen for a temporary emergency, namely, engage men of guaranteed experience and fidelity, through a responsible agency? 3. Is there any proof of actual abuses, outrages or evils, attributable to the acts of the Pinkertons and their employees in this capacity?

To the first and second questions, there can be but one answer, No. It is manifestly impossible for a corporation to employ continuously so many watchmen as it may need in a special crisis. Nor can a corporation intrust the protection of its property exclusively to its ordinary employes, since the chief emergency requiring special guards is caused when the employes wholly or in large numbers abandon their duty. At such a time it is not only better for the corporation and its property, but also for the community, that the necessary special watchmen should be trusty men, accustomed to that particular business; not ignorant of their responsibility under the law; and not liable to be led away by excitement. For, it must be remembered, the legal position of a private watchman is clearly defined. He may resist the invasion of his employer's property by force of arms, even to the killing of the invader; but he can wage no aggressive war, make no reprisals, in short, do nothing not necessary to his duty of defense; and for every act he is held to a responsibility much more strict than that of a regular policeman or soldier. One would naturally expect that practiced watchmen would be far less likely to become angry or flustered, and to provoke or commit unnecessary bloodshed, than untrained men, suddenly recruited for such service.

To the third question, it must be answered, so far as my observation goes, that the actual record of the Pinkerton watchmen confirms the expectation just stated. I do not recall a single instance in which one of these men was proved to have overstepped the line of strict defensive duty. They have been cool, prudent, brave and incorruptibly faithful; and corporations cannot reasonably be forbidden, on any ground furnished by the Pinkerton record, from employing such expert and trustworthy guards, to prevent the wrecking of railway trains, or the burning and sacking of shops and offices. The very prominence of this agency is due to the excellence which has won the confidence of business men.

Some may even think that the same excellence is the cause of the hostility to the "Pinkertons," which has been so loudly expressed. But that

feeling is doubtless intensified by the operations of the agency in its entirely distinct detective department. The Pinkerton detectives have penetrated the secret councils of the Mollie Maguires, the Anarchists, and all other conspiracies against order and law. They are now testifying in Idaho and Pennsylvania to the unlawful plans and deeds of such conspirators. The Pinkerton agency is honorably distinguished by its invariable refusal to touch divorce cases or private scandals; to compromise with thieves or be a party to such compromises; to accept or permit its men to accept special rewards. It is, moreover, never vindictive. On the contrary, its founder was notoriously an active helper of discharged convicts who desired to live honest lives; and the same spirit still animates the office. These and other well known facts are mentioned in justice to a concern just now subject to much hasty condemnation. But such agencies will continue to exist, whatever may become of this one. While criminals run away and hide, or secret leagues plot crime, detectives will be necessary. This separate function of the Pinkertons, however, has nothing to do with their business of supplying private watchmen; and, returning to that subject, I would say in conclusion, by way of summary, that I am unable to see any valid reason for releasing corporations from the ordinary duty of guarding their own property, by forbidding them from hiring the best men they can get for the purpose, and that I think it would be well to put that responsibility back upon them, where it used to rest, so that the National Guard could be reserved for service only in the presence or prospect of actual mob violence.

R. W. R.

NEW PUBLICATIONS.

A TEXT BOOK OF EXPERIMENTAL ENGINEERING for engineers and for Students in Engineering Laboratories. By Rolla C. Carpenter, C. E. M. E. Professor of Experimental Engineering, Cornell University. John Wiley & Sons, New York, 1892. 694 pages, price \$6.

The present work is a third edition of "Notes to Mechanical Laboratory Practice," published in 1890. The book has been rewritten and very much enlarged. The earlier editions were prepared especially for the use of students in the laboratory of experimental engineering in Sibley College, Cornell University, but the enlarged work is also adapted to the use of the practicing engineer, as a reference book, since it contains the principal standard methods in use for testing materials, engines and machinery.

In chapter I., the author discusses the reduction of experimental data, showing the application of the method of least squares for determining the probable error of a result, the deduction of empirical formula from observed data, and the use of graphic methods for recording and studying observations. Chapter II. treats of the slide rule, various forms of planimeters and averaging instruments, micrometers, etc. Strength of materials, testing machines, and their accessories, and methods of testing materials of construction occupy four chapters, or over 100 pages. Chapter VI. relates to friction and the testing of lubricants, and description of oil testing machines.

Dynamometers, prony brakes, etc., are treated of in chapter VII., which illustrates and describes several forms, such as the strap brake, the Alden, Morin, Lewis, Batchelder, Webber, Emerson and Van Winkle dynamometers. Chapter VIII. discusses the measurements of liquids and gases, and their flow through orifices and pipes, also meters, anemometers, etc., and chapter IX. hydraulic machinery, such as water wheel pumps, etc. These chapters constitute part I., averaging about half the bulk of the book. Part II. consists of 13 chapters, and is devoted to methods of testing of steam and other engines, boilers, fuels, etc. Indicators, calorimeters, draft gauges and other instruments used by the steam engineer are described at length. About 60 pages of useful tables are given in conclusion.

The work is well indexed and paragraphed, and is handsomely printed. It will prove a valuable reference book in an engineer's library, and will be especially useful to engineering students.

DYNAMOMETERS AND THE MEASUREMENT OF POWER. A treatise on the Construction and Application of Dynamometers, with a Description of the Methods and Apparatus employed in Measuring Water Power. By John J. Flather, Ph. B., M. E., Professor of Mechanical Engineering, Purdue University. John Wiley & Sons, New York. 206 pages.

This little work presents in convenient form for the use of students and engineers a description of the construction and principles of action of the various types of dynamometers employed in the measurement of power. It is the outgrowth of a series of articles recently published in the *American Machinist*. In addition to such description it treats incidentally of the friction and power of machine tools, belts, etc., and of the measurement of water power.

The forms of dynamometers considered are practically all of those in common use, old forms described in the text books, but which are now no longer used, being omitted. In general the work is altogether commendable, but there are a few slips which may be corrected in the next edition. On page 73 the words "moment of flexure" are used for "moment of inertia," and the first formula does not follow as stated from the conditions given. On page 76 the principle of the Batchelder dynamometer is stated in a manner which is not very clear and not strictly correct. In speaking of the Webb dynamometer the author says: "There is no other dynamometer in which the accidental errors may not cover up or reverse the results; this is the natural result of the simplicity of principle and construction of this dynamometer." It would probably more accurately express the author's ideas to say that the defects of the other dynamometers are the natural result of their own lack of simplicity; it is not apparent how the simplicity of the Webb dynamometer can cause errors in other instruments.

Professor Flather is to be congratulated upon having struck out of the

broken track of the ordinary technical text-book writers, and given us a monograph upon a subject upon which no one hitherto, as far as we know, has written a whole book. We trust he will continue his researches upon the same subject, and in a new edition, a few years hence, give us more experimental results, and, if possible, a description of a more convenient and generally useful transmitting and recording dynamometer than any that has yet been brought into use. The engineering world is waiting for such an apparatus.

BULLETIN NO. 3 OF THE GEOLOGICAL SURVEY OF ALABAMA (Dr. Eugene A. Smith, Director, University, Ala.). A Preliminary Report on a part of the Lower Gold Belt of Alabama, in the counties of Chilton, Coosa and Tallapoosa, by Wm. B. Phillips. Published by the Survey.

The gold fields of Alabama lie in these counties, as also in the counties of Cleburne, Clay, Talledega, Randolph, Chambers and a part of Elmore, and comprise about 3,500 square miles. This territory is watered by numerous streams, such as the Coosa and Tallapoosa Rivers, of considerable size, as also by large creeks, Hatchet, Weoguffka, Hillabee, etc. The Appalachian Mountains have here their southwestern termination, the granites, gneisses, schists, etc., of the northeastern part of the range extending as far as Wetumpka on the Coosa River. The general shape of the gold fields is that of an immense equilateral triangle of 90 miles to the side, connecting the points Calera, on the Louisville & Nashville Railway, 30 miles south of Birmingham; Tallapoosa, Georgia, on the Georgia Pacific Railway, and Columbus, Georgia, on the Columbus & Western Railway. The most westerly point at which gold has been found is on Mulberry Creek, in Chilton Co., 12 miles west of Clanton, a station on the L. & N. Ry. From this place to the Alabama-Georgia line, a distance of about 100 miles, gold is found, sparsely, in a great number of small streams, and in workable amount in many quartz seams.

No considerable operations have been conducted in any part of the field, with the exception of Clay and Cleburne counties, for 30 years. Prior to the discovery of the California gold fields and for a few years thereafter, great activity was shown in the county of Chilton at the Rippatoc Mine; in Tallapoosa at Silver Hill and Gregory Hill and between Hillabee Creek and Goldville; in Coosa Co., along Weoguffka Creek; in Cleburne Co., at Abacoochee; and in some other less important places. The work was confined to the gravel almost entirely. The quartz seams were merely scratched, enough having been done to show that some of them, at least, were of profitable richness. The assays of the quartz samples taken between Hillabee Creek and Goldville, including the Jones Pits, beyond Goldville, show a value varying from \$2 to \$58.67 per ton. Four samples from Hog Mt., Tallapoosa Co., gave results varying from \$6.20 to \$58.67 per ton. Two samples from Silver Hill, Tallapoosa Co., gave \$8.56 and \$104.98 respectively. One sample from Gregory Hill, Tallapoosa Co., gave \$6.30, and one from Blue Hill, close to Gregory Hill, \$8.46. Two samples from Alum Bluff, Coosa Co., gave \$15.43 and \$7.33 respectively, and one from Rockford, Coosa Co., \$12.40.

Dr. Phillips, who has had several years' experience with similar ores in North and South Carolina, thinks that some of the quartz seams of Tallapoosa Co. are very favorably located for cheap mining and milling. This is notably the case with the seams lying on and near Hillabee Creek.

The gold, now carried free by the quartz in the upper levels, will doubtless be carried by quartz and sulphuret in depth, but appendix A is devoted to a description of the Thies Chlorination System, so successfully applied to such ores at the Phoenix Mine in North Carolina, and the Haile in South Carolina.

To many of our readers it will doubtless be a surprise that Alabama, known as an iron State, has resources that could place it also among the gold producers. The Geological Survey will pursue the investigation until all that can be known as to the gold fields of the State will be laid before the public. We await with interest the completion of the work. To judge from the preliminary report there must be occurrences of gold ores in Alabama well worth attention. A fine climate, an abundant supply of good water, extensive forests of hard wood and pine; and easy accessibility render the gold fields of Alabama by no means unattractive to those who wish to engage in gold mining without spending a great deal of money.

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 in another page of the Journal.

Annual Report of the Geological Survey of Arkansas for 1892: Vol I. The Iron Deposits of Arkansas, by R. A. F. Penrose, Jr., Ph. D. Published by the Survey, Little Rock, Ark. 1892. Pages, 153. Illustrated.

Electric Lighting Specifications for the Use of Engineers and Architects by E. A. Merrill. Published by the W. J. Johnston Co., Ltd., New York, 1892. Pages 176. Price, \$1.50.

Handbook for the Department of Geology in the U. S. National Museum, Part I. Geognosy.—The Material of the Earth's Crust. By George P. Merrill. Published by the Government, Washington, D. C., 1892. Pages, 61. Illustrated.

Mineral Resources of the United States 1880 and 1890. By David T. Day. Published by the United States Geological Survey, Washington, D. C., 1892. Pages 671.

The Mining Laws of the Republic of Colombia with a Short Explanation of Their Application and Official Forms for Notices, Denouncements and Applications for Title. Translated and edited by Charles Bullman, M. E. Published by the Scientific Publishing Company, New York, 1892. Pages, 107. Price \$1.50.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials 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 Aggregate Molecular Surface in One Cubic Inch.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The fact brought out in Mr. Church's recent letter is of course an interesting one, but unfortunately the premises and calculations are by no means correct.

It is true that Sir William Thomson estimates the number of molecules in one cubic inch of gas at 10^{23} . He, however, does not say that they touch one another; in fact such a supposition is impossible, for where would be the molecular bombardment which produces heat if every molecule were wedged in tightly among its neighbors? Then, again, in the calculation Mr. Church assumes that each molecule is a sphere, but takes its volume to be equal to 10^{23} of 1 cu. in. This volume is of course the volume of a cube whose side measures 10^{23} in.

On the hypothesis that each molecule touched twelve neighbors it would need too long a calculation to ascertain the exact diameter and surface of each, and from that the total area of all the 10^{23} molecules. In general terms, however, the proposition may be stated thus: If there is a sphere of diameter a , its area is πa^2 ; if now we fill it with x^3 spheres each of $\frac{a}{x}$ diameter, then the area of each small sphere is $\pi \left(\frac{a}{x}\right)^2$ and the total area of the x^3 spheres will be $\pi x^3 \left(\frac{a}{x}\right)^2$. The total area of the spheres will thus vary with the $\frac{3}{2}$ power of the number of spheres. If we make x very great, then, though the total volume of the spheres can never exceed the volume of the inclosing sphere, the total superficial area of the spheres becomes very great also. If we make x infinite the total area of the infinitely small spheres is infinitely great.

NEW YORK, Sept. 1st, 1892.

EDWARD WALKER.

Nitrogen and Water.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: "Coutie's contribution to the Metallurgy of Iron and Steel" should be the title of a little pamphlet issued by William Coutie, Troy N. Y., instead of "Nitrogen and Water, or the Water Atoms and Their Revelations," as he thus obscures under an abstruse phraseology, a discussion which should interest every iron and steel worker in the country, if what he affirms be true.

When we are told to apply "this same rule in the same way to coal," without being told what the rule is or what the way is, how can we be prepared to believe that coal "becomes the phosphorus of iron?" Or that under its benign influence graphite becomes a nitrate of cyanogen? Or that "common phosphorus (it would be very uncommon phosphorus that would demean itself thus) becomes a hydrate of coal?" Or that "sulphur becomes a hydrate of the sulphur of iron?" Or that "the application of this rule will convert the manufacture of iron into a science as well as an art, and give it a truth, an honor and a dignity it can never otherwise attain?" It must be a powerful rule that will do all these things, but it may well be supposed that the way in which the rule is to be applied would influence the result no little.

I have thought that perhaps this rule was concealed, in certain dark sayings, such for instance as "an atom of nickel is simply an atom of atmospheric nitrogen with its one atom of hydrogen replaced by one of ammonia, and an atom of platinum is simply one of caesium with the same hydrogen atom replaced by one of zinc." And that nature in her every day practice converts common air into silver, platinum and gold (she would certainly deserve her Sunday afternoons out after such week-day labors). He informs us that "all the heavy elements are formed almost directly out of nitrogen and nitrogen gas;" and imparts many other items of information equally exhilarating. But as to the rule by which these wonders are to be wrought, he is unfortunately silent. Perhaps, after all, the iron ore that is charged into a blast furnace is not the source of the pig iron that flows from the tapping-hole. It may be only the essential part of the aforesaid rule by the operation of which the nitrogen in the blast is transformed, transmuted, translated, transmogrified, transanything so that we get Bessemer or No. 1 F. A distinction, however, is made between nitrogen and nitrogen gas, for we are told that "the last and most resultant discovery of all is that nitrogen gas is a hydrate of nitrogen, having the atomic form, N_3HN_3 ." And "nitrogen itself is composed of seven atoms of hydrogen." This seems to dispose of the suspicion that No. 1 F. iron may be only a condensed form of nitrogen.

WILLIAM B. PHILLIPS.

A Hint to the Friends of Silver.

EDITOR ENGINEERING AND MINING JOURNAL:

In your issue for Sept. 3d, inst., when treating of the forthcoming International Monetary Conference on the "silver question," you say truly, "that what is to the interest of the United States is equally to the interest of all the great commercial nations, . . . and to none more than Great Britain."

The difficulty before the representatives of the United States at the Conference will be to carry conviction on this point.

While our annual purchases of 54,000,000 fine ounces of silver continue and the Congressional representation from both parties numbers many advocates of "free coinage," the other nations will, naturally, stand aside, and allow this country to work out a solution of its politico-monetary problem whose political phase has been assumed rather on sectional than on party lines. The United States' arguments will be received cum grano salis, "the wish being father to the thought," and the consensus of opinion, as I gather it from the financial journals, foreign and domestic, seems to be that the Conference will resolve

itself into "an academic discussion of the silver question" and end without practical result.

If our Government silver purchases were stopped, and the commercial nations advised that, while this country desires the rehabilitation of silver as a money metal, and seeks co-operation accordingly, and that if the great nations determine that gold alone shall be the metallic base, the United States will accept the verdict and "demonetize" silver, except for subsidiary coinage, the position of our representatives would be greatly strengthened and some solution of the interminable "silver question" might be expected.

"Free coinage" is probably as dead an issue as its predecessor, "greenbackism." There is a growing sentiment favorable to the cessation of silver purchases. Will not the friends of silver find it to their interest to unite in the movement, thus placing the nation in the best possible position at the Conference, rather than to preserve the status quo until the failure of the Conference shall have encouraged the anti-silver men, and, very likely, bring permanent "demonetization" as the outcome?

Can not you, who so ably refuted the "free coinage" heresy, take up the cudgels in favor of the repeal of the "Sherman Law of 1890," before the conclusion of the Conference? Very truly yours,

REFORM CLUB, NEW YORK, September 5, 1892.

R. V. DU BOIS.

The Royalty on Canadian Nickel.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: By a number of private inquiries from American mining men I find that a part of my last letter, in reference to the royalty on nickel ores, has been misunderstood, and I would therefore like to explain the matter more fully.

The new mining law of Ontario went into effect on the 4th of May, 1891, imposing a royalty of 3 per cent. on nickel, copper and silver ores, and 2 per cent. on iron ores, to be calculated on the gross output of the mines. But this latter clause was amended last session of the Legislature to have the royalty calculated on the value of the ore at the pit's mouth less the cost of labor and explosives, or, in other words, on the estimated value of the ore in the mine. Of course, the royalty applies only to claims taken up after the passing of the new act, or since the 4th of May, 1891, and is not to be charged in any case until seven years from the date of patent or lease of any claim. By that time, if not before then, it is confidently expected that the Government will adopt a more liberal and progressive mining policy and abolish royalties altogether.

But as far as nickel is concerned, the new law need not affect mining here for the present generation or the next fifty years, as nearly all the best nickel properties in the whole district were taken up and patented before the new act was passed, and are, therefore, exempt from royalties in any shape or form for all time. They were sold with an absolute title to everything on and under the ground except the pine timber, and the Government could not interfere with them in this or any other way, even if it wanted to. They are private property now, and enough of them are still in the hands of the original owners and unworked to furnish a dozen new mining companies with an unlimited supply of ore.

The ore bodies here are not superficial deposits, but large volcanic beds of unknown but evidently very great depth. One of the mines is down to the eighth level or about 600 feet, without any signs of the ore giving out. On the contrary, in all the mines so far worked in the district the ore bodies have been found to improve both in size and grade the more they are opened up. There is no vein system on the nickel range here, but in the township of Graham there are several continuous red ridges, indicating regular ore beds for six miles without a break. Mr. J. C. Ryan, of East Saginaw, Mich., in stripping a claim on one of these ridges last week, discovered a massive bed of nickel ore right on the surface, but in most cases the mineral deposits in this township are somewhat heavily capped by a diorite overflow. Very little development work has been done on this section of the range yet, but when opened up there will undoubtedly be a number of very productive mines in it.

NICKEL CITY, Aug. 27, 1892.

A. MCCHARLES.

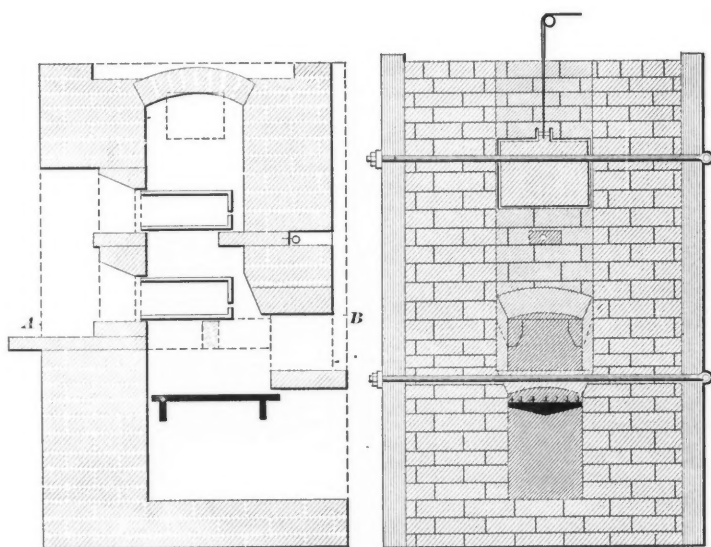
Storage Battery Traction in England.—In Birmingham, England, electric cars run by accumulators do not appear to be a success. During the year 1891-2 a loss of £1,679 is reported. The receipts were £10,423, the miles run were 188,760 and 1,382,997 passengers were carried. The loss is put down to the heavy charges for renewals of batteries. The total cost per mile run was 15.39 pence. In Birmingham they have cable cars, steam cars, horse cars and omnibuses, so that a comparison can be made of their cost. During the year 1891-2 the steam cars ran 1,212,624 miles, carried 14,659,240 passengers and the total cost per mile run of 12.03 pence. The horse cars and omnibuses ran 634,551 miles, carried 3,753,741 passengers and the total cost per car mile run was 9.96 pence. The cable cars ran 621,210 miles, carried 6,922,304 passengers and the total cost per mile run was 6.18 pence. It will thus be seen that the accumulator cars compare very badly with the remainder and that the cable cars are by far the most economical.

English and American Freight Cars Compared.—We often wonder why the English railroads stick to their small freight cars and do not adopt the large cars universally used in this country. An English freight train carries a tremendous amount of dead weight. Mr. Acworth, a British authority on railroad statistics, makes the following comparison: To carry 329 tons of coal an English railway would use about 40 wagons, with a total length of 640 ft. and a total weight of 200 tons; an American railway would use about 13 wagons, with a total length of 312 ft. and a total weight of 117 tons. To carry 329 tons of general merchandise, English practice would use, on the average, 165 wagons, with a total length of 2,640 ft. and a total weight of 800 tons; American, 66 cars, with a length of 1,584 ft. and a weight of 660 tons. These figures apparently show English railroad managers in a bad light, but there are other reasons, as a matter of fact, that outweigh the advantages that would be obtained by the adoption of large cars.

ASSAY FURNACE FOR BITUMINOUS COAL.

The furnace for the plans of which we are indebted to W. Geo. Waring, is lined with firebrick, and costs \$100 to build. The plan is the result of various changes and improvements, and is now considered absolutely perfect, but the dimensions must be adhered to exactly, as to internal arrangements, and whenever the fire is to be allowed to run down, the ash pit opening (as well as fire door and fronts of muffles) must be closed with a sheet iron door, and the damper in flue leading to chimney closed in. This prevents the muffles and muffle supports from cracking, and prolongs their life to 4 or 5 times the usual duration. A muffle has been in constant use 5 months without cracking in this furnace, whereas in another one the muffle lasted but one week. For use with coke, it is best to have but one muffle, and the grate up to within 12 in. of the muffle, with feed door above, and walls 3 in. wider than in this place, for same sized muffle (7 x 11 x 16, with high sides). The fireplace at grates is 13 in. wide, and at base of lower muffle supports it begins to widen out to 17 in. in width at base of lower muffle. The fire place is closed by a sliding door supported from a weighted wire rope running over a pulley, the sliding door being of fire brick bound in iron.

Proposed High Speed Electric Road in Belgium.—A proposition is on foot to build a high speed electric railway between Antwerp and Brussels. The distance between the two cities is 27 miles by the State Railway, and is covered by the fast railroad trains in 48 to 58 minutes. With electricity as the motive power the journey is to be made in 20 minutes, namely, at the rate of 66 miles an hour. The scheme is favorably received all over the country, and two ministers of the Government have intimated their approval of the same to its originator. The State Railway might do away with its fast trains altogether on the already over-taxed existing line. As the electric trains would be dispatched in all the different directions every ten minutes, the service would amply meet the traffic between the two cities, and there would then only remain the ex-



IMPROVED ASSAY FURNACE FOR BITUMINOUS COAL.

tra local traffic to be dealt with in the same way as before. The proposed electric road is to run straight, as a main line, and this could be carried out all the more easily since the most serious grade is only one-half per cent. The trains would consist of one or two coaches having prow-shaped ends, in order to reduce the air resistance. The guard would have his place in a separate compartment in the front of the train, whence he could control the motors located on the car axles, the current being conveyed to them by an overhead conductor. The coaches would be lightly built, and each have accommodation for 60 passengers; they would be capable of being coupled to ordinary trains or of being employed to draw ordinary coaches.

Forel on the Avalanche at St. Gervais-les-Bains.—The avalanche that destroyed the villages of St. Gervais-les-Bains, Travet and Bionnay, according to Prof. F. A. Forel, was one of the most remarkable known. The avalanche came, not from the well-known glacier of Bionnay, but from one higher up on the Tetes-Rousses. From a careful study, Prof. Forel states that the avalanche, consisting of a mass of ice and stone of 55,000,000 cu. ft., rushed down a height of nearly 3,000 ft. The heat disengaged was sufficient to melt the mass and convert it into a viscous mud. This mud broke suddenly over the villages, overwhelming them completely, causing the loss of 150 lives. He describes it as follows: "The mass was fluid enough to slip down a slope of ten feet in a hundred; it was dense enough to overthrow everything in its passage. I estimate that it spent about half an hour, perhaps a little more, in reaching the Arve from the point of its fall. In a few minutes everything had gone by, and there remained only a coating of mud, covering all the ruins with its infected and viscous slime." It seems that the inhabitants did not dread this glacier, more especially as no great avalanche had been known to occur in that region, although it is likely that this same glacier did detach a few avalanches every year, which, being small, did not reach the towns. Regarding future occurrences of a similar nature, Prof. Forel says that "all the glaciers of the Mont Blanc group are, at present, on the increase," and that the glaciers should be inspected and warning given, when possible, of any increase in their rate of movement.

VARIATIONS IN THE MILLING OF GOLD ORES—I.

Written for the Engineering and Mining Journal by T. A. Rickard, A. R. S. M., F. G. S

GILPIN COUNTY, COLORADO.

(Continued from page 222.)

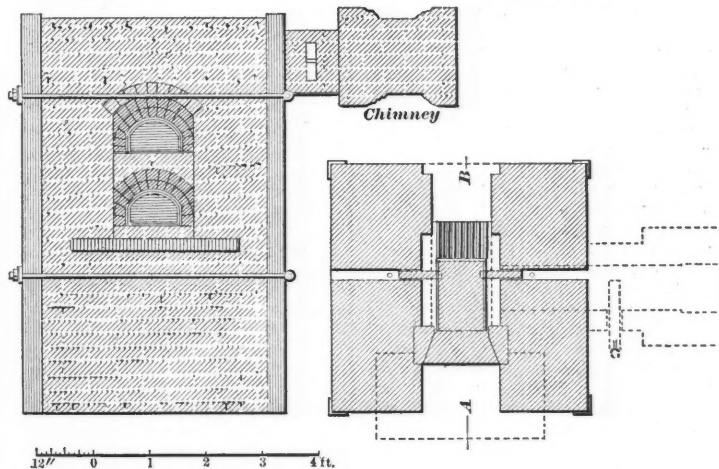
Before venturing upon a criticism of the methods of milling it will be well to glance at the character of the ore. It has been stated that it is of the refractory class, the percentage of concentrates obtained at the mills and the low grade of the bullion will have confirmed this statement. To give a more detailed description I will not scatter my observations over the district, but endeavor to describe the ore of the California mine, treated at the Hidden Treasure mill, an ore which is of a representative character and is the produce of a representative mine.

The ore as sent down to the mill consists, roughly speaking, of 10 to 20% metallic sulphides, 15 to 20% quartz, 60 to 70% vein filling other than quartz. The lode matter consists of an altered form of the rocks enclosing the vein; the latter traverses for the most part a gneiss, which, however, alternates with granite on the one hand and mica schist on the other. The filling of the vein consists, therefore, largely of feldspathic material. Of the metallic constituents, the sulphurets, iron and copper pyrites, predominate. Gray copper (fahlerz or tetrahedrite), arsenical pyrites (mispickel) and galena are also present in noteworthy proportions. Blende is sometimes seen and chalybite (carbonate of iron) appears occasionally.

The gray copper, which here is antimonial, is generally remarkably favorable to the presence of gold. This fact would prove a valuable index in selecting the ore were it not so often confounded with arsenical pyrites. Quartz, especially favorable when of a blue tint, is always associated with the pyrites in rich ore.

The following results of assays made by me* upon a typical piece of ore broken in the 1,700 ft. level will throw some light upon the distribution of the gold and silver in the ore.

Mineral.	Gold. oz. per ton.	Silver. oz. per ton.	Remarks.
Iron pyrites.....	.65	4.85	White, coarsely crystalline.
Copper pyrites.....	.85	53.50	Flaky, dark yellow.
Gray copper.....	.90	38.65	Chiefly covering the last.
Blende.....	.16	6.45	Black; crystalline.
White quartz.....	3.32	7.35	Opaque, massive, with small
Bluish quartz.....	3.56	5.84	crystals of pyrites throughout.
Flinty quartz.....	.18	1.90	Brown, vitreous.
Feldspathic gangue.....	.90	2.35	Soft, granular, white.



This analysis bears out the experience of the mills where half the gold contents of the ore are extracted by the first amalgamation in the mortar box. The gold cannot, therefore, be chemically combined with the pyrites; on the other hand, though the more highly mineralized the ore is the richer also it usually is. There is no doubt that the silver contents are for the most part associated with the copper-bearing minerals, while the gold is enclosed by the quartz, especially that quartz which is in immediate association with pyrites. Neither blende nor galena is an attendant upon the gold, and both are a nuisance in the mill.

The following figures further illustrate the character of the ore; they represent the output for 1890: 150.44 tons of smelting ore, averaging \$92.79 per ton net; 1,376.03 tons of concentrates, averaging \$15.06 per ton net; 10,320.57 tons of mill stuff, averaging \$7.42 per ton.

The "smelting ore" simply represents the heavily sulphuretted ore picked out at the mine and shipped direct to Denver. The mill stuff yielded 4,766.39 oz. of bullion, worth \$16.65 per oz. Of the total tonnage 98% was mill ore, and of the total value 84%. Of concentrates the mill ore yielded 13%.

Tests have been made from time to time to determine the completeness of the extraction at the mill. Herewith is given the result of the last one, made in March, 1891:

A lot of 8,400 lbs. was passed through the breaker and rolls erected at the mine by the company for the particular purpose of accurate sampling. These 8,400 lbs. contained 4% moisture, leaving 8,064 lbs. net.

The assay gave: Gold, 1.85 oz.; silver, 8.75 oz. per ton.

The contents of the 8,064 lbs. were, therefore, 7.46 oz. of gold and 32.86 oz. of silver. At the smelter such ore would be worth, † net, \$27.08 per ton and have a total value of \$109.18.

The ore was sent down to the mill and yielded, after treatment for 18 hours by five stamps, 6.70 oz. of bullion, worth \$16 per ounce, or \$107.20, and 2,325 lbs. of concentrates, containing 15% of moisture, leaving 1,977 lbs. net. ‡ The assay of the concentrates gave 1.76 oz. gold and 10.34 oz.

* In 1886, when in the management of this mine.
† Smelting charges, \$12 per ton and a return of 95% of the gold and silver, according to the New York quotations.
‡ The ore therefore contained 24 1/4% of sulphurets.

silver per ton, or a total for the 1,977 lbs. of 1.74 oz. gold and 10.37 oz. silver, worth \$44.03, or, deducting smelter charges, \$36.03 net.

Let us compare the results. The milling cost was at the rate of 84 cents per ton. Therefore the mill return was, after all deductions are made, \$140.85; bullion, \$107.20; concentrates, \$36.05; total, \$144.23. Deducting milling cost at 84 cents per ton, \$338 = \$140.85. At the smelter the amount received, owing to the larger deductions and charges, reaches the smaller sum of \$109.18. Commercially the mill therefore gave better returns than the smelter.

As a test of the millwork the figures work out as follows: There was in the ore 7.46 oz. of gold and 32.86 oz. of silver. There was extracted as bullion 5.25 oz. Au., 14 oz. Ag.; and in the concentrates 1.74 oz. Au., 10.22 oz. Ag., or a total of 6.99 oz. Au., 24.22 oz. Ag. Thus the mill, including the value in the concentrates, saved 93.8% of the gold and 74% of the silver. The mill did not, however, complete the extraction of the gold and silver in the concentrates, so that it actually obtained by amalgamation alone 70.4% of the gold and 42.6% of the silver.

This test is very fairly representative of the returns obtained on a larger scale. Generally speaking, it has been found that the mill yields as many ounces of base bullion as there are ounces of pure gold in the ore as found by fire assay. The mill gold is 780 fine, and this proportion very nearly represents the percentage extracted by amalgamation. Considering the fact that the Gilpin County ore is probably the most highly charged with sulphurets of any of the gold-bearing millstuff treated by amalgamation at the chief mining centers of the present day, it is not too much to say that the extraction at the stamp mills is exceedingly good.

That this is so is due to the proper recognition of the necessity for altering modes of treatment in accordance with differences in the character of the ore treated—the first principle of all successful milling. The Georgian and Californian types of stamp batteries were found unsuited so soon as ever the surface quartz had been pierced and the unoxidized pyritic ore was penetrated. The change from the fast drop, shallow discharge system to that which has been described did not take place in a day, but was the outcome of much hard, persevering experimental work. The result is seen in the roomy mortars, slow drop and deep discharge which characterize the Black Hawk mills.

These features are those best adapted to the extraction by amalgamation of the gold in the ores of this particular district. The ore has been described and it may be added that in this locality ordinary panning such as that employed by every prospector will give no "colors" even with material which in the mill will yield rich returns.* The gold is in a very finely divided condition and very intimately associated with the pyrites. To bring about a separation fine crushing is a necessity, and to cause the combination of the gold so separated with the mercury, time must be allowed for it to sink to the bottom of the mortar box where the mercury chiefly lies.

The slow drop and deep discharge produce a pulverization which is even finer than is indicated by the size of the screen openings, for it is found that a large percentage of the pulp will pass through a 100-mesh wire sieve.† Of the finest pulp a preponderating part is pyrites, which is thus crushed smaller than the rest, because the deep discharge and roomy character of the mortar allow it to remain inside after it has been pulverized to a size which would allow of its passage through the screen. This fact is of great assistance in causing the fine gold to be separated from the pyrites, with which it is chiefly associated.

It may appear an error to allow the pulp to remain inside the battery after it has been pulverized sufficiently to allow of its expulsion through the screen. If pulverization were all that is aimed at this would indeed be a mistake, but the battery is here an amalgamating as well as a crushing machine. The delay which occurs before the pulp is expelled enables the gold which has been separated from the pyrites to become amalgamated by contact first with the free mercury introduced by the feeder, and secondly by being splashed against the plates at the front and back of the mortar. The roomy character of the mortar is here necessary, for in a mortar whose construction allowed of less space between the dies and the screen, or between the dies and the back of the mortar, the violent splash of the pulp would cause a scouring of the inside plates, which would rapidly remove the coating of amalgam and render the plates useless as gold savers. Thus to summarize, the deep discharge causes a fine pulverization of the ore and the long interval between the drops, which with a speed of 30 per minute is noteworthy, allows of the action of gravity among the particles of the pulp. The deep discharge and roomy mortar aid in preventing the production of a too violent splash, and in permitting the pulp to remain inside the battery until the amalgamation required has been effected. Thus all three features—roomy mortar, long drop and deep discharge—are seen to supplement one another until the proper conditions are obtained.

Black Hawk is the most important gold-milling center in Colorado, and the group of machines whose principle features we have considered is in every way representative of the best milling practice. Among the factors tending to increase the cost of handling the ore must be mentioned the universally bad situation of the stamp mills. They are placed in the flat of the gulch away from the hillside, the consequent want of fall rendering impossible the erection of suitable ore bins and feeding machinery. This is a fault which may be partially condoned on the ground of their erection having been by no means recent, and is largely due to the desire to utilize as much as possible the motive power in the creek.

The mills are out of date in being unsupplied with rockbreakers. It is true that the advantage derived from the use of a rockbreaker is largely discounted by the fact that the position of the mill buildings would prevent its being supplemented by grizzlies (or sizing bars) and ore bins. At the Hidden Treasure there were a few years ago three small rock-breakers, but owing to the consumption of motive power and the awkwardness of feeding them they have given way to a return of the more primitive methods of the sledge-hammer.

The mills, as we have seen, crush very slowly, and hence there is not that crying need for a rock breaker which exists in a Californian or Aus-

*Of course in this statement I exclude the oxidized quartz ore of the surface portions of the veins.

†This fact has already been explained as being due to the particular variety of screen employed.

‡Owing to the construction of the mill the ore had to be shoveled up into the breakers.

tralian mill but notwithstanding this there is no doubt that in this respect the Gilpin County batteries are defective, for apart from the improvement in the feeding which follows the introduction of a breaker, the irregular work of the sledge hammer must tend largely to increase the strain upon the mill machinery. This is rendered very evident by noting the wear and tear of the shoes and dies, which in the mills of this section is excessive.

In the matter of feeding it is safe to say that given handfeeding which is conscientious, it is superior to that of a machine. But man is human, and an occasional pipe or a casual nap are both temptations known to feeders as to other men. On the score of regular and accurate feeding the automatic machine is, therefore, preferable to the average man.

Where stamps crush fast the self-feeder is a great economy. How does this side of the question appear in Gilpin County? We find that the low crushing capacity of the mills enables one man to keep 25 heads supplied. On the score of economy one would therefore, at first sight, acquit the mills of this district; but if the figures are examined a different tale is told. For 75 stamps the cost of feeding comes to a total of \$6,500 per year, while, on the other hand, if the mill were supplied with the most expensive type of self-feeder, the cost of the additional plant would not be over \$4,000. On the score of efficiency I can vouch for the fact that the feeding is regularly and intelligently done, and, with well-tried workmen, leaves but little to be desired. Feeding machines are of but little use unless preceded by grizzlies and rock-breakers; and therefore, notwithstanding a natural aversion to methods which are out of date and machinery which is incomplete, and recognizing the unfortunate position of the mill buildings, a position chosen in the days preceding the introduction of improved labor-saving appliances, I cannot say that, either from a shareholder's or millman's point of view, the arrangement of the mills can be advantageously altered. When new mills are built it is to be hoped, now that the mule wagon as a transporting agency has begun to give way to a steam tramway, that they will be erected in well-chosen sites, giving the full requisite for the labor-saving machines which have been tried and not found wanting since the days when the Black Hawk batteries were first put up.

The Black Hawk millman is as interesting and important a feature of the milling as the machine whose working he directs. He has been trained in the best of schools, that of experience, and this factor in making him a good workman has been supplemented by the necessities of a continual watch over the treatment of an ore which is subject to a great variety of mineralogical constitution. Two other points are worthy of notice in this connection. All the mills are to a more or less extent dependent for their full supply of ore upon mines other than those of the owners of the mill itself. The custom milling which characterizes Black Hawk is a power in making both proprietor and millman careful in the treatment of the ore and wide awake for possible improvements in the methods employed. Further, the milling is recognized to be as important as the mining. This may seem an unnecessary statement, but I have known instances where a good mine well managed has owned a mill whose working has been under the direction of a man who may have been a good miner, a good chemist, anything you will, but who most assuredly was a bad and inexperienced millman. In Australia I have seen a first-class 40-stamp battery consigned to the tender mercies of an engine driver, who, in addition to attending to the machine which gave the power to work the stamps, was supposed to have the general millwork under his charge.

In Gilpin County the work of management is not considered to finish at the shaft mouth; on the contrary, the milling demands the greater attention. The millmen are better paid than the mine foremen. The needs of the district have produced men who are more fully conversant with the bedrock principles of gold milling than those of almost any other mining center, and such men are not too well paid. Custom milling has had its effect in making proprietors anxious, by placing good men in charge, to gain the confidence of the mining community, and has reacted upon the millmen themselves by encouraging competition in doing good work.

The early evolution of Gilpin County milling practice has been alluded to in previous paragraphs; it was an education and an experience which has left its traces upon the district, for as a milling center it leaves an impression of good work intelligently and conscientiously done.

[The publishers of the "Engineering and Mining Journal" and Mr. Rickard will thank the readers of this article if they will promptly call attention to any inaccuracies or omissions they may observe in it. Correspondence on the subject is solicited.]

Separation of Tin from Cadmium.—Louventhal's method, which is the one commonly used, consists in oxidizing the stannous chloride in solution by heating it with a mixture of sodium sulphate and ammonium nitrate. This method of separation requires considerable care, for the oxide of tin precipitated is gelatinous and is consequently hard to collect and thoroughly wash. Mr. French, by using peroxide of hydrogen as the oxidizing agent, finds that the oxide of tin obtained separates readily from the solution and is easy to wash. The peroxide is added to a nearly neutral solution, to which heat is then applied. The cadmium remains in the filtrate, from which it can be precipitated by sodium or potassium carbonate.

German Method of Preventing Coal Dust Explosions.—In some of the German collieries it has been the practice to sprinkle water in the dusty parts of the mines with a view to preventing coal dust explosions. The following modification of this process has recently come into use at some of the collieries and is giving satisfactory results. Holes 1 metre deep are drilled at a distance from each other of about 3 metres, and in them wooden plugs are tightly inserted. Passing through the plugs are iron pipes from $\frac{1}{4}$ to 1 metre long, with openings between $2\frac{1}{2}$ and 3 millimetres wide. These apertures are connected with a pump and water is forced in under pressure. At the Camphausen colliery, with a pressure of 8 to 10 atmospheres, an injection through two tubes during 8 hours proved sufficient to impregnate 6 by 1 by $1\frac{1}{2}$ metres. At the Kreuzgraben colliery water forced in under pressure of 20 atmospheres during 16 hours moistened the coal 4 metres above the highest hole. In using this method a great deal depends upon the firmness of the coal seam.

THE HISTORY OF BORAX IN THE UNITED STATES.

Previous to the year 1864 the existence of borax in the United States was unknown, and the whole of our supplies came from abroad. In those days its application for commercial purposes was comparatively limited, and it was chiefly known as a drug and a blacksmith's flux. Now it is largely used in welding, as a preservative for animal food, and as an enamel, while its uses in metallurgical processes and in assaying have been enormously extended. Thirty years ago the imports of borax into this country were \$145,000 to \$220,000 per annum, but in 1864, when the domestic product was first placed on the market here, the imports fell to the yearly value of \$9,000. In the old days borax figured chiefly in drugstores, where it was retailed at 25c. an ounce. In 1864, however, the price fell rapidly, until in 1872 it was sold by the producers at 10 cents a pound. Coming down to recent years we may note that the 7,589,000 lbs. produced in 1888 realized on an average 6 cents a pound, and that the eleven million pounds produced in 1887 brought about 5 cents a pound. As yet the only States where borax is found are California and Nevada. It is found in several forms, which chiefly occur as efflorescences from ancient marshes and lake bottoms. In some cases it occurs as tinkal i. e., crude crystals of sodium baborate; at other places it is accompanied by other chemicals, such as sodium chloride and carbonate of soda; another common form is borate of lime imbedded in clay and sand, and known as ulexite or cotton balls; and pure borate of lime in the forms of colemanite and pandermite is also found in great quantities. In the first two cases very little treatment except purification by solution is required, and with ulexite, colemanite and pandermite the borate of

in Nevada, and this was brought to Hachinhama and mixed with the concentrated waters of the lake. The effect of this mixture was to transform the borate of lime into borate of soda, and to change the carbonate of soda into carbonate of lime.

Borax was first discovered in Nevada by Dr. Veatch in 1860, and Mr. William Troup found a marsh near Columbus, Nev., which contained common salt and ulexite or cotton balls. It was not, however, till the year 1871 that Mr. Troup rose to the consciousness that if the cotton balls were mixed with carbonate of soda, a commercially pure borax was formed. Even then very little was done, and the Hachinhama people were allowed to go on without any rivals, and this condition of affairs was unaltered until in 1872. The Teel's Marsh deposits of crude borax were discovered by Mr. F. M. Smith, who is at the present time the president of the Pacific Coast Borax Company. This borax was of an extremely rich character, and no time was lost in putting it on the market.

The effect of the competition that sprung up between Teel's Marsh and Hachinhama was most disastrous. Prices were cut ruthlessly, until they were insufficient even to pay for the wood used in the evaporating tanks. It was no wonder, therefore, that a financial crisis occurred which ruined the company that worked Teel's Marsh temporarily, and the Hachinhama people permanently. Only a short time elapsed before the Teel's Marsh works were in full swing again, and they have ever since then held on their course with the prosperity that attends on careful and energetic management. The Teel's Marsh deposit was at first a most remarkable sight. The ground was covered with a vast deposit which had an appearance not unlike dirty snow or chalk. On examining it closely it was found to be covered with a



WAGON TRAIN LOADED WITH BORAX—DEATH VALLEY, CAL.

lime is changed into borate of soda by mixing the solution when hot with carbonate of soda.

The credit of discovering borax in the United States is due to Dr. Veatch, who noticed in 1856 that the water in a spring near Red Bluff, Tehama Co., Cal., contained a small amount of borax in solution. He followed up this discovery by searching through the country north of San Francisco, and in the course of a year or so he found a lake among the mountains called Clear Lake, whose mud contained great quantities of crystals of borax. This lake is entirely surrounded by a circle of hills and the water has no outlet. The scenery and features of the landscape present many indications that the bowl of the lake has at one time been the crater of a volcano. When Dr. Veatch first came across the lake it was in the summer season, and the area of the lake was only about 50 acres, and its depth not more than one foot; but the appearance of the banks showed that in winter the lake would cover at least 200 acres. The uncovered bottom at the time of discovery was a mass of slimy mud emitting a horrible smell, but studded all over with groups of crystals of the desired article. It was not, however, until 1864 that a company was formed to collect these crystals and place them on the market. The four succeeding years were bright times for the company, who grew rich fast, but an unexpected event put a stop to their undertaking, and suddenly made the district an unprofitable one. This was the sinking of an artesian well whose upward flow of water was so great that all attempts to plug it failed, and the valley consequently became deluged in water. Shortly after this catastrophe another lake, the Hachinhama, was discovered in the same locality, and work was there for some time. At this lake, however, the borax did not crystallize out of its own accord, and the mud had therefore to be washed and the chemicals in solution extracted by crystallization. The borax thus produced was largely mixed with carbonate of soda, which had to be washed away afterward. A few years afterward, in 1872, borate of lime was found

sandy crust which would break under the feet and reveal an under-structure of clay and unfathomable slime. This and many other marshes subsequently discovered sometimes, in very wet seasons, assume the form of lakes, and in almost every case they are surrounded by hills which allow no outlet for the local mountain streams except the marsh itself. In all these cases, as in the case of Clear Lake, the first discovered, there is every reason for supposing that they are the location of ancient volcanoes. It is even supposed that these volcanoes are not yet entirely defunct, for as fast as the first crop of superficial crystals is removed they are replaced by further formations which crystallize out of the liquid that oozes upward through the mud and clay. At Teel's Marsh this ooze crystallizes out in a hard crust composed of borax, carbonate of soda and common salt, while at the San Bernardino Company's marshes in California, subsequently discovered and worked, the crust becomes so hard that the miners have to use their picks very forcibly. Since the time that Teel's Marsh was first worked many other deposits of crude borax, both in marshes and otherwise, have been worked with profit.

It has already been mentioned that cotton balls or ulexite were discovered at Columbus and Saltwells, Nev., in 1871. Though these deposits were neglected at first they were afterward developed, along with many other marshes which were found to give excellent yields of this, so to speak, ore of borax. The balls vary in size from pin heads to watermelons, and they occur generally imbedded in tough clay, though in some cases they are distributed among sand. They are easily broken at first, but exposure to the air causes them to become very hard.

In some localities the ulexite is not in the form of balls, but exists as a powder mixed with sandy loam. For some years the borax marshes and ulexite formed the only source of commercial borax, but in the course of a few years a new and valuable deposit of borate of lime was discovered by Mr. W. T. Coleman, a well-known borax man

of San Francisco. This discovery was made accidentally while prospecting for silver in the Calico Mountains in the neighborhood of Death Valley, where a deposit of borax had already been found. The borate of lime was in the form of a stratum of snowwhite color, and at first its constitution was not understood. Mr. Coleman, however, had an analysis made of it, and to his and everybody's surprise it was announced to be very rich in borate of lime.

The new substance existed in stratum or ledge, cropping out at various points and of an average thickness of six feet. The Pacific Coast Borax Company took possession of the ledge and christened the material colemanite. Further deposits have been discovered more recently, and a variation of it called pandernite has also been found. The natural features of the country, however, have stood in the way of a really successful working of these magnificent deposits. It can be worked easily enough, but it is impossible to carry out the chemical processes on the spot, owing to the total absence of fuel and to the great scarcity of water. Consequently the Pacific Coast Borax Company are obliged to transport it to San Francisco for chemical treatment and preparation. Unfortunately, however, even this part of the business is surrounded with difficulties. There is no railroad near and there are absolutely no roads or highways. The colemanite has to be carried in wagons, such as are shown in the accompanying illustration, and the wagons are drawn along over rough ground by a team of mules. For this illustration we are indebted to our contemporary "Good Roads," and in passing we may thank our contemporary for the excellent work it is doing in rousing the people of this country to the necessity of having something better than the average country road. At the present time the deposits of colemanite are comparatively untouched, owing to the absence of good roads.

As we have already stated the colemanite is heated for the production of borax at San Francisco. The method pursued is the same as in the treatment of cotton balls. The colemanite is crushed to a fine powder and mixed with the requisite quantity of carbonate of soda and then the mixture is dissolved in water in an iron boiler. The solution is stirred by an internal mechanical stirrer. The resulting solution of borax is allowed to stand for a short time in order that the carbonate of lime shall be precipitated and then it is run into open tanks, where, on cooling, the borax crystallizes out in dark colored crystals. These crystals are redissolved and recrystallized in a pure and marketable form.

In the manufacture of borax from cotton balls the process is slightly different. The balls are ground and mixed with carbonate of soda and then dissolved in water contained in an open vat. Besides the resulting carbonate of lime there are impurities in the cotton balls to be precipitated, such as sand and clay. The heating is done by steam from a boiler, and the stirring is done by hand. When the chemical treatment and purification are carried on at the marshes and other sources of supply, where wood is too expensive to be used for heating, it is customary to burn sage brush directly under the vats.

Brain's Proposed Underground Conduit for Electric Car Lines.—Mr. C. T. Brain, of Liverpool, has recently proposed an ingenious form of closed underground conduit for electric car lines. His idea is to build the conduit with a comparatively wide slot, and then to cover this opening with a stout iron rail, lying flush with the surface of the street. To enable the collector attached to the car to come in contact with the cable, this rail is raised from its seat as the car goes, by rollers beneath it, which are carried on U's attached to the car. After the car has passed the cover rail falls back into its place. Thus at any time the conduit is open only under the car, being completely closed both before it and behind it by the cover rail. The wide slot which can be used with this system enables the collector carriers to be made of ample strength, and by removing the cover rail of any section the cable and its supports can be easily got at for repairs, no taking up of the roadway being required. The cover keeps the conduit free from dirt, which would injure the insulation of the conductor. Mr. Brain claims that the working of a road built on his system would not be liable to interruption by frost or snow, and that the working expenses would be very low.

Volumetric Determination of Mercury.—It is a well known fact that if a solution of stannous chloride be added to a slightly acidulated solution of mercuric chloride the mercuric salt is first reduced to mercurous chloride, then to the state of metallic mercury. It is also known that while the first reaction takes place immediately, the second only takes place after some time, especially if the excess of stannous chloride is small. Upon this reaction Mr. Rod. Namias has based a volumetric determination of mercury in which, by means of a suitable reagent, he determines the moment at which there is an excess of stannous chloride. The process can only be used upon mercuric chloride, consequently all other salts must be transformed into it. The nitrate is treated with hydrochloric acid in excess and then evaporated to dryness; mercurous salts are evaporated in the presence of hydrochloric acid and chlorate of potash. The evaporation must be conducted with caution and at a temperature below the boiling point in order to avoid loss by volatilization. The reagent used by Mr. Namias to determine free stannous chloride is sodium molybdate. To obtain this, he dissolves molybdic acid in a solution of hydrate or carbonate of soda. The solution should always be prepared fresh. The solution of stannous chloride is standardized either by means of a standard iodide solution, or, which is preferable, with a solution of pure mercuric chloride obtained by sublimation. When a mercuric salt is to be titrated, a slip of filter paper is introduced into the sodium molybdate solution and laid wet upon a porcelain plate. The paper should not be allowed to dry and should not have any yellow color. If a drop of the solution is put upon the paper and it contains free stannous chloride, the molybdate will be reduced and a light blue to a dark blue coloration will be obtained. The bulk of the solution to be titrated should not exceed 50 c. c., and it should contain about 0.5 of hydrochloric acid. The results obtained by this method, which is given in full in the *Gazetta Chimica Italiana* and in the *Revue Universelle des Mines*, are slightly high.

DIMENSION STONE QUARRYING—THE BLASTING PROCESS.*

Quarrymen have, ever since the introduction of blasting, tried to direct the blast so as to save stock. Holes drilled by hand are seldom round. The shape of the bit and the irregular rotation while drilling usually produce a hole with a triangular section. It was observed, many years ago that, when a blast was fired in a hand-drilled hole, the rock usually broke in three directions radiating from the points of the triangle in the hole. This led quarrymen to look for a means by which the hole might be shaped in accordance with a prescribed direction of cleavage.

As the Portland quarries in Connecticut, the oldest in the country, were carried to great depths the thickness of bed increased. With beds from 10 to 20 feet deep, all of solid and valuable brownstone, it became a matter of importance that some device should be applied which would shear the stone from its bed without loss of stock and without the necessity of making artificial beds at short distances. A system was adopted and used successfully for a number of years which comprised the drilling of deep holes from 10 to 12 inches in diameter, and charging them with explosives placed in a lune-shaped canister made of two pieces of sheet tin, with sections, minor segments of a circle, soldered together and the ends filled with cloth or paper. Earth or sand was filled in around the canister in the drill-hole, so the effects of the blasts were practically the same as though the hole was drilled in the shape of the canister. Straight and true breaks were made, although the system was expensive, as obviously a larger hole than necessary was drilled.

Another of the older systems of blasting is that known as lewisling. Two or three holes are drilled close together on parallel, the partitions between being broken down. Thus a wide hole or groove is formed, into which the powder is charged by being rammed down or in a tin canister, the shape of the trench-hole. This system is confined almost entirely to granite. Then again there was the well-known plug and feather system, in which the plugs were driven between the feathers by the blast and the rock split. This process frequently resulted in irregular breaks and damage at the top of the hole. During all these years there was conspicuous waste due to the lack of knowledge of the influence of the shape of a drill-hole on the effect of a blast. The system devised by Mr. Knox does all and more than was claimed for the old Portland canister system.

In the first place, in this system a round hole is drilled by hand or otherwise, preferably by a machine drill, as it is important that the hole should indeed be round. In sandstone of medium hardness these holes may be situated 10, 12 or 15 feet apart. Then the holes should be reamed out with an instrument made for that purpose, at least 1.2 times the diameter of the hole. This is done to the bottom of the hole. When finished the hole resembles the shape of the Portland canister. Then the hole is charged with the smallest possible amount of slow acting powder; dynamite is unsuitable. The cap should be inserted near the bottom of the cartridge. Then the tamping is put in, not directly upon the charge, as in most systems, but an air-space is left between. The tamping should be placed about 6 to 10 inches below the top of the hole, and placed securely so it will not blow out. The intervening air-space may be filled with a wad of hay, grass or paper. The hole is now ready to blast. If several holes are on a line they should be blasted simultaneously by electricity. The effect of the blast is to make a vertical seam connecting the holes and the entire mass is sheared several inches or more. The following explanation of the rationale of the blast has been given: "The gas acting equally in all directions from the center is forced into the two opposite wedge-shaped spaces by a force equally prompt and energetic. All rocks possess the property of elasticity to greater or less degree, and this principle being excited to the point of rupture at the apices of the section of the hole the gas enters the crack and the rock is split in a straight line, simply because, under the circumstances, it cannot split in any other way." The new form of hole is, therefore, almost identical in principle with the old Portland canister system, save that it has the great advantage of a shaped groove in the rock which serves as a starting point for the break.

It is also more economical than the Portland canister in that it requires less drilling and the waste of stone is less. It is, therefore, not only more economical than any other system of blasting, but it is more certain, and in this respect it is vastly superior to any other blasting system, because stone is valuable, and anything which adds to the certainty of the break also adds to the profit of the quarryman.

The popular idea that the system is antagonistic to the channelling process is a mistaken one. There are, of course, some quarries which formerly used channelling machines without this system, but which now do a large part of the work by blasting. Instances, however, are rare where the system has replaced the channeller. The two go side by side, and an intelligent use of the new system in most quarries requires a channelling machine.

The first work done by this method was in 1885, and at the close of that year two quarries had adopted it. In 1886 it was used in twenty quarries. In 1887 in forty-four, in 1888 in upward of one hundred, and at the present time about three hundred quarries have adopted it. Its purpose is to release dimension stone from its place in the bed, by so directing an explosive force that it is made to cleave the rock in a prescribed line and without injury. The system is also used for breaking up detached blocks of stone into smaller sizes.

The Electrolytic Manufacture of Lead White.—The *Revue Industrielle* gives the following account of the process used at l'Usine Voad for obtaining Lead White. In a solution of acetate of ammonium, lead bars are suspended with pieces of non-conducting substance at the cathodes, such as carbon. When a current of carbonic acid gas is passed through the solution, the acetate of lead is decomposed, the carbonate being precipitated; this is filtered and pressed. The filtrate is reconducted directly to the bath.

*Abstract from article by William L. Saunders, M. Am. Soc. C. E., in *Transactions of that Society*.

THE EDNIE COAL UNDERCUTTER.

In the opinion of some coal miners, the principle of the rotating drill for coal cutting has many points of superiority in under cutting machines. We illustrate below a machine embodying this principle. A Thomson-Houston motor of a special type is used for operating the cutters. The series of cutters is so arranged as to cut close to the wall beside which the machine is placed. This style of coal cutter is strongly and substantially built, all parts being carefully proportioned to the work they have to do, as ascertained from thorough tests. It is manufactured by the Thomson-Houston Electric Co.

PRODUCTION OF COKE IN THE POCAHONTAS FIELD, VIRGINIA.*

By Joseph D. Weeks.

The Pocahontas Flat Top coal field has rapidly sprung into prominence during the last eight or nine years owing to its excellent coal for fuel and coking purposes. Originally the coke produced in this district was chiefly employed in Virginia, but the amount shipped to the Southern districts in Tennessee and Alabama has constantly increased during the last five years, until it has reached a very respectable proportion of the whole output. The coke will at no distant day be made a formidable competitor to Connellsville in the Western iron districts, by the opening up of a new line of the Norfolk & Western Railroad.

The manner in which coal is won and sold in this district is worthy of notice. In 1889 the coal mining companies all leased their lands from either the Flat Top Coal Land Association or from the Crozer Land Company, under a royalty of 6 to 10 cents per ton, and under an agreement to sell all their coal through the Pocahontas Coal Company. The selling of the coke is conducted on partially similar lines, as the makers pay 15 cents a ton royalty, and are practically bound to sell their product through the Hull Coal & Coke Company. The furnaces on the land owned by the Association are bound to use the Flat Top coke only.

Geographically, the Pocahontas Flat Top field is situated in the county of Tazewell, in southwestern Virginia, and in the counties of Mercer and MacDowell, in southeastern West Virginia. It can be divided roughly into three districts, viz., the Pocahontas district, the Bluestone district and the Elkhorn district. The name, "Pocahontas Flat Top," is a combination of Pocahontas, the original name, derived from the town where the first mining was done; and Flat Top, the name of the mountain range in which most of the coal seams are located.

Geologically, the coals of this field belong to the lowest member of the

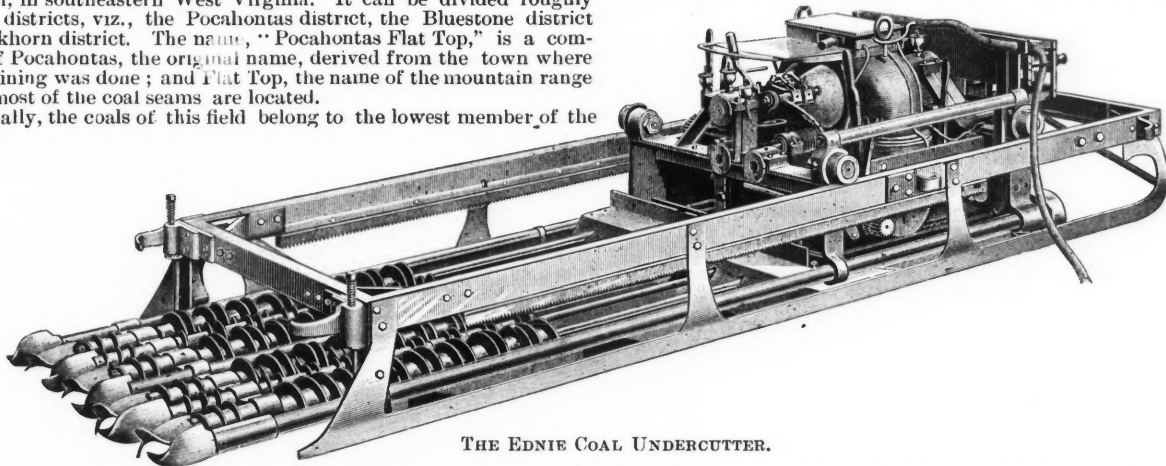
The first shipments of coal in this field were made from Pocahontas in 1883. Up to Jan. 1, 1890, there had been sent to market 6,215,166 net tons of coke. As regards the coal sent to market, other than that used in the manufacture of coke, the following were the yearly productions in tons of 2,000 lbs: 1883, 68,125 tons; 1884, 196,280 tons; 1885, 581,680 tons; 1886, 857,959 tons; 1887, 1,149,278 tons; 1888, 1,549,663 tons; 1889, 1,812,181 tons; and 1890, 2,035,644 tons.

The shipments from 1887 to 1891, divided into sizes of coal, are given as follows in short tons:

Sizes.	1887.	1888.	1889.	1890.
Run of mine.....	1,083,092	1,458,609	1,698,090	1,966,099
Lump.....	60,789	65,355	70,893	56,557
Nut.....	.....	.....	4,363	15,287
Slack.....	5,105	16,277	10,237	6,287
Total.....	1,148,986	1,540,131	1,783,583	2,044,567

"Run of mine" must contain at least 40% of lump and is sold to the Pocahontas Coal Company at an average of 83 cents per net ton free on board at the mines including royalty. Lump is sold at \$1 and slack at 65 cents a ton.

Not only have the operators a magnificent seam to work on, but the mines are situated above the water level and thus require no drainage. The measures are almost horizontal with a rise just sufficient to aid the subterranean transport. There is an ample supply of timber on the lands, and the companies own their own sawmills. The rates paid for mining are 75 cents per wagon of 90 cu. ft. for room coal and \$1.05 a car for entry coal. At the end of 1889 the greater proportion was entry coal, but in the near future when the rooms are mined out, the cost will be reduced. The company lays all roads and posts the rooms. Drivers are paid \$1.68 per day; men at the head of the tippie, \$1.75; laborers, \$1.20. Powder costs the men about 3½ cents a ton of coal, and tool sharpening 50 cents a month. Good miners average four cars a day in the Pocahontas mines. It is estimated that the average wage of miners per month is \$45, but some make as much as \$120 and \$130 a month. From these figures it can be deduced that the cost of the coal is 72½ cents per ton of 2,240 lbs. made up by mining 37.5 cents, dead work and hauling 25 cents and royalty 10 cents. Flat Top coal is semi-bituminous, somewhat dull in luster, rather hard



THE EDNIE COAL UNDERCUTTER.

coal measures, No. XII of Rogers, the Pottsville conglomerate of Pennsylvania. There are on the field at least three workable beds above water level, but only one, the "Pocahontas," is being worked as yet. At the town of Pocahontas it is 11-13 ft. thick; on the Virginia line it is 11 ft. thick and diminishes to 5-6 ft. on Flipping Creek and to 6-9 ft. on the Elkhorn. The average thickness worked at Pocahontas is 9 ft. This seam is absolutely without a slate parting, but it is split into distinct workable seams by a thin streak of bone coal quite rich in carbon. This bone coal increases in thickness northward, reaching 6-7 ft. on Flipping Creek and dividing the bed into two seams.

The seam is also free from faults. Everything handled by the miner is placed in the wagon, excepting a small streak of bone coal found near the top and certain portions of the coal at the openings which has been discolored by the water. This latter portion, however, gives as good an analysis as the remainder of the coal, and is apparently only discarded for appearance sake. About 220,000 acres are held by the two controlling land companies, and from detailed surveys it appears that 175,000 acres can be classed as actual coal lands. At present only about 1,000 acres have been undermined, with an average output of 9.156 long tons per acre. When it is considered that only about 55,000 to 60,000 acres of coking coal remain in the Connellsville region, the extent and value of the Flat Top field can be readily appreciated. A most interesting and valuable statement has been made by the Flat Top Land Association showing the acreage and tonnage of coal mined on its lands from the beginning of operations to December, 31st, 1890. This is presented in tabular form here-with:

Name of Company.	App'imate thickness of vein in feet.	Number of acres mined.	Number of long tons per acre mined.	Percentage obtained per acre.
Southwest Virginia Improvement Co	9.0	481.0	8,819	61
John Cooper & Co.....	8.0	118.0	9,273	72
Caswell Creek C. & C. Co.....	7.7	87.1	10,076	81
Booth-Bowen C. & C. Co.....	6.8	69.5	9,975	91
Buekeye C. & C. Co.....	6.5	68.4	10,121	96
Goodwill C. & C. Co.....	4.7	32.1	7,133	94
Louisville C. & C. Co.....	4.8	19.1	7,401	96
Elkhorn C. & C. Co.....	7.5	17.2	10,370	81
Shamokin C. & C. Co.....	7.5	17.2	10,467	87
Norfolk C. & C. Co. No. 1.....	7.5	11.1	10,806	89
2.....	7.0	0.7	11,161	99

Liek Branch Colliery.
Total acres undermined 899.7.
Total number of long tons mined 8,237,734.
Average number of long tons per acre mined 9,156.

* Abstract of Census Bulletin No. 200, published August 2, 1892.

in vein, requiring powder to mine it, but it is low in volatile matter and ash. The following table gives average analyses of Flat Top coal and Connellsville coal made by the H. C. Frick Coke Company:

Component parts	Flat Top.	Connellsville.
Volatile matter.....	18.812	30.107
Water.....	1.011	1.250
Fixed carbon.....	72.708	59.616
Sulphur.....	0.787	0.784
Ash.....	5.191	8.233

An inspection of the analysis does not warrant the belief that Flat Top coal is particularly suited to coke making. Though it is low in ash, it would be regarded as too low in volatile matter to agglutinate properly.

It makes a good enough coke when burned as "run of mine," but is greatly improved when prepared by crushing, as otherwise many large lumps come out "roasted" instead of coked. It is not so bright as Connellsville, it is more friable and contains more fixed carbon. The coke makes a first class furnace fuel, capable of carrying in the furnace as heavy a burden as the Connellsville and having much less ash. The coking process is however carried on at the expense of a considerable portion of fixed carbon. A ton of coke takes at least 1.6 tons of coal containing on the basis of 72.708 per cent of fixed carbon, 116.33 units of carbon. The coke contains only 91.50 units of fixed carbon, so that there has been a loss of 24.83 units of carbon in the coking process, or more than one-fifth of the fixed carbon contained in the coal. As a matter of fact many makers say that they do not obtain so much as 62½ per cent. of coke. In coking Connellsville coal the loss of fixed carbon is much less.

The ovens used in the district during the census year were, without exception, of the beehive type. Some experiments had been made with the Soldenhoff-Coppee oven, but, though admirable results were obtained, the oven has not been introduced in practice. The earlier ovens were 11 ft. and 11 ft. 6 in. in diameter, and from 5 ft. 6 in. to 7 ft. high; but all those recently constructed are 12 ft. diameter and 7 ft. high. It is said by some authorities that these ovens are too large, as the smaller ones burn more actively and quicker than the 12 ft. ovens. The waste, however, is really caused by the fact that after drawing an oven, in order to restore the initial heat necessary to agglutinate a dry coal, a portion of the fixed carbon is consumed. This loss depends a great deal on the skill of the labor employed. Ovens are unduly saturated with water, and the time taken in drawing is unnecessarily prolonged. The ovens do not differ materially from the ordinary beehive oven. They are arranged 3 in. apart, in two rows 6 in. apart. They are 12 ft. in diameter, 6 ft. 6 in. high in the center, one brick thick, and they have their necks projecting so as to remove the door as far as possible from the excessive

heat of the charge. The charge of coal is about 9,000 lbs. for 72-hour coke, and 8,000 lbs. for 48-hour coke.

Very good results were obtained with the Soldenhoff-Coppee oven. About 175,650 lbs. of coal from the Bluestone district were sent to the Coppee ovens in the New River district. Of this amount 46,850 lbs. were "run to mine" and the remainder slack. The average yield was 67.5 per cent. and the 36 hour to 48 hour proved the best.

There is a great diversity of opinion among the operators as to the cost of coke. The figures given range between \$1.35 and \$1.75 per ton. No doubt the diversity arises in some part from the difference of opinion as to the price at which the coal should be charged to the oven. The fairest way, however, would be to charge it to the ovens at cost, *i. e.*, at an average of 55.8 cents per short ton without royalty. The cost of coking per ton 2,000 lbs. of coke is: Charging 2c., leveling 3.2c., drawing 20c., general labor 2.4c., cleaning ovens 1c., supplies and repairs 7c., total 35.7c. The cost of a ton of coke will then be as follows: 1.6 tons of coal at 55.8c., \$0.8928; cost of coking \$0.3570, general expense \$0.0500, royalty (15c. on 2,240 lbs.) \$0.1340, total \$1.4338. It would be fair to assume therefore that \$1.40 to \$1.45 is the cost of coke at well managed works. A statement made from the returns for 1889 would show a higher cost, as will be seen from the following items of cost as returned:

Value of coal used	\$302,742
Royalty on 321,686 short tons at 13.4 cents per ton	43,105
Cost of other materials	8,913
Total wages paid	149,727
Total miscellaneous expenses	14,084
Aggregate cost at ovens of 321,686 short tons of coke	518,572

This gives an average cost of \$1.612 per short ton, which represents the average cost at economical and uneconomical works.

Three analyses of Flat Top coke are given in the following table:

	No. 1.	No. 2.	No. 3.
Moisture	0.700	0.664	0.747
Volatile matter	1.270	1.059	0.757
Fixed carbon	91.430	92.816	92.550
Ash	6.090	4.913	5.749
Sulphur	0.509	0.548	0.597

In the following table are given some interesting statistics of the production, etc., from 1883 to 1889 inclusive.

	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Number of establishments	1	1	1	2	5	13	17
Ovens built	200	200	200	210	684	1,282	1,833
Ovens building				238	842	200	631
Coal used, short tons	39,000	90,000	81,899	100,518	240,814	312,614	517,613
Coke produced	22,718	57,107	50,194	60,436	150,708	201,317	321,686
Total value of coke at ovens	\$44,345	\$111,300	\$85,993	\$155,771	\$271,276	\$358,938	\$542,219
Value of coke at ovens per ton	\$1.951	\$1.948	\$1.713	\$2.577	\$1.800	\$1.782	\$1.686
Yield of coal in coke, per cent.	58	58	61	60	62.5	64.5	62.15

The total value of the ovens put down is given as \$657,521, which gives \$359 as the average cost of each oven. The chief material used in the production of coke is coal. Of this 517,613 short tons, valued at \$302,742, were used in 1889, and the remaining materials and supplies amounted only to \$8,913. During the same year 533 hands were employed and they received \$149,727 in wages.

ABSTRACTS OF OFFICIAL REPORTS.

The Broken Hill Proprietary Company.

The report of the working of the Broken Hill Proprietary Company, New South Wales, during the half year ending May 31st last, states that as in previous half-years the quantity of ore treated exceeded that of the six months immediately preceding, the silver produced amounted to 5,754,940 oz.; and lead to 26,843 tons 10 cwt., the net amount received being £1,192,962 13s. 1d. The value per ton of ore treated was £6 11s. 11d., the lowest amount on record. The total expenses, including depreciation, amounted to £670,179 15s., the highest total for any half-year. The cost per ton of ore treated averaged £3 14s. 1d., higher than last half-year, while the profit per ton of ore treated was only £2 17s. 10d., considerably below the average of any half-year. Since the establishment of the company 984,349 tons of ore has been treated, and 36,512,245 oz., of silver and 151,945 tons of lead produced, the net amount received being £8,232,138 6s. 6d. The shareholders have altogether received £3,880,000 in dividends £592,000 in cash bonuses, together with shares in Block 14, British Blocks, and Block 10 Mines of a nominal value of £1,744,000, making a grand total of £6,216,000. The dividends were the same as for the previous half year, and amounted to £576,000.

During the 12 months ending May 31st there were treated in the blast furnaces 267,560 tons gross including moisture, or 246,907 tons net, producing 39,390 tons lead and 9,269,022 oz. silver. For the same period about 360 tons of copper matte, carrying (approximately) 47,800 oz. silver and 148 tons copper, were produced. The following were the quantities (net) of the different classes of ore treated: Lead ore, 126,692 tons, or 51.5% of total; silicious iron and kaolin, 116,742 tons, or 47%; iron ore, 3,473 tons, or 1.5%. The consumption of fuel and fluxes is set out as follows: Coke, 44,452 tons, or 18% of the ore; coal, 7,057 tons, or 2.8%; limestone, 79,241 tons, or 32%; ironstone, 7,750 tons, or 3.1%. The cost of treatment per net ton of ore, including all expenses from the time of its arrival on the smelter floors to the delivery of the bullion trucks, was £1 14s. 9d. For the first half year the cost of treatment came to £1 17s. 3½d. per net ton as against £1 12s. 3½d. for the second half year. The extra expenses incurred directly at the furnaces on account of the lack of water had been approximately 1s. 4½d. The large increase of time lost in the second half was entirely due to the concentrated mineral contents of the water, which was also responsible for a decrease in the capacity of the furnaces. The total quantity of ore run through the leaching plant came to 14,802 tons net; 71,738 oz. silver was produced. Treating the tailings from the concentrators cost 6s. 1d. per ton—the same as last year. The actual cost in the experimental works of crushing, roasting and leaching was £1 1s. 8d. per ton, which would be lessened by at least 2s. per ton in works other than experimental.

A report is also given of the operations at the British smelters at Port Pirie. The ore smelted during the half-year totaled 17,022 tons (net dry weight) average assay per ton, lead 15.27 per cent., silver 33.41 oz., the

lead amounting to 2,600 tons and the silver to 534,694 oz., 1,915 tons of bullion being recovered in the smelting. The contents of the bullion were—Lead, 1,904½ tons; fine silver, 504,585 oz. The cost of smelting was £1 2s. 6.9d. per ton. The company's representative at Dry Creek reports that during the half-year there were treated 11,949 net tons of ore, giving a production of 1,584 tons of bullion, containing 1,575 tons of lead and 323,577 oz. of silver. The cost to the Proprietary Company of treating the ore was £1 6s. 11d. per ton. In addition to the production named 2,881 tons of ore was sold to the Australian Smelting Company, returning to the Proprietary 232 tons of lead, containing 91,047 oz. of silver.

There remain in the mine large blocks of ground above the 300-ft. level which have had only prospecting drives and cross-cuts put through them. Many of these openings disclose nothing but dry silicious kaolin and silicious iron ores, carrying a good value in silver, but very little lead, and quite unfit for smelting. During the ensuing year several of these blocks will be more thoroughly opened, as the amalgamating mill, which is now completed, will enable the miners to successfully and properly treat these dry silicious ores, which heretofore have had to remain in the mine for want of proper works for their reduction. Since last report some extensive bodies of high-grade kaolin and carbonate ores have been opened, the most important of which is the body of rich kaolin ore discovered about 60 ft. west of the main lode on the 300-ft. level at McBryde shaft. Another important development of kaolin ore has been made on the 400-ft level on the eastern side of the lode, between McBryde and Drew shafts; little, however, is yet known about this block of ground, for it has only lately been penetrated with a drive going south from McBryde shaft. To this find Mr. Howell attaches much importance, as it proves the existence of high grade oxidized ores at the 400-ft. level, for until quite lately there has been a good deal of doubt about the occurrence of this class of ore at such depths. It is, however, only in certain portions of the mine that the oxidized ores will be found at this level, and generally in isolated bodies. The ore body referred to will shortly be connected with Drew shaft by a crosscut from the main 400-ft. level drive, which will enable them to open the ground in all directions. It is, however, to the west of and beneath the kaolin ore body now being worked on the 300-ft. level that he looks for the most extensive body of similar ore on the fourth level. Another shoot of high-grade kaolin of unknown extent is being opened between the 300 and 400 ft. levels, about 250 ft. south of Jamison Shaft. The extensive body of lead carbonates discovered and opened about a year ago near McCulloch Shaft is holding out well, and there is still a large quantity of lead ore in sight. In this portion of the mine extensive blocks of ground remain to be opened, but little can be done here until the large manganese iron outcrop is removed, which is now pressing down with almost irresistible force on the old worked portion of this section. Mr. Howell, the General Manager, also refers to the open-cut and quarrying system, which has been carried on uninterruptedly for about seven months, with constantly increasing beneficial and profitable results.

The deficiency in the water supply is causing the directors some anxiety, and they are boring experimentally and also casting about for some economical method of bringing the waters of the Darling River to the mines. The directors have decided to establish a cash reserve fund and to gradually raise a fund of £250,000.

The question of treating sulphide ores has received a good deal of attention. Mr. Schlapp is now engaged in investigating the matter in America and England. Dr. Schnabel has recommended two different processes, which are described as sulphurous acid and sulphuric acid processes, respectively. The directors have under consideration the desirability of offering a bonus for the solution of the sulphide difficulty by a process which will give good results on a workable scale.

The position taken up by the United Mining Companies on the Barrier as regards stoping by contract is already well known. The complete annulment of the agreement with the Amalgamated Miners' Association was only adopted after much thought and deliberation, and under a united and firm conviction that the step was necessary. It is abundantly evident that the mining companies must insist upon a fair day's work for a fair day's pay. There is no desire on the part of the company to lower the wage which the workman can earn, but it is absolutely necessary that a change in the present arrangement should be effected.

DIGEST OF RECENT DECISIONS.

NECESSITY OF PAYMENT FOR WORK ON MINING CLAIMS.

The Montana statute requiring the owners of quartz lode claims to perform or cause to be performed the annual labor and to make the improvements required by the laws of the United States to prevent their forfeiture provides for the filing of "affidavits of the person or persons who performed such labor or made such improvement, showing . . . The actual amount paid for such labor and improvements, and by whom paid when the same was not done by the owner or owners of the quartz claim," which affidavits are also thereby made "prima facie proof of the facts recited therein," and another provision is for the preservation and recording of the prima facie evidence of such labor and improvements; but these do not relate to the effect of doing the work or making the improvements, but merely to the preservation of prima facie evidence of the fact thereof; and it is not necessary if labor of a sufficient value can be done on a claim within a given year that it be paid for, the payment being a matter between the laborer and the owners.—*Coleman v. Curtis, Supreme Court of Montana, 30 Pac. Rep., 266.*

Pyrite, a New Smokeless Powder.—Although full information of the composition of this powder is not obtainable, it is known that nitro-cellulose enters largely into it. It is claimed that this powder burns without flame or smoke, that it can be handled and transported without danger, and that it is not affected by moisture or heat. According to the *Revue Scientifique* experiments recently made at Stockholm showed that 20 shots with pyrite did not heat the gun as much as 15 shots with ordinary Swedish powder or as 10 shots of nitro-glycerine powder. Neither does it foul the gun, 800 shots with it leaving the gun clean. The same authority states that with the new magazine gun used in Sweden 3.5 grams or about 1.8 of an ounce will give an initial velocity of 640 metres or 2,080 ft., with a pressure of 2,260 atmospheres. The manufacture of this powder requires, it is said, neither special appliances nor buildings.

SENSITIVE DRILL AND COLUMN.

The power to drive this improved drill is applied from a jack shaft drill to a tight and loose pulley on the base of the frame. From this shaft the speed is transmitted by means of a grooved pulley and round belt to the drill spindle. The speed can be changed by means of two pulleys upon the driving shaft and drill spindle. The pulleys on the spindle are arranged with phosphor-bronze sleeves, which are pressed into the frame. The drill is manufactured by Milliken & D'Amour, of New York. The price is \$20 and \$25, according to size. The small size is intended for drills up to 3-16 of an inch; the large size, up to 5-16 of an inch.

THE "ROBB-ARMSTRONG" ENGINE.

We illustrate on this page a new single-valve automatic engine recently brought out by the Robb Engineering Company, of Amherst, Nova Scotia. The frame is of the "Porter" type with double-disk crank; it has considerable sectional area, carried well above the center line, and is particularly thick at the top, thus bringing the metal in the direct line of strains between the cylinder and shaft bearings. The engine weighs a little over 100 pounds per horse power.

The crank is "built up" of cast disks and forged steel pin and shafts, the peculiar arrangement of the crank permitting the fits of the shafts and pin in the disks to be very long, without separating the shaft bearings unduly, as is shown in the cross-section at the right of Fig. 1; the counterweight is of equal moment with the reciprocating parts. The shaft bearings run in cast iron shells, babbitted; they are not provided with means of adjustment for wear. The shafts are made to gauge, and the shells are interchangeable, as are the other parts of the engine; hence, a duplicate set of shells may be kept for emergencies. The crank is covered by a cast iron case, shutting it completely in except at the slot through which the

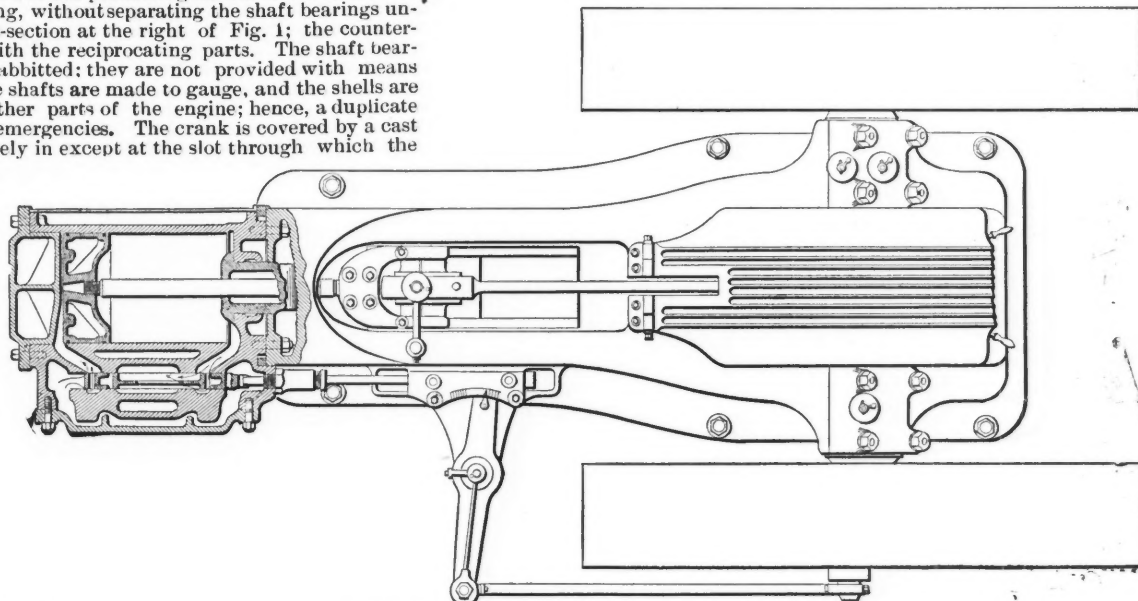
The piston is a single casting with sprung rings, made extremely light. The exhaust passages are jacketed by air spaces from the cylinder and from the live steam in the steam chest. The throttle is a modification of the "Coffin Valve" used by the Straight Line Engine Company, but is operated by a lever instead of a wheel, or ball handles.

The engine was designed and its manufacture organized by Mr. E. J. Armstrong, now with the Ames Iron Works, Oswego, N. Y., which company will also build the engine in this country.

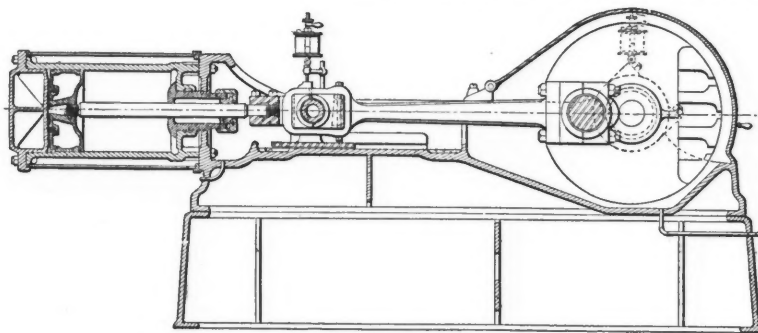
Manufacture of Ferric Salts from Roasted Pyrites.—In the manufacture of sulphuric acid from pyrite, a large quantity of ferric oxide is obtained, of which until recent years but little use has been made. Taking FeS_2 as the formula for pyrite, 1,224 lbs. of it will yield one ton of sulphuric acid and 816 lbs. of ferric oxide. If the pyrite is pure and thoroughly roasted the resulting oxide will be pure. In Europe it has been used in making an inferior quality of pig iron. According to recent experiments of A. & P. Busine it would seem that a new and more important use of this waste product has been discovered in the manufacture from it of ferric salts. In a recent issue of the *Revue Industrielle* they state that pyrite ash is readily soluble in sulphuric or hydrochloric acid, and that the preparation of ferric sulphate in this way is cheaper than by the method commonly used of dissolving iron in dilute



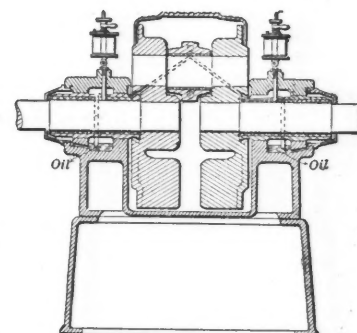
SENSITIVE DRILL AND COLUMN.



HORIZONTAL SECTION THROUGH CYLINDER.



VERTICAL SECTION THROUGH CYLINDER.



VERTICAL SECTION THROUGH SHAFT.

connecting rod works. The crank disks are without the usual finished flanges on the periphery, and free access is given to the crank-pin box, when the hinged crank case is raised.

The fly-wheel governor is a modification of the "Straight Line," and, together with the valve, is used by arrangement with the Straight Line Engine Company.

The eccentric rod, so called, although there is no eccentric, has ball and socket bearings at each end, the balls being case-hardened and ground, and the sockets or boxes of phosphor bronze. The rocker arm, by which the eccentric rod drives the valve, is horizontal, with a vertical axis; there is no twisting strain on either of its bearings, a straight line passing through all three of them. An index finger attached to this arm, as shown in plan view, Fig. 2, shows, by the graduations over which it passes, the movement of the valve, and thus is of assistance in valve setting.

The crosshead is a single steel casting, of the "Slipper" type, the bottom of the slipper being babbitted. The piston rod is secured by being gripped in two places, about two inches apart, one place being threaded and the other a parallel fit. The crosshead is split and is gripped onto the rod by bolts, so that it can be taken apart and put together again without getting out of line more than permissible in engine work—a point in which the usual methods of securing piston rods to the crossheads (with the exception of the taper fit and key) are often faulty. The crosshead pin is of cast iron, as it is believed that, in connection with the large and long bearing, it is of the best material for the place. The connecting rod is a steel forging, the crank end being of the "Marine" type, while the crosshead end is mortised for boxes, which are cast iron, lined with babbitt. The adjustment is by a wedge and adjusting screws.

sulphuric acid and oxidizing the ferrous sulphate obtained. They treat the ash in fine powder with sulphuric acid of 50° to 66° B. The best results are obtained by heating the mixture to 300° C., but the reaction will take place in the cold, although slowly and incompletely. The results depend upon the proportions used and the temperature employed. The experimenters state that when 45 parts of roasted pyrite was treated with 100 parts of sulphuric acid of 60° B, the results at different temperatures were:

	130°	150°	300°
Water	20.63%	8.41%	0.00%
Insoluble oxide.....	11.75	7.38	2.74
Ferric sulphate	47.23	74.82	96.65
Sulphuric acid (free).....	20.39	9.39	0.00
Ferric oxide, combined as basic sulphate.....	00.00	0.00	1.63
Ferric oxide (no ferric sulphate).....	18.80	29.93	40.90

The ferric sulphate obtained is a grayish anhydrous powder and is not very soluble in water. It is easily hydrated, however, by the aid of heat.

Ferric chloride can be obtained by passing the vapor of hydrochloric acid over the roasted pyrite. The reaction takes place in the cold, accompanied by an elevation of temperature.

Ferric sulphate can be used in many ways; for example, in the manufacture of ferrous sulphate or green vitriol by reduction with metallic iron. Messrs. Busine state that this would be a cheaper process than dissolving iron in sulphuric acid, and that the difficulty of the evolution of a large volume of hydrogen gas would be obviated. Ferric sulphate can replace ferrous sulphate in the greater part of its uses, notably for the purification of illuminating gas, as a mordant and in the purification and precipitation of sewage waters.

PERSONALS.

Mr. Leo Von Rosenberg, of New York, returned from a visit to Enterprise mines at Rico, Col., on the 6th inst.

Mr. T. F. Walsh, of Denver, Colo., has been appointed general manager of the Ironclad Mining Company's property at Ouray, Colo.

John M. Burke, a prominent mining operator of Coeur d'Alene, Idaho, has been nominated for Governor by the Democratic party of that state.

Mr. George W. Grayson, the well-known mining operator of San Francisco, Cal., is in New Mexico, where he has large mining and cattle interests.

Mr. Wm. Skyrme, formerly of Virginia City, Nev., and lately connected with the El Cristo Mine, Colombia, has taken charge of the underground workings of the Ontario Mining Company, Park City, Utah.

Wm. A. Watt, formerly of the Edgar Thomson Steel Works, at Bradford, Pa., has resigned his position with that company to accept the position of chief chemist at the works of the Linden Steel Company, at Pittsburg.

A regular quarterly meeting of the Mining Society of Nova Scotia was held at Londonderry, on Sept. 7. Papers were read by Mr. David McKeen, M. P., on "Coal Cutting in Cape Breton;" Mr. R. G. E. Leekie on the "Iron Deposits of Torbrook," and by Mr. J. E. Hardman on the "Crawford Mill."

OBITUARY.

Gen. Joseph R. Anderson, one of the principal owners of the Tredegar Iron Works, Richmond, Va., died on the 7th inst. at the Isle of Shoals, N. H., aged 80 years.

INDUSTRIAL NOTES.

The Twenty-ninth Street Steel Company, of Pittsburg, Pa., employing 400 men, signed the Amalgamated Association scale on the 3d inst.

The Superior Cold Rolled Steel Company of Pittsburg, has commenced the erection of its works at Mansfield, Pa. The plant will consist of one hot and one cold set of rolls, and will be in operation before the close of the year. The product will consist of steel of the quality requisite for keys, door plating, etc.

Moses Taylor, ex-President of the Delaware, Lackawanna & Western Company, bequeathed in his will \$300,000 for the establishment of a hospital for the benefit of the employees of that company and also those of the Lackawanna Iron & Steel Company, at Scranton. Since that time a son and daughter have each donated \$100,000 toward the same object. The institution was opened Aug. 15.

American capitalists have secured the contract for the completion of the Coatzacoalcos & Tehuantepec line of the Tehuantepec Mexican National Railroad; \$14,000,000 has been spent on this line by various companies, but it still lacks 150 miles of being completed, but the government will carry it through to completion. In case the work is completed before three years, the specified time, the government will confer a land grant of 8,000,000 acres upon the builders.

The model foundry, machine and boiler plant which Fraser & Chalmers, Ltd., are now equipping at Chicago will be traversed by Ridgway balance steam-hydraulic cranes, manufactured by Craig, Ridgway & Company, of Coatesville, Pa. There will be six of them in the foundry, two in the yard for handling flasks, etc., and others in the other shops. The company have a perfect electrical installation for driving the traveling cranes, and their plant, when completed, will embody the latest improved machinery and practice. Craig, Ridgway & Son, of Coatesville, Pa., are now building the cranes.

During the shut-down of the Haselton Iron Works of Andrews Brothers Company, a number of extensive improvements and repairs were made. The old muck train was turned out and replaced by a new three-high one, which will be sufficient to take care of the product of their 40 puddling furnaces. The heating furnaces have also been changed and remodeled to conform to the latest and most improved design. The capacity of the sheet department of the plant has been increased by the addition of finishing rolls, shears, annealing boxes, etc. The Haselton Blast Furnace, also operated by this concern, has recently been rebuilt, and now has a daily product of about 200 tons. The bar and band mills will finish 50 tons daily, exclusive of the sheet department.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, his "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at this office.

No charge will be made for these services.

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, thus enabling the purchaser to select the most suitable articles before ordering.

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.

Goods Wanted at Home.

2,771. A second-hand 6 to 8 H. P. engine and boiler. Alabama.

2,772. Machinery suitable for cutting out, removing from the quarry, and slabbing marble and lithographic stone. New Mexico.

2,773. A second-hand steam drill. Alabama.

2,774. Steam trap. South Carolina.

2,775. Mining tools for a mine in United States of Colombia. Michigan.

2,777. Pumps and boilers. Louisiana.

2,778. A 30-H. P. boiler and a 25-H. P. engine. Massachusetts.

2,779. Second-hand 60-lb. steel rails. Massachusetts.

2,780. Switchboard and telephone wires. South Carolina.

Goods Wanted Abroad.

2,776. Illustrated catalogues of ditchers, graders, electric apparatus, agricultural implements of all sorts, rock crushers, and automatic wire-rope tramway. West Indies.

2,781. Catalogues of mining machinery, more especially relating to electric coal cutting machines; diamond drills for deep boring, say 2,000 ft., and the best kind of water motors. New Zealand.

GENERAL MINING NEWS.

ALABAMA.

Fort Payne Coal & Iron Company.—Some of the stockholders are considerably disturbed over a report that their stock may be assessed under the laws of Alabama in the receivership proceedings to pay the debts of the company.

ARIZONA.

The Old Dominion mine and smelter are closed down temporarily for want of coke. There is very little coke en route from Willcox.

Mohave County.

The San Francisco "Report" publishes the following letter from a Comstock miner, who has been connected with well-known mines in Arizona for the past seven years: "White Hills, August 22.—I arrived here one week ago and I am very much disappointed in these mines and the country. In the first place, the ledges are too small. The largest one in the camp is not more than 14 in. wide, and most of them are only from 2 to 5 in. wide. Then there are about 25 claims being worked, and the deepest hole is about 30 ft., with no ore in the bottom. In every claim that has been sunk on 15 ft. the ore has given out at 10 ft from the surface. All of the best claims have been sold to one company, and since the sale they have found the bottom of the ore in six of these claims at from 10 to 12 ft. There are 11 claims in the group that were sold. There is not a continuous run of ore in any one claim in the camp. There are from one to three little bunches of ore in each claim. The most of these bunches are about 12 ft. in length. The longest and best run of ore in the camp is only 20 ft. long and gave out in the bottom. In all of the six best claims in the camp where the ore gave out at from 10 to 20 ft. they have sunk down about 10 ft. below where it gave out and have no sign of ore yet. All the other claims in the camp that are owned by other parties have had their little 10 and 20 ft. of ore, from two to five in. wide, faced up in good shape for inspection, and some of the ore is nicely laid out on the dump, some with five sacks and some with 10 to 15 sacks, and they are asking from \$30,000 to \$60,000 for them. There is no water here, and the nearest wood is 25 miles. There is only one way I can describe it to you, and that is that if every claim owner in camp put every man on his claim, they could not furnish ore enough to run a 20-stamp mill.

Pinal County.

J. D. Reymert Mining Company, Reymert.—In our issue of the 20th ult. we published a statement to the effect that work at this company's property had been suspended owing to a quarrel among its owners. We are now reliably informed that the closing down of the mine was not due to this reason but to the scarcity of water at Reymert. The milling capacity could not be increased and as the ore could not be worked profitably in a small mill, the company was forced to close down for the present.

CALIFORNIA.

Mono County.

Mono Mining Company.—According to the latest official weekly letter from the superintendent of this company, some very good quartz is being cut in the upraise from No. 1 crosscut on the 700 level. The quantity, however, is small.

Summit Mining Company.—The latest official

weekly letter says: "About 23 tons of ore were hoisted from the 100 and 200 levels during the past week. The ledge of the 200 level is from 12 to 15 in. wide, of fair milling ore."

(From our Special Correspondent.)

Summit Mining Company, Bodie.—An improvement in the grade of ore has taken place in several of the openings of the mine during the last two weeks. On the 200 level the ledge ranges about 15 in. wide, of good milling ore. Detailed accounts of the ore worked, or its car or battery assay value, is kept secret from the stockholders. Last week 23 tons were hoisted from between the 100 and 200 levels alone.

Placer County.

(From our Special Correspondent.)

Gray Eagle Mine, Forrest Hill.—The recent improvements noted continue to be very encouraging. The face of the drift is now over 150 ft. in on the river channel and is steadily improving, giving promise of being one of the best gravel deposits on the divide. Arrangements are now being made for the introduction of a complete electric system for use in working and lighting the mine. The mill keeps steadily at work and it is anticipated that the mine will very shortly be paying regular dividends. This week 46 oz. of bullion, being a clean up of the mill, were received in San Francisco.

San Diego County.

(From our Special Correspondent.)

Private advices received from Gen. W. E. Webb, who is at present in England, tell of the completion of the sale of the Tepustete iron mine, situated in Lower California, about 40 miles south of Eusestada, to an English syndicate, who in addition to developing the mine propose erecting extensive smelting works, probably at San Diego. The people of San Diego promised a subsidy of \$100,000 for the establishment of an iron plant on San Diego Bay within a specified time.

Siskiyou County.

A syndicate of Colorado capitalists, according to reports, has just purchased the Trinity River gold mines. The properties embrace over 400 acres of ground. The company includes George Arthur Rice, L. I. Bailey, and William Gilder, president of various prominent Colorado banks. The purchase price was \$1,500,000.

Trinity County.

Integral Quicksilver Mining Company.—This company, says the Redding "Democrat," will erect a reduction milling plant on its ground. The property of the company is a portion of what is more familiarly known as the Altona quicksilver belt in the northeastern part of Trinity County, near the boundary line between Trinity and Shasta and about 20 miles from Castella.

COLORADO.

Baldwin.—This mine has been leased by the Citizens' Coal & Coke Company, of Denver. It is expected that 300 men will be at work on it shortly.

Chaffee County.

The Buena Vista correspondent of the Denver "Times" reports that the Jimmie Mack mine has again resumed shipment and is running a day and night shift. The ore grows better at the greater depth. The Gold Cap mine has been shipping nearly all summer and still continues to push work forward. In a few days it will ship about five carloads. The Lee began its first shipment by sending some four or five carloads of good gold ore to the smelters.

Gunnison County.

May-Mazepa Consolidated Mining & Milling Company.—H. W. Smith has taken a lease on No. 8 shaft, and is now prospecting for an ore body. The May-Mazepa is shipping ore from the 265 level, Dividend shaft. There are 5 ft. of good ore in sight. A large force of men is at work.

Lake County.

(From our Special Correspondent.)

Grey Eagle Consolidated Mining Company.—A south drift is being driven from the 400-ft. level of the Grey Eagle shaft, which is meant to connect with a corresponding level of the Pooahontas, in order to secure better ventilation. This drift was originally started in on the contact, but that material suddenly rose, indicating that the mineral, if any is to be found in that vicinity, lies above the 400-ft. level. A drift is also being run west from the 400-ft. level of the Pooahontas to connect with the Penrose, thus forming a complete triangle for ventilation between the three mines named. The station at the 410-ft. level of the Penrose has been completed and two additional pumps are now going in place. The shaft, barring accidents, will be drained within the next ten days. The Bohn shaft has again started up, and the retimbering is nearly completed at the 6th street.

Mike & Starr Mining Company.—A drift, now in 350 ft., is being run westward from the 500-ft. level of the Mike & Starr shaft, which is intended to develop the Gardner ground. This drift cuts through the Goodell, a claim now held in litigation between the Iron Silver and Mike & Starr companies, and upon which a decision of the Supreme Court is now pending.

Pawncos Mining Company.—The recent strike in the Pawncos is proving up much better than was

at first anticipated. The vein has greatly enlarged and improved in commercial value, and a large amount of ore has already been broken and hoisted ready for shipment as soon as the necessary arrangements will have been made.

St. Louis Mining Company.—A rich strike has recently been made in the St. Louis, on Bruce Hill, by lessees. This strike consists of a fine 3-ft. body of lead carbonates and was made in the new incline recently started from the surface to intercept the chute opened up some years ago in the shaft, and abandoned on account of water. Shipments will be inaugurated next week.

Valley Mining Company.—Another large body of ore, 16 ft. in the breast, has been discovered in the old incline run from the lower level in the Valley shaft, being the third successive chute cut by the same incline. The last discovery, by late development, has proved to be an extension of the famous Forest Rose chute and comes in from the north-west, dipping directly into the hill. A new incline is now being driven from a point lower down in the shaft in order to intercept the chute from below and thus be able to more correctly handle the ore. New arches are being erected and will soon be inclosed for the winter. Shipments from the Opulent chute, in the upper workings of the Valley, average 15 tons daily and will be increased shortly to 35 tons.

Pitkin County.

The Holden Lixivation Works, at Aspen, are making an experimental run on ore from the Mollie Gibson dumps.

Aspen Mining and Smelting Company.—According to the Aspen "Times" this company's output for August amounted to 2,050 tons. The product of the property was largely from the 29 leases that are operating on the property of the company which as a whole have afforded satisfactory results. The experience has been good and indifferent since the tribute system was introduced at the property. Many have realized a handsome thing, while others have been less fortunate. The latest disclosure of importance has been in Lease 26, operated by John Ingram, who drove into an unexplored block and disclosed a quantity of ore that is yielding 100 oz. to the ton. In the company workings but little ore has been broken, owing to water.

Saguache County.

We extract the following items of Creede news from the Deuver "Times": The practicability of deep mining in this camp has been fully demonstrated in the results that have attended such work so far. The Nelson tunnel is a good example, for with 180 ft. of work now done, the managers are in solid formation carrying heavily mineral stained matter with indications of a vein within a few shots. This tunnel runs through Bachelor Mountain from West Willow gulch to Bachelor City, a distance of 3,000 ft., underlying some of the best prospects on that mountain, and cutting the Amethyst at 1,400 ft. Taking the richness of the Amethyst at its present depth, 300 ft., there is no indications of a pinch, but on the contrary an increasing ore body. The large new shaft house of the Amethyst is completed. It is 40x90 ft. The 80-H. P. boiler has been taken up. The hoister has 1,000 ft. of English crucible steel rope, and it is expected to sink a shaft its full length. During the month of July the tramway brought down 1,650 tons of ore, and this month it is averaging 80 tons a day. The Montezuma tunnel, in Windy gulch, is in 40 ft. and will run through the Lillie May, Rosita and Omaha, all of which have good lead matter. They are owned by Henry Benner. The shaft in the Lillie May is down 32 ft., showing a 25-oz. ore and improving.

Summit County.

According to the "Summit County Journal," the ore and concentrates shipped from Breckinridge during August amounted to 1,030½ tons, making a total for the year since January 1st of 4,888½ tons, against 3,501 tons during the same period last year, a gain of 1,387½ tons for 1892.

IDAHO.

Boise County.

Boulder.—According to a special correspondent of the Anaconda "Standard," the saw mill and quartz mill are running full time. The tunnel, which is in 350 ft., following the ledge, is in pay ore all the way. The face of the tunnel is under a gulch, but it is 150 ft. below the surface. Before reaching the gulch the depth is considerably more. The face will soon be under the steep mountain, when a foot in depth will be gained for every foot run. The surface prospects show the chute to be at least 1,000 ft. long. The ledge is 20 ft. wide, all pay ore only, but at present the owners are taking out seven feet of it—the width of the tunnel.

Owyhee County.

De Lamar Mining Company, Limited.—Following is the manager's report of milling operations during July: Number of wet tons crushed, 2,450; number of dry tons crushed, 2,184; assay value of pulp, per ton—gold, \$20.27; assay value of pulp, per ton—silver, \$19.07; total percentage saved, 83.25%; No. of dore bars produced, 28; number of ounces pure gold produced, 1,554.285; number of ounces fine silver produced, 39,033.300; value of gold produced, \$31,085.61; value of silver produced, \$32,902.76; surplus on bullion sold, \$1,619.53. Ore shipped during the month, \$15,000; miscellaneous receipts, \$506.97; expenses

for the month, \$37,722.98; estimated profit for the month, \$43,381.89. Included in the expenses for the month is the item of \$1,000 on account of well-boring plant.

Phillips & Sullivan.—The Leonard mill is now running on Phillips & Sullivan ore. A body of rich milling ore has been opened in the lower workings of the above mine, and ore will be milled until the roads are again blockaded with snow.

Ralph Mining Pool.—The winze 158 ft. deep, connecting No. 3 and No. 4 tunnels on the Ruth vein, was finished in 46 days. This furnishes ventilation for No. 3. Tunnels 3, 4 and 5 are being driven ahead with a double shift on each tunnel. The work of putting up the mill will be commenced Sept. 1st. This will have a capacity of 30 tons per day.

South Central Mining Company.—The south drift on this mine has opened up a very rich body of ore in the past few days. The development work on all parts of the mine is being pushed with a view of opening large reserves of ore before stoping. When ready to stope the output will be large and steady, says the Idaho "Avalanche."

Shoshone County.

Last Chance Mining Company.—In this mine a force of men have recently been developing on level of tunnel No. 2, and as the upper works are drained, ore can now be extracted from the level and below. On level of No. 1 a carbonate chute has been leased. The Sweeny tunnel, from development work alone, keeps the mill running during the day, and the concentrates are considered better than Wardner averages. Nearly half a mile of 12-in. steel air pipe is being placed in this tunnel, which, in connection with a Root bowler, will effectively ventilate the works. A large quantity of good ore is visible here, which can be easily and economically extracted, says the "Barbarian."

ILLINOIS.

Illinois Coal & Coke Company.—This company has been foreclosed by the bondholders, who have bought the property in for \$250,000 and reorganized it under the name of the Peoria Coal Mining Company. Mr. Charles Howard has been chosen general manager for five years. Under the old management Pierce Bros., of Chicago, took the whole product of the mine, but through their selling the output at such low prices the company was barely paying expenses and the bondholders decided to foreclose the property in order to be relieved of the contract with Pierce Bros., which was to run for two years longer. Mr. Howard has already made contracts with various railroads to take the product of the mine and some \$15,000 have been already spent in improvements on the property. There have been nine miles of new track laid in the mine and the output of coal will be 4,000 tons per day when the contemplated improvements have been made.

KANSAS.

Cherokee County.

During the week ending August 27th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,294,140; rough ore, pounds sold, 1,593,560, zinc ore, pounds sold, 890,040; lead ore, pounds sold, 322,940. Sales aggregated a total value of \$17,640.

MICHIGAN.

Copper.

Allouez Mining Company.—The diamond drill is working toward the Calumet conglomerate, which the company expects to strike at a depth of about 400 ft. vertical or at a depth of 700 to 800 ft. on the underlay of the lode. The drill has reached a depth of about 160 ft. West of the Allouez lode the company is hastening to uncover the Pewabic lode. The Osceola lode dips into the property and it is likely that this lode will be explored at some future time.

Atlantic Mining Company.—The men employed by this company have struck for higher pay, and as the price of copper does not warrant any such increase the mine has been shut down. About 300 men are in the strike. To this number of idle men may be added the 200 recently thrown out of work by the closing down of the Peninsula mine.

Calumet & Hecla Mining Company.—The new coal shed will soon be completed. It is 658 ft. long by 223 ft. wide, and 27 ft. clear inside, and has 11 tracks running lengthwise of the shed, and under the floor, to facilitate the loading of coal for the mine and mills. There are 644 shutes, which enable two men to load a car. To unload coal from boats there is provided the latest appliances. There are 6 hoists and 28 runways, and it takes an engineer and weigher for each hoist. The cars are automatic, traveling to any point in the shed, dumping and returning to the scales. When running full, it requires 36 coal heavers, 6 engineers, 6 weighers, 1 fireman, 4 water boys and a foreman. The best ten hours' record, with 6 hoists in use, was 2,019 tons. The greatest tonnage handled for one month was in May, 1892, when 32 cargoes were unloaded, aggregating 24,235 tons of coal, when the average coal time was 15 days. The shed has a capacity of about 100,000 tons of soft coal. The hoisting appliances, automatic cars, etc., were furnished by the Hunt Engineering Company of New York.

Centennial Mining Company.—The work of pumping out No. 1 shaft on the Osceola amygdaloid has been started and as soon as the pump at this shaft does full duty unwatering will be commenced at No. 2. The intention of the company is to give this belt

a trial. Developments on the conglomerate, thus far, are anything but encouraging, and No. 3 shaft being so far north of the south line, the chances for striking anything of value appear remote, says the Torch Lake "Times." The company owns a full section of land with outcrop of this belt extending clear across it, and the outcrop is situated well up to the east line, affording the opportunity to sink down to almost any reasonable depth and develop a great mine. When last worked, the lode, particularly in the north end, looked well and promising, showing considerable heavy copper, and there was also considerable silver taken out.

Franklin Mining Company.—This company will furnish several pieces of massive native copper for the exhibit at the World's Fair. One is a piece about 3 ft. high shaped something like an hour glass, the lower part of which is amygdaloid rock plentifully sprinkled with fine copper, and the top of pure copper is connected with the base by a narrow neck of copper and rock several inches in thickness. The smaller piece is of crystallized copper of about 25 lbs. weight.

Huron Mining Company.—There are now 120 men and boys employed, says the Portage Lake "Mining Gazette." The openings are being vigorously pushed. At present 4 drifts and a winze are being opened and it is the policy to develop as much new ground as possible and do it rapidly. One head is running at the mill full time. The product for July was 40 tons and for August about 50 tons of mineral.

Quincy Mining Company.—This company has now nearly gotten the old Pewabic property in shape to begin taking out ore. In the opening up of its several levels it has found some very rich ground.

Tamarack Mining Company.—No. 3 shaft, North Tamarack, is about 2,500 ft. deep. No. 4 is down 2,400 ft. These shafts are now going down at the rate of something better than 80 ft. per month. They must be sunk nearly 5,000 ft. to reach the conglomerate.

Tamarack Mining Company.—The annual report of this company for the year ending June 30th, 1892, compares with the two previous years as follows:

	1892.	1891.	1890.
Gross receipts from copper.....	\$1,906,798	\$1,971,919	\$1,070,697
Interest receipts.....	13,895	36,857	2,413
Total.....	1,920,694	2,008,776	1,073,110
Expenses at mine.....	851,311	728,115	471,688
Smelting.....	265,117	213,921	176,576
Mining profit.....	806,265	1,066,739	424,846
Dividends.....	800,000	750,000	480,000
Surplus.....	6,265	316,739	def. 55,154
Construction.....	170,060	340,430	362,863
Product mineral, lbs.....	22,275,557	18,776,153	12,031,574
Product refined copper, lbs.....	16,805,390	14,076,957	8,928,249
Cost per lb. at mine.....	5.07c.	5.17c.	5.28c.
Cost per lb. for smelting, etc.....	1.56c.	1.52c.	1.98c.
Cost per lb. for construction.....	1.01c.	2.42c.	.....
Cost per lb. at N. Y.....	7.64c.	9.11c.	7.26c.

Superintendent John Daniel says: "In the 14th level the Osceola amygdaloid was drifted on 200 ft. north. The copper-bearing part of the lode is fully 10 ft. wide and the rock we rate as better than the average of the Osceola mine. It in no way indicates that depth has any unfavorable influence on productiveness." The mill has run regularly; 74,648 tons of rock were stamped for Kearsarge and 338,700 tons for the Tamarack; total, 413,348 tons.

Wolverine Mining Company.—The openings are being continued at the 5th level south of No. 2 shaft. It is said that the ground is showing well for copper. The 6th level is only in south of shaft a short distance in poor ground. The 7th level south of No. 2 is also showing up fairly well. The 7th level north of No. 2 has gone through quite a run of ground that will pay to stope. No. 2 shaft is sinking to the ninth level in ground that must be called poor, though at times it shows a little copper.

Iron—Gogebic Range.

Champion Mining Company.—The work of sinking three or four shafts at this mine will be commenced at once. This will give employment to something like 60 men in addition to the force now engaged. The prospects for an early resumption of mining are considered good, says "Iron Ore."

Germania Iron Company.—The mine is not producing much ore but is sinking 3 shafts to a greater depth.

Minnewawa.—This mine will soon begin the sinking of a three-compartment shaft to reach the ore found by the diamond drill.

Superior Iron Company.—At this mine no mining is being done, but about 15 men are loading from stockpiles. The pumps are kept going to keep the mine dry.

Iron—Menominee Range.

Hamilton.—Iron Company.—The water in this mine is now within 75 ft. of the surface.

Ludington.—Experts report that it will take a year's work to put this property in condition to be worked. Rumors are again afloat that the Schlessingers are preparing to secure this mine and point to the fact that an inventory is being made.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

There is but little change to report from the mines of the lead and zinc belt over the previous week.

The zinc ore market remains unchanged at a general average of \$23 per ton. Large operators are holding their ore in the bins for better prices, which they feel sure they will get inside of 30 days. Lead ore closed at \$23.25 per thousand. W. B. Jeffries, M. E., of London, England, is again in the city and closed a deal for the purchase of the lease of Messrs. Rice and James of the Mahuska mines, for \$40,000. This property contains 160 acres and adjoins the Eagle tract of the Empire Zinc Company. The tract of land is fairly well developed and has been a steady producer of lead and zinc ore. Mr. Jeffries will put in some new machinery and make other improvements so as to increase the output. Following are the sales of ore from the different camps: Joplin mines, 1,600,660 lbs. zinc ore, and 286,720 lbs. lead; value, \$25,763.80. Webb City mines, 352,300 lbs. zinc ore, and 105,630 lbs. lead; value, \$6,460.95. Carterville mines, 951,990 lbs. zinc ore, and 142,340 lbs. lead; value, \$14,121.70. Zincite mines, 127,200 lbs. zinc ore, and 1,770 lbs. lead; value, \$1,525.30. Oronogo mines, 48,610 lbs. zinc ore, and 27,300 lbs. lead; value, \$1,086.70. Carthage mines, 42,500 lbs. zinc ore; value, \$488.75. Alba mines, 41,500 lbs. zinc ore; value, \$477.25. Galena, Kan., mines, 705,740 lbs. zinc ore, and 322,940 lbs. lead; value, \$15,680. District's total value, \$65,604.45.

The South Joplin Lead and Zinc Company made an important strike last week. The company have been doing but little work for several months on account of the bad condition and caving of their old workings. They decided to open up an old shaft sunk about two years ago to a depth of 95 ft. This shaft was found to be in a solid formation, but at a depth of 103 ft. an excellent ore body was cut, also a strong flow of water, which proves the shaft to have penetrated open ground. A pump was put in and the water held under control, and the ore body has now been penetrated to a depth of 7 ft. A drift will be started at once on the run of ore. The old Ruby mines, located south of the city of Joplin, are once more coming into the list of steady producers. Over three years ago this property was sold by the Frye Bros. to a St. Louis syndicate, who spent a small fortune in development and expensive machinery but made a small output. The property was then shut down and lay idle for over a year, when it was sold to a New York syndicate. They commenced prospecting some of the old workings and found new ore bodies. They then overhauled the old concentrating plant, put in new machinery where required, in fact, several months have been spent in dead work and repairs, but now the property is in good working order and plenty of ore in sight and is now producing at the rate of 30 to 50 tons of high grade zinc ore.

MINNESOTA.

Iron—Mesaba Range.

Biwabik Iron Company.—Drilling is being done to determine the thickness of the ore body. In one pit a depth of 40 ft. has been reached without touching the bottom of the ore. Mr. Kimberly is of the opinion that an average of eighty feet of ore will be found on the property.

Cincinnati Iron Company.—The first hoist to be used on the range has been put on this property. Mr. H. W. Oliver has transferred the lease of this mine to the Standard Ore Company in which he is interested. It is now expected that several cargoes will be sent out before the season closes.

Itasca Iron Company.—This company is a consolidation of the old Itasca Iron Company and the Ohio, Buckeye, Licking Iron companies. The capital is \$5,000,000. Considerable work was done on the Itasca, and now active operations will be commenced at once, and the company's land, embracing about 4,500 acres, will be thoroughly developed.

Lone Jack Iron Company.—A second shaft has been sunk in ore to a depth of over 100 ft. The bed of ore has been shown up for a width of 650 ft. and a length of 750 ft.

Wyoming Iron Company.—This company has leased three forties to the Parkersburg Iron Co. A bonus of \$30,000 was given for the lease and the lessee company agrees to mine a minimum of 50,000 tons of ore each year, on which it will pay a royalty of 50 cts. a ton. The Wyoming company recently leased another forty to John T. Jones. The guarantee minimum production was 25,000 tons a year, with a royalty of 50 cents a ton.

MONTANA.

Deer Lodge County.

Red Lion.—There is now quite an amount of ore on hand. A carload will be shipped to the Helena smelter to be treated by the cyanide process.

Jefferson County.

Alta.—This mine, a few miles from Wickes, is the only mine now in operation in that part of the county. Over 200 men are now employed at this mine.

American Development and Mining Company.—In cross-cutting in tunnel No. 2 a 4-ft. lead has been discovered which, upon being assayed, yielded \$17 in gold and 9 oz. silver per ton. The surface opening is still going on, the vein being opened and sampled every 35 or 50 ft.

Comet.—This mine will soon be closed down. The method used at the concentrator has been only partially successful, it is said.

Elkhorn Mining Company.—The assistant manager's report of milling operations for July is as follows: "The mill was shut down for repairs on

July 4th, and started up again on the 9th. During the shut-down a new dryer was put in, the fire section of the White & Howell roaster replaced, and the general repairs to the machinery were completed. The semi-annual clean-up was made at the same time. Ore on hand July 1st, 74.72 tons; raised from the mine, 1,368 tons; less shipping ore, 429.78 tons; second-class, 81 tons; waste, 115 tons; add for salt, 130.83; ore panned in July, 835.134; pulp in the mill, 12.64 tons; rough ore in stock, 100 tons; total, 947.77 tons. Dry tons panned, 835.134; average assay value, 41.90 oz., average per cent. salt used, 14%; average value of tailings, 3.75 oz.; average per cent. saved, 91.70%; number of dore bars produced, 31; number of oz. fine silver, 28,173.63; number of oz. fine gold, 36.595; batteries in service, 22 days, 23 hours; pans in service, 25 days; estimated value of bullion shipped, \$24,240; actual returns from 429.7785 tons of ore shipped, \$37,721.47; total, \$61,961.47; current expenses, including salaries, labor, supplies, etc., \$26,579.00; balance, being profit for July, 1892, \$35,382.38.

Goodyear Mining Company.—This company owns five claims, which lie on both sides of Indian Creek, and two claims one mile north, making seven claims and a millsite. The company is sinking on the Whopper shaft on the Jenny Lind lode. It is now down 130 ft., following a shoot of ore, the dimensions of which are unknown. Samples taken from across the shaft ran \$38 in gold, 18 oz. of silver and 40% lead.

Meagher County.

Galt.—In the lower tunnel at a distance of 350 ft. an upraise is being driven which will be 200 ft. to the surface. The ore chute of this tunnel is about 400 ft. long and averages all the way from 4 to 6 ft. The upper tunnel extends 225 ft. and enters into the ore body 75 ft. This ore body is fully 4½ ft. wide. The shaft is down 110 ft. and the vein is from 4 to 6 ft., with continuous ore from top to bottom. On the dump at the lower tunnel there are 75 tons of ore which was taken recently. At the upper tunnel there are at least 100 tons of good ore and 400 tons at the mouth of the shaft. At present there are 1,000 ft. of tunneling in the mine, which is 6½ ft. in the clear and 4 ft. wide.

Loretta Mining Company.—This company was formed to work the Tiger claim. The ore is a mixture of galena and soft and hard carbonate in a vein 6 ft. wide. An assay of a sample taken across the face gave 64% lead and 64 oz. silver per ton. After striking the ore the tunnel was extended to 325 ft. and work is still progressing. From 12 to 15 carloads of ore are now waiting shipment. Teams are now hauling to the station and a trial shipment of two cars will be made to Aurora, Ill.

Park County.

According to the Livingston "Enterprise," the mining industry is improving at the Boulder district. The Independence Mining Co. has about 40 men at work upon its mines and in the construction of a tramway 1,000 ft. in length, to conduct the ores from the mines to the ore house at the lower mill. This company expects to have its own mill in operation early next month. The Poorman Company is pumping the water from the shaft and getting the mine in shape for milling operations as soon as their electric power plant is in position, the machinery for which is now arriving at the mines. The Hidden Treasure Company is also preparing to start up the mill.

Silver Bow County.

Boston & Montana Mining Company.—The loss by recent floods will be less than \$10,000. By improvements being made at Great Falls, and which will be completed by end of present month, the company expects to be able to treat 800 tons of ore per day. Company is erecting large bins which will hold one week's supply.

Butte & Boston Mining Company.—A letter received from Superintendent Palmer, of this company, says that four reverberatory and four O'Hara furnaces are now in operation, and that two more of the latter will soon be put to work. The main buildings are completed according to contract. The present output is at the rate of 600 tons fine copper per month, or more than was produced before the fire. The company is now treating about 200 tons of ore per day.

Coal—Flathead.

Black Eagle Coal Company.—The deposit was discovered at 40 ft. below the surface, and at 51 ft. the bottom was still in coal. Here the work was temporarily suspended, owing to the increase of water. The quality is similar to the North Fork coal, and is believed to be the same vein. The company will continue to develop the property.

NEVADA.

The Reno "Journal" says: "Five ore cars loaded with tailings from the Nevada mill were brought down on the Virginia & Truckee R. R. on the 27th ult., consigned to the Reno Reduction Works. If a fair percentage of the assay value can be realized it is probable regular shipments will be made."

Dolores County.

Enterprise Mining Company & Rico-Aspen Consolidated Mining Company.—According to the Denver "Republican," a fight occurred on the 1st inst. between the miners employed in the properties of these companies. The Vestal claim of the Rico-Aspen group adjoins the Jumbo, belonging to the Enterprise group. A portion of the ground is in dispute, says

the "Republican," and both sides have in all haste been running tunnels toward the contested territory. On the 1st inst. the workings were so near together that the two forces of miners could converse and warn each other of the danger of exploding shots. It was then discovered that the Enterprise tunnel was several feet below the Vestal workings, and a winze was sunk by the Vestal miners to make a connection with the tunnel underneath. It was here that the Vestal foreman was hurt by a shot fired by the Enterprise miners. The Enterprise people said that due notice of the shot about to be fired had been given. The Enterprise miners built a fire in their tunnel and the smoke prevented the opposition from entering their workings. The Aspen people, as a counter move, built a fire in their Montezuma workings for the purpose of smoking out the miners in the Jumbo claim. A part of the Jumbo miners were compelled to decamp, but the working force in the tunnel at Vestal Junction were not disturbed, and they are now at work, while the Vestal force are compelled to remain idle at that point. Harold Browne, manager of the Rico-Aspen Company, makes the assertion that the Enterprise people have removed over \$100,000 worth of ore from the Rico-Aspen property. The Rico-Aspen company has secured an injunction which will prevent further operations for the present. At the office of the Enterprise Mining Company it was said that no news of this nature had been received from the mine and the foregoing could be neither confirmed nor denied. Mr. George Crawford, secretary of the company, is expected to arrive from Colorado before the end of this month and he will probably bring full details.

Elko County.

Following are the latest official weekly letters from the various Tuscarora mines: Belle Isle Mining Company.—West line crosscut, 250-ft. level, extended 8 ft. through the vein and a drift started south on rich ore; progress 3 ft. The upraise from the gangway drift, same level, extended 4 ft. on the ore, which is improving in size and quality, rock very hard.

Commonwealth Mining Company.—We have started stoping from west line drift, seam of high-grade ore exposed, balance second class. Joint east line drift has been stopped and a drift started from chute 3; progress, 15 ft., showing a little ore in the face of the drift. No material change in third level stopes. Hoisting during the week 3 cars first-class ore, car sample assay \$400 per ton, and 139½ tons, assay from battery \$23 per ton.

Del Monte Mining Company.—There have been crushed 423 tons of ore; assay \$31 per ton; on hand 29 tons of concentrates; assay value (estimated) \$236 per ton.

Navajo Mining Company.—There is nothing new to report in the stopes above the 350-ft. level; the ore continues about the same.

Nevada Queen Mining Company.—East line drift advanced 10 ft., small seam first-class ore and 2 ft. second-class exposed. No. 4 raise up 65 ft., progress 20 ft. in hard rock. No particular change in the stopes. Extracted 32 cars first-class ore, assay value \$260 per ton, and 134 tons second-class, battery sample \$24 per ton.

North Belle Isle Mining Company.—North drift, 400-ft level, extended 4 ft., showing no change. An upraise has been started from the south 500 stopes to connect with the 400-ft. level; progress 20 ft.

North Commonwealth Mining Company.—Have crushed to date at the concentrator 423 tons; assay \$31 per ton; on hand 41 tons of concentrates; hoisted 2 cars first-class ore.

Lincoln County.

Pioche Consolidated Mining & Smelting Company.—It was reported last week that this company had sold its property to the Consolidated Kansas City Smelting & Refining Company. The transfer was said to include the Pioche company's mines, smelter, jackrabbit railroad and other property. At the office of the Kansas City Company in this city, it was said by the officers that this report was without foundation. No such deal had been consummated.

Ormsby County.

(From our Special Correspondent.)

May Day Mine.—The peculiarity of milling methods, so abundantly illustrated in the working of Comstock ores, has again been illustrated in the reduction of ore from this mine. Four tons of ore worked at the Mexican mill netted \$59.60 per ton to the owners. The battery assay was \$151.70, so that the difference between the two amounts showed a loss which can scarcely be accounted for by the assertion made by the millmen that the ore was base. The loss was such a startling one that the Reno Reduction Works sent a representative to examine the mine and test the ore, after which they offered to work all May Day ore at a uniform charge of \$12 per ton, guaranteeing a return to the owners of 90% of the assay value. The next lot of ore will be worked at Reno, when the result will be closely annexed.

Storey County—Comstock Lode.

A lot of four tons of ore from St. Louis district, which was worked at the Mount Diablo mill recently gave the following results: First-class ore, 1,133 8-10 oz. silver; second-class ore, 659 7-10 oz. silver to the ton.

The Occidental mill has shipped 6½ tons of ore concentrates, valued at about \$7,000, for account of

the Occidental Consolidated Mining Company, and one ton valued at about \$1,000, for account of the Gould & Curry Mining Company.

Consolidated California and Virginia Mining Company.—The Virginia "Enterprise" says: The extraction of pay ore from the various levels of the mine in greater or lesser quantities is going along all the time, and the appearance of all the workings is favorable at present. Ore is being taken from all the levels between and inclusive of the 1,500 and 1,800 levels. In prospecting upward from the old sill floor of the old stopes on the 1,600 level ore of fair quality is being encountered and the showing is good. The workings from the bottom of the winze from the 1,800 level are in a quartz formation, from which some good ore is being obtained. A south drift from an east crosscut from the bottom of this winze is out 21 ft. There is ore-bearing quartz in the face of this drift and there is a chance for a development here as the drift advances.

Justice Mining Company.—The latest official weekly letter says: "We are stopping in a streak of ore in the west wall of the vein, at the north end of the mine, on the 822 level, which is 2½ ft. wide, and will mill \$25 per ton. Also stopping out ore from the south winze from No. 2 crosscut on the 622 level. The streak is 2 ft. wide and will mill from \$25 to \$30 per ton."

Overman Mining Company.—The latest official weekly letter says: "On 1,300 level, northwest drift has been extended 30 ft.; total, 223 ft. Formation, porphyry and quartz, latter of a low grade. On 1,200 level, the west drift from crosscut No. 1 has been advanced 31 ft. through bright, lively quartz, but of too low a grade to save for ore. The assays run from \$3.18 to \$12.25 per ton. On 1,100 level, the northwest drift from the south drift has been extended 14 ft.; total length, 605 ft. Have a seam of ore in the face of the drift about three feet in width, which assays about \$18.62 per ton. The upraise, at point 268 ft. in on this northwest drift has been extended 20 ft. through quartz assaying from \$6.97 to \$10.36 per ton. On 600 level, the face of west crosscut No. 1 from the south drift, is in porphyry."

Savage Mining Company.—The latest official weekly letter says: "The repairs to the Nevada Mill and Water Company's flume have been completed, and the mill has resumed crushing ore. On the 25th ult. we shipped to the Carson Mint 412 lbs. of bullion. The upraise from the 950 ore stopes has been carried up to within 40 ft. of the 750 level, with which it will connect; the top is in quartz-carrying fair-grade ore. On the 1,100 level the winze in the south drift near the ore stopes is down 42 ft. No men were working on ore in the mine from the 21st to the 29th ult., but the usual prospecting and repair was carried on throughout the mine. On the Sutro tunnel level work in the joint north drift with the Gould & Curry is temporarily suspended pending repairs to the Sutro tunnel. We expect to resume work in the drift during the coming week."

(From our Special Correspondent.)

The following is the weekly statement of ore hoisted from Comstock mines and milled, the car and battery assays, bullion shipped, etc:

Mine.	Tons hoisted.	Car sample assay.	Tons milled.	Average battery assay.	Bullion product, week.	Bullion shipped.
Con., Cal. & Va.....	983 26.61	980 21.88	.....	.....	.....	\$14,915.03
Gould & Curry.....	28 18.20	105 17.03	.....	.....	.....	21,000.00
Occidental.....	170	170 19.40	.....	.....	.....	37,000.00
Potosi.....	216 30.20	170 21.26	.....	.....	.....	335½ lbs.
Savage.....	.....	.....	.....	.....	.....	412 lbs.
*Yellow Jacket.....	.....	.....	.....	.....	.....	.....

* No report.

¹ Shipped on August account to date, \$46,568.03. ² One ton of concentrates of this estimated value. ³ Six ton and one half of this estimated value.

Savage Mining Company.—All efforts to combine with other companies in the lease or purchase of a mill have failed. The presidents of the Hale & Norcross, Potosi and Gould & Curry companies have promptly refused to join in any such measure without offering any reason for such refusal. The Savage Company, therefore, will be compelled to pursue any course of reform that may be inaugurated alone. Mr. Mills, in arriving at a decision upon the questions involved in the proposition of turning the mill into a naying property, has undoubtedly been largely influenced by the figures submitted at the last annual meeting by the superintendent of the company in his annual report. They are very suggestive, to say the least. During the fiscal year there were worked 28,533 tons and 1,300 lbs. of ore, the average car sample of which was \$23.17, the average battery sample being \$19.26. A bullion return was made of \$397,284.93, being 72.49% of the battery sample assay. It requires a short calculation only to perceive that the residues which were appropriated by the mill company as their perquisite, sanctified by custom and long usage, was 27.51% of the ore value by battery assay or about 45% of the car sample assay.

From these facts and figures Mr. Mills argues that the time is fully ripe for a change. Last year the Savage Company paid in the neighborhood of \$171,000 for working its ore. A mill can be erected for much less than that sum. He contends therefore

that if the milling company will not enter into a fair contract it will be much wiser as well as more profitable for the company to store its ore until a mill can be built. As an alternative proposition, however, he is willing that the milling company shall be paid \$5 per ton for crushing, haulage to be added, it. If to work the ore by the process now in vogue, to save and work the concentrates for th emines account, and to receive the same price per ton for saving and working same as for ore, the slimes to be impounded by the milling company for one-half the proceeds when worked, or in case they are not worth so much to them, they to belong to the mine to dispose of as may be seen fit. The tailings to belong to the mine also, or else that the milling company guarantee to return 70% of the car sample taken under the supervision of persons duly appointed for the purpose.

This later proposition is practically the same as that made by Mr. Mackay in the olden time with J. P. Jones, who then represented the milling company.

So far Mr. Woods has not ventilated his opinion on the subject, but it will be a surprise if he meets Mr. Mills even half way in agreeing upon any contract based upon figures such as the above. Such a contract would mean that the milling companies are willing to act fairly and honestly toward the mining companies, and any such new departure is not to be believed nor is it warranted by the facts.

Sierra Nevada Mining Company.—Considerable interest has been aroused by the news received to the effect that the west ledge has been cut in the Kenosha tunnel. What this find will amount to remains to be seen, but meantime the cutting of this gold-bearing quartz has attracted attention, and the stock of the company rapidly advanced in the market.

NEW MEXICO.

Grant County.

According to the Silver City correspondent of the New York "Sun," the lixiviation plant at Stein's Pass, which has been in operation on ores from the Volcano mine for more than two months, will be enlarged and the low grade ores produced in the camp will be treated by this process. Until this summer no attempt has ever been made to treat the ores produced in that camp, which were too low grade to ship. The shipping ore was sorted out and the low grade thrown on the dump, but now it has been demonstrated that this ore can be treated at a fair profit by the lixiviation process.

It has been nearly two months since the Silver City correspondent of the New York "Sun," since the Atchison, Topeka & Santa Fe Railroad Company refused to furnish cars to the Silver City & Northern Railroad Company, and during that time no ore has been shipped from Hanover. The mines there, which are the heaviest producers in the Territory, are closed down, and there is no work going on in the camp except development work on a small scale. Legal proceedings have been commenced by the Atchison company to restrain the Silver City & Northern Railroad Company from charging local rates on ore shipped to points beyond its line. The case was to have been heard this week at Las Cruces by Judge McFie of this District Court. The Silver City & Northern Railroad was built last year to the Hanover mines, and the stockholders formed another company known as the Southwestern Coal & Iron Company. This company purchased iron and other mines in the district, and the shipments over the railroad were heavy, as a through rate had been made which enabled owners of iron mines there to ship iron ore to the smelters at Socorro and El Paso. Last March, as duly reported in the "Engineering and Mining Journal," a Pennsylvania syndicate purchased 31 mines in the district for \$110,000, and commenced to ship ore to the injury of the interests of the Southwestern Coal & Iron Company. Soon after this the Silver City & Northern Railroad Company canceled the through rate on ore, and thus prevented the Philadelphia syndicate from shipping ore. This move was checkmated by the Atchison, Topeka & Santa Fe, which refused to furnish cars to the Silver City & Northern, thus cutting off shipments altogether. The fight will be a bitter one, and may result in the building of a new line to Hanover.

Bremen, Silver City.—The Bremen mill is running on ore from the Sherman mill, and the first bar of bullion will be turned out this week. The mill is treating about 25 tons of ore a day, and there are several hundred tons of ore in the mill.

Maud S. Mining Company.—The mill is completed. The crosscut tunnel was finished some three weeks ago, says the Silver City "Enterprise," and a large body of low grade ore was found in the vein. After drifting about 30 ft. a body of ore of a higher grade was opened and is showing up well. Ore for present reduction will be extracted from the stopes in the upper levels which were opened by the former management and work of developing the new ore body continued, keeping the ore reserves fully up to and exceeding the amount extracted. By this means the mill can be kept running continuously.

Mimbres Consolidated Mining Company.—This company's mill, says the Silver City "Sentinel," has been closed down in order to make some needed repairs, and ore is accumulating at the mine. It was thought that the ore would be worked up by the end of last month and the mill closed down indefinitely, but the delay which is being occasioned by the repairs now making, will put off the time of closing down for several weeks. The camp is reported as being quieter than ever before.

Sierra County.

Iron King, Kingston.—This mine has been sold to the Kingston Ore Reduction Company, which has been organized to operate the Kingston smelter. The Iron King produces a silver-manganese ore, desirable for smelters, and large quantities of the ore, says the New York "Sun," have been shipped to the smelter at Hillsborough within the past few weeks.

Pelican, Hermosa.—Messrs. Wheeler, Eceborger & Slater, lessees of this mine, have uncovered what is reported to be the largest body of shipping ore ever been found at Hermosa. They have a face of ore which is 20 sq. ft., and the ore averages nearly \$200 per ton. The camp is a long distance from the railroad, and low-grade ores cannot be mined profitably there.

OHIO.

Stark County.

Howells Coal Company.—The new shaft has passed through a 4-ft. seam of coal of good quality.

PENNSYLVANIA.

Coal.

The river coal operators in the Pittsburg district have formally announced their intention of reducing the price of mining from 3½ to 3 cts. per bushel. The change will go into effect on September 10th, and will probably cause a strike of more than 5,000 miners.

At Pottsville on the 6th inst., Judge Perishing rendered a decision restraining Tyler, McTurk & Company, the Mill Creek Coal Company and others from operating coal washeries near New Boston. The defendants claim to have an investment of \$150,000 and that washing coal by water flowing through their breakers into the creek is a universal custom. If sustained, his decision will crush out an immense industry.

SOUTH DAKOTA.

Lawrence County.

Buxton Mining Company.—In the Bonanza mine, one of the Buxton group, a body of ore has been encountered 186 ft. in width and 6 ft. thick; the average value per ton is \$22. The Clarinda, another of the company mines, has not been sufficiently developed to determine the extent of the ore body. The company is shipping to the Deadwood & Delaware smelter to Omaha, and has contracted to deliver 1,000 tons to the lessees of the Buxton mill, which will start up in 10 days with a new process for treating ore.

Carbonate.—Considerable prospecting has been done in the Potsdam sandstone contacts during the summer, says the Black Hills "Times," but with very little success. But one ore body has been discovered near the upper Potsdam, and the same is true of the lower belt. The Iron Hill company tapped this upper Potsdam with its diamond drill, and also penetrated a small uplift with a drift some three or four years ago, but without apparently finding any ore in its proximity. This rock was at that time commonly supposed to be quartzite, and the failure to discover ore at the contact exerted no little influence on mine owners in regard to deeper prospecting. As a matter of fact the sulphide bearing quartzite is all of 200 ft. below the bottom of the sump of the Iron Hill shaft. The lower Potsdam sandstone is only found in three different places in the Carbonate district, and is but little prospected. The recent discovery made by Mr. McLaughlin is said to be very extensive, however.

Golden Reward Chlorination Works.—The clean-up for the last 15 days of August amounted to \$20,000. During September, owing to the increase of ore obtainable, the company will increase the capacity of the mill one-third, by the addition of another chlorination barrel.

Golden Sand.—The deal which has been pending for some time past between C. H. Havens and Thos. White, involving the "Golden Sand" property at Bald Mountain, was consummated Aug. 31 by Thos. White paying Havens the price agreed, \$5,000. The property in question is one that has only been partially developed. White is acting for a Canadian syndicate and has bounded properties to the extent of \$300,000.

McGee & Daegling Amalgamating Process.—The McGee process for the reduction of silicious ores is declared by Mr. Daegling to be a failure and a receiver has been asked for, says the Black Hills "Times." Mr. Daegling says that he was induced to enter into taking hold of the process by McGee, who painted the success of the process in glowing colors, showing him tests of the process, which would convince the most skeptical that the process was a success. He then entered into an agreement to the effect that he and McGee should introduce the process into the Black Hills, each putting in an equal consideration; Mr. Daegling's consideration being the building of a mill and equipping it, McGee's consideration being his patent process. The mill was built and the machinery put in; several runs were made, each one being unsuccessful owing to defects in the machinery, or the lack of first one article or another, so said McGee. For the past year and a half this has been going on, Mr. Daegling stating he had, at the suggestion of McGee, put in new vats, and many other appliances, but still without success. About Aug. 1 McGee treated a quantity of concentrates for Deadwood parties, promising a clean up of 90 per cent., but the clean-up only showed 27% or less. Mr. Daegling was

kept in ignorance of the result and did not learn it until August 5th when he tested a quantity of ore which was in the mill and the result proved that the mill was not a success. Since then McGee has asked that a receiver be appointed. The unprofitable experience should be a lesson to enthusiasts over patent but not profitable processes.

Moulton.—A strike of a rich body of free milling ore has been made on this claim, near Poorman. The vein is 30 ft. wide, says the Black Hills "Times."

St. John's Mining Company.—There has been considerable work done on this property since the new managers have taken charge, says the Black Hills "Times." The shaft will be enlarged into two compartments, 4 ft. in the clear. The water and ore will be drawn up in buckets on guides, and can be dumped in three directions. The shaft will be timbered with square timbers.

Victory Mining Company.—This company has struck a 9-ft. ledge of galena. The ledge has two well defined walls and is as near a true fissure as has been found in the Carbonate camp.

Pennington County.

Keystone Gold Mining Company.—The deal for the sale of the Keystone mine is completed and the above company has been formed to work it. The company will erect a milling plant of 100 tons daily capacity. The work done has placed in sight sufficient ore to run the mill between three and four years. About 1,500 ft. of underground exploration has been prosecuted during the past year. The company owns 4,500 ft. in extent along the lode, and has other valuable rights and privileges under bond.

UTAH.

Juab County.

American Eagle Mining Company.—This company which is the owner of the Mammoth-Copperopolis mine, has brought suit against the owners of the Hungarian, seeking for a perpetual injunction restraining Caleb Chamberlain, George Arthur Rice and J. W. Jackman, owners under bond and lease of the Hungarian mine, from working that property, especially that portion on which there is a large dump, claimed by the plaintiffs as their property. The Hungarian is a valuable piece of property, and was recently secured under lease and bond by the defendants in this action.

Aspinwall.—A vein of ore has been uncovered in this mine east of Silver City. The vein is about 18 in. and assays from 130 to 219.48 oz. silver and 12 gold.

Keystone Mining Company.—An important strike has been made in this mine says the Tintic "Miner." On the 700 level between the old and new shafts there is a large body of ruby silver ore. A large amount of it is already blocked out by running drifts and stopes about the ore body.

Piute County.

Deseret Mining Company.—This company has appointed a committee to investigate the various processes of ore reduction and to ascertain the one best suited to the various ores found at its mines. It is the intention immediately on the conclusion of this investigation to erect a mill with a capacity of not less than 50 tons daily.

Salt Lake County.

Woodlawn.—In a 300-ft. tunnel run from the south side of the mountain, a body of concentrating ore from 4 to 11 ft. wide is being worked. The owners are now running from the east side to strike the vein at an increased depth of 200 ft., and have just broken into the ore, 175 ft. in.

Summit County.

Alice.—The shaft is now down about 135 ft. and two shifts are being worked. As soon as the new whim arrives, another shift will be put to work.

Anchor Mining Company.—The shaft has reached the tunnel level and a station is now being cut. This will be one of the principle points in the mine and every means will be used to make it as convenient as possible. As soon as the station is cut and the shaft and station timbered thoroughly, sinking will be resumed and the shaft sent into the depths below the tunnel level. The 8, 6 and 5-in. piping for the water system from Deep Lake have been laid and tested and is now being covered. The flood gate at the lake has been placed and everything is in readiness to lay the smaller piping as soon as it arrives and complete the system. No prospecting will be done above the tunnel level until the shaft and station on that level are completed, says the Park City "Record."

Delaware.—The shaft is down 185 ft. with an incline, the last 150 ft. being in the vein, which has two perfect walls and is filled with vein matter.

Iron Horse.—The old shaft will be sunk 52 ft. deeper by W. C. Hall & Co., who have leased it, which will give it a total of 220 ft.

Roaring Lion.—The leasers on this mine have closed down and it is now idle. The Park City "Record" says: "Nothing can be learned definitely as to whether work will be resumed again or not, but the chances are that no further developments will be made this season."

Tooele County.

Gold Hill.—A Crawford mill is running on \$25 ore at this place and is said to be saving \$23 per ton. The mill will make a clean-up in about 20 days, and from that time forward there will be regular receipts of Deep Creek gold in Salt Lake.

WASHINGTON.

The construction of the Everett & Monte Cristo Railroad into the Monte Cristo mining district is going steadily forward. Workmen are also busy getting the mines ready for operation. Joseph L. Colby, of Cleveland, Ohio, the president of the principal mining companies operating in the district, and head of the Colby & Hoyt syndicate, which is building the railroad, recently said of the Monte Cristo mines: "About half of the precious metal in this ore is gold. Sixty per cent of the ore must be concentrated." For this latter purpose a concentrator will be erected at Monte Cristo. Mr. Colby has selected Everett, the Sound terminus of his railroad, as a site for his smelter.

Pierce County.

Tacoma Smelter.—The production of this company for the month of July amounted to 527.05 oz. gold, 18,765.33 oz. silver, and 124,608 lbs. of lead.

WISCONSIN.

Ashland.—With almost three months left, during which shipments of ore may be made from this port, the ore shipped up to Aug. 17 was 71,279 tons more than the entire shipment during 1891. The figures were 1,324,605 gross tons shipped on Aug. 17 of this season, against 1,253,326 gross tons shipped during the entire season of 1891. Large sales of Bessemer ore this season is the cause of this increase. Shipments have been made as follows: Ashland, 111,841 tons; Aurora, 188,006; Colby No. 2, 37,584; Raud, 15,536; Tilden, 147,285; Taylor, 12,783; Globe-Ashland, 5,309; Iron Belt, 92,162; Montreal, north vein, 21,920; Palms, 34,655; Section 33, south vein, 2,362; Section 33, north vein, 3,133; Anvil, 1,686; Brotherton, 66,031; Comet, 19,198; Carey, 18,977; Newport, 63,233; Imperial, 2,446; Norrie, 257,802; East Norrie, 125,877; Odanah, 1,286; Pabst, 25,255; Eureka, 5,084; Sunday Lake, 38,628; Windsor, 15,503. Shipments from Ashland during the entire season of 1890 aggregated 2,174,556 gross tons. It is more than probable that the record of 1890 at this port, at least, will be overreached during the present season, as to do this an average weekly movement of but about 60,000 tons will be required.

Rawlins.—A special from this place says that a great number of people are on their way to the South Pass gold fields. The metal is found in both veins and placers. A Cheyenne syndicate has built a mill which has been working for some time with the cyanide process. The company is working from 12 to 18 tons of ore per day with an output of \$100 in gold. E. C. Bartlett, a coal operator, is now in the country with a diamond drill, but the results obtained are not yet known.

WYOMING.

It is reported that a thick seam of anthracite has been discovered south of the Yellowstone Park. Analysis by Denver chemists, it is said, show 98% fixed carbon.

The Newcastle coal mines are now putting out from 1,200 to 1,800 tons per day, and employ steadily from 400 to 500 men. The coal finds a ready market on the line of the Burlington & Quincy R. R. in Nebraska.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

A shaft 374 feet deep has been sunk through layers of sandstone and other formations on the Marrowstone Peninsula. These formations are similar to the coal formations of Departure Bay.

James G. Wardner has secured the Freddie Lee and is putting out 10 tons of ore per day. Among the several new discoveries lately sold, S. R. Wharton has purchased the Rico and O. D. Garrison on the Blue Bird, and active development is going on at the Slocan Star, Bonanza, Freddie Lee and Payne. The immediate building of a wagon road into the heart of this country by the Government is under consideration. Already good pack rails exist and 200 animals are now packing ore and supplies on Nakusp trail.

At the recently discovered coal seam near Kamloops a large force of men are at work sinking on it. According to the "Golden Era," progress is being made at the rate of six to eight feet per day, and says that every foot of progress shows that the seam is of value.

Kootenai.

Not less than three smelters have been erected during the past five years in British Columbia, and another is in course of erection; one built at Vancouver is now demolished; the one at Revelstoke has had only a disastrous trial run of a week or ten days, and that at Golden, although finished, has not yet been blown in. They all attribute their failure to smelt anything to the impossibility of purchasing ore, and to the high percentage of zinc and antimony in the small quantities of ore offered. There is no pretense of legitimate mining, and while many mines are in the hands of wealthy individuals, none of them have any idea beyond bonding their properties in the hope of selling out. The only notable exception to this is the Blue Bell mine, on Kootenai Lake, owned by Messrs. Franklin Farrell and Tomlinson (of the Parrot Copper and Silver Mining Company, of Montana), and A. B. Hendryx (of New Haven, Conn.), where the intention is to work the property.

Speaking of the Slocan District of the West Kootenai Mr. Walter B. M. Davidson says:

The mineralized zones seem to be fairly regular and continuous for some little distance. At the Bonanza King the zone is plainly traced on the course of a snow slide for two or three hundred feet, varying in width from 6 to 14 ft., carrying a varied percentage of galena in places; the galena appeared to form about ten per cent. of the zone, and there was occasional lenses of a foot to 18 in. in width of pure ore. As no work has been done except clearing away the snow, and in places little picking on the surface, it is impossible to estimate the percentage of lead ore to the total contents of the mineralized zone.

The assays of the galena vary extremely, but without doubt they carry an exceptionally high percentage of silver, varying from 80 oz. to many hundred ounces per ton.

Freddy Lee.—Very little work had been done at the time of my visit, not enough to determine exactly if there was a lode or zone, or if it was only a "blow out" or pocket. On the dump, formed by breaking up the croppings at this place, there were some 20 tons of galena, mostly of coarse cubes with occasional nodules of gray copper, which, it is reported, run very high in silver. Some 20 ft. above where this work was done there is a narrow seam of ore some 4 in. in width, and the same is found about 30 ft. below, but the lode is not traced or its dip or strike determined.

Lucky Jim.—This mine has been uncovered for about 30 ft. on the strike of the lode, the mineralized zone having a width with possibly $3\frac{1}{2}$ ft. of galena, where there is the best showing. No development has been done on this claim.

Slocan Star.—Where the owners have commenced work they had made a cross-cut of 7 ft. into the lode, exhibiting a body of galena measuring in all about 4 ft. 6 in. in width, and several tons of ore were in the dump. According to the owners, average assays of this ore gave about 60 oz. of silver to the ton of galena. This lode or zone could be traced in the creek some 700 yards away and 500 ft. below; here it showed itself much wider, but apparently carrying only a very small percentage of lead and silver.

The Blue Bell.—This mine, owned by the parties building the smelter, has been sufficiently developed to prove the existence of enough ore to supply the smelter for some years. The ore is cheaply mined, the tunnel coming out on the edge of the lake near the wharf. The ore is a galena mixed with considerable quantities of iron pyrites and zinc-blende and will need concentration.

CANADA.

A correspondent in Iron contributes the following regarding the iron ore mines at Bristol, Quebec: The deposits of high-grade magnetic iron ore at Bristol are greater than any heretofore thought to have existed in the Dominion of Canada. They are the property of the Bristol Iron Company, and are leased to and operated by Messrs. Ennis & Co., of Philadelphia. Openings and tests have been made on different portions of the attraction and show a very large deposit; the Geological Survey estimates the amount available from the north and south lodes at 34,000,000 tons. There is but one opening in operation at present. It is a slope some 200 feet in depth and has drifts or galleries in various directions. A careful inspection shows over 20,000 tons of ore in sight. The present capacity of the plant permits of the mining and hoisting of over 150 tons per day. Blast-furnace tests from large quantities shipped have demonstrated that it is capable of producing the finest grade of low-phosphorus pig and also valuable in combination with minerals exceeding the Bessemer limit. Analyses show the following average: Metallic iron, 63.258; metallic manganese, 0.080; silica, 7.630; phosphorus, 0.003; sulphur, 0.379; titanium, none; magnesia, 3.230; lime, 2.280%. The ore shows the following chemical composition after treatment in the Ball-Norton magnetic separator: Silica, 1.210; alumina, 0.533; lime, 0.160; magnesia, 1.050; peroxide of iron, 65.946; protoxide of iron, 30.130; sulphide of iron, 0.665; sulphide of copper, 0.014; phosphoric acid, 0.006; carbonic acid, 0.135; water of composition, 0.175%; total, 100.063. In other words the ore contains: Sulphur, 0.374; phosphorus, 0.003; iron, 69.928; copper, 0.011%. An examination of the machinery and buildings show great care and knowledge to have been employed in arranging a thoroughly equipped modern plant. The ore-roasting plant is of the latest approved Davis-Colby pattern, consisting of two large gas-roasters, 17 ft. in diameter and 27 ft. high, and of a daily capacity of 150 to 200 tons. The six gas-producers are of the Taylor design. This ore, though a magnetite, is, after roasting, very porous and spongy; its structure is opened and it is easily attacked by blast-furnace gases, so that roasting, even if there were no sulphur to be reduced, does a valuable portion of blast-furnace work on the ore, enabling the furnaceman to convert it at a lower cost.

Quebec.

Jeffrey Asbestos Mines.—The pits are five in number; they vary in depth from 75 to 130 ft., and the larger ones are about 400 ft. in width. The workings cover altogether about 40 acres, and the entire property is 75 acres. The quantity mined averages eight tons per day. Speaking generally, 50 per cent.

of the whole ranks No. 2, 10 per cent. is No. 1 and the balance is No. 3, though there is besides a No. 4 quality which is made from the "scrappings," and is found to be a readily handled commercial article. There is now ready for shipment about 600 tons.

MEXICO.

The government has established an official Mining and Agricultural Agency in Europe, of which Mr. Lic. Ernesto Eisenman has been placed in charge. His appointment is chiefly due to his assistance in the forming of the new mining law when that measure was before Congress, and also to former able publications in reference to the old mining code, which were made in Germany ever since 1885.

Chihuahua.

Cerro Colorado.—The mill of this company is now crushing from 50 to 60 tons of ore per day, and regular shipments of gold bullion are being made to the United States.

Durango.

Candelaria Mining Company.—Bullion valued at \$40,000 has been received at San Francisco, Cal., from the Candelaria mines.

(From our Special Correspondent.)

Shortly after the dispatch of my last letter (July 5th) heavy rains commenced falling in most parts of this State and the "hacendados" were thereby enabled to plant their corn. At present the indications seem to be for a fair crop, and there is consequently a much more cheerful feeling everywhere. The rains have not been general all over the State, however, and there are many localities which have not been favored, where the crops are likely to prove a failure again. On the 15th inst. there was an unusually heavy rain at the city of Durango which did some damage at the works of the Durango Steel and Iron Company.

Reports from all over the State are of dullness among the mining camps owing to the scarcity of water and the impossibility of moving heavy machinery on account of the poor condition of the livestock. I understand that work has been practically suspended for this reason at the new pan mill of Mr. Haggin's Guancevi mine for some time past, and it is likely to be six months yet before all is completed. The machinery has been on the road, within 100 miles of the mine, but no teams good enough to bring it in could be secured. The common report is that this mine, which was recently purchased by Mr. Haggin, will be a very large producer.

The great Promontorio mine in the Sierra de San Francisco remains idle, only two pans being kept running on tailings from the concentrating mill. With the ample water supply that there now is, however, it is likely that work will be resumed within a short time.

The construction of the new railway from Torreon to Durango has been delayed by the loss of a vessel laden with rails and track material, but it is expected that the last spike will be driven before the end of September.

Hidalgo.

La Reina.—The shaft in this mine has been sunk 185 ft. Pay ore has been tapped, and some is being sold toward the expenses of drilling. It has been decided from September 1st to put on a night shift of men as well as a day shift.

Maravillas Mining Company.—A vein over two yards wide was struck recently in the Carmen mine, containing ore running from 112 to 220 oz. per mon-ton of 3,000 lbs. The Xotol shaft is being carried down and will soon attain a depth sufficient to allow of cross cutting the main lode of the La Luz mine, of which the output will then largely increase. The deepening of the Xotol shaft will also have the effect of draining the San Buenaventura workings and will make it possible to attack the Salon vein, a strong ore body, between 5 and 6 yds. wide, which can be reached only from the San Buenaventura shaft, which for some time past has been flooded. The weekly output of the group of mines belonging to the company is at present 643 tons and will be twice as much when the developments now in progress are completed.

NEW CALEDONIA.

A new French company is starting high furnaces for cobalt, in Noumea, and the Nickel company intends to move its smelting works from Thio to Noumea. New Hebrides laborers cannot be used for mining purposes, ticket-of-leave men are not to be relied upon, and it has consequently been found necessary to import Japanese labor to work the mines. The increase in the shipping is principally due to the export of ore from the mines.

NOVA SCOTIA.

In his report to the State Department Consul General Frye says as follows concerning the gold mining industry of this province:

The product for 1891 is a little less than for 1890. The returns show that 53,543 tons of quartz were crushed yielding 21,131 ounces of gold, worth here not less than \$450,000. A little more than 530,000 ounces of gold have been extracted within the last 30 years. The average value per ounce of Nova Scotia gold is about \$18.75. At that rate the yield in 30 years has been about \$10,000,000. The crushed ore yields an average of about \$13.60 per ton. For the last 10 years the average product of the mines

has been a little more than \$390,000 per year. The number of mines reported in the province is 34; number of crushing machines, 39.

Oldham Gold Mining Company.—It is reported that this company will permanently close its Baker mine in September, the extensive prospecting work done underground during the past two years having failed to show any paying proposition.

Rhode Island Gold Mining Company.—This company after sinking over 100 ft., cut the Dunback lode on its western extension on the August 20th. The lode showed only 2 in. of black, barren looking quartz. This is the third place on the property on which this lode has been cut, and each opening failed to show pay quartz.

SOUTH AMERICA.

Straits of Magellan.

Société des Houillères du Detroit de Magellan.—This company has been formed, with \$400,000 capital, to work the beds of lignite recently discovered in the Straits of Magellan, and of which we have already made mention. The mine has been examined by Messrs. Willours and Rousson who state that there are two seams, of which, however, the upper is the only one that is workable. It has a thickness of 15 to 26 ft., but is divided into layers of 3 to 6 ft. by intervening clay partings, 4 in. thick. They estimate that the mine could supply a demand of 80,000 tons per year.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Sept. 9.

Heavy Chemicals.—The feature of the week in the heavy chemical market has been the advance in the price of bleaching powder. The cholera scare abroad has caused a most active demand for bleach for disinfecting purposes and producers are so crowded with orders that they cannot supply all wants. We call attention to our Liverpool correspondence on this point. In this country a similar state of affairs has prevailed during the past week, aggravated by the alleged possibility of delays in future shipments. To-day we hear of sales at 8c., and many are asking 10c. for their holdings. There are no stocks on first hands here, and it is impossible to say what price will be reached before the demand ceases. In carbonated soda ash there has been considerable trading for forward contracts, and the same thing may be said of alkali. Caustic soda is quiet and steady and shows no change as to price. Our quotations this week are:

Caustic soda, 60%, 3 1/2@3 20c.; 70%, 2 95@3 12 1/2c.; 74%, 2 97 1/2@3 12 1/2c.; 76%, 3 12 1/2@3 25c.; 77%, 3 12 1/2@3 25c. Carbonated soda ash, 48%, 1 57 1/2@1 60c.; 58%, 1 47 1/2@1 52 1/2c. Alkali, 48%, 1 50@1 55c.; 58%, 1 47 1/2@1 52 1/2c. Sal soda, English, 1 07 1/2@1 15c.; American, 1 05@1 10c. Bleaching powder, 6@8c., according to quantity.

Acids.—The usual jobbing demand for the various acids is reported. No change has taken place in the acid market as to price and the features which have characterized it for many months past may be noted to-day. Our quotations are: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@2 according to quality; muriatic, 18", \$1@1.25; 20", 90c.@1.10; 22", \$1.25@1.50; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 85c.@1.10; mixed acids, according to mixture; oxalic, \$7.25@7.75. Blue vitriol is quoted all the way from \$3.50@3.75; alum, lump or ground, \$1.70@2. Glycerine for nitro-glycerine, 11 1/2@12 1/2c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone is quiet and dull. Quotations this week are as follows: Best unmixed seconds to arrive near due, \$24.50; future shipments, \$24 for best unmixed seconds; thirds are held at 75c.@1 less.

Fertilizing Chemicals.—There is no change of importance to report of the market for fertilizing chemicals. There is a fair inquiry for ammoniates, and some sales are reported, but on the whole the market is quiet. Our quotations are as follows: Sulphate of ammonia, \$2.87 1/2@2.95 for bone goods and \$2.90@2.95 for gas liquor. Dried blood, \$2@2.05 per unit for high grade and \$2 for low grade; acidulated fish scrap, \$13.50 f. o. b. factory; dried scrap, \$23@23.50. Azotine, \$2. Tankage, \$18@22, according to grade. Bone tankage, \$22.50 @23.50; bone meal, \$23.50@25.50.

Double Manure Salts.—Quotations are as follows for lots of from 10 to 50 tons ex-vessel New York, 48-53%, \$1.13 1/2@1.23 1/2; 90-95%, \$2.13@2.23 1/2.

Kainit.—There is nothing new to report in this market. Prices remain \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia.

Muriate of Potash.—This market is very quiet. During the past week the arrivals have aggregated 375 tons. Sales for future delivery amounted to 400 tons. Vessels are being delayed now on account of the quarantine regulations, but shipments continue to come regularly. The prices fixed by the Sales Syndicate prevail as follows: Fifty-ton lots or over, New York and Boston, \$1.81 1/2; Philadelphia and Baltimore, \$1.84; Southern ports, \$1.86 1/2.

Nitrate of Soda.—Nitrate has been quiet owing to the recent advance. Quotations are as follows: \$1.95 to \$2 on the spot and \$1.95 to \$1.97 1/2 to arrive, according to quality.

Messrs. Mortimer & Wisner, the well known nitrate brokers of this city, send us the following interesting statistics, as given in their monthly statement of nitrate of soda:

	1892.	1891.	1890.	1889.
	Bags.	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1892, to date...	493,455	456,212	483,802	349,891
Imported into Atlantic ports from Europe.....	.....	18,802	.....	.....
Stock in store and afloat Sept. 1, 1892, in New York.....	493,455	484,014	483,802	349,891
in Boston.....	58,527	95,743	38,754	53,076
in Philadelphia.....	.....	1,000	.....	.....
in Baltimore.....	4,200	5,000	3,500	11,500
To arrive, actually sailed.....	144,000	171,500	.....	.....
Visible supply to Dec. 1, 1892.....	206,727	273,243	.....	.....
Additional charters ..	76,000	250,000	488,700	257,000
Total supply, when shipped.....	282,727	523,243	531,954	321,576
Stock on hand, Jan. 1, 1892.....	53,585	36,454	22,009	84,043
Deliveries past month.....	60,758	92,781	49,023	51,449
Deliveries since Jan. 1 to date.....	484,313	424,725	463,577	372,268
Total yearly deliveries.....	.....	634,207	673,679	546,589
Price current Sept. 1, 1892.....	1'95c.	1'90@1'95c.	1'70c.	1 1/2@1.90.

Liverpool. August 31.

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

There is a good deal of excitement this week in bleaching powder, but with this exception there is no change to report. Soda ash is still very scarce for any position to the end of this year, and quotations are quite nominal as follows, viz.: Caustic ash, 48%, £5 6s. 3d. per ton; 57@58%, £6 7s. 6d. per ton; carb. ash, 48%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d. per ton all net cash. For prime brands of caustic and carbonated ash, a considerable premium on above figures would have to be paid.

Soda crystals are in request at £3 7s. 6d.@£3 10s. per ton, less 5%.

Caustic Soda is still quiet, but perhaps rather more doing. Quotations are without change, as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s.@£12 10s. per ton, all net cash. For parcels under 10 tons 5% per ton extra is charged. These quotations apply to all quarters except United States and Canada.

Bleaching Powder.—Owing to the cholera scare and the short supplies of other disinfectants there has been quite a rush of orders from the Continent for bleaching powder, and prices have advanced daily this week, being at the close 20s. per ton higher within the last three days. Sales have been made of softwood to-day at £8 10s. per ton and £8 15s. per ton for hardwood, net cash. Manufacturers are declining to give any firm offers and talk of a further advance.

Chlorate of Potash is in small compass, 6 1/2 d. per lb., less 5%, is about nearest value for any position, although possibly a resale parcel might be picked up from second hands at 6%, but these resale lots are now getting very scarce. Bicarb. Soda selling for £6 15s. per ton, less 2 1/2%, for one cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia is practically without change. The nearest values on the spot being about £10 1s. 3d.@£10 2s. 6d. per ton for good grey, 24%; £10 2s. 6d.@£10 5s. per ton for 25%, both in double bags, less 2 1/2%, f. o. b. Liverpool. There are a fair number of inquiries in the market, but buyer's ideas of price are low.

MINING STOCKS.

(For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo., Baltimore, Pittsburgh, Deadwood, Dak., St. Louis, Helena, Mont., London and Paris, see pages 262 and 264.)

New York, Friday Evening, Sept. 9, 1892.

The mining market continues dull and quiet. During the week nothing of interest has transpired, and not a single transaction of importance can be reported. The holiday on Monday did much to increase the dullness.

The Comstooks show little or no change from last week. Consolidated California & Virginia was dealt in to the extent of 425 shares at \$3.05@3.35. There was a single transaction of 100 shares of Hale & Norcross at 80c. and another of 100 shares of Sierra Nevada at 45c. Comstock Tunnel stock continues to show large transactions; during the week 4,000 shares changed hands at 12@13c.; of this company's bonds we note a sale at 17c. Other sales were as follows: 100 shares of Yellow Jacket at 65c.; 100 shares of Bullion at 45c.; 100 shares of Mexican at \$1.30; 100 shares of Union Consolidated at 30c., and 200 shares of Potosi at 70c.

Of the Tusearora stocks there was a sale of 500 shares of Commonwealth at 10c.

Of the California stocks Bodie Consolidated underwent sales of 900 shares at 30@37c. Of Brunswick Consolidated 3,500 shares are reported to have changed hands at 10@12c. At the close 10c. was paid for this stock. Belmont shows a single transaction of 500 shares at 36c., and Middle Bar, one of 100 shares at 1c.

Of the Colorado shares Chrysolite shows a sale of

100 shares at 18c. Leadville Consolidated was stationary at 15c., with sales of 600 shares. Little Chief was very quiet. Only 200 shares were sold at 24 to 25c. No other Colorado stock was dealt in.

The Black Hills stocks were quiet this week. Of Caledonia there was a sale of 100 shares at \$1. An equal number of shares of Deadwood Terra were sold at \$2.15. Father de Smet declined from 30 to 27c.; sales aggregated but 200 shares. Sullivan Consolidated appears again in the official sales list of the Consolidated Stock and Petroleum Exchange, but this week only 200 shares are alleged to have been sold. The official price was \$1.05.

Castle Creek shows a transaction of 1,000 shares at 2c. Alice was fairly steady at 60@63c.; total sales, 600 shares.

Phoenix of Arizona this week shows sales of 2,000 shares at 50c.

According to the official list of sales at the Consolidated Exchange El Cristo was dealt in to the extent of 700 shares at 35@40c.

Boston. September 8.

(From our Special Correspondent.)

Copper stocks continue to decline on the pressure to sell and the weakness of the ingot market. There is no speculative interest in the market and buying by room traders, who have sold stocks short, seems to be the only support given to prices. The dividend-paying stocks have felt the pressure as well, and sales are made only on concessions. Calumet & Hecla, which sold last week at \$2.25, declined \$1.00 per share during the week and only 30 shares are reported as being sold at \$2.00@2.25.

Tamarack was more freely wanted and it took quite a large block to break the price from \$1.58 to \$1.55.

The Montana stocks have been forced upon the market; every broker has some for sale; the shorts are not anxious to buy, and in the absence of outside orders to purchase concessions have to be made in order to effect sales.

Boston & Montana sold at \$34 early in the week, but the price weakened on free offerings to \$31½. Butte & Boston, which has held quite firm for some weeks at \$9@9½, was also forced down to \$8½ on sales of only 100 shares to-day. There is nothing in the outlook at the mines to account for the decline, and it would seem as if at present prices these stocks ought to be a good purchase for a long pull.

Oseola, in sympathy with the rest of the market, also declined \$2 from \$31 to \$29. The company increased its output for the month of August 43½ tons over last year, and the prospects of the mine are considered good.

Franklin sold only in a small way at \$12¼@12½. The August product shows a loss of 10 tons from last year.

There was a little more activity in Kearsarge at a decline from 11½ to 10½.

Centennial, on the unfavorable reports from the mine, declined from \$7 to \$5. It is stated that developments on the conglomerate are anything but encouraging.

Atlantic declined to \$10. A strike of the miners and the closing of the mine and mill until grievance is settled, is the cause for the decline.

Tamarack Jr. sold at \$23, a decline of \$1.25 from last week. Arnold is quite firm at \$1.25 to \$1.50. The prospects are considered favorable for a good mine, which will pay to work when the condition of the copper market warrants. Alouez holds steady at \$1. Santa Fe sold at 12¼@10c., and Wolverine was quoted at \$2. Napa Quicksilver declined from \$6 12½ to \$6. We hear of bids of \$120 for Quincy, and none offered less than \$124.

3 P. M. This afternoon Boston & Montana was pressed for sale and declined to 31 on sales of 1,500 shares. Tamarack, on free offerings, further declined to \$152. Centennial sold at \$5, and Butte & Boston at \$8.12½.

San Francisco. Sept. 2.

(From our Special Correspondent.)

The mining stock market, after a few days of active trading, has settled back into the old rut of quiet stagnation. It is to be noted, however, that the slight advances in values are being sustained despite the small volume of business being done, and this fact alone carries with it some hope of more active trading in the near future.

The north end Comstocks have during the week monopolized attention on account of the west ledge being cut in Seine, Nev. That stock has within the week sold at an advance of over 100% on the ruling rate of a week ago. Sales have been fairly large and to-day, in regular session, 850 shares sold for \$1.35. From now on until it is seen what the mine development amounts to this stock will certainly receive more than ordinary attention. Consolidated California & Virginia has ruled at \$3.25, Mexican at \$1.25; Ophir at \$2.35; Union Consolidated at \$1.30; and Utah Con at 25 cents. All these prices are an advance on last week's prices.

Of the middle group of Comstocks Savage has received more attention than any other on account of the large offerings. In both the San Francisco and Pacific exchanges the sales have been heavy at prices ranging from 65 cents to 75 cents. Two causes have combined to throw large blocks of this stock on the market. First, when the manipulating powers wished to control Savage they had to go into the market and purchase the stock. The price was run up until it touched the \$3 mark. Having gained the end aimed at, they have recently been allowing the public the proud privilege of again

holding the stock. Roughly estimated, the loss falling on the inside ring by this little deal will be the neighborhood of \$45,000. Query: How do they hope to recoup themselves, if not by swindling milling operations?

Second, The Savage stock belonging to the Hobart estate is being peddled out. The market is scarcely in a condition to absorb this amount, but the dealings are being made shrewdly and evidently under orders.

Hale & Norcross has remained throughout the week steady at 95c. The promise of a good ore development on the 1,800 level has not yet been fulfilled, or if so has not been made public. Best & Belcher at \$1.25; Chollar at 60c.; Gould & Curry at 90c. and Potosi at 60c., have all sold at better prices than last week.

The south end Comstocks and Gold Hills have not been active, albeit prices are being sustained. The reports from the Overman are so gratifying that it might be expected the stock would advance. Ore assaying from \$25 to \$30 per ton is being taken out at a point further west from the shaft, 1,100 level, than it has ever been found before. Despite this showing the stock has ruled at 35 cents steady, a 5 cents decline on the week's trading. It must be remembered, however, that "Bob" Morrow, the able lieutenant of D. O. Mills & Co., has ever been a wily manipulator of Overman and other stocks controlled by the clique for whom he acts. Belcher at \$1.15; Bullion at 25 cents; Challenge at 30 cents; Confidence at \$1.10; Crown Point at 60 cents; Consolidated New York at 30 cents; Justice at 15 cents; Kentucky at 10 cents; Occidental at 30 cents; Seg. Belcher at 20 cents, and Yellow Jacket at 60c. have sold with varying fortune, the first five named at an advance on the week's trading of from 5 to 15 cents per share.

Of the outside stocks Bodie Con. has sold for 30 cents, Bulwer Con. for 25 cents and Mono for 10 cents.

Of the Quijotoas, Central, Crocker, Peer and Peerless have sold for 5 cents with nominal sales.

The Tuscarora group have been so quiet that trading has been almost nil. Quotations to-day ran: Belle Isle, 15 cents; Del Monte, 15 cents; Grand Prize, 10 cents; Navajo, 10 cents; North Belle Isle, 5 cents; North Common wealth, 5 cents, and Nevada Queen, 15 cents; all asked.

Of miscellaneous stocks Eureka Con. has sold for \$2.00, and Mt. Diablo for \$1.00, with offerings small.

MEETINGS.

Mono Gold Mining Company, at the office of the company, room 62 Nevada Block, No. 309 Montgomery street, San Francisco, Cal., September 15th at 1 P. M.

University Gold Mining Company, at the office of the company at New York, September 16th at 11 A. M.

DIVIDENDS.

Deadwood Terra Mining Company dividend No. 45 of five cents per share, 10,000, payable September 20th, at the office of Messrs. Lounsbury & Co., No. 15 Broad street, New York.

ASSESSMENTS.

COMPANY.	No.	When levied.	DT'ng't in office.	Day of sale.	Am't per share.
Best & Belcher, Nev.	62	Aug. 17	Sept. 22	Oct. 13	.25
Bullion, Nev.	39	.....	Sept. 2	Oct. 4	.25
Challenge Con., Nev.	12	Aug. 24	Sept. 27	Oct. 18	.10
Confidence, Nev.	12	Aug. 13	Sept. 15	Oct. 6	.50
Crocker, Nev.	12	.....	Sept. 2	Oct. 18	.05
Del Monte, Nev.	6	.....	Aug. 26	Oct. 5	.10
Eschequer, Nev.	33	July 27	Aug. 31	Sept. 20	.10
Florida Hill Gravel, Idaho	4	July 27	Sept. 2	Sept. 28	.30
Gold'n Fleece Gravel, Cal.	17	July 16	Aug. 24	Sept. 20	8.00
Guaucaran & California, Hon. C. A.	7	Aug. 9	Sept. 15	Oct. 8	1.50
Hale & Norcross, Nev.	102	Aug. 11	Sept. 15	Oct. 7	.50
Justice, Nev.	51	July 26	Aug. 31	Sept. 19	.10
Mountain Tunnel Gravel, Cal.	5	July 28	Sept. 5	Sept. 26	.07
Navajo, Nev.	22	Aug. 17	Sept. 2	Oct. 14	.10
North Belle Isle, Nev	2	Sept. 1	Oct. 6	Nov. 7	.10
Northwestern, B. C.	5	Aug. 17	Sept. 24	Oct. 15	.20
Peer, Ariz.	13	July 19	Aug. 25	Sept. 22	.10
Scorpion, Nev.	4	July 11	Aug. 19	Sept. 12	.05
Silver Hill, Nev.	31	Aug. 29	Sept. 6	Sept. 27	.05
Silver King, Ariz.	8	Aug. 26	Oct. 7	Nov. 4	.25
Teresa, Mex	8	July 19	Sept. 22	Oct. 8	.10
Union Con., Nev.	46	July 18	Aug. 24	Sept. 13	.25
Western Star, Cal.	1	July 25	Aug. 30	Sept. 21	.02

The total sales of pipe line certificates at the Stock Exchange up to Sept. 9 amounted to 68,000 bbls.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 9.

PRODUCTION OF BITUMINOUS COAL for week ending September 3d, and year from January 1st.

	1892.		1891.
	Week.	Year.	
Pittsburg, Pa.	25,312	859,042	849,095
Westmoreland, Pa.	30,116	1,124,398	1,361,153
Monongahela, Pa.	14,192	422,578	408,333
Total	69,620	2,406,018	2,618,581
Grand total	427,592	13,645,973	14,340,012

EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	
Phila. & Erie R. R.	1,029	57,043	125,491
Cumberland, Md.	79,212	2,479,977	2,811,001
Barclay, Pa.	783	36,485	125,637
Broad Top, Pa.	12,747	397,824	336,072
Clearfield, Pa.	71,830	2,646,489	2,694,475
Allegheny, Pa.	23,496	851,198	872,634
Beach Creek, Pa.	38,781	1,647,544	1,628,157
Pocahontas Flat Top	51,380	1,612,637	1,552,293
Kanawha, W. Va.	78,804	1,610,758	1,575,670
Total	357,972	11,239,955	11,721,430

* Week ending August 31st.

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending September 3d, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 95,674 tons; year 3,614,723 tons; to corresponding date in 1891, 2,682,160 tons.

Anthracite.

In spite of the advent of fall the anthracite trade does not exhibit any approach to briskness; in fact the dullness that has characterized the trade for a month or more still continues. The demand is slow, the stocks are high, and production is curtailed to as little as three days a week at most mines. The efforts of the barons to flog the trade into briskness by putting up the prices are not giving the results they apparently expected. The continued dullness surely means that many consumers are still holding off in hopes that the State and government authorities will be able to do something to lower the price. It is certain also that many are transferring their orders to bituminous dealers, though to what extent this transfer is going on it is difficult to ascertain exactly. The fact remains, however, that while the bituminous producers have more orders than they can find transport for, the anthracite producers are forced to work on short time as all the available storage room would otherwise be filled. Toward the end of this month when the first cold snap comes, domestic sorts will be in demand, but whether the soi-disant benefactors of humanity will take advantage of the demand to still further raise the price of coal remains to be seen. For ourselves we quite expect this move.

The State Senate Committee resumed its sittings in this city on Wednesday last and on that occasion Mr. MacLeod made an official statement explaining the position of the Reading company and attempting to show that the policy of raising the prices of coal is due to their desire to cover the cost of production and freight, and not to obtain an exorbitant profit simply to enable them to pay a respectable dividend on the watered stock of the companies. We give an abstract of his statements here in order to place his official opinions on record.

"As may be seen from the official lists, the prices in July, 1891, compare with those of July, 1892, as follows:

	Broken.	Egg.	Stove.	Chestnut.	Average.
July, 1891.	\$3.90	\$4.00	\$1.05	\$3.75	\$3.92½
July, 1892.	\$4.00	\$4.30	\$4.50	\$4.40	\$4.30

Thus it will be seen that the average price at present is only 37½ cents a ton greater than at this time last year.

"Then the accusation has been made that we are restricting the production. As a matter of fact, we are producing every ton of coal that the public will take. As is perfectly well known, the storage plants are full and we have been obliged to work only three days a week during the last three months on account of this great plethora of stocks. At the present time the Pennsylvania & Reading Coal and Iron Company have something like one and a quarter million tons of coal stored at various points of distribution waiting for the public to buy it. It cannot, therefore, be said that there is any desire to create a scarcity of coal on our part.

"The cost of producing and shipping the coal is very great. The total coal produced by my company during 1891 cost on an average \$1.55 a ton on the cars; to this must be added 50 cents as loss on small sizes, freight to Jersey City \$1, loading on boats 15 cents, and commissions to middlemen 15 cents; so that the total cost of delivering a ton at Jersey City amounts up to \$3.95. In this sum there is no provision for interest on or depreciation of plant, nor is any mention made of dividends on capital. I hope, therefore, that you will grant that the difference between the cost of production and shipping \$3.95, and selling price \$4.30, does not constitute an unreasonable profit.

"As regards the question of small sizes, I wish to state that the small sizes amount to about 30% of the whole production, and cannot be sold except on competition with bituminous for steam purposes. During 1890 their sale resulted in a loss of \$1.00 per ton. If they had not been sold at this loss they would have remained unsold, and would have been put on the waste heap. Thus the total loss would have been greater still. As the mining of the small sizes costs \$1.59 a ton, just the same as the larger sizes, it follows that the loss in selling the small sizes averaging 30% of the output, must be placed to the cost of mining the large sizes. Thus it is that the item of 50 cents appears in the above estimate."

This method of calculating costs, profits, or losses will bring a very broad smile upon the face of every one who is familiar with the coal trade and the actual cost of producing and transporting anthracite. We have not here the space to analyze these statements but shall refer to them again in the Journal and endeavor to show the actual condition of the coal trade.

Still another action has been brought against the

Reading. This time by Timothy G. Brown, of Jersey City, who has asked for an injunction against the Reading, Jersey Central and Lehigh Valley Railroad companies. Chancellor McGill has named Monday, September 12th, as the day for hearing the application, which is similar in outline to other recent litigants' contentions.

As we stated last week the Philadelphia & Reading Railroad Co. have given notice to the Pennsylvania Railroad that its joint rates for the transport of anthracite will be done away with. Following on this comes the news that the Central Railroad of New Jersey has taken up the same position as the Reading and served a similar notice on the Pennsylvania.

This action will cut off nearly 2,000,000 tons a year of anthracite from the Pennsylvania. Last year the Pennsylvania R. R. carried 7,277,348 tons and of this 3,610,679 tons came from the Pennsylvania Coal and Iron Company. The remainder, 3,676,669 tons was received from the Reading, Jersey Central and Lehigh Valley. It will thus be seen that by the recent action of the Reading and its followers, the Pennsylvania R. R. will lose half its anthracite traffic. Though some retaliatory move is expected from the Pennsylvania people, nothing certain has been made public as yet, and in all probability no steps will be taken until the new tariff regulation goes into effect on the 12th inst.

The result of this rate will, no doubt, be somewhat similar to what occurred some years ago, during Mr. Gowen's administration of the Reading, when the Pennsylvania refused to agree with the Reading in advancing the rate of coal to Philadelphia. The result of this was an immediate loss to the Reading of \$1,000 a day in freights owing to the diversion of traffic, and so the tariff had to be abandoned. Now the conditions are changed. The situation is so exactly reversed that conditions which seven or eight years ago cost the Reading \$1,000 a day, will probably net the company at present \$1,500 a day.

The Philadelphia & Reading Railroad Company are threatened with a universal strike of engineers and train hands generally. A grievance committee have waited on Mr. McLeod and asked for an increase of wages of 20 per cent, and an hour less work every day. It is stated that active preparations are being made on both sides for a strike, and that it will certainly come off unless the men obtain their terms. They are, of course, urged to this course by the increased price of coal, as they are desirous of sharing in the plunder. If such a strike does occur, it will be another blow at the combine, and will hinder the shipments of coal and divert trade from anthracite to bituminous.

Bituminous.

The boom in bituminous coal which we mentioned last week still continues. The demand is far in advance of transportation facilities, and producers are very much annoyed that at this season of the year they are not able to get all the coal to market that they could mine and sell. Next week a still more annoying event will occur, viz.: an entire stoppage of coal transport on the Pennsylvania R. R. and Baltimore & Ohio R. R. from the 14th to the 18th on account of all the locomotives being required to carry the Grand Army of the Republic to Washington.

This stoppage will cause a very great loss. If anything the Baltimore & Ohio is worse than the Pennsylvania at present in the matter of transport, for their deliveries have become exceedingly slow. There is a good supply of vessels at all ports, and ocean freights are low. From Philadelphia the freights are: To Boston, Salem and Portland, 55¢@60¢; to Sound ports, 60¢. From Baltimore, Newport News and Norfolk the freights are 60¢@65¢; to Boston, Salem and Portland, and to the Sound ports, 70¢. Local trade in the city and neighborhood is excellent.

NOTES OF THE WEEK.

The coal shippers of Pittsburg are making arrangements to offer their coal for sale in Cuba through an agency in Havana. England has hitherto been supplying the coal markets of Cuba, but it is believed that Pittsburg and Alabama coal would stand a fair show in competition. The work is to be pushed through a company known as the Southern Transportation Company. The matter is of sufficient importance to have been alluded to by President Harrison in his letter of acceptance. He declared that the reciprocity policy by which the United States will import Cuban sugar will assist American coal exporters very materially. Shipments of coal to Cuba from England now amount to about 150,000 tons per annum.

From now until the middle of the month the officers of the Pennsylvania's construction department will have their hands full, as they intend to open several new extensions on their system. That portion of the Cambria and Clearfield road between Clearfield Junction, near Cresson, and La Jose, was opened for traffic on Wednesday, and in a few days the line from Kaylor to Ebensburg, which forms the main stem, and which traverses the upper Susquehanna coal fields and the large deposits of soft coal in Indiana county, will also be opened. The operation of other stems will commence at an early date, and the work of placing in the market 3,000,000 tons of heretofore uncovered bituminous coal will then have been started in earnest.

Boston. Sept. 8.

This has been a very quiet week in the hard coal business in this city. The retail dealers all have their yards well stocked, and are in no need of fresh

supplies. The great topic of interest here is the action of the Pennsylvania Railroad Company in refusing to advance rates to a basis with those of the Reading and allied companies. Some in the Boston trade are disposed to think the Pennsylvania company can make trouble for the combination. Prices as yet have remained untroubled.

Quotations are: Stove, \$4.75; egg, \$4.50; chestnut, \$4.65; broken, \$4.10.

There is a growing improvement in the demand for soft coal. Clearfield is receiving the most attention. Prices on it are still low, however, ranging from \$3.10 to \$3.15 per ton on cars here. George's Creek coal is quiet at \$3.40 to \$3.45 per ton on cars here.

Freight rates are in a number of cases five cents per ton lower than they were a week ago. They are as follows: From New York, 60¢@65¢; from Philadelphia, 65¢@70¢; from Baltimore, 90¢@1.00.

The retail dealers are doing but a very limited business, as fall buying has not really commenced yet. Prices are very firm at the advance. The retailers talk of making another advance the first of next month, whether the producing companies put up prices or not. Now seems to be the time for consumers to lay in their winter stocks.

Boston retail prices are: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.50; Lehigh egg, \$6.25; Lehigh furnace, \$6.25. Wharf prices 50 cents less than the foregoing.

Buffalo. Sept. 8.

(From our Special Correspondent.)

The coal trade has nearly arrived at what may be called its normal condition. Receipts are free though the anthracite movement is not adequate to the demands of vessels for western shipments by lake. A large business is expected by carriers for the balance of the season of 1892. Purchasers of anthracite are bitterly denouncing producers.

The bituminous trade is moderately active and there is less firmness in the market. The tug boats are now all busy, so that a good demand is manifested from that quarter. The nominal quotations are: From \$1.50 for slack, \$1.70@1.80 for nut and slack mixed. \$1.95@2 for screened nut and run of mines, \$2.05@2.15 for lump and nut mixed; and \$2.15@2.25 for screened lump, per 2,000 lbs., to consumers on track.

The propeller "Gilcher" left this port on Tuesday last laden with 3,300 tons of anthracite coal, the largest cargo ever shipped from this or any other lake port.

A circular which reads as follows is being distributed around our city: "Why pay high prices for coal? The anthracite monopoly has again advanced the price of hard coal and we know of nothing to stop its further cupidity. But there is no necessity for using hard coal when coke can be had so much cheaper. Coke is smokeless, cleaner and more lasting than coal. It is more widely used in domestic hot-air furnaces, kitchen ranges and base burning stoves. We make our coke from the celebrated Connellsville coal. It is nothing like gas-house coke, which latter is black, charred and spongy. Our coke is solid, clean and uniform in size."

Lake shipments have increased during the past week. Freights are firm, coal not plenty yet, but supply better than for some weeks past.

The shipment of coal westward by lake from September 1st to 6th, both days inclusive, aggregated 63,604 net tons, distributed about as follows: 19,000 to Chicago, 19,600 to Milwaukee, 7,600 to Duluth, 1,000 to Gladstone, 6,700 to Superior, 495 to Windsor, 650 to Detroit, 3,850 to Toledo, 840 to Lake Linden, 114 to Marquette, 350 to Saginaw, 1,590 to Bay City, 525 to Portage, and 270 to Marine City. The going rates of freight were 65¢ to Racine; 55¢ to Chicago, Milwaukee and Green Bay; 50¢ to Portage and Lake Linden; 35¢ to Duluth, Superior, Gladstone, Bay City, and Marine City; 45¢ to Marquette and 25¢ to Toledo, Detroit and Windsor—closing firm; fairly active. The canal report for the first week in September shows the receipts of coal at this port were 1,554 net tons and the shipments 1,145 net tons.

The following statistics were prepared by Mr. William Thurstone, Secretary of the Merchants' Exchange, showing the coal trade of Buffalo thus far this year, as compared with preceding years: Railroad receipts and shipments at this port of coal are not reported, by request. Receipts of coal by lake thus far this season, none. Shipments of coal by lake westward for the month of August, 247,562 net tons, as compared with 289,660 net tons in 1891 and 260,900 net tons in 1890; for season to September 1st, 1,420,347 net tons, as compared with 1,433,910 net tons in 1891 and 1,111,500 net tons in 1890. The receipts of coal by canal for the month of August, 6,145 net tons, as compared with 144 net tons in 1891 and 7,996 net tons in 1890; the shipments 3,545 net tons, as compared with 3,072 net tons in 1891 and 2,658 net tons in 1890. Total receipts by canal of coal this season to September 1, 11,436 net tons as compared with 625 net tons in 1891, and 16,146 net tons in 1890; the shipments 18,764 net tons as compared with 19,921 net tons in 1891, and 6,148 net tons in 1890. The aggregate shipments of coal by lake thus far this season to Sept. 1 show a decrease of 13,533 net tons as compared with 1891, and an increase of 304,847 net tons as compared with 1890. The rate of freight on coal hence to points named during August were 60¢@55¢ to Chicago and Milwaukee; 35¢ to Duluth and Lake Superior ports; 25¢ to Toledo and Detroit; 60¢@55¢ to Green Bay; 40¢ to Saginaw, and 35¢ to Bay City. A year since the rate to Chicago and Milwaukee was

50¢, and to Duluth and Lake Superior ports 40¢ per net ton. Coal freights by canal from Buffalo during August were as follows: 60¢ per gross ton to Utica; 50¢ per gross ton to Syracuse, and 80¢ per gross ton to Hudson; all free on and off.

The shipments of coal by lake from Buffalo thus far this season to Sept. 1, were distributed about as follows:

Buffalo to: Chicago, 513,730 net tons; Milwaukee, 322,675; Duluth, 109,458; Superior, 93,185; Gladstone, 26,950; Green Bay, 21,805; Racine, 18,565; Toledo, 50,825; Detroit, 8,000; Ft. William, 9,990; Algonac Mills, 1,110; St. Clair, 1,400; Alpena, 300; Lake Linden, 720; Ft. Huron, 3,920; Sault Ste. Marie, 2,275; Kincaidine, 915; Ft. Stanley, 200; Bay City, 12,605; Amherstberg, 414; Hancock, 1,700; Owen Sound, 460; Barry Sound, 600; Ashland, 7,850; Marquette, 14,835; Marinette, 1,350; Manitowoc, 5,240; St. Ignace, 700; Menominee, 5,620; Saginaw, 21,625; Windsor, 1,940; Marine City, 1,390; Washburn, 2,100; Sheboygan, 3,640; Cheboygan, 1,050; Houghton, 3,075; Escanaba, 1,450; Kenosha, 3,385; Traverse City, 400; Oscoda, 500; Pt. Dover, 746; vessels from Tonawanda not reported at Custom House, etc., 151,631.

Chicago. Sept. 8.

(From our Special Correspondent.)

And now there looms up the specter of another advance to offset the advance to be made in freight rates from the mines to Buffalo, and from that great entrepot to the distributing points in the West. The public may well ask, "When is there to be an end of these advances?" The consolidated companies have the unquestionable right to put the price of anthracite coal to any figure they like, but they certainly have no right to add insult to injury, as expressed in the language used by their president in reference to the decision of Chancellor McGill. The people, through the courts, have "rights" which it is evident the combine have violated, and the sooner the end comes the better it will be for the public who will finally have to foot all the bills. The advance on September 1st was attended with the usual amount of grumbling and strong language and was followed by a considerable falling off in demand both wholesale and retail. A large share of the country orders which could not be shipped by August 31st, have been canceled. This is taken as proof conclusive that the advance is as hateful to dealers as it is to consumers. There is, notwithstanding this, a fair amount of business in progress, but there is no snap, no life to it, altogether of a perfunctory character.

Country orders are almost entirely confined to actual and known requirements, and although most of them are for small lots of a few cars at a time the aggregate tonnage is fairly satisfactory to the shippers. This condition will continue until a week or so before the next advance when another rush will be made to cover. Retail trade is moderately fair, that also having dropped off wonderfully since the first proximo. The effort made by the Coal Exchange here to fix the retail price at \$7.50 has ingloriously failed, and none of the down town merchants ask more than \$7.25 delivered. Domestic consumers, as a rule, are taking less coal than usual, and the economy thus practiced, although only amounting to a few tons in each case, yet on the whole foots up into the thousands of tons. In the event of a long winter or late spring next year, the small trade may continue right up to end of April as it did this year.

Bituminous coal is in good demand; prices firm and the usual annual scarcity of cars seems greater than ever this year. Operators in all grades of soft coal and all railroads carrying it appear to be equally short of cars, with every prospect of these conditions existing for some time to come. In the event of a severe winter, with the increased trade from the natural growth of the country, and the increased consumption of soft coal, brought about by the marked advances in the cost of anthracite to consumers, demand for bituminous will be heavy.

Country trade is already such that circular price is now very closely adhered to. In some mining districts in the Indiana and Northern Illinois coal fields cars are so hard to get that prompt delivery orders are only taken subject to car service. Hocking is in excellent demand, as also Brazil block and other good grades of steam coal. The prospects for bituminous were never brighter, and an active trade is fully assured right through the whole season.

Coke is still dull but is quietly gaining. The condition of the crude iron trade precludes any pronounced activity at present. Foundry coke is in fair demand only; but is improving each week. Crushed coke is in some inquiry, but by no means active.

Quotations are: \$4.65 furnace; \$5.05 foundry crushed; \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.40@2.50.

Pittsburg. Sept. 8.

(From our Special Correspondent.)

Coal.—The most important question at present is the settling of the price of mining among the coal miners along the Monongahela Valley. Will they

accept the half cent reduction asked or will they go out on a strike? The general impression is that there will be a strike Saturday, 10th instant, to quit paying 3½ and to fix the price of mining in the first three pools at 3c. and 2½ in the fourth pool. So far the miners have not given out what course they will pursue; the coming week will undoubtedly settle the question. The coal men argue that as the railroad men pay only three cents the prices on the river ought to be the same. There was no river shipments during August. A coal shipper has this to say: "A Cincinnati agent asked a bid on 121,500 tons. You may be certain that there was some close figuring for that contract, but here a Monongahela Valley railroad company bid one cent a bushel below ours and of course the contract went to his firm. The railroad operatives pay 14c. a ton for mining less than we do. That's where the secret lies."

Connellsville Coke.—The improvement in the volume of business noted in our last has been maintained. There is a decidedly more hopeful feeling among producers all through the region. The opinion seems general that better times are not far off. A large number having blown out, the active plants are now making a fair average run with a good prospect of increasing. The Frick company have fired up cold ovens to the extent of 308 ovens. In the running order of their plants 20 made six days and three made five days.

The McClure company also increased its average run, making a 5-days' run at its eight active plants with a fair prospect of increasing to six days. At least five other plants are making arrangements to run six days. Week's shipment aggregated 97,200 tons; increase over previous week, 3,478 tons. Shipments: To Pittsburg, 1,450 cars; east of Pittsburg, 1,150 cars; west of Pittsburg, 2,800 cars—total, 5,400 cars. Western shipments increased 132 cars; Eastern, 11 cars; Pittsburg increased 50 cars. Prices without change.

METAL MARKET.

NEW YORK, Friday Evening, Sept. 9, 1892.

Prices of Silver Per Ounce Troy.

Sept.	Sterling Exch. ge.	London, Pence.	N. Y. Cents.	Value of sil. in \$1.	Sept.	Sterling Exch. ge.	London, Pence.	N. Y. Cents.	Value of sil. in \$1.
3	4'88	38½	83¼	.641	7	4'88	38½	83¼	.643
5	4'88	38½	83¼	.641	8	4'88	38½	83¼	.643
6	4'88	38½	83¼	.641	9	4'88	38½	83¼	.644

* Holiday.

Silver has remained steady to firm, with considerable purchases for London on India account. Supplies have been temporarily larger, but are not likely to be maintained on an equal scale.

The United States Assay office at New York reports the total receipts of silver for the week to be 75,000 oz.

Government Silver Purchases.

The Government has purchased during the week the following quantities of fine silver at the accompanying prices per fine ounce:

September 17th, 325,000 oz. at 83.6c. to 83.64c.; September 19th, 100,000 oz. at 83.54c. to 83.58c.

There were sold during the week ending Friday, September 9, 140,000 ounces in silver bullion certificates at from 83¼ to 83½ cents per ounce.

Gold and Silver Exports and Imports at New York for Week Ending September 3rd, 1892, and for Years from January 1st, 1892, 1891.

Week	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1892.....	\$2,600,000	\$19,517	\$852,273	\$127,144	\$3,305,612
1891.....	57,955,353	6,418,327	15,100,408	1,498,024	65,139,420
1891.....	75,218,910	3,040,879	10,870,112	1,394,802	81,653,371

During the week ending September 10th the exports and imports, so far as ascertained, have been as follows: Exports gold, \$45,000; silver, \$371,000. Imports, gold, \$28,494; silver, \$99,887. The greater part of the gold went to England.

NOTES OF THE WEEK.

The time for the meeting of the International Silver Conference has not yet been appointed, the delay being caused by the difficulty in agreeing upon a place of meeting in consequence of the almost universal quarantine established against the cholera.

A late cable from Berlin states that Privy-Councillor Glasenapp, of the Imperial Treasury, has been appointed the representative of Germany at the conference.

The *Journal des Mines*, in speaking of the situation, says that since 1881 European banks of issue have increased their holdings of gold by \$534,000,000, or from \$1,000,000,000 to \$1,534,000,000.

In contrast with this the increase in silver is small, being only \$2,000,000. All the banks have participated in the increase, but those of Germany, France and Russia have increased the most.

The reason for this increase of the banks' holdings of gold is to be found in the more extended use of paper money. The journal intimates that just as notes have replaced gold so will the notes in time be replaced by the system of Clearing House ex-

changes, now so generally in use in the United States.

This view is important, showing as it does the belief that the amount of metallic money does not increase in proportion to the increase of the world's commerce. This view which the ENGINEERING AND MINING JOURNAL has always asserted has a very important bearing on the silver question, for if a great gold reserve is not required for carrying on the world's business, still less will silver be required, and this is in accordance with the opinion of many eminent financial writers.

A quite opposite view of the matter, however, is taken by some prominent statisticians. Dr. Eduard Siess, for example, in his recent work *Die Zukunft des Silbers* argues that the production of gold is gradually becoming less (which is not the case) and that the amount in existence will be absorbed in time for use in the arts, which may or may not be the case, and from this he argues that silver is the metal of the future.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	.66	.67
Peruvian soles and Chilean pesos.....	.61	.63
Victoria sovereigns.....	4.36	4.40
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.79	4.81

Copper.—The market is in a still more unfavorable condition, as sellers are becoming more numerous. This is particularly true as regards lake copper, the supplies of which are accumulating quite extensively as few of the mining companies have for sometime past been able to make sales at the prices at which they were holding, manufacturers not feeling warranted in taking in supplies, beyond what was urgently needed, in view of the lack of business and unstable condition of the copper market. Now, lake is freely offered at 11½c., and in some quarters can be bought at from 11'30@35, the best bid obtainable being 11¼, and that only for limited quantities. It becomes more and more evident that in order to establish a healthy condition of things this market will have to be relieved of its surplus at such prices as Europe is ready to pay, as otherwise values here must necessarily suffer further, unless there should be a considerable reduction in business, for which one can hardly look in view of the generally disturbed condition of affairs. Casting copper is quoted at 10½c. delivered thirty days, while Arizona is decidedly lower, being obtainable now at 9½c. The foreign market opened a little lower, G. M. B.'s being quoted at \$44 5s. @ 7s. 6d. for spot and \$44 15s. @ 17s. 6d. for futures. It closes at 2s. 6d. lower for the former and 5s. lower for the latter, manufactured sorts being quoted as follows:

English Tough, £46 10s @ £47; Best Selected, £48 @ £48 5s.; Strong Sheets, £54 10s. @ £55; India Sheets, £51 @ £51 10s.; Yellow Metal Sheets, 4½.

Tin has been very inactive, the fluctuations ranging within such narrow limits, that to-day's closing prices of 20'35 for spot and September and 20'50 for futures, are the same as those ruling last week. Though to-day's cable from abroad reported an advance of 7s. 6d. over yesterday's figures, this has not had the least effect on values here, it being generally considered that the gain will soon be lost. The foreign market opened at £92.17s. 6d. @ £93 for spot and £93 @ £93 2s. 6d. for futures, and closes at the same figures.

Lead continues to be quite firm, in view of the light offerings, and a fair demand from manufacturers all over the country. It is true several hundred tons have changed hands at a somewhat lower figure (4½), but as no more can be bought thereat, the market must again be quoted 4'15 @ 7'7½. The foreign market is even lower than last week, Spanish being quoted in London at £10 1s. 3d. and English at £10 3s. 6d.

Chicago Lead Market.—The Post Boynton Strong Company telegraph us as follows: "The market has ruled quiet at 4c. asked, with sales early in the week at that price. Latterly values are easy at 4c., with 3'95c. bid."

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: "In the early part of the week the market was quite strong at 3'95 @ 3'97½c. for both common and refined. With in the past couple of days the demand has slackened off some and forced sales have been made 02c. less. Market closes quiet."

Spelter is still weaker, owing to the great falling off in demand, and sales have been made at \$4.55 @ \$4.60, New York. The foreign market has also come down, and for good ordinaries we quote £20 5s. 1d. with 2s. 6d. more asked for specials.

Antimony is about the same, Cookson's 12½, L. X. at 11½ and Hallett's at 10½.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 9, 1892.

Pig Iron Production.—The following table gives the number of furnaces in blast, and the estimated production of pig iron in the United States, during the week ending Saturday, September 5th, 1891, and for the corresponding week ending September 3d, 1892. Also the total estimated production from January 1st of last year to these dates. This table has been corrected by the official returns of the Ameri-

can Iron and Steel Association for the first six months of each year. The figures are in gross tons

Fuel used.	Week ending—				From Jan., '91.	From Jan., '92.
	Sept. 5, '91.		Sept. 3, '92.			
	F'cs.	Tons.	F'cs.	Tons.	Tons.	Tons.
Anthracite.....	94	36,434	68	29,000	1,275,003	1,215,365
Coke.....	165	134,151	132	118,100	3,476,015	4,727,975
Charcoal.....	54	11,120	40	8,200	365,127	367,281
Total.....	313	181,705	240	165,300	5,116,145	6,310,621

The pig iron trade in this district continues to be discouraging. Buyers are taking very little and only for quick monthly deliveries. The fall boom which is expected at this time of year has not set in with any heartiness, and what increase of trade there is, is only a feeble reflection of usual fall increases. Eastern dealers state that there is no stiffening of prices and that they are only just able to sell what they do at minimum prices.

The only merchants who have a satisfactory tale to tell are the agents for Southern irons. These claim to have sold a good deal of all qualities lately and to have secured a better price. To what extent their statement represents actual facts we are not prepared to decide. The production of pig throughout the country is still decreasing, and the consumption is much less than half a year ago.

In all probability we are in a period of stagnation in the iron trade. Of course the cholera scare is to blame for a good deal of the stagnation of buying as many manufacturers are afraid of overburdening themselves with stocks and orders, on account of the uncertainty of being able to keep their works going. The prices quoted for Northern brands continue as follows: No. 1 is \$15; No. 2, \$14; gray forge, \$13 to \$13.50 at tide water.

Spiegelisen & Ferromanganese.—The market for ferromanganese is gaining in strength with the fall and it is probable that no dealers have tendered such low prices as have been ruling lately. No prices are given to us, but hints are made that \$58, the \$59 price lately ruling has been placed in the background, and an advance of two or three dollars insisted on. A few supplementary orders for small lots of spiegelisen are reported as having come in during the last two weeks.

Steel Rails.—The steel rail mills are beginning to fear that a period of scarcity of work is about to commence. It is certain that the order books of the various Eastern companies are in a poorer state than they have been for many years. There seems to be a doubt whether the mills will have enough work to occupy them this fall. Usually at this time of year the mills have sufficient orders for forward delivery to keep them occupied for many months.

The Eastern makers will meet here some time next week for their usual monthly meeting, but it is not likely that any reorganization of prices will be effected or even considered. Prices continue at \$30 at mill, and \$30.75 at tidewater. The only new transaction recorded this week is an order for 2,000 tons for a New England railway.

Rail Fastenings.—The demand for rail fastenings is very dull. We quote prices as follows: Fish and angle plates, 1'55 @ 1'65c. at mill; spikes, 1'90 @ 2c.; bolts and square nuts, 2'50 @ 2'70c.; hexagonal nuts, 2'70 @ 2'80c., delivered.

Merchant Iron and Steel.—The sales for all kinds of merchant iron and steel continue slow and in small quantities at a time. There is no variation in prices, which stand as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6½ @ 7½c.; special grades, 13 @ 18c.; crucible machinery steel, 4'75c.; crucible spring, 3'75c.; open hearth machinery, 2'25c.; open hearth spring, 2'50c.; tire steel, 2'25c.; toe calks, 2'25 @ 2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Iron and Steel.—This department still continues to be the brightest feature of the iron trade. The works are all crammed with orders, and deliveries are very slow. There has, however, not been much new business received just lately, but the orders now in hand are sufficient to last for two months on an average. There are still some orders coming in to Eastern mills that would usually go to Pittsburg district, and there is absolutely no sign of Western material coming here in competition with local manufactures. Prices are as follows: Beams, 2'3 @ 2'5c., except for 20 inch beams, which are 2'8c.; angles, 2'15c.; sheared plates, 2 @ 2'10c.; tees, 2'40 @ 2'60c.; channels, 2'35 @ 2'50c.; universal plates, 2 @ 2'10c.; bridge plates, 2 @ 2'10c., all on dock.

Buffalo.

(Special report by Rogers, Brown & Co.)

Iron is being ordered forward rapidly on old contracts, indicating that requirements are fully up to expectations. There has been a fair demand during the week. Some furnaces with large stocks located at a distance, in order to move iron, are naming prices which must net a heavy loss to them. Our quotations remain unchanged, and are for casn 1. o. b. cars Buffalo. No 1 X Foundry Strong Coke Iron Lake Superior Ore, \$15.25; No. 2 X Foundry Strong Coke Iron Lake Superior Ore, \$14.35; Ohio Strong Softener No. 1, \$15.25; Ohio Strong Softener No. 2, \$14.25; Jackson County Silvery No. 1, \$17.30; Jackson County Silvery No. 2, \$16.80; Lake Superior Charcoal, \$16.50; Tennessee Charcoal, \$17.00; Southern Soft No. 1, \$14.15; Alabama Car Wheel, \$19.00; Hanging Rock Charcoal, \$20.50.

Chicago.

Sept. 8.

(From our Special Correspondent.)

The event of the week in industrial circles was the grand parade on Labor Day of the wage earners of Chicago. "The Iron Brigade," composed of men employed in the various branches of crude and finished iron and steel was the most notable in the whole line. There were upward of 20,000 machinery men. The boiler makers settled their strike last week by going to work at the old rate of wages and hours. They have been out since May, about four months, and their obstinacy has diverted a large amount of business in boilers, tanks, etc., from Chicago. The shops are now all running full and have plenty of work. The prospects for crude iron so far as regards tonnage are improving, but values, despite the heavy demand for finished material, are still weak, and agents look for no betterment for several months.

Pig Iron.—Some dealers are taking courage to believe that as trade in all forms of finished iron is larger than was expected both from mill and foundry, and the consumptive demand greater for the crude article, prices should gain strength in the near future. Local cast iron was rather quiet last week. Sales generally were confined mostly to small lots of fifty to a hundred tons or so. Several negotiations, however, are in progress for round lots, and as competition is keen our inside prices may be shaded 20 to 30 cents. As stated in a previous report, with some makers tonnage apparently cuts a more important figure than price Lake Superior charcoal iron is very dull but as most of the larger furnaces are well sold ahead, values are fully maintained. Southern coke iron is in moderate demand, but prices continue weak. Some of the stronger furnace companies consider the present time a good opportunity to go out of blast for repairs and several have already done so, with others to follow. In some brands the figures have gone so low that it would not be safe to make an offer that is anything in reason. Foundries are taking in more work and consumption is steadily increasing.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.55@17.00; Lake Superior coke, No. 1, \$14.25@14.75; No. 2, \$13.50@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@16; American Scotch, \$16.75@17.75; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.25; No. 3, \$12.50; Southern coke, soft, No. 1, \$13.25; No. 2, \$12.50; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

Steel Billets and Rods.—Billets continue in good inquiry, and the local steel company is booking some contracts at \$24.50. Rods, though quieter, are steady at \$34.50.

Structural Iron and Steel.—Inquiry and demand are good, the season considered. Some 1,800 tons of iron and steel will be required for the Public Library building, and contracts will be awarded this week. Shapes are in better supply. Regular quotations, car lots f. o. b. Chicago are as follows: Angles, \$2@2.25; tees, \$2.30@2.40; universal plates, \$1.45@1.55; sheared plates, \$1.95@2; beams and channels, \$2.25@2.50.

Plates.—The settlement of the boiler makers' strike has already caused an improvement in mill orders. Warehouse business is fair and prices steady. Tubes are stronger. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, 2% in and smaller, 60%; 7 in. and upward, 70%.

Merchant Steel.—The large carriage makers are now in the market for tire and other steels. In this line of trade there has been marked activity during the past week. Jobbers are also placing orders for miscellaneous steels. Tool steel is fairly active. We quote tool steel, \$6.50@6.75 and upward; tire steel, \$2.10@2.20; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.80; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

Galvanized Sheet Iron.—Demand is very heavy; mill shipments so entirely inadequate that agents have to buy from each other. Discounts are firmer at 70 and 10% off on mill lots, and 70% on Juniata, and 70 and 5% off on charcoal from warehouse.

Black Sheet Iron.—Quite a good deal of new business is coming forward, all of it for quick and early shipment, but as mills are crowded with this class of work, some jobbers will go short. Prices are steady at 2.90@2.95c. for No. 27 Common, f. o. b. Chicago. Steel sheets are 10c. higher. Dealers quote 3.10@3.20c. from stock, same gauge.

Bar Iron.—Valley mills and those in this vicinity are very conservative as to acceptance of orders for earlier delivery than November. An assorted order of five carloads for San Francisco was quoted on or about 1.55c. rates, half extra f. o. b. Youngstown. The general tone of the bar iron market is firm and strong at 1.62½@1.65c. Chicago. Jobbers quote 1.85@1.90c. in less than car lots from stock.

Nails.—Wire nails are more active from mill and \$1.73 case is bottom and mills behind with orders. Jobbers quote \$1.85 from store. Steel cut nails are also in good demand from factory at \$1.60@1.62½, 30c. average. Jobbing price is \$1.75 in less than carloads.

Steel Rails.—Inquiry for steel rails is mostly for light weight sections and in small lots. No demand worthy of note is reported for heavy sections, but price is unchanged at \$31@32.50 according to quantity. Bolts, splice bars, etc., are in fair demand at \$1.70 for iron or steel splice bars; spikes, \$2.05@2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

Scrap.—Some inquiry is noted, but dealers report demand still very light, and prices nominal. No. 1 railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$9.50; fish plates, \$17; axes, \$19; horseshoes, \$15.50; pipes and flues, \$7; cast borings, \$5.50; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.60; coil steel, \$14; leaf steel, \$15; tires, \$14.50.

Old Material.—Iron rails in lots of several hundred tons can be had at \$18, but holders ask more for round quantities of 500 to 1,000 tons. Offerings are light. Old steel rails are quoted at \$12.50@14 as to length and condition. Old carwheels are stagnant at \$14.75@15.

Philadelphia.

Sept. 8.

Pig Iron.—The possibility of slightly higher prices for certain desirable brands of pig iron is the reason assigned by a few buyers of large lots this week for mainly October delivery. Other equally sureword buyers regard higher pig iron quotations within the next four or six weeks as highly improbable. Selling prices do not vary. But little No. 1 has been sold above \$15; but it should be said the finer brands are for the present not in the market. Certain makes of No. 1 are selling at \$14.25@14.50, but poor makes go slowly. There is a promised increase of activity in forge; average price \$13. Stocks at most mills are low. Makers, instead of offering additional inducements to make sales, are discounting the possibilities of getting 25 cents more next month. A quiet improvement is certainly in progress, but an actual advance is just now a remote contingency.

Muck Bars.—Manufacturers, while speculating on the possibility of higher prices, are taking orders this week at \$25.50@26.

Steel Billets.—The lowest quoted price this week was \$25 on an inquiry for a large lot, late delivery. The highest price paid was \$26.25. Competition is active, and buyers appear to have the advantage. Makers anticipate a heavy demand on the first signs of an upward tendency, which they all insist must soon show itself.

Merchant Iron.—The market is quite sensitive, as was shown in the sharp competition this week for a large order, in which a cut of one-tenth was made below the lowest price quoted for 10 days. Mill owners are very anxious for business for early winter, and will cut to get it. For early deliveries, prices range from 1.70@1.80. Orders are abundant and prospects good.

Nails.—Buyers say the advance in nails means nothing, but makers are confident an upward tendency has set in which will be maintained.

Skelp.—Makers report some new business at 1.65@1.80 respectively for grooved and sheared.

Pipes and Tubes.—Only small orders are coming in.

Sheet Iron.—Mills keep full of work and less shading is reported. Galvanized is now being ordered for early winter. The retail demand is especially active.

Plate and Tank.—On late delivery orders prices are in favor of buyers; on early deliveries makers terms are not questioned. This oversold condition is likely to continue for several weeks at least. Some more sanguine brokers and mill men hazard the prediction that mills will be crowded all winter and at present selling prices—an improbable thing. Tank, 1.85@1.95; shell, 2.20.

Structural Material.—There is manifested a strong desire among manufacturers to book large orders for late delivery, and this has led to a shading of prices on such orders. They say that as soon as a little more work is accumulated winter quotations will approximate closely to current rates, a conclusion buyers do not accept. Angles are 2@2.10. Beams, tees and channels 2.25@2.40.

Steel Rails.—There are but few inquiries. One broker predicts two or three large orders in a few days. Price \$30.

Old Rails.—Iron are offered at \$19, and sell slowly. Steel \$16.

Scrap.—There is an abundance of No. 1 at \$17.

Pittsburg.

Sept. 9.

(From our Special Correspondent)

Raw Iron and Steel.—There is no particular change in the condition of the iron and steel market. The sales for some time past have shown up remarkably well, all things taken into consideration. The mills that have been idle, undergoing repairs and adjusting the scale of wages, are gradually starting up, and will soon be running steadily with or without the scale. The demand for Bessemer, steel billets and grey forge have been large; sales the past two weeks amount to 114,435 tons. Values are practically unchanged, prompt delivery commanding the top figures; later delivery sold at various prices according to circumstances and the views of dealers.

As usual, the largest demand was for standard descriptions. The present would undoubtedly be a good time for producers of iron and steel to meet together, establish prices and systematize their branch of the business. Formerly they have been going it alone, pulling against one another instead of working together, and it is not singular that the con-

sumers have been able to take advantage of their lack of policy and hold the market against them. Producers, it is true, will have to start out this Fall with considerable dead weight in the shape of accumulated stocks against them, but this has to be overcome, and no man ever attained success by flinching because the odds were apparently against him at the outset.

The outlook is certainly encouraging, there being increased inquiries and a good deal of business actually in hand and more in prospect. Taking all things into consideration, therefore, the trade have good reason for feeling amply satisfied, although it is perhaps too much to expect that the improvement will continue without reaction. The curtailment of production since the 1st of July caused a shrinkage in finished material which, of course, will be overcome as the mills get to work, although with such a good start it is quite probable that full activity will be maintained to the close of the year unless something unexpected occurs.

Buyers are keeping a close watch on the condition of the market, and the numerous inquiries made indicate the probability of larger buying during the fall months. There have been some good-sized orders placed and some buyers who bought a few weeks ago express a willingness to duplicate the order upon the same terms, but the leading producers are firmly adhering to present prices for deliveries during the next few weeks, and are not disposed to accept orders at less.

A well-informed Eastern dealer has this to say: "Without being particularly active there is a steady demand at firm prices for good brands of pig iron. There can be no question that iron is dearer to buy, that is to say, the asking price is the selling price, and not merely a basis for negotiation at some other price. This was so common up to a recent date that quotations had but little real meaning, and, in fact, some sellers claim that such is the case at present as regards 'the other fellow,' but of course they would scorn to do such things themselves." The market noted steady; prices fairly maintained; the sales below will describe the situation.

Coke Smelted Lake and Native Ores.

5,400 Tons Bessemer, Oct., Nov., Dec	\$11.00 cash.
3,000 Tons Bessemer, City Furnace	11.00 cash.
3,000 Tons Grey Forge, City Furnace	12.50 cash.
3,000 Tons Bessemer, Sept., Oct., Nov.	13.55 cash.
2,000 Tons Grey Forge	12.60 cash.
2,000 Tons Bessemer	14.00 cash.
2,000 Tons Grey Forge	12.55 cash.
1,000 Tons Mill Iron	12.50 cash.
1,000 Tons Grey Forge	12.50 cash.
1,000 Tons Grey Forge	12.50 cash.
1,000 Tons Bessemer	14.00 cash.
1,000 Tons Grey Forge, del. at Valley Mills	12.50 cash.
500 Tons Foundry No. 2	13.75 cash.
500 Tons White and Mottled	12.00 cash.
400 Tons Grey Forge	12.55 cash.
150 Tons No. 1 Silvery	16.50 cash.
150 Tons No. 1 Foundry	14.50 cash.
100 Tons No. 2 Silvery	15.50 cash.

Charcoal.

200 Tons Cold Blast	26.50 cash.
150 Tons Cold Blast	26.50 cash.
100 Tons Cold Blast	26.00 cash.
100 Tons No. 2 Foundry	19.00 cash.
75 Tons No. 1 Foundry	20.00 cash.
75 Tons Cold Blast	26.50 cash.

Steel Slabs and Billets.

3,500 Tons Billets, Sept., Oct. at mill	23.00 cash.
3,000 Tons Billets, Oct., Nov., Dec. at mill	23.65 cash.
1,500 Tons Billets, Oct., Nov., at mill	23.75 cash.
1,500 Tons Billets, prompt	24.00 cash.
1,000 Tons Billets and Slabs, prompt	24.50 cash.
500 Tons Billets, at mill	23.75 cash.

Muck Bar.

1,000 Tons Neutral, Sept., Oct., Nov.	25.00 cash.
1,000 Tons Neutral, Sept., Oct., Nov.	25.00 cash.
400 Tons Neutral	24.75 cash.

Skelp Steel.

800 Tons Wide Grooved	1.50 4 m.
250 Tons Wide Grooved	1.50 4 m.

Skelp Iron.

750 Tons Sheared Iron	1.85 4 m.
500 Tons Narrow Grooved	1.60 4 m.
300 Tons Wide Grooved	1.6½ 4 m.

Sheet Bars.

200 Tons Sheet Bars, prompt	30.50 cash.
150 Tons Sheet Bars, prompt	30.50 cash.

Steel Wire Rods.

600 Tons No. 5 Gauge American at Mill	32.25 cash.
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Ferro-Manganese.

100 Tons 80 per cent. Foreign Seabound	56.50 cash.
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Blooms, Beams, Rail and C. Ends.

500 Tons Bloom and Billet Ends	16.50 cash.
500 Tons Bloom and Billet Ends	16.50 cash.

Old Iron and Steel Rails.

650 Tons Steel Rail, Mixed Lengths	15.00 cash.
500 Tons Old Iron Rails	19.50 cash.
500 Tons Old Steel Rails	15.60 cash.
400 Tons Old Steel Rails	15.50 cash.

Scrap Material.

500 Tons No. W. R. R. Scrap, net	14.50 cash.
500 Tons Open Hearth Melting Steel, net	16.00 cash.
300 Tons Steel Scrap, net	15.75 cash.
200 Tons Leaf Spring Steel, gross	21.00 cash.
100 Tons No. 1 Wrought scrap, net	15.20 cash.
100 Tons Cast Borings, gross	7.50 cash.
50 Tons Coil Springs, gross	18.00 cash.

Weekly sales raw iron August for five years.

	1888.	1889.	1890.	1891.	1892.
August 4	27,925	45,805	13,450	31,455	23,305
August 11	30,955	45,275	42,250	28,691	33,725
August 18	18,000	35,115	62,225	15,125	23,500
August 25	31,275	40,380	46,555	23,400	52,160
September 2	76,270	58,965	36,610	54,320	62,275
Total	134,425	225,300	201,090	156,991	194,965

NEW YORK MINING STOCKS QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from Sept. 3 to Sept. 9, and Sales. Lists various companies like Adams, Allice, Amador, etc.

*Ex-dividend. +Dealt at in New York Stock Ex. Unlisted securities. †Assessment paid. ‡Assessment unpaid. Dividend shares sold, 4,925. Non-dividend shares sold, 12,000. Total shares sold, 15,825. † Holiday.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, including columns for Name of Company, dates from Sept. 2 to Sept. 8, and Sales. Lists companies like Atlantic, Bodie, Bonanza Development, etc.

* Holiday. Dividend shares sold, 8,662. Non-dividend shares sold, 5,469. Total shares sold, 13,531.

COAL STOCKS.

Table of Coal Stocks, including columns for Name of Company, dates from Sept. 3 to Sept. 9, and Sales. Lists companies like Cambria Iron, Cameron Coal & I. Co., etc.

* Holiday. Total shares sold, 405,611.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, including columns for Name of Stock, dates from Sept. 2 to Sept. 8, and Sales. Lists companies like Alpha, Alta, Belcher, etc.

* Holiday.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

Main table containing two columns: 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND PAYING MINES'. Each column lists company names, capital stock, shares, assessments, dividends, and dates of payments.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$3,320,000 in dividends, and the Cons. Virginia \$4,900,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$180,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Ely Company, which had paid \$3,075,000 in dividends. †††† Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends, against \$425,000 in assessments.

STOCK MARKET QUOTATIONS

Aspen. Sept. 3. The closing quotations were as follows: Agnes C., Argentum Juniata, Aspen Deep Shaft, Aspen Contact, Best Friend, Bimetallic, Bushwacker, Carbonate Chief, Empire Champion, Justice, Little Annie, Mollie Gibson, Nolan Creek, Park, Mamie & Queen, Pontiac, Sneep Mountain S. & M. Co., Suggler, St. Joe & Mineral Farm, Yellow Boy.

Baltimore, Md. Sept. 8. Bid. Asked. COMPANY. Atlantic Coal, Salt & N. C., Vein Coal, Conrad Hill, Cons. Coal, Diamond Tunnel, George's Creek Coal, Lake Chrome, Maryland & Charlotte, W. & B. State, Silver Valley.

Pittsburg, Pa. Prices highest and lowest for the week ending Sept. 8th: COMPANY. Hegheny Gas Co., Jrdgewater Gas Co., Chartiers Val. Gas, Columbia Oil Co., Consolidated Gas Co., East End Gas Co., Fisher Oil Co., Forest Oil, Hazlewood Oil Co., Haldago Mining Co., La Nora Mining Co., Luster Mining Co., Mansfield C. & C. Co., Manufacturers Gas Co., Nat. Gas Co. of W. Va., N. Y. & Clev. Gas Coal Co., Ohio Valley Gas Co., Pennsylvania Gas Co., People's Natural Gas Co., People's N. G. & P. Co., Philadelphia Co., The Run Gas Co., Pittsburg Gas Co., Red Cloud Mining Co., Silverton Mining Co., South Side Gas Co., Sterling Silver Mining Co., Union Oil Co., Union Gas Co., Washington Oil Co., W. Moreland & Camb., Wheeling Gas Co., W. House F. Light, W. House Air Brake Co., W. House Brake Co., Ltd.

Deadwood. Sept. 3. Bid. Asked. Bullion, Caledonia, Calumet, Cambrian, Carthage, Cora, Deadwood Terra, De Smet, Double Standard, Elk Mountain, Emmett, Equitable, Florence, Golden Reward, General Merritt, Harmony, Hester A, Homestake, Hermit, Iron Hill, Isadorah, Maggie, Monitor, Rainbow, Retriever, Ross Hannibal, Ruby Bell, Ruby Wilkes, Seabury-Calkins, Silver Queen, Spaulth R., Stewart, Tornado, Troy.

St. Louis. Sept. 7. The closing quotations were as follows: Bid. Asked. Adams, Colo., American & Nettie, Colo., Bi-Metallic, Mont., Central Silver, Elizabeth, Mont., Granite Mountain, Mont., Hope, Leo, Little Albert, Montrose Placer, Colo., Mickey Breen, Pat Murphy, Colo., Silver Age, Silver Bell, Small Hopes, Colo., Yuma, Ariz.

Helena, Mont. (Special report by SAMUEL K. DAVIS.) Prices biggest and lowest for week ending Sept. 4: H. L. Bald Butte (Mont.), Benton Group, Mont., Bi-Metallic, Mont., California (Castle), Mont., Champaign (Oro Fino), Mont., Combination (Phillipsburg), Mont., Copper Bell (Cataract), Mont., Cornucopia, Mont., Cumberland (Castle), Mont., Elizabeth (Phillipsburg), Mont., Florence (Nehart), Mont., Fourth of July, Wash., Glengary (Butte), Mont., Helena & Victor, Mont., Ingersoll, Mont., Iron Mountain (Missoula), Mont., Jersey Blue (Butte), Mont., Lone Pine Consolidated, Mont., Moulton, Mont., Polaris (Beaverhead Co.), Mont., Poorman (Coeur d'Alene), Idaho, Queen of the Hills (Nehart), Southern Cross (Deer Lodge), Mont., Whitlatch Union & MacIntyre, Yellowstone (Castle), Mont.

Foreign Quotations. London. August 27. Highest. Lowest. Alaska Treadwell, Amador, Cal., American Belle, Colo., Appalachian, N. C., Can. Phosphate, Can., Colorado, Colo., De Lamar, Idaho, Dickens Custer, Idaho, Eagle Hawk, Idaho, East Arevalo, Idaho, Eberhardt, Nev., Elkhorn, Mont., Elmore, Idaho, Emma, Utah, Esmeralda, Nev., Flagstaff, Utah, Garfield, Nev., Golden Feather, Cal., Golden Gate, Cal., Golden Leaf, Mont., Golden River, Cal., Idaho, Jay Hawk, Mont., Josephine, Cal., Kohinoor, Colo., La Luz, Mex., La Plata, Colo., La Valera, Mex., Maid of Erin, Colo., Mammoth Gold, Ariz., Mount McClellan, Mont., Montana, Mont., Mona Lake Gold, New California, Colo., New Consolidated, Nev., New Eberhardt, Nev., New Gold Hill, N. C., New Guston, Colo., New Hoover Hill, N. C., New Russell, N. C., New Viola, Idaho, Old Lout, Colo., Parker Gold, N. C., Pittsburg Cons., Nev., Poorman, Idaho, Plumias Eureka, Cal., Richmond Con., Nev., Ruby, Nev., San Christian, N. C., Sierra Buttes, Cal., Plumas Eur., Cal., Silver King, United Mexican, Mex., West Argentine, Colo., Yankee Girl, Colo.

Paris. August 25. Frances. East Oregon, Ore., Forest Hill Divide, Cal., Golden River, Cal., Laurium, Greece, Lexington, Mont., Nickel, New Caledonia, Rio Tinto, Spain, Tharsis, Spain, Vieille-Montagne, Belgium.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, No. 8, pure, 1.040, Hydrocyanic, U. S. P., Hydrofluoric, U. S. P., Alcohol-95%, Absolute, Ammoniated, Alum-Lump, Ground, Powdered, Lump ton, Liverpool, Aluminum Chloride-Pure, Amalgamating solution, Sulphate, Ammonia-Sul. in bbl. lots, Carbonate, English and German, Muriate, white, in bbls., Aqua Ammonia-(in cys)18%, Antimony-Oxide, Regulus, Argols-Red, powdered, Arsenic-White, powdered, Red, Yellow, White at Plymouth, Asbestos-Canadian, Italian, Ashes-Pot, 1st sort, Pearl, Asphaltum-Prime Cuban, Hard Cuban, Trinidad, Californian, at mine, Barium-Carbonate, pure, Chlorate, crystal, Chloride, commercial, Iodide, oz., Nitrate, Sulph., Am. prime white, Sulph., foreign, floated, Sulph., off color, Carb., lump, f. o. b. L'pool, No. 1, Casks, Runcorn, No. 2, bags, Runcorn, Bauxite, ton, Bichromate of Potash-Scotch, American, Bichromate of Soda, Borax-Refined, in car lots, San Francisco, Concentrated, in car lots, Refined, Liverpool, Bromine, Cadmium, Cadmium Iodide, Chalk, Precipitated, China Clay-English, Domestic, Chlorine Water, Chrome Yellow, Chrome Iron Ore, Francisco, Chromatium-Pure, Commercial, Cobalt-Oxide, Copper-Sulph. English Wks, Vitriol (blue), ordinary, extra, Nitrate, Copperas-Common, Best, 100 lbs., Liverpool, ton, in casks, Corundum-Powdered, Flour, Cryolite-Powdered, bbl. lots, Emery-Grain, Flour, Epsom Salt, Feldspar-Ground, Crude, Fluorspar-Powdered, No. 1, French Chalk, Fuller's Earth-Lump, Glauber's Salt, in bbls., Glass-Ground, Gold-Chloride, pure, crystals, s. v., doz., Chloride and sodium, 15 gr., c. v., doz., Oxide, oz., Gypsum-Calcined, Land Plaster, Iodine-Resublimed, Iron-Nitrate, 40%, Kaolin-See China Clay, Kieselrite, Lead-Red, American, White, American, in oil, White, English, Acetate, or sugar of, white, Granulated, Nitrate, Lime Acetate-Am. Brown, Litharge-Powdered, English flake, Magnesite-Crude, ton of 1,015 kilos, Calcined, ton of 2,240 lbs., Brick, ton of 2,240 lbs., Manganese-Ore, per unit, Oxide, ground, Mercuric Chloride-Corrosive, Sublimated, Powdered.

Marble Dust, Metallic Paint-Brown, Mineral Wool-Ordinary slag, Mica-In sheets according to size, 1st quality, Naphtha-Black, Nitre Cake, Ochre-Rocbelle, Washed Nat Ox'rd, Lump, Washed Nat Ox'rd, Powder, Golden, Domestic, Oils, Mineral-Cylinder, light filtered, Dark filtered, Extra cold test, Dark steam refined, Phosphorus-Red, Precip., red, white, Plumbago-Ceylon, American, Potassium-Cyanide, Bromide, domestic, Chlorate, English, Chlorate, powdered, English, Carbonate, Caustic, Iodide, Nitrate, refined, Bichromate, Yellow Prussiate, Red Prussiate, Pumice Stone-Select lumps, Original cks., Powdered, Pyrites-Non-cupreous, p. units, Quartz-Ground, Kotten Stone, Powdered, Lump, Original cks., Rubbing stone, Sal Ammoniac-lump, in bbls., Salt-Liverpool, ground, Domestic, fine, Common, fine, Turk's Island, Salt Cake, Saltpeter-Crude, Soapstone-Ground, Block and slab according to size, Sodium-Persulfate, Phosphate, Stannate, Tungstate, Hyposulphite, Strontium-Nitrate, Sulphur-Roll, Flour, Sylvinit, Talc-Ground French, American No. 1, American No. 2, Terra Alba-French, English, American No. 1, American No. 2, Tin-Crystals, feathered or flossed, Muriate, single, Double or strong, Oxy. or nitro., Vermilion-imp. English, Am. quicksilver, bulk, Am. quicksilver, bags, Chinese, Trieste, American, Zinc White-Am. Dry, Antwerp, Red Seal, Paris, Red Seal, Muriate solution, Sulphate crystals, in bbls.

THE RARER METALS.

Aluminum, Arsenic-(Metallic), per lb., Barium-(Metallic), per gram, Bismuth-(Metallic), per lb., Cadmium-(Metallic), per lb., Calcium-(Metallic), per gram, Cerium-(Metallic), per gram, Chromium-(Metallic), per gram, Cobalt-(Metallic), per lb., Dysprosium-(Metallic), per gram, Erbium-(Metallic), per gram, Gallium-(Metallic), per gram, Germanium-(Metallic), per gram, Indium-(Metallic), per gram, Iridium-(Metallic), per oz., Lanthanum-(Metallic), per gr., Lithium-(Metallic), per gram, Magnesium-(Powdered), per lb., Manganese-(Metallic), per lb., Molybdenum-(Metallic), per gm., Niobium-(Metallic), per gram, Osmium-(Metallic), per oz., Palladium-(Metallic), per oz., Platinum-(Metallic), per lb., Potassium-(Metallic), per gram, Rhodium-(Metallic), per gram, Ruthenium-(Metallic), per gm., Rubidium-(Metallic), per gram, Selenium-(Metallic), per oz., Sodium-(Metallic), per lb., Strontium-(Metallic), per gm., Tantalum-(Metallic), per gram, Tellurium-(Metallic), per lb., Thallium-(Metallic), per gram, Titanium-(Metallic), per gram, Thorium-(Metallic), per lb., Tungsten-(Metallic), per lb., Uranium-(Oxide), per lb., Vanadium-(Metallic), per gm., Yttrium-(Metallic), per gram, Zirconium-(Metallic), per oz.