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* Illustrated.

Table listing market prices for various commodities like Coal, Iron, and Metals in different cities.

THE authorities of Harvard University have recently instituted in the Lawrence Scientific School a four years' course in Anatomy, Physiology and Physical Training, designed to afford a preparation for the study of medicine or to train those who intend to devote themselves to the care of gymnasiums or to the management of classes in physical culture.

Although the instruction in this department is to begin with the next term of the University, it is already evident that the course will meet a public need of a varied nature. The students include those who are preparing for a medical career, for the supervision of athletic departments in our schools, as well as others who, for various reasons desire to pay particular attention to the care of their bodies.

Not the least of the good effects which may be expected from the foundation of this new department may be looked for in the betterment of the athletic motive which prevails among young men. This impulse clearly needs to be qualified by all the culture which can be associated with it.

"LABOR."

The articles of Dr. RAYMOND on various aspects of the labor question, of which we publish this week the third, have been reprinted in other journals, and heartily approved in private communications.

Your article on 'Labor and Business' in the ENGINEERING AND MINING JOURNAL, of August 20, 1892, is so good, so clearly and practically presented, and shows the fundamental principles of these great questions in such a simple and conclusive manner, that I, for one, must thank you personally for the same.

Dr. RAYMOND has promised to continue this series of articles (and if other duties permit, to do so in successive weeks, without intermission), taking up for a similar treatment the topics of "Labor and Arbitration," "Labor and Skill," "Labor and Science," etc.

"I hate the title 'Labor Question,' because it assumes the existence of a single problem, expressed, as it were, by one general equation, which, being solved, all difficulties are over. There is no 'labor question' in that sense; but there are a thousand separate questions, which it is folly to mingle and muddle, and to which no new social formula, but only the old constants of liberty and justice, need be applied.

"I use the word 'babe' to express a passionate opposition to these abstractions (outside of their legitimate sphere), because they are the tools of a mad tendency to destroy the hard-won principles of the rights and duties, not of 'man,' but of 'men; and because I believe in men, rather than in men's artificial and transitory creations, whether of theory or of practice.

"You will easily understand, therefore, that I would not willingly appear as another solver of the 'labor problem,' or contribute to the general confusion my smart generalization, based on a few things known to me, and a million, cut out of newspapers, or quoted from books on authority not much better.

"I feel, however, that I could make some suggestions, drawn from a business experience of nearly thirty years, and primarily applicable, in their full force, only to the field of which I have personal knowledge, which might enlighten to some extent both those who feel that they know nothing and those who fancy that they know all. And I am willing to contribute to the general discussion these results of personal experience and observation, though I distinctly disclaim the position of an 'authority.'

"I wish you would in some way express this disclaimer for me, so that I need not repeat it in my articles. It will be hard enough to make them sufficiently clear and decently short, without the extra embarrassment of personal considerations.

"No doubt I shall have to use, for sheer lack of convenient synonyms, the terms against which I protest; and I may get tired (or the printer may get tired) of putting them in quotation marks, to show that they are not mine. No doubt, also, I may fall into unguarded dogmatic utterances, just as everybody else does, who touches, with a single pair of human hands, a theme so multiplied, but, whatever may be my hasty lapses from consistency, I shall claim the right to fall back at all times upon my comprehensive disclaimer of any intention to dictate conclusions, or grasp generalities, or reconstruct philosophies, or reform society."

LABOR AND LAW.

The most mischievous of the delusions surrounding the "labor question" is the notion that statutes are effective cures for social troubles, real or supposed, permanent or temporary. This leads our political doctors—the regulars scarcely less than the quacks—to urge one remedy after another, dose upon dose, plaster upon plaster, until the real ailments of the body politic (if it has any that could not be safely left to the diet of liberty and the nursing of time) are lost among the effects of multiplied nostrums.

Now I think no addition to the social materia medica is required to meet the causes of such fits. I do not concede that quiet can be, or ought to be,

secured by the sacrifice of liberty, or that modern conditions have necessitated a radical change in the ancient principles of justice, as expressed in law. At all events, I say earnestly, before these results of human experience throughout human history are discarded as inadequate to our brand new case, in the name of common sense, *let them be fairly tried!* Let us see those who commit crime in the name of "labor" not merely checked by a temporary display of force, only to be forgiven in a gush of good feeling when the "strike" is over, as honorable enemies embrace at the end of a war, but pursued and punished, without passion and without pause, like any other individual outlaws. The behavior of the labor unions, in cases of dispute with employers, is invariably based upon the theory that they represent one of two great powers, between which war has been declared. They use the language and adopt the ethics of war. Men who would not, in other relations, lie or steal or assault their fellows, do not hesitate to spread false reports, in order to deceive "the enemy," or win allies for their own side; to conspire for the injury of "the enemy's" property and business; and to smite the enemy's "minions," or the "mercenaries" who impertinently interfere in the battle. This savagery is rooted in the delusion that "organized labor" is an *imperium in imperio*, a "power," with a "cause," commanding allegiance, waging war, enforcing discipline and punishing treason. This delusion has been assisted by the manner in which legislatures, conventions, newspapers, social philosophers and Christian ministers have dealt with "organized labor," ignoring, for the most part, the more than 80 per cent. of the mass of wage-earners not organized, and accepting the noisy minority as an ally to be cajoled, or a type of noble discontent to be encouraged, flattered and gently guided, or a portentous monster, born of modern conditions, against which the weapons of the fathers are in vain. Concerning the error of these conceptions, I may have something to say at another time. What I would say now is simply, that in these ways the "leaders" of "organized labor" have been greatly assisted to maintain among their followers the disciplined obedience and supreme allegiance of a tribe of warriors, sojourning in the midst of an alien population, and, though consenting at times to a temporary truce, always contemplating the renewal of the normal state of open hostility.

Before looking for any other remedy, why not try the effect of repeated, unmistakable, unconditional enforcement of equal laws? Why not make it thoroughly understood that the responsibility of individuals for criminal acts cannot be juggled away by any device of "organization;" that no organization in this country, except the United States of America, can exert the powers or claim the rights of war; and that any so-called organization committing or abetting crime simply adds to individual guilt the deeper shade of conspiracy? These propositions will sound to many like truisms; but they have been weakened by more than one statute, excepting "organized labor" from their full operation, and they are weakened every day by shallow utterances, involving the notion that this small fragment of our population is somehow distinguished by peculiar rights and wrongs, and should not be treated like other folks.

So much for the relation of organizations of any kind to the criminal law. An equally important subject is their relation to the laws governing civil rights and contracts. Here, too, the accepted theory is simple and familiar enough. An association of individuals doing business is either a partnership, in which every partner is responsible, with all his property, for all the debts and liabilities of the concern (including those incurred by any of his partners without his knowledge), or else it is a firm or corporation, in which the liability of the parties is, to some definite extent, and on definite prescribed conditions, limited by law. The enforcement of contracts and of responsibility for damages being the second (as the maintenance of order against domestic and foreign enemies is the first) of the acknowledged functions of government, great care is very properly taken in all civilized states, to guard the privilege of limited liability. Whoever will not give these safeguards cannot complain if he is held to full liability in civil suits for all the acts and contracts of his associates. Thus, the unincorporated "trusts," managed by committees not subject to the conditions prescribed for limited liability, have been held to be unlimited partnerships, in which every owner of a trust-certificate is a partner; and the simple declaration of this principle has practically killed that form of commercial combination.

Now, the great labor organizations, when not engaged as sovereign powers in making war, are doing business as individuals. In fact, their most desperate fights appear to be for "recognition," that is, for the acknowledgment of their right to make contracts. As I showed last week, the best kind of union with which a detailed contract as to wages can be made is one which comprises the employes of a given establishment, and no others. This is, by the way, the only relation which permits a mutual consideration of local circumstances, and the introduction of such plans as profit sharing, co-operation and the like. The great organizations, which present to many concerns, without distinction, the same "scale," cannot intelligently decide upon such local modifications—and, what is more, their managers do not favor anything which tends to make employes contented, and unwilling to pay dues for nothing, or strike without a grievance. I am amazed that believers, like the *Christian Union*,

in some coming system better than that of wages, should fail to recognize the fact, well known to every business man, that the labor unions, as at present conducted (with a few honorable exceptions), are the bitterest foes of every attempt at such improvement of their relations. They do not want permanent peace. They prefer alternate war and truce, and they wish to keep their forces at all times in a condition to be easily mobilized.

If the liberty of the employer to contract with this or that organization, or with none at all, be adequately protected, then he may make his bargain with the Knights of Labor or with a union representing a single trade, or with an organization of his own workmen only, as he sees fit. My opinion is that irresistible forces, if liberty of action be not otherwise hindered, will bring about, as a general rule, the practice of contracting, either with the local organization only, or with the larger organization, upon terms acceptable to the local employes, whether they are equally acceptable elsewhere or not. But no matter what is the outcome, liberty only being secured, it may settle itself in any way, or (more likely, perhaps,) in many ways.

The heart of the trouble, however, is that contracts made with the labor unions cannot be practically enforced. They are great unincorporated trusts, making agreements which involve many millions of dollars annually, and holding (if their boasts be true) hundreds of thousands in their treasuries. Yet they offer no guaranty except their word. Some of them, to their honor be it said, like the Locomotive Engineers and (in former years) the Amalgamated Association of Iron and Steel Workers, have so well kept their word as to secure the confidence of employers. Many more have shown that their agreement as to any particular establishment was worthless, if they choose to break it by reason of a dispute with some other establishment, or in the general interest of "labor," or at the order of some Grand Master, whose slaves they had sworn to be. Even as to the honorably conducted unions, it may fairly be said that they ought not to expect, any more than individuals or corporations do, that their mere promise should be accepted without security for its performance, or effective remedy for its violation.

They are, in fact, unlimited partnerships. If their members wish to escape the personal liabilities of such a position, there are two ways open to them. They can either become incorporated, so as to be capable of suing and being sued, and then be bound, like other corporations, to keep intact a certain capital, as a guaranty of their obligations; or they can put up, in connection with every contract they make, a sum of money to be forfeited upon breach of the contract, and to be accepted by the employer as liquidated damages. The latter plan is, I think, the more feasible; and it is by no means so chimerical as it may at first appear. For the amount of such a forfeit need not be very large, not nearly as large as the amount of the savings which, at many establishments of which I have knowledge, are actually held by the employer at higher interest than the savings banks pay, for account of the employes. The men who, at Homestead, destroyed life and property in their furious hostility to the Carnegie company, had \$180,000 on deposit at interest with the company, and subsequently received their deposit in full. The Association which ordered the strike claimed, how truly nobody can say, to have in its treasury a still larger sum.

At all events, it is practicable (for I have known it to be successfully done) to require from each employe, under the agreement made with him, the deposit either at once or by successive deductions from his wages of, say, one month's pay, to be forfeited if he leaves work without 30 days' notice; the employer, on the other hand, binding himself to repay this deposit whenever he discharges the workman, with or without cause; and, if such discharge be made without sufficient cause, and without 30 days' notice, to pay in addition another month's wages. Moreover, the employer is bound to give 30 days' notice of any proposed change in wages or other conditions of labor.

This is only an illustration, but I know such arrangements to be practicable in many trades. I do not suggest that they should be forced upon those who do not like them, but only that those who do should be protected in the freedom of their contract, and secured in its enforcement.

I must leave to another article the further explanation of this subject, and especially the consideration, in connection with it, of the true sphere and value of arbitration, concerning which so much is sentimentally dreamed and windily declaimed. R. W. R.

NEW PUBLICATIONS.

JAHRBUCH DER CHEMIE, HERAUSGEGEBEN VON RICHARD MEYER. I Jahrgang, 1891. Verlag von H. Bechhold, Frankfurt a. M. Pages 544.

This work is a history of the more important discoveries and improvements made during the year 1891, in the different departments of pure and applied chemistry, written in collaboration by some of the most eminent specialists in Germany, the whole being revised and edited by Prof. Meyer, of Braunschweig.

Naturally such a work must be incomplete, for the subject is too vast to be crowded in a single book, but the authors have not endeavored to make it a chronicle of chemical discoveries, but a history of the year's development of chemical science and theory along certain well defined lines.

Notwithstanding the natural limitations of the book, it is to be regretted that more space was not devoted to the part on metallurgy written by Prof. Dürre, of Aachen. Under this head reference is made to the improvements in chemical analysis of iron and steel, the direct preparation of wrought iron from the ore, including the researches of Wedding, Siemens and Howe, blast furnace practice, wrought iron in general, and the preparation of phosphate from slag, in all of which frequent reference is made to the ENGINEERING AND MINING JOURNAL.

The metallurgy of lead, gold, copper, silver and zinc are only briefly touched on. Under the head of technical inorganic chemistry Professor C. Häussermann gives an account of improvements in the manufacture of nitric and sulphuric acids, of the Le Blanc soda process and sulphur regeneration by Chance-Claus, the Solway process, the chlorine industry, and manufacture of alkaline chromates.

Under the head of explosives the same writer describes recent improvements in the manufacture of nitro-cellulose, nitrate and chlorate mixtures, and black powder.

In the department of physical chemistry Professor Nernst describes the theory of liquid and solid solution. Walker's variation of Mendelejeff's law, estimates of molecular weights and the vapor density apparatus of Lunge and Neuberg, molecular refraction, rotation and light absorption by chemical compounds.

Professor Krüss, in his part on inorganic chemistry, treats Mendelejeff's law *in extenso*, giving numerous recent experiments by Newlands, Lecoy de Boisbaudran, Walker and others. Finally, various interesting data and discoveries are given by Bischoff, Röhman, Beckurts, Märcker, and Bühring under the heads of organic, physiological, pharmaceutical chemistry, and technology of the hydrocarbons. Professor Meyer himself is the author of the chapter on dyes.

The book is further provided with well prepared subjects and author's indexes, and is creditably gotten up typographically.

GEOLOGICAL SURVEY OF MISSOURI. The Higginsville Sheet, Report by Arthur Winslow, State Geologist.

Mr. Winslow's report on the Higginsville coal deposits will in some respects prove an unexpected pleasure. It is a distinctively new departure from the form of publication adopted for such reports hitherto, in that the report comes in folio form, including within the same cover both text and maps. Mr. Winslow has prefaced the report by a notice calling attention to the change, and giving some reasons, for and against it. Hitherto such reports have been issued in two volumes, one for text, the other for maps, or with folded maps inserted in pockets at the end of the book. Of the former class, Beckers and Emmons' reports may be cited as examples. The principal objection to this form is that the two volumes must always be consulted together, which is inconvenient to say the least. Then, again, as the volumes are of different sizes, it is necessary to arrange them on different shelves of the library, which entails extra work whenever it is necessary to refer to them. Lastly, if either one is lost, as sometimes happens, the other is nearly useless.

As regards folded maps inserted in pockets it is easy to mention objections. The paper upon which such maps are printed is generally thin, and consequently a too frequent folding and unfolding rapidly mutilates or wears it out. Then again such maps are easily lost or mislaid, rendering the remaining part almost useless. We cannot agree with Mr. Winslow, however, in saying that this form of report is "inconvenient for reference," unless he restricts his application to the library, for wherever it is necessary to travel with the book, and to refer to it in the field, this is the most convenient form. Regarding the form adopted by him, Mr. Winslow candidly says that it is "of inconvenient size and shape for ready reading and it cannot be easily carried about," but it has, as we have already stated, the valuable feature of containing both text and maps together, and we are inclined to believe with him, that it may prove the best form for the special reports for which it has been adopted. Certain it is that a number of these reports bound together will make a very handsome volume.

The present report embraces a detailed statement of the economic and general geological features of that part of Missouri between latitudes 39° and 39° 15', and longitudes 93° 30', and 93° 45' W., an area of about 231 square miles. To it the name Higginsville has been given, this being the principal trade center. As coal is the principal product of the district, a description of the coal measures forms the principal feature of the report. There are four beds in all, having a total thickness of 5 ft. 9 in., of which the most important is the Lexington, 1 ft. 6 in. thick, the others being the Waverly, 3 ft., the Mulky, 1 ft. 3 in., and the Edwards. It is estimated that the Lexington field has an area of 40 square miles containing 50,000,000 tons which it would be possible to mine and ship. The Mulky field has an area of 40 square miles with 40,000,000 tons, and the Waverly field 60 square miles and 95,000,000 tons of coal, the total being 185,000,000 tons. Of the total area but 265 acres have been mined, from which 520,000 tons of coal have been extracted.

The report is accompanied by two finely lithographed maps colored in soft gray tints. The maps themselves embody much information and it is patent that much care has been given to their preparation. The scale is $\frac{1}{33,333}$, similar to that used by the U. S. Geological Survey.

The report is further illustrated by a number of half-tone reproductions of photographs which detract from, rather than add to, its value.

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: Sir W. Thomson, the eminent experimentalist, deduced that one cubic inch of any perfect gas contained 10^{23} molecules when the barometer marked 30 in. and the thermometer 32° F. (*vide* Jos. P. Cooke, Jr.'s, "New Chemistry," pps. 43 and 75). Considering the molecule to be a sphere, its solidity equals $\frac{\pi}{6} \times D^3 = \frac{1}{10^{23}}$ whence its diameter = $D = \left(\frac{6}{10^{23} \times \pi}\right)^{\frac{1}{3}} = .000000267309002$ in. Substituting his value in the

formula for the convex surface of one molecule = πD^2 , and multiplying the result by 10^{23} , the number of molecules in a cubic inch determines the aggregate molecular surface in one cubic inch to be 224,479,691 sq. in., equivalent to 1,558,877 sq. ft. or 35.78 acres!

August 12th, 1892.

WALTER S. CHURCH.

The Crawford Crushing and Amalgamating Mill.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of the 13th inst. appears a letter from John E. Hardman, M. E., stating that certain figures printed in a former number of your JOURNAL and relating to the Waverly Mine, Nova Scotia, "are purely fictitious."

Your correspondent's disingenuous assertion would lead a casual reader to infer that neither ore nor tailings from the Waverly Mine had ever been treated by the "Crawford Mill," whereas Mr. Hardman knows that tailings were so treated; two different runs having been made, one with and the other without quicksilver in mill. Samples of these tailings in both cases were taken by Mr. Hardman's own men, and the samples on which we based our figures were taken by Mr. Hardman himself. Our own assayer carefully made the assays (and still retains duplicates to confirm, if need be, his accuracy). Following are the results: Tailings from stamp mill contained \$1.03; tailings from the Crawford Mill a trace only. Looking at this test in its true aspect, as made on tailings and not ore, and one will observe that it simply confirms the sole material point made in the table, namely, that the Crawford mill saved a high percentage of what the stamps lost.

To prove our entire innocence of intention to mislead your readers or misrepresent the Waverly mine, it is only fair to state that we could have given the results of many fully established and conclusive tests at our other agencies, showing as high a percentage of saving and demonstrating even better work on the part of the Crawford mill, owing to the ores being of higher grade, had we not desired to have the Canadian agency represented in the table in question. Yours truly,

MECHANICAL GOLD EXTRACTOR COMPANY,
 by W. O. ROSS, Sec.

The Reorganization of the Santa Fe Copper Company.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The management of this company, after trying hard to make both ends meet, has at last come to the conclusion that in order to make its copper production pay it must avail itself of suitable concentration works.

This suggestion has been repeatedly made in the ENGINEERING AND MINING JOURNAL several years ago. It is true, the company owns a small concentrator of a capacity of about 40 tons of ore per 24 hours, but it seems it did not prove a success for various reasons. A plant of a capacity of 250 tons of ore per diem is needed for which, including some other necessary work at the mines, about \$100,000 in cash is required.

There is an immense dump of concentrating ore on hand (mining costs all paid) estimated to be between 30,000 and 40,000 tons, besides a much larger amount of the same grade of ore in sight in the mine, carrying from 2½ to 5% of copper, and several dollars of gold per ton. There is sufficient ore to keep the new concentrator running for 15 months continually, allowing the company plenty of time to develop its mines properly.

The capital of the Santa Fe Copper Company consists of 500,000 shares of stock, and \$300,000 1st mortgage bonds, on which two years interest is unpaid and due. The mortgage bondholders have the right to foreclose the property, and this done, the stockholders would be left out. The management deserves great credit for having arrived at an agreement with the bondholders, that they will accept under the new organization 50,000 shares of new stock in payment of these bonds.

The capital of the new organization will consist of 125,000 shares, of which 50,000 will be used to pay off the bondholders as aforesaid, 50,000 will be held at the disposal of the old stockholders, giving them one new share for ten old ones, provided they pay an assessment of 20 cents per old share, or \$2 per new share. The old stockholders will also receive additionally a first mortgage bond, bearing semi-annual interest, for the amount of their assessment of 20 cents per share.

This will give the new organization a working capital of \$100,000 cash, and leave 25,000 new shares in the treasury for future disposal. The necessary legal formalities have been entered into, to foreclose the properties and then to start up again under the new organization.

The mines show large quantities of low grade ores, besides a limited body of ore of better grade, occasionally widening out to a considerable extent. This high grade ore, after being roasted, goes direct to the furnaces, and a matte containing over 60% copper with from ½ to 1 oz. of gold, is obtained, besides some copper bottoms carrying 97% copper and from 6 to 7 oz. of gold. The refined copper is very desirable, not containing any impurities.

Various mining and smelting experts have expressed themselves favorably on the future outlook of this new company, provided the company's management endeavors to engage a competent man to build and run the proposed concentration works. It is also under advisement to make the company's San Pedro's grant, containing 35,000 acres, productive. The case pending, in regard to its Canyon del Agua grant, will be finally settled in October by the Supreme Court at Washington. The grant contains 3,400 acres and is mineral. Whatever the decision of the courts may be, it won't affect the company materially. The 12 copper mines, though situated on this grant, are also located and worked under the United States Mining Laws. S. R.

The Relations Between Employers and Workmen.—II.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: It is not fair to judge of a class by either its best or its worst examples, and unfortunately when war breaks out, it is almost inevitable that the leaders with the strongest passions come to the front. As a rule they are not the best of their class. Nor during the war is it generally possible to negotiate terms of peace on any generous or permanent basis. In martial warfare conducted on the lines of refined savagery, and with weapons of destruction, the aim is to so utterly crush the foe that recuperation shall be impossible. The terms of peace are then a sentence of annihilation.

But bitter though the feeling be which an economical war excites, neither side aims to annihilate the other, for such a consummation, if desired by the more heated of the combatants, is known to be impossible. Victory therefore means at the best a temporary lull of hostilities and a probable change of base. The assault is sure to be renewed when the treasury has been refilled, and some more vulnerable point of attack has been detected. Rarely prudence, always intensified bitterness and thirst for revenge, remains as a legacy of the defeat to the conqueror. Too often overwhelming pride and self-confidence and a certain sanguinary exultation are the immediate fruits to the conqueror. But while these emotions are acute, neither side can dispassionately review the situation, can appreciate the follies and crimes of the past, or wisely draw lessons for guidance in the future. But the losses and misery which both sides inevitably suffer must appeal with full force to the reason, when sooner or later, the heat of the controversy has subsided.

And surely in this nineteenth century of the Christian era, other motives, besides those of economy and prudence, should and do actuate men. Is our Christianity a mere varnish to conceal selfishness and not the gospel of peace and good will? and are our vaunted civilization and control over nature's forces to be used only in training men the more cunningly to torment and kill one another? On the contrary, we believe the world is better than it ever was, and that there are more men in it to-day moved by disinterested impulses to do unselfish deeds than there ever were. But we are passing through a great social and economical revolution, initiated by the French Revolution and fought with machinery impelled by steam and electricity. All the old manufacturing methods and appliances have been replaced, but not more completely and thoroughly than the old commercial practices and principles. One man in the mill now does the work of a thousand; one locomotive hauls in a year more than a thousand teams and teamsters could drag of yore through mud and dust; one steamer, making its 20 trips annually across the ocean, carries more passengers and freight than a whole fleet of the once famous packets. But this concentration of work is only effected by concentration of capital, and concentration of capital has necessarily elicited combination of labor.

Thus has arisen a new state of society, and with it a thousand new problems for solution, not only by legislatures, but by every honest man, whether working or thinking in the ranks of capital or of labor. The problems are complex and very difficult of solution, and unfortunately they present themselves suddenly for speedy settlement, and yet under pain if a mistake be made by either side of such terrible consequences as we have been witnessing during the past month. At times there is no precedent to guide those on whom the responsibility of action rests. Yet he is a blind bigot who cannot see in the altered conditions of trade and manufacturing and in the enormous power which has been conferred by legislation on consolidated capital, the creation of new responsibilities on the one side, and of implied, if not expressed, rights on the other. And every one who controls that eminence of power which consolidated capital wields, must feel that the rights and the wrongs of the old code of intercourse between the employer and employe no longer strictly apply; that every man is no longer in every sense his own master; that while certain generals of trade control the forces of capital, the rank and file of the workmen must marshal themselves under leaders, and must merge their individuality into the common cause.

Of course there are certain rights which we cannot conceive, that transformations in the methods of trade will abrogate, and these rights were undoubtedly transgressed at Homestead, and they and others are transgressed wherever workmen organized under a union, tyrannically and by force, prevent other workmen exercising their liberty of independent action and choice. And other great wrongs are committed, wrongs which should be summarily punished by every lawful means, and which no true friend of the workman can ever palliate. But if allowances are to be made for errors of judgment and errors of conduct, the less educated and poorer of the opposing classes are surely entitled to the larger share of forbearance, and magnanimous treatment and self-sacrifice are certainly to be looked for first, and in greater measure from the men of higher education and of greater wealth than from the masses, who, whether it be due to their improvidence or not, seldom know from month to month where their daily bread will come from.

When the struggle at Homestead commenced, and after the attack on the barges was made, there was only one course open to the Carnegie Company—that of fighting to the bitter end. Whether it was originally wise on the part of the company to force the fight, even though sure of their ability to win it, may well be questioned. But one thing is certain, that when victorious, and the more so when completely victorious, the company should use their advantage, not in the futile endeavor to prevent combination among their workmen, but in the wiser effort of educating their men up to such an appreciation of others' rights, as well as of their own, that they will be proof against the blandishment of demagogues and the passionate appeals of anarchists. Thus organized under wise leadership, the unions will, while claiming and compelling payment of their adherent dues, insure the property which yields them their wages, and the owners their dividends, against such loss and depreciation as inevitably attends a strike or a lockout.

At the head of our great industrial enterprises there are men of high principle and of undoubted philanthropy, and yet they drift or rush, impelled by false pride or passion into contests, which, end as they may, in the sombre reaction which follows must cause them many a regret and many a misgiving.

Did we entertain a lower estimate of the character of the men who by dint of their extraordinary energy, and intellectual force and integrity, have risen as presidents of our great railroads, and as managers of our immense consolidated industries into positions of greater influence than any in the land, unless it be those held by our statesmen of first rank, and did we not know that our skilled mechanics and operators were men of shrewd sense, as well of fair education, and with too great an interest in the country to be long misled by such false doctrines as were enunciated by the Amalgamated Association of Foolish Philosophers at Homestead, we might lose heart. But being convinced that the owners of capital are not heartless cormorants, and that the men can be persuaded to choose as their leaders the wisest and most cool-headed of their own number, we believe that the results of such a deplorable contest as that

now ending at Homestead will be to compel each side to view the position of their opponents dispassionately and forestall the compulsory passage of laws looking to compulsory arbitration, by creating some tribunal, or devising some method, for fixing the rate of wages and settling differences of opinion before they grow into disputes. No body of legislators, even if more sagacious and non-partisan than those which compose our national and State assemblies, are as competent to elaborate a scheme of arbitration as a committee appointed one-half by the owners of our great mills and one-half by their workmen.

D.
New York, August 25th, 1892.

GOLD PLACER MINING IN SURINAM.

Although the existence of auriferous alluvial was ascertained as far back as 1862, it was not until 1875 that local attention was given to its working. The results were so extraordinary that by the following year over 500,000 acres of land were applied for and conceded. At the present time over two million acres of land are held by local concessionaires, but as the auriferous area of the country exceeds 30,000,000 acres, there is room for a considerable expansion of this industry.

The auriferous alluvial deposits are shallow, and are covered by a loam deposit from 6 to 10 ft. deep, which is easily stripped. They occur in channels of dry rivers and lakes, also in valley bottoms and the slopes of hills underlying the course of the mountain streams. The beds of the main tributaries of the large rivers have also proved to be auriferous, and if the waters could be diverted from their course, would pay to work. These deposits have their origin in the auriferous quartz bodies that intersect the mountains, and the pay stuff, although varying in different districts, is more generally a quartzose gravel; and in the northern limit of the gold fields of Midrinetti, they appear to be of recent deposition. Some of the auriferous gravel channels are of almost indefinite length and continuity, but their widths vary according to the configuration of the locality from 80 to 500 ft. They are generally from 6 to 15 ft. in thickness, and lie on a clay stratum, which is never penetrated in general operations. A pit which was sunk through the clay uncovered another deposit lying upon a stratum of decomposed schist, which was superincumbent on the country rock. In the pay gravel boulders of quartz are frequently found, which when broken open show large patches of gold. The fine quartz gravel also contains gold which, however, could not be separated from it in bulk without crushing and amalgamation. And on many properties there are thousands of tons of this gravel among the sluice tailings, which from assays made, yield over one-half ounce to the ton. In the pay drift the gold is found in coarse nuggets, and no attention seems to be given or attempt made to save the fine gold: hence, at almost every property the tailings would pay to rewash, with a view to securing the fine gold, which is generally more abundant in the gravel than the nuggets obtained. The common nuggets vary in size and weight from 2 dwt. to 15 dwt., but occasionally some weighing 40 to 50 oz. are found, and some have been found which have weighed over 200 oz. When pay drift, carelessly worked, averages over 4s. per cu. yd., and only costs about 2d. to be treated, it is not surprising that fine gold is not sought after. The method of winning the gold from the alluvial deposits is by "ground-sluing" and the use of "long toms." The latter are generally used when there is a scarcity of water or for gravel, which is believed to be rich and requires particular attention, or for gravel, which may be argillaceous and otherwise difficult to disintegrate. The "long toms" require much greater attention than the ordinary sluices. The gravel cannot be treated in situ, but being dug out, is thrown into the sluices, but the native methods of sluice washing, although in many respects crude, is entitled to every respect, and, indeed, compares favorably with those of other gold fields.

The gold production of Surinam from 1875 to the end of 1890, exceeded £2,600,000, and the annual average is now about £150,000, all of which is obtained entirely from alluvial deposits.

RECENT DISCOVERIES OF MANGANESE ORE.

At the last meeting of the North of England Institute of Mining and Mechanical Engineers, Mr. Edward Halse communicated two papers describing new finds of manganese ore, one at Mulege, in Lower California, and the other at Arenig, Merionethshire, Wales.

Mulege is on the western shore of the Gulf of California. Several outcrops of manganese ore veins are found crossing the trachyte, which forms the bulk of the rock. The veins consist of psilomelane and gypsum, and they vary in thickness from a few inches to three or four feet. The prevalent direction is about northwest to southeast. The chief veins run in wavy lines, consisting of a succession of curves, each a few feet long. The best ore is found at La Trinidad, where two veins intersect. No distinct evidence of true fissure veins is to be obtained anywhere, but the ore occurs in superficial vein-like fissures and rock-joints. It seems probable that the manganese ore has come from the trachyte or by leaching and subsequent deposition.

In the Lower Silurian formation, in Eastern Merionethshire, Wales, there are deposits of trappean ash and feldspathic porphyry, accompanied with manganese ore. This ore consists chiefly of psilomelane, and also as pyrolusite, and it occurs in much the same manner as in the find mentioned in Lower California. In one of the hills which consists of upper trappean ash, with a mass of feldspathic porphyry cropping out of the northern side, several vein-like deposits of manganese and iron ores were found. Samples of this ore gave the following analysis: Manganese, 46 per cent.; silica, 14 per cent.; phosphorus, 0.147 per cent., and iron 1.7 per cent. In one vein the ore was 21 in. thick, and was separated from a 9-in. vein by 11 ft. of moderately soft rock. And this vein, 3 ft. wide, was discovered, consisting of impure earth, brown oxide of iron, and patches of pyrolusite and psilomelane. How far the manganese penetrates in lateral and downward direction, has not yet been ascertained. At the present price of manganese, however, it does not pay to extract the ore, or to pursue investigations as to the extent of its occurrence.

THE LATE PROF. WILLIAM P. TROWBRIDGE.

For the second time this year has Columbia College had occasion to mourn a death among her professors, first in the death of Wm. Guy Peck, Professor of Mechanics; now, in that of Gen. William Petit Trowbridge, Professor and head of the Department of Engineering, in the School of Mines, who died very suddenly of heart failure, at his home in New Haven, Conn., on August 12th.

Prof. Trowbridge was born at Troy, Oakland County, Mich., on May 25th, 1828. At the age of 16, after receiving such an education as was afforded by the county schools, he received an appointment as cadet at West Point. He was graduated at the head of his class in 1848, having, moreover, acted as Assistant Professor of Chemistry during the last year of his course, and was assigned to the Engineer Corps, with the rank of brevet Second Lieutenant. Being desirous of joining the U. S. Coast Survey, he spent the two years following his graduation in astronomical work at the observatory of West Point. During the year 1850-'51 he served with a company of sappers, miners and pontoons, and in the year following secured a coveted position on the Coast Survey, then conducted by the late Alexander D. Bache. He was assigned to duty on the primary triangulation of the coast of Maine, where the entire work was placed under his charge. His work on the Survey lasted until 1856, during which time he made surveys of the Appomattox and James Rivers, in Virginia, of the Dutch Gap, where he recommended the cut-off canal, afterward constructed, and, finally, on the Pacific Coast. This latter survey, which included astronomical,

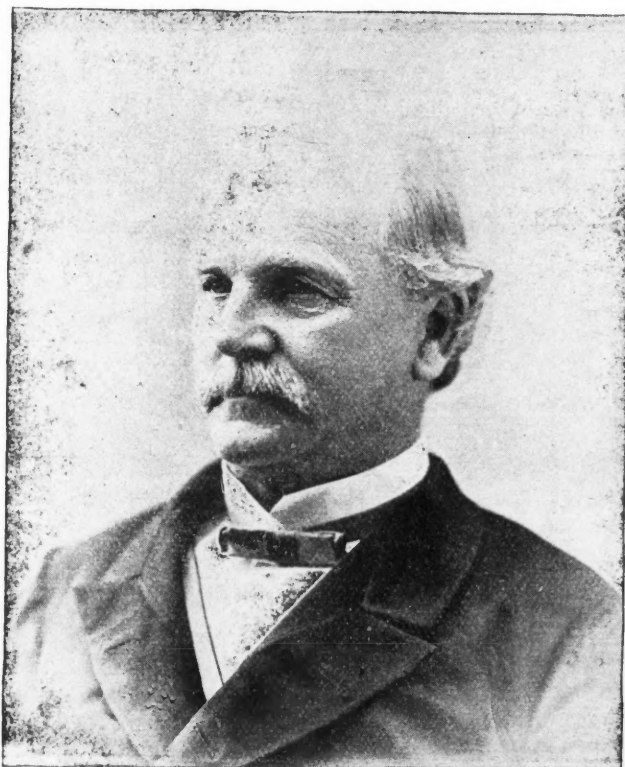
From 1872 to 1876, he was Adjutant-General of the State of Connecticut; also Commissioner of the State for the building of the new Capitol at Hartford. During this time he was Commissioner for the establishment of the harbor lines of the city of New Haven, and for building a bridge across the Quinnipiac River. In 1877 he was elected Professor of Engineering, at the School of Mines, Columbia College, and was made head of the department. This post he held at the time of his death.

From 1889 to 1891 he was Chief Special Agent of the 10th United States Census for Collecting Statistics Relating to Power and Machinery Employed in Manufactures.

Prof. Trowbridge was a member of many scientific societies, among them being, The New York Academy of Science, The American Association for the Advancement of Science, and the National Academy of Science, to which latter he was elected in 1882. He has held the position of Vice-President of the New York Academy of Science, and the same in the American Association, in which latter university he presided over the section of Mechanical Science in 1881.

The degree of A. M. was conferred upon Prof. Trowbridge by the Rochester University, in 1856, and by Yale, in 1870. The degree of Ph. D. by Princeton University, in 1880. In 1883, Trinity College conferred upon him the honorable degree of LL. D.; this being followed by that of the University of Michigan, in 1887.

Prof. Trowbridge took to the School talents of a high order combined with unflagging zeal. His work at the School of Mines was of such a high order as to make it no easy matter to fill his place.



THE LATE PROFESSOR TROWBRIDGE.

tidal and magnetic observations, was conducted by him. Full accounts of his work on the Survey can be found in the Proceedings of the American Association for the Advancement of Science, to which he was a frequent contributor. In 1854 he was promoted to a first lieutenancy; the second being given him in 1849. In 1856 he resigned from the army to accept the chair of Mathematics, in the University of Michigan, but his early inclination for coast survey work was not to be so easily overcome, and he resigned his professorship in the following year to accept, at the request of Mr. Bache, the post of Scientific Secretary to the Superintendent of the Survey.

While holding this position, Prof. Trowbridge prepared for publication the results of the Gulf Stream exploration. In 1860 he superintended the erection of the Automatic Registering Magnetic Observatory, at Key West, Fla. In the following year he prepared the chart of the Southern coast, for the use of the United States Navy, and subsequently made a hectograph survey from Narragansett Bay, in Rhode Island, at which place the establishment of the navy yard had been proposed by the Government.

At the outbreak of the war, Prof. Trowbridge re-entered the Union Army, and served throughout the war. He was placed in charge of the Engineering Agency, in New York City, which supplied materials for fortification. From 1862 to 1865, he also occupied a position of superintending engineering of the fort of Willet's Point. He also took charge of the harbors of Fort Schuyler and Governor's Island, and New York Harbor.

He again resigned his position in the army, and for the four years following 1865 he was Vice-President of the Novelty Iron Works, in New York City.

In 1870, he was called to take charge of dynamical engineering in the Sheffield Scientific School, Yale College, which position he held for the ensuing seven years.

Although not what might be called a brilliant teacher, his grasp of the complex subjects which he taught was so complete that, with his scientific bent of mind, he never failed to make his students understand the subject upon which he happened to be lecturing.

That this was true, however, was not alone due to his clearness and consciousness of description; a part should be credited to the unflinching kindness and patience of his nature. In the School of Mines, a certain amount of ground must be daily covered, and the work is not easy, more especially if a mathematical bent of mind is lacking.

To those who occasionally did not understand the subject in hand, Prof. Trowbridge was always ready to lend his time, when they came seeking his aid, while to those who could not keep up he gave the advice to pursue some other course for which their talents seemed to fit them, and this was done in such a manner that no sting of disappointment was left behind. He was the friend as well as instructor, and naturally his students loved him.

Six children survive him, three sons and three daughters. His eldest son was associated with him in instruction at Columbia College.

The Salt Lakes of Southwestern Siberia.—In the Lower Steppes of Southwestern Siberia, extending from the northeast end of Aral Sea toward Kolivan, there is a great depression in which numerous small salt lakes are found. The basin in which these lakes are found consists of fine clayey oligoclase sand. The lakes are gradually becoming smaller with time, and the brine more concentrated. In some of them, Glauber's salt is found; in others, common salt, while in others, Epsom salt is found. According to Von Helmhacker, in the *Berg und Hüttenwännische Zeitung*, these lakes are of great value to the country, as they are its sole resource for common salt. The Glauber's salt is manufactured into soda at the Siberian manufactory of Barnaul. The lakes belong in part to the Czar, in part to the Crown and in part to the Kirghese inhabitants.

VARIATIONS IN THE MILLING OF GOLD ORES—I.*

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

GILPIN COUNTY, COLORADO.

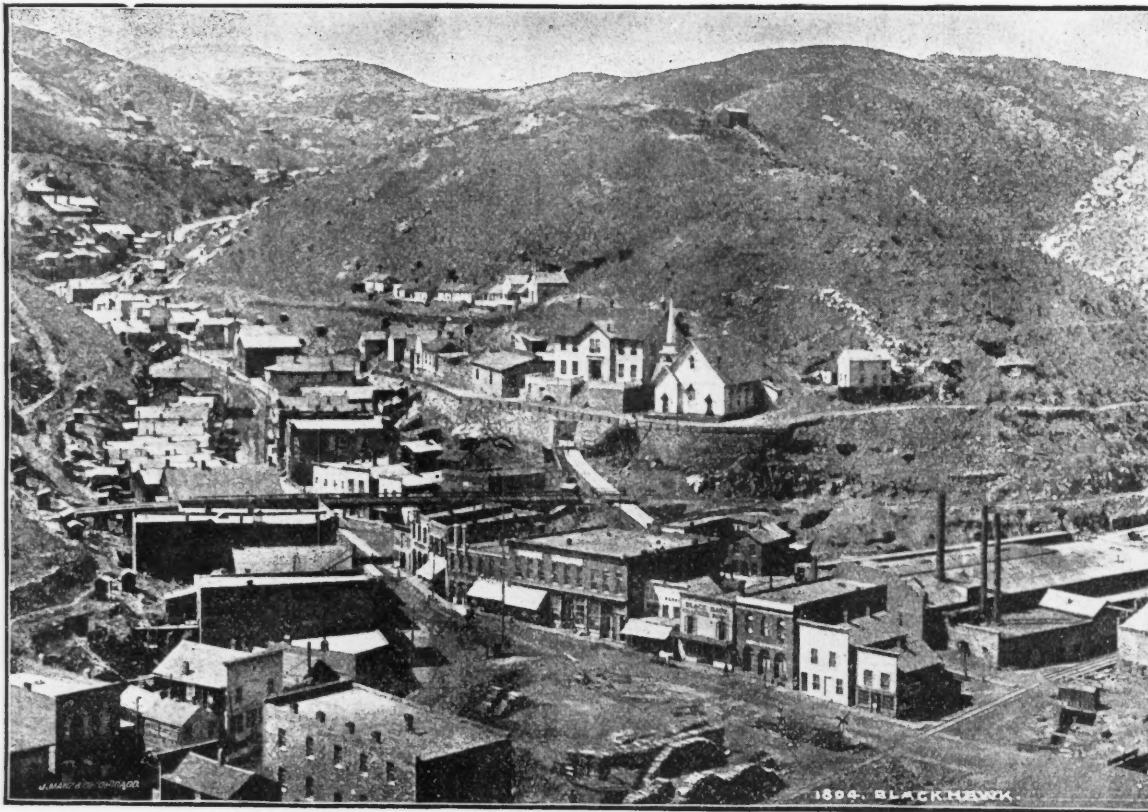
Gilpin County, the most important gold mining district of the State of Colorado, lies at the foot of the main range of the Rocky Mountains. With its record is interwoven the beginning of the history of Colorado and the birth of a great industry.

In the days when this part of the United States was yet a portion of Kansas, an unknown region over-run by the Indian and the now almost extinct buffalo, a motley crew of eager seekers after gold were drawn thither by the fame of Pike's Peak. The pioneers of 1858 were mostly Georgia men, some of whom had been to California. When their El Dorado proved a delusion the more enterprising, leaving the log cabins by the side of the River Platte, log cabins which marked the site of the now stately city of Denver, followed the course of Clear Creek up the winding cañons and found the river gravel which produced the first output of gold. The alluvial deposits, however, owing to the narrow, rocky channel and the rapid current of the stream, were of but small extent, and the area available soon becoming exhausted necessitated the search for further auriferous ground. It was then that the pioneer, following the rapidly narrowing beds of the mountain torrents, found himself fronted by the ramparts of the mighty Rockies themselves, and turning to one side discovered in the quartz lodes the original source of the river gold.

In April, 1859, John H. Gregory first made his way up North Clear

place to ore which was less quartzose, which contained more of the country rock as vein filling and carried a percentage of pyrites which steadily increased with depth. This was at levels varying from 100 to 200 ft. The mills which had previously been extracting from 60% to 75% of the gold contents gradually commenced to return only 50%, 40% and then 30%. None but the richest ore would now pay; the mills swallowed up two-thirds of the yield which should have rewarded the miner's toil; some of the mines were forced to shut down, while others had to confine their development to the narrower, richer portions of the lodes. Gilpin County as a mining field seemed to be about to write "finis" across the portals of its mills and engine houses. At this juncture a small smelting establishment was erected in the district and the metallurgist came to the rescue of the baffled millman. It was in the spring of 1867 when the Boston & Colorado Smelting Works were first established at Black Hawk. The Swansea process of copper smelting was introduced, the matte being shipped East. In the year which followed most of the mills remained idle; many of the mines were shut down, for only those could afford to be worked which yielded ore sufficiently rich to meet the cost of smelting. For some years the smelter took the place of the stamp mill, but in the interval the energetic, resourceful men of the place studied the successful treatment of their pyritic ores, and after experiments, which cost much time and more money, eventually in the beginning of the "seventies" they solved one of the knottiest questions ever put to the miner.

We are now familiar with the terms "free milling" and "refractory" ore, and we are to some extent cognizant of the different treatment required by the two types, but such knowledge as we possess is in no small



BLACKHAWK, GILPIN COUNTY, COLO.—(BOBTAIL 125-STAMP MILL ON THE RIGHT).

Creek and found good prospects near Black Hawk. On May 6th the Gregory lode was discovered. The fame of Gregory Diggings at once drew to it all the wandering population scattered among the neighboring hills. Other lodes were discovered in rapid succession. Then there commenced the active working of the gold veins, which is the only excuse for the existence of Black Hawk, Central City and Nevadaville; which has made Gilpin County the chief gold producer of Colorado, which trained the men who opened up the Leadville mines, and gave the money to those who built up Denver.

While the area of Gilpin County is only 122 square miles, its output to date is estimated at \$72,000,000. Its largest annual production (in 1889) was \$3,334,300, while that for last year is estimated at \$2,500,000.

As a milling centre it ranks among the most important. The history of the solution of the milling practice of Gilpin County forms one of the most interesting chapters in the record of the American mining industry. Briefly it was thus: The first machine introduced was the arastra, which at first proved satisfactory, but was soon found to be too slow for the American, however well suited to the Mexican. Stamp mills of three, four and six heads were erected by the Georgian miners and these in turn gave place to larger plants modeled after the California fashion. This type—fast drop and shallow discharge—of battery was adapted to the treatment of the surface quartz. All went well; the output and importance of the district steadily increased. In July, 1860, 60 mills were at work in the county. The gold saving at that time was all done by rifles, carrying quicksilver, but in the following year the first copper plates were introduced. Soon after this the camp received its first check; the oxidized material of the upper portions of the lodes began to give

measure due to the plucky manner in which the millmen of that day overcame the obstacles presented by the treatment of a most difficult ore.

The accompanying tabulated statement illustrates how, from the Californian or "fast drop, shallow discharge" type of milling practice, Gilpin County has arrived at a distinct type which may be summarized in contrast as the "slow drop, deep discharge" system.

The figures herewith given will serve as a text for the paragraphs which follow.

One of the best mills of the district is the Hidden Treasure, the property of the California Mine, and as it thoroughly represents the best practice of Gilpin County, I shall take it as a type and endeavor to describe fully the methods of work.

The Hidden Treasure plant consists of 75 stamps in three sections of equal number; of these two are of an older date than the third. The stamps of the former are supplied with screw tappets, while in the case of the latter the tappets are kept in place by means of gibs and keys. The last-mentioned method is much preferred.

The stamps weigh 550 lbs. each and fall at the rate of from 30 to 32 drops per minute. The order of drop is 1-5-2-4-3. Each stamp makes from 1½ to 1¼ revolutions with each drop, depending upon the amount of grease upon the cam surface. The height of the drop varies from 16 to 18 in. The issue or depth of discharge, that is, the distance from the top of the die to the bottom of the screen, is 13 inches when new dies have just been placed in position, and increases to a maximum of 15 and 15½ ins. as they wear down.

The shoes are 5½ in. deep and 8 in. in diameter. The dies are plain, cylindrical in shape and fit into a round seat in the mortar bed. They are 3½ in. deep, slightly wider than the shoes, and are kept in place by tailings which are packed tightly between and around them. The shoes

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COMPARATIVE TABLE OF GILPIN COUNTY MILLS.

Name of the mill.	Number of stamps.	Weight of each stamp.	Number of drop per minute.	Height of the drop.	Depth of discharge or issue.	Capacity per stamp head.	Capacity of entire mill.	Size of the screen.	Description	Percentage of concentrates per ton of ore.	Value of the concentrates per ton.	Percentage of bullion obtained in re-torting.	Fineness of bullion.	Life of the screens.	Loss of mercury per ton of ore crushed.	Consumption of water per stamp per minute.
		Lbs.		Inches.	Inches.	Tons.*	Tons.	No.		Per cent.	dols.net.	Per cent.	Per 1,000.	Days.	Dwts.†	Gallons.
Hidden Treasure.....	75	550	30 to 32	16 to 18	13 to 15	1.14	85	1½	Burr slot alternate punched.	15	15	40	782 to 786	81	4.3	2
Gregory Bobtail.....	125	550	27 to 30	16 to 18	11 to 13	1.04	130	1 and 2		14	10 to 25	40	800 to 850	60	5.2	2.3
Randolph.....	50	500	30	16 to 18	14 to 16	.93	48	1½		20	10	33 to 47	750 to 850	16	9.8	1.4
New York.....	75	600	26	18 to 20	13 to 15	1.07	80	1½		15	7 to 10	40	750 to 800	25	3.7	1.3
Prize.....	25	500	28 to 30	15 to 17	13 to 16	.80	20	1½		12	10 to 15	35	750 to 775	75	9.7	1.5

* Tons of 2,000 lbs each.

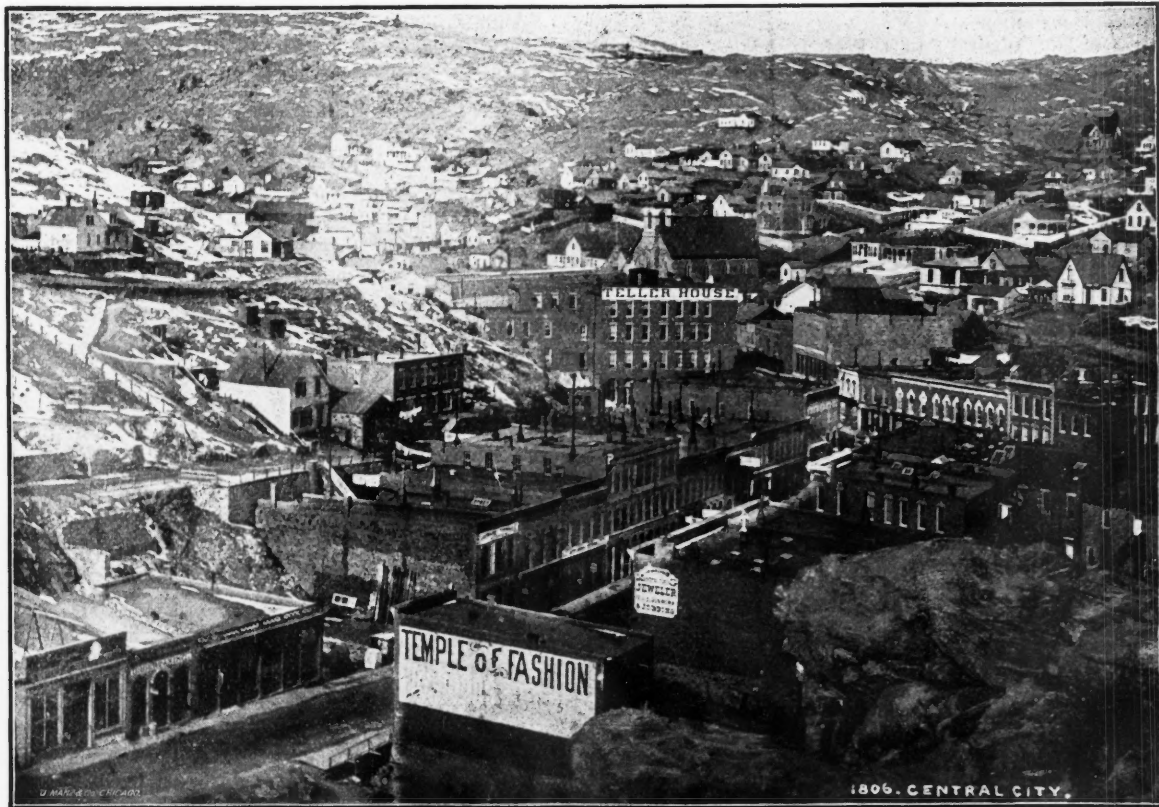
† Mercury is sold by avoirdupois—a tank contains 76¼ lbs.

weigh from 83 to 86 lbs. each, the dies from 46 to 48 lbs.; both are made of cast iron at the local foundries. The wear of the shoes is at the rate of 11.3 ounces of iron per ton of ore crushed, that of the dies is 4.5 ounces per ton.

The capacity of the mill varies somewhat. At present 50 heads are engaging in treating custom* ore, and these crush faster than the 25 which are fed by millstuff coming from the California Mine. The entire mill crushes 320 cords or 2,560 tons per month of 30 days. The mills do not close down on Sundays. From January to May inclusive 1,066.48 cords were crushed by the 50 heads. This, taking a cord as equal to eight tons, comes to be 1.14 tons per stamp per 24 hours.†

The screen used is that known as burr slot; the slots are horizontal and

gold. This is effected to a slight extent by the free mercury which is added, but chiefly by two amalgamating plates arranged along the front and back of the mortar. They are both made of plain copper. The back plate is 12 inches wide and 4½ feet long. The front plate is of the same length, but has a width of only 6 inches. The two plates are arranged differently, that at the back being placed at an angle of 40°, while the front one is nearly upright. At the front of the battery and above the screen frame there is an opening ordinarily covered by canvas, by the lifting of which the millman is able to introduce his arm and can tell by the feel of the front plate whether the correct quantity of mercury is being added by the feeder. The regulation of the addition of mercury is thus effected without the stoppage of the battery and the removal of the screen frame.



CENTRAL CITY, GILPIN COUNTY, COLO.

alternate. No. 1½ is generally employed, that size being equal to a 50 mesh wire screen. The screen surface is 4½ feet by 8 inches. During the past year 200 feet of screens were used up, or at the rate of 66.6 screens per year. The average life of a screen was therefore 81 days. With the ore coming from the California Mine they last three months, it being the custom to turn the screen upside down so soon as the lower portion, the first affected, gets worn. Occasionally, after having served for the treatment of the company's ore, the screens are used in the custom sections of the mill where coarser crushing is required by an ore coming from a shallower level and of a somewhat different character.

The average of a year's work shows that the ore yields concentrates at the rate of 13%, and of a mean net value of \$15 per ton. Both the quantity and quality of the concentrates vary directly with the richness of the millstuff.

In retorting, the percentage of bullion yielded by the amalgam varies from 30 to nearly 50%, but 40% may be considered the average. The bullion contains 782 to 786 per thousand of gold and 207 to 211 of silver.

Six and a half tanks of quicksilver are consumed by the 75 stamps in one year. This amounts to 4.3 dwts. per ton of ore crushed. The quantity of water used in the mill is at the rate of 2 gallons per minute per stamp.

The gold saving is done in the mortar boxes, on amalgamating tables, by the blankets and finally by concentrators. The last mentioned were formerly supplemented by buddles or "ties," but these have now been discarded. The mortar box itself does most of the work of arresting the

Upon an average the feeder adds a half thimbleful of quicksilver every hour. As a test it was found that in crushing one cord (8 tons) of ore carrying gold at the rate of half an ounce per ton there were added 4½ ounces of mercury, one drop as large as a medium sized pea every hour after the first six hours.

The amalgamating tables are of copper and are in one length of 12 feet having a breadth of 4 feet. They slope 2¼ inches per foot. In the crushing of three cords of half ounce stuff (10 dwts. per ton) it was found that the one copper table used required 5 oz. of mercury to dress it, while there were used for the dressing of the front inside plate 3 oz. and for the back or wide plate 4 oz.

(To be continued.)

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

The Arcas Electrolytic Process consists in depositing by electrolysis an alloy of silver and cadmium upon suitable objects. The bath is formed of a mixture of the cyanides of cadmium, silver and potash. The anode is composed of an alloy containing 70% silver, 30% cadmium. The coating obtained is hard, homogeneous, brilliant, and resists better than silver the destructive influences of the atmosphere.

The Iron Ore Shipments on Lake Superior may yet reach the high figure of 1890, when 9,003,701 tons were shipped. The figures for this year to August 1 show that 4,085,577 tons have been shipped against 2,718,938 tons in 1891, and 4,033,000 tons in 1890. It is said that the early opening of navigation and moderate freight charges have had more to do with this large shipment than the actual demand of the trade.

* Custom milling is a great feature of the mills of this section. The charges are \$7.50 per day per battery of 5 heads, that to include the concentration of the pyrites and their shipment on board the railway ear. For small lots the rates are \$15 per cord for milling and \$2 per cord for concentrating. The last charge varies from \$1 to \$3, according to the percentage of pyrites in the ore.

† In this district there is a curious custom of measuring ore by the "cord," a unit derived from firewood measurement, and equal to 8 x 4 x 4 ft. or 128 cu. ft. A cord of mill ore is equal to 7½ to 8 tons, and one of smelting ore to from 9 to 10 tons.

THE PHOSPHATE BEDS OF THE MALTESE ISLANDS.

Written for the Engineering and Mining Journal by John H. Cooke, B. Sc., F. G. S.

The recent discovery of phosphate beds that has been made in the Maltese Islands has been attracting considerable attention, and, as no details of the beds have yet been published, the following notes bearing on the subject may not be without some interest to the readers of the Engineering and Mining Journal.

The Maltese group, consisting of the islands of Malta, Gozo, and Comino, and of several smaller islets, is situated in the central Mediterranean, at a distance of about 60 miles to the south of Sicily, and 200 miles to the north of Cape Calipia, the nearest point in Africa.

On the north it is connected with Sicily by means of a sub-aqueous plateau, the depth of submergence of which does not exceed 70 fathoms in any part; while to the south, a deep channel having an average depth of 230 fathoms, and which is 190 miles long, and from 60 to 100 miles wide, forms a well defined natural boundary between it and Africa.

Malta is the principle island of the group, both in size and commercial importance; its area being 95 sq. miles, while that of Gozo is but 50 sq. miles. Gozo is more fertile, however, a fact that is attributable to the greater diversity that exists in its surface contour, whereby the numerous phosphatic nodule seams that are interstratified with its rocks, are exposed along the slopes of most of the hills and valleys throughout the island.

The topographical aspect of Gozo and of the western half of Malta is that of a series of plateaus, and flat topped, conical hills that rise to an average height of 550 ft. above the sea level, and that expose around the sides either a clean cut vertical section, or a softly rounded talus. The late Admiral Spratt, Prof. L. Adams, Prof. T. R. Jones, as well as many other eminent Mediterranean geologists, were divided as to whether the Maltese Islands should be considered as being of Eocene or of Miocene age. Latterly, the subject has received most careful attention at the hands of Prof. Thos. Fuchs, the Vienna geo-

logist, Dr. John Murray, and Mr. J. W. Gregory, F. G. S. It has been concluded that the lower half is certainly of Oligocene age, and most probably Tortonian, whereas the upper half, in which the phosphate seams occur, is certainly Miocene, and finds its equivalent in the rocks of the Vienna Basin.

The following table will best illustrate the order in which the Maltese beds occur, and the relation that they bear to the Austrian series:

The Maltese Islands.				Vienna Basin.	Series.	Period.
No.	Formation.	Thick-ness.	Sub-division.			
I.	Upper coralline limestone.	250 ft.	{ a. Compact rock. b. Soft and por's. }	Leithakalk.	Tortonian...	Miocene.
II.	Green-sands.	50 ft.	{ a. Compact sand. b. Friable sand. }	Greend Schichten.	Helvetian	"
III.	Blue clay.	30 ft.	.....	Schlier.....	Langhian...	"
IV.	Globigerina limestone.	200 ft.	{ Various colored beds interstratified with seams of phosphatic nodules. }	a. Horner... b. Sotzka Schichten.	"	"
V.	Lower coralline limestone.	250 ft.	{ Semi-crystalline and non-cryst'line limestones. }	.....	" .....	Oligocene.

The five formations which constitute the Maltese series vary lithologically and chemically; but as it does not lie within the scope of this article to discuss the differences in detail, I shall limit my remarks to pointing out those only that have a direct bearing upon the subject which I am now treating.

From the following table, which has been compiled from analyses made by Dr. John Murray, Prof. J. Blake, and myself, it will be seen

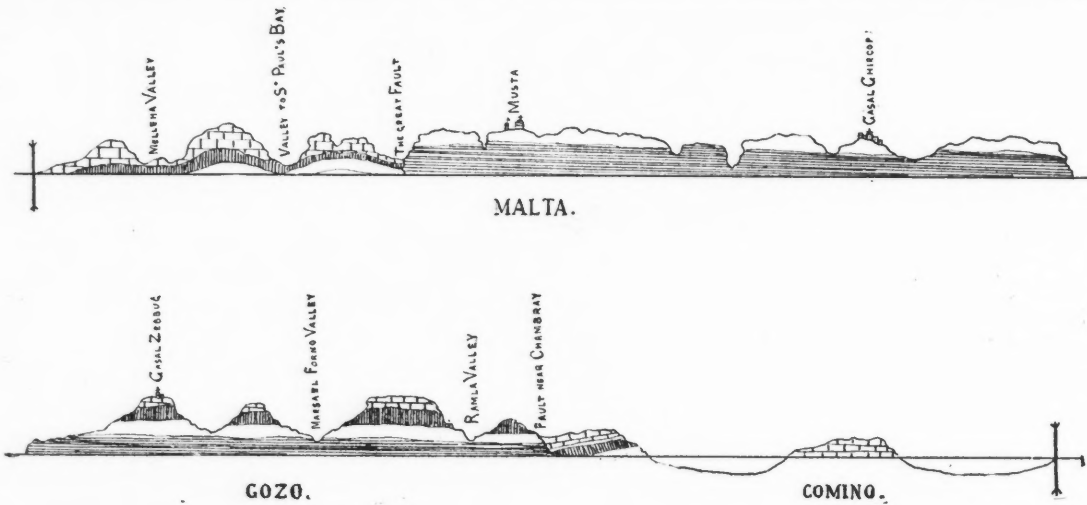
that all of the beds contain phosphoric acid combined with calcium, in a greater or a lesser degree:

- Bed I.—Upper coralline limestone contains traces to 2% of P₂O₅.
- Bed II.—Greensands contain traces to 6%.
- Bed III.—Blue Clay contains traces.
- Bed IV.—Globigerina limestone { a. Limestone 2% to 3%.
b. Nodules 10% to 18%.
- Bed V.—Lower coralline limestone, traces.

In the greensands and the Globigerina limestone, the highest percentages were found in the black or chocolate colored nodules that were interspersed through the beds. These nodules occur very irregularly, and in but small quantities in the former, so that, from a commercial point of view, the formation needs no further consideration. In the latter, they are found in great abundance, occurring in well defined layers that are both uniform in their thickness and unvariable in their distribution. As it is, therefore, with the Globigerina rock that we shall have to deal, a few details relative to its principal characteristics will be necessary before proceeding to consider the phosphate beds that lie interstratified with it.

This formation, as the section (Fig. 1) shows, extends throughout the length and breadth of both islands; but in the northwestern and western parts, it is overlain by the clays, greensands, and upper coralline limestone, which effectually mask it over a considerable district; but its outcrops along the valleys and in the eastern parts of Malta extend over an area that is equal to about two-thirds of the total extent of the island. Between the Great Fault and Marsa Scrocco, an area of about fifty square miles has been planed down to such an extent as to remove from it a capping of deposits that had an average thickness of 350 ft. The surface contour of this district is, therefore, very irregular, and, as the Globigerina itself has in many cases been also subjected to considerable erosion, the upper phosphate seams contained in it have either been broken through and swept away, or, owing to their more compact nature, they have been left exposed as the surface layer.

In Gozo, the denudation of this formation has not been so extensive, and, therefore, it exhibits a more uniform thickness in that island than



SECTIONS OF THE MALTESE ISLANDS.

it does in Malta, and appears as the surface deposit over an area equal to about one-fifth of the total area of the island, the greater part of which is found in the bottom of the valleys, and at the bases of the hills. Proceeding now to consider the various divisions of the formation, we find that they consist of at least four varieties of rock, each of which varies considerably in its lithological characters, and interstratified with which is a series of seams of phosphatic nodules, which is very irregular in its occurrence, and very extensive in its distribution. The following table shows the order in which these beds and their intercalated layers of phosphatic rock occur:

Formation.	Sub-divisions.	Thickness.
Globigerina Limestone.	a. A grayish, fine grained freestone.....	15 to 20 ft.
	b. First seam of nodules.....	1 ft.
	c. A white compact freestone.....	40 to 50 ft.
	d. Second nodule seam.....	2 ft.
	e. Irregular bands of nodules.....	Variable.
	f. A soft blue limestone.....	50 ft.
	g. A white limestone with chert nodules.....	100 ft.
	h. Fourth nodule seam.....	3 to 4 ft.

In Gozo, and in the western half of Malta, the whole series crops out along every valley and hillside; but where the Globigerina rock itself serves as the surface deposit, the intermediate layers of limestone often mask the nodule beds in such a manner as to completely hide all evidences of their presence. Where this occurs the soil is usually very poor and unproductive.

The first nodule seam is very variable in its nature and thickness in different localities. For example, in the southern coast exposures, it does not average more than 9 in. in thickness, and the nodules are sparsely distributed; but in the cliff sections, in the center of the island, it has an average thickness of 1 ft. 3 in., and the nodules are numerous and compact.

The second seam is more regular in character, and extends uninterruptedly throughout all of the plateaus. In this respect it offers a marked contrast to seam one, which often thins out and disappears.

It comes of an aggregation of irregularly shaped nodules, intermixed with which are considerable quantities of the phosphatized remains of molluscs, corallines, echinoderms, crustaceans, sharks, whales etc., the whole being firmly bound together by an interstitial cement, composed of foraminiferal and other calcareous matter, similar to that of which the overlying beds are made up. It has an average thickness of 2 ft., and is very uniform in its general physical and chemical aspects.

The limestone matrix in which the nodules are imbedded is of a very soft nature, and readily disintegrates before the constant and insidious attacks of the Scirocco. The nodules contained in it, therefore, drop out in considerable quantities, and, falling to the bases of the escarpments, they become incorporated with the soil of the fields, either by the transporting agency of rain, or by the hoe of the husbandman.

The third seam is the poorest of the series. Its nodules are small in size and few in number, and those that do occur are very irregularly distributed. Sometimes this seam consists of two or more thin layers of nodules, none of which exceeds three inches in thickness. At Madalena, near the northern extremity of the Great Fault, three of these small layers are distinctly shown, the upper of which disappears in an easterly direction beneath a talus of soil, but to the west it thins out and breaks off abruptly. It seems to be a purely local development, as it does not occur in any other part of the island.

Between these and the next, or lowest layer, is a bed of rock varying in thickness from 50 to 80 ft., underlying which is the fourth and most important seam of the series. The organic remains contained in it are more varied, and the nodules are larger, richer, and much more numerous. It averages 3 1-2 ft. in thickness, and ranges from 3 to 4 1-2 ft. The nodules are of a dark chocolate color, and they generally present an exceedingly wrinkled and coriaceous appearance. Most of them con-

The origin of the nodules themselves is more obscure. Alluding to this subject, Dr. John Murray remarks that the nodules found in the Malta beds are precisely similar to the phosphatic nodules that were dredged from modern sea beds during the "Challenger" cruise, and he is of opinion that both were formed in situ at the bottom of the sea.

The following table gives the result of the analyses of the Maltese nodules, made in 1890 and 1891 by Dr. John Murray and Prof. J. F. Blake, respectively:

Dr. Murray's Analysis.		Prof. Blake's Analysis.	
Sulphate of Lime Ca SO ₄	2.26	Sulphate of Lime.....	1.97
Carbonate of Lime Ca CO ₃	47.14	Carbonate of Lime.....	51.12
Phosphate of Lime Ca ₃ 2 PO ₄	38.34	Phosphate of Lime.....	31.66
Alumina, Al ₂ O ₃	5.98	Alumina, etc. (indeterm.).....	10.59
Oxide of Iron, Fe ₂ O ₃	trace	Silica.....	3.83
Residue.....	6.08	Moisture.....	.87
	99.80		100.00

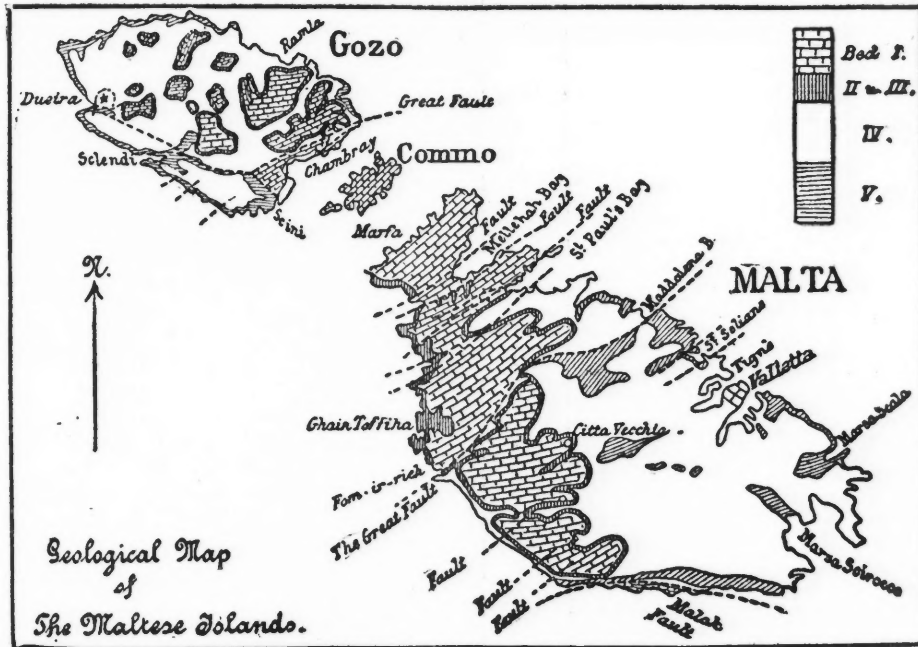
In Prof. Blake's analysis the nodules and equal parts of the interstitial cement were taken, whereas Dr. Murray took the nodules only.

The following is the analysis of the interstitial cement:

Carbonate of Lime (Ca CO ₃).....	86.89
Phosphate of Lime (Ca ₃ 2 PO ₄).....	1.24
Sulphate of Lime (Ca SO ₄).....	0.07
Alumina (Al ₂ O ₃).....	1.28
Insoluble in dilute H Cl.....	9.87
	99.15

From these tables it will be seen that the amount of phosphoric acid contained in the matrix is so small, and the amount of calcium carbonate is so great, that were the matrix not separated from the nodules it would render worthless these products.

This separation may, however, be easily effected, owing to the soft



tain one or more fossil organisms, around which the phosphate of lime seems to have segregated.

The numerous sections that I have examined under the microscope* show the larger nodules to be almost entirely made up of the casts of Globigerina intermixed with a few other foraminifers.

The phosphatized remains of larger organisms are also extremely abundant. Estimating the area of Malta at 95 sq. miles, and the average thickness of the seam as being 3 ft., we obtain as a result 7,945,344,000 cu. ft. of phosphate rock.

Supposing that not more than one thousandth part of this to be available for quarrying purposes—a very modest estimate, indeed—we should obtain 7,945,344 cu. ft., which at 25 cu. ft. to the ton would represent 317,813 tons of workable phosphate rock in the one seam only.

The origin of these nodules and the phosphatization of the limestone in which they are imbedded afford us a problem for solution that is of great interest. The occurrence in the phosphate beds and Globigerina limestones of two groups of echinoderms, that varied widely in their habits and characters when living, show that the Maltese area during the Miocene period was situated on the border line which divided the Mediterranean into two parts, each of which differed from the other in its physical aspects and conditions.

The alternate elevations and depressions to which the Maltese area was then frequently subjected, led to changes that caused the intermingling of the shallow-water fauna, that has migrated from the western, with a deep-water fauna that had migrated from the eastern basin.

Comparing these facts with those that the nodule seams themselves supply us with, it seems reasonable to suppose, that each seam marks a period at which one of these physical changes in the sea bed took place, and which, by altering the conditions most favorable to the then existing marine flora and fauna, it caused all organic life then existing in the waters to die off suddenly, and to leave their remains distributed in thick, regular layers over the sea bed.

It was from these remains that the phosphoric acid was derived, which now enters so largely into the composition of the rock.

* I owe much to the courtesy of Dr. John Murray, who kindly lent me the numerous sections of Malta rocks that he had had prepared.

character of the limestone in which the nodules occur. Several experiments have already been made on a small scale, the modus operandi of which was as follows:

Masses of the phosphate rock were broken up into small blocks averaging from 3 to 4 in. in diameter, after which they were transferred to a kiln for calcination. When ready, the material was subjected to a powerful stream of water and screened, by which means the nodules were obtained free from the matrix, the former remaining in the sieve, and the latter passing through it as a quicklime. The nodules were then dried and crushed into a fine powder, which on analysis gave 41.5 per cent. of phosphate of lime, with no trace of iron, and but slight traces of alumina.

This shows the Malta rock to be of but a low or medium grade, yet it is much richer than the Belgian phosphates that are now in the European market, and that do not average more than 29 per cent. of phosphate, with 63 per cent. of lime.

It is, therefore, hoped that some means may be devised whereby the Maltese phosphates may be put on the Italian market, as there is at the present time a brisk demand in that country for a low-grade rock.

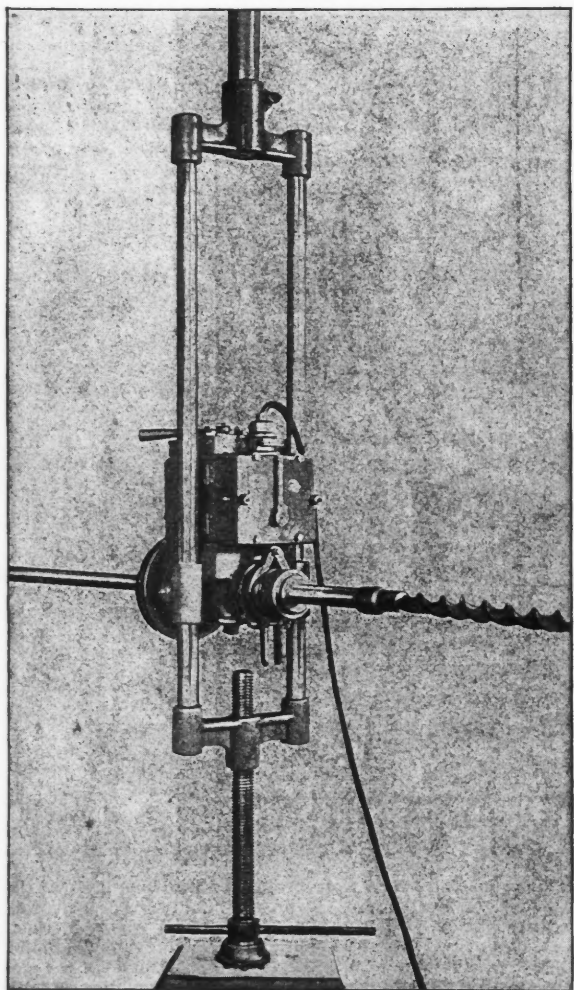
French Exposition of 1900.—The French *Journal Officiel* has published a decree ordering a Universal Exposition of Arts and Manufactures to be opened in Paris, May 5th, 1900. It would seem from this announcement that France has decided to have a universal exposition every eleven years, for there was one in 1867, 1878 and 1889. The decree states that the exposition of 1900 will be fully representative of the art and philosophy of the nineteenth century.

Galvano Plating with Iron and Nickel.—Mr. Capelle, the French chemist, recommends, according to *L'Industrie*, the following solutions for plating with iron and nickel: Solution 1st, for iron. Take equal parts of pure sulphate of iron and of the sulphate of iron and ammonia, to which is added 1 in a 1,000 of sulphate of magnesia. The solution should have a strength of 18° to 20° B. Solution 2d, for nickel. To a solution of sulphate of nickel and ammonia, 2/3 of sulphate of magnesia and 2% of boric acid is added, and the solution is then neutralized with carbonate of magnesia. The bath should have a strength of 8° to 10° B.

ROTARY ELECTRIC COAL DRILL.

We herewith illustrate a rotary electric coal drill made by the Thomson-Houston Electric Company, of Boston. It is intended for boring the holes necessary for breaking down the coal after the under cut has been made. The drill is driven by the armature shaft of an electromotor, which is inclosed within a dust and waterproof iron casing. The drill is automatically fed into the coal, and there is a safety clamp for stopping the feed when any hard substance is encountered. The drill is mounted on trunnions and a central pivot bolt, so that the angle of operation can be varied within a considerable range without the supporting frame being moved. The drill is also capable of vertical adjustment amounting to 2 ft. 6 in., which is obtained by unclamping the nuts or the side bars. The screw at the bottom of the frame has a run of 15 in. The rectangular frame is 4 ft. high by 1 ft. wide over all. The machine is extremely handy and serviceable.

Fortis Powder is an explosive which is claimed to have an explosive force approaching that of dynamite and to be less inflammable and



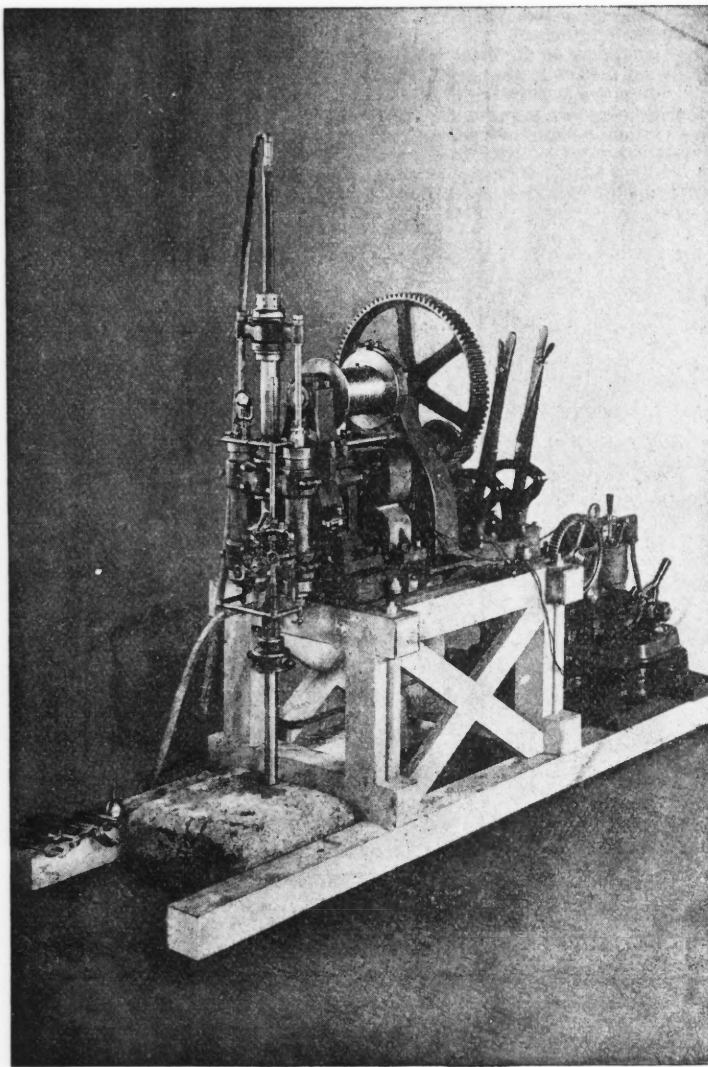
IMPROVED DIAMOND DRILL.

less dangerous than ordinary black powder. The principal constituents are nitrate of potash or soda 65%, sulphur 13%, charcoal 12% and binitrobenzene 10%. Spent tan bark is used to replace the charcoal in part. The mixture is reduced to powder with great care. To granulate it or put it in cartridges, it is warmed in a basin heated by steam, water being added if necessary. To the above base, nitroglycerine, picrate of potash or picrate of ammonia may be added to give it greater force. These substances make the powder pasty, which aids the formation of cartridges. This powder is patented in Germany under the name Polynitro-cellulose and in France as Benzoglyceronitrite.

The proposed **Simplon tunnel** will be, when finished, says the *Journal des Mines*, the longest tunnel in the world. According to the plans adopted it will have a length of 20 kilometres (12.43 miles). The Northern half of the tunnel will have an inclination of $1\frac{1}{2}$ per 1,000; the Southern an inclination of $6\frac{1}{2}$ per 1,000. The method of excavation will be the same as that on the Arlberg tunnel. The workshops which will be established upon the right bank of the Rhone will cost 4,000,000 francs. The motor force used will amount to 1,560 H. P., of which 520 will be used in drilling, 780 in ventilating, and 260 for electric lighting. This power will be obtained from the Marsa River. The tunnel is estimated to cost, when completed, 80,000,000 francs, or \$1,240,000 per mile. The present wagon road over the Simplon, which rises to a height of 2,000 metres, was constructed by Napoleon at the commencement of this century, and cost 18,000,000 francs. From eight to nine hours are required to pass it; the tunnel when completed can be passed in three-quarters of an hour.

AN IMPROVED ELECTRIC DIAMOND DRILL.

The General Electric Company has just perfected a new diamond drilling machine for which is claimed a superiority over any others yet devised. The drilling apparatus is shown mounted upon a heavy timber frame. Behind this is the electric pump supplying water to the drill. It also supplies water to the hydraulic cylinders of the drill as well as the drill rod. Valves are set in the pipes leading to the pressure cylinder, so that any desired pressure may be put upon the drill bit. A valve also controls the supply of water to the drill rod, the pump being able to supply an ample amount to keep the cutting rim of the bit perfectly free and clean. The drill head is arranged with a heavy hinge, so that when uncoupled from the drill rod it may be swung away from the frame and allow room for hoisting the drill rods from the hole. Here, also, the machine shows its complete fitness for this work, for at the top of the main standards of the iron frame is arranged a small hoisting drum, which by a simple movement of a lever is geared to the armature of the motor, and the machine is ready, with the aid of a block and fall, to hoist out its own drill rods. In the experiments which were made with one of



ROTARY COAL DRILL.

these drills at the factory the drill under a pressure of 120 lbs. per square inch on the pistons of the pressure cylinders bored through 12 inches of solid blue granite in three minutes. Under a pressure of 75 lbs. the drill cut through 12 inches in six minutes, and at a pressure of 35 lbs. it cut through the same amount in about 16 minutes. These cutting speeds were made with the drill bit and short barrel coupled directly to the drill head, and will necessarily be slightly diminished when a considerable length of rod has been driven into the rock, but they are sufficiently conclusive to show that the even motion of the electric motor makes it the ideal power for this work.

A Great Engineering Work Abandoned.—In consequence of the fall in the price of silver the Saxon government has decided not to complete its work on the Rothschoenberger Stollen, which if completed would be the longest tunnel in the world. The tunnel was intended to drain the water from all the Freiberg silver mines and carry it to the Elbe. The main tunnel is 9 miles long, but its branches add 21 miles to its length, making the total extent almost 30 miles. The tunnel was begun at State expense in 1844 and after thirty-three years of continuous work it was opened in April, 1877.

Hundreds of men are thrown out of employment by the government's decision, and it is expected that many more will follow, as the Freiberg mines can not be worked without great loss at the present price of silver. Work in the mines was begun in 1200, and since that time the mines have produced 9,500,000 Prussian pounds, equal to 151,860,500 troy ounces of silver.

GASOLINE HEATING AND BRAZING FURNACE.

The furnace manufactured by the Clayton & Lambert Manufacturing Company, of Ypsilanti, Mich., is designed for use in melting metals, heating soldering iron, or for brazing purposes. The company claims that it will melt 120 lbs. of solder in 20 minutes; and that it will heat a soldering iron more quickly than is possible in any other form of furnace. The burner is movable, and can be used equally well in any position. The device is sold at \$16 net.

COMBINED SWITCH AND FUSEBOX FOR RAILWAY LIGHTING CIRCUITS.

The accompanying cuts illustrate a very neat combination switch and fusebox for use on the lamp circuits of electric street railway cars.

Fig. 1 shows the box complete with the switch handle in place; Fig. 2 the body of the box with the rotating ratchet switch in the lower compartment, and Fig. 3 the reverse side of the cover with the terminals and thumb screws for the metal fuse.

The fuse is placed on the inside of the cover, so that in replacing a blown-out fuse the fuse terminals are taken completely out of the circuit, and it is utterly impossible to receive a shock in any way.

The brass clips on the cover fit over the two contact posts in the box, and serve the double purpose of holding the cover in place, and forming part of the circuit.

As will be seen the box is divided into two parts, the lower holding the switch and the terminals for the wire, and the upper part consisting of a shallow recess into which the thumbscrews on the inside of the cover project. In the back of the box behind this upper recess is a magnetic blow-out, which breaks the arc formed when the fuse is blown. In general appearance the box is quite ornamental, and with its great superiority over other and older devices for the same purposes, it should commend itself strongly to all street railway men. It is manufactured by the General Electric Company.

THE MUNKTELL GOLD EXTRACTING PROCESS IN HUNGARY.*

There are many chlorination processes at present in use at the gold mines of Hungary, but the only novel one is the Munktell process as carried out at Brade and Boitzas. The ores treated at the Brade works con-

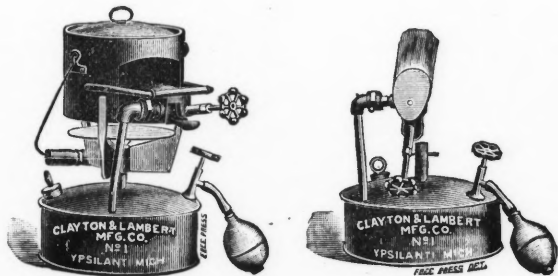
signed for the removal of sulphur and the precious metals are reduced in the usual way.

Per ton of ore the expenditure of material is as follows: Fifty kilograms of salt, 0.80 gulden (a gulden nominally equals 48 cents); 46.6 kilos of sulphuric acid, 2.98 gulden; 1.3 kilos of chloride of lime, 1.82 gulden; 6.7 kilos of hyposulphite of soda, 0.93 gulden; 3.3 cubic metres of fuel, 4.0 gulden; labor, 1.8 gulden; amortisation, 0.80 gulden. The total cost is 13.13 gulden per ton of ore treated.

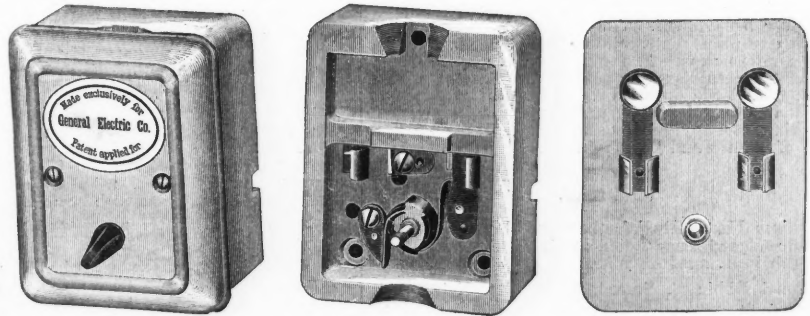
It has been found that an appreciable quantity of gold volatilizes during the chloridizing with salt in the furnace, and, therefore, it is proposed to build seven story furnaces. Such furnaces are used in the Biotza works and also at Rodizo, near Milan, Italy. At the latter works the roasting is carried on by the heat of the combustion of the sulphur contained in the ore.

[If this is the newest chlorination process in Hungary what must the old processes be? This seems antiluvian to Americans.—EDITOR ENGINEERING AND MINING JOURNAL.]

Annual Report of the Lake Superior Iron Company.—According to the annual report of this company for the year ending April 30, 1892, the gross receipts for the year, exclusive of sales of real estate, aggregated \$1,352,415.14, and the total expenses \$1,083,581.70. The net profits, after crediting the depreciation account with \$59,427.94, to offset reduction in valuation of two of the company's steamers, are placed at \$287,723.90. This does not represent the difference between receipts and expenses, but it may be explained by the system of bookkeeping. The profits were not encouraging. While \$6 per share was paid but \$4 per share was loaned, the balance of \$2 being paid from former earnings. A balance sheet of April 30, 1892, makes the following showing: Real estate and mining property, \$1,285,527.87; steamships (four), \$580,000; steamship building account (two steamers), \$200,178.26; iron ore, \$587,797.37; agents' inventory, \$48,123.68; notes and loans receivable, \$144,934.27; accounts receivable, \$15,193.99; cash, \$184,002.66; suspended debts, \$131.22; Messard Iron Company stock, \$100; Atlantic Iron Company stock, \$100; rents earned, \$200; interest balance favor of company, \$1,918.27; office furniture, \$300; steamship operating (new account), \$8,081.38; total, \$3,056,588.97. Notes and accounts payable, including taxes, pay roll, mine debt, etc., \$92,513.95; advance payments for ores undelivered, \$182,854.28; capital stock, \$1,800,000; new stock subscriptions, \$298,825; re-



GASOLINE FURNACE.



COMBINED SWITCH AND FUSE BOX.

tain in addition to gold, iron pyrites, barytes, zinc-blende antimonial minerals and argentiferous galena, and also in some cases calcite and carbonate of manganese. After concentration the ores contain 36 grams of gold and 170 grams of silver per 1,000 kilograms and 36% to 40% of sulphur. In the first place, the ores are roasted in double hearth reverberatory furnaces in order to free them of sulphur.

The roasting process takes about 28 hours. When complete the chloridizing of the ore is commenced. For this purpose about 5% of salt is thrown upon the incandescent ores in the furnace. After the reaction has gone on for four hours the charge is removed and thrown into pits dug in the earth and lined with brick. The pits are 1 meter broad, 2 meters long and 0.75 meters deep, and are covered with iron sheets. When the ore becomes cool it is charged into cars and carried back to the works and brought to the chlorinating vats. But before the chlorinating process is commenced, the salts, which might hinder the exhaustion of the gold, are removed from the ore by oxidation.

The vats are 3 metres broad, 5 metres long and 0.75 metres deep. The charge is ten tons and forms a layer not exceeding 0.5 metre deep. The vats are made of wood and are lined with lead. A false bottom is placed 8 to 10 centimetres above the true bottom, and it is bored with holes 1.5 centimetre in diameter. A layer of quartz is placed over the false bottom to form a filter and upon this layer the chloridized ore is charged. The ore is first washed from 17 to 18 hours with warm water, of which 14 cubic metres are required per 10 metric tons of ore. By this means the chlorides of copper and zinc and about 25% of the silver are removed. The remaining silver is extracted by lixiviation with a weak solution of hyposulphite of soda, a process which lasts about 13 to 14 hours and consumes about nine cubic metres of 2% solution.

Lastly, the ore is washed with a weak solution of sulphuric acid to remove the oxides of iron. This process lasts for 30-60 hours and consumes 15 cubic metres of solution. The wash liquors are all carried into separate vats.

The chlorination of the gold is then begun. For this purpose a weak solution of bleaching powder and sulphuric acid is simultaneously run into the vats. As the reaction between these solutions takes place slowly, three whole days are consumed in the chlorination. The charge is then washed well with cold water and the resultant solution collected in a separate vat. The gold and silver are precipitated from their solutions by means of a solution of sulphide of sodium and the precipitate is dried and pressed into briquettes under a filter press. The briquettes are

serve guaranty, \$253,326.13; depreciation, \$416,940.83; profit and loss, \$12,128.78; total, \$3,056,588.97.

Separation of Metals by Electrolysis.—Dr. Vortmann, in *Chemiker Zeitung* gives a method for the electrolytic separation of metals which may prove of considerable metallurgical value. According to his experiments, substances held in suspension in an electrolytic bath, such as hydrate of iron, or the sulphides of copper or lead, do not exercise any influence upon the separation of the metals dissolved in the bath; thus, nickel and cobalt could be quantitatively separated by an excess of ammonia from the solution in which iron is precipitated and held in suspension.

His experiments show that zinc cannot be separated from iron in this manner, but the same result is obtained by transforming the iron into a ferrocyanide by the addition of cyanide of potash and an alkali. It was found that such a solution with an excess of alkali was not decomposed by an electric current even though this continued to act during several days. In the electrolytic estimation of zinc, cobalt and nickel, it is best to add alkaline carbonates and a little tartrate of potash to the solution. In the presence of caustic alkalies, the nickel cannot be separated in the metallic state; it remains dissolved or is precipitated as oxide or as carbonate. Upon this fact Dr. Vortmann has based a process for the separation of cobalt from nickel. In order to avoid the formation of hydroxide of cobalt at the positive pole, a small quantity of iodide of potash is added to the solution; the separation obtained is complete. Iron can be separated completely from its alkaline solution, to which tartrate of potash has been added, but, as has been remarked by Mr. Edward Smith, the metal deposited always contains a little carbon, as when iron is precipitated from a tartrated ammoniacal solution; consequently, the results obtained are a little too high, say, from .05 to .25.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office:

- TUESDAY, AUGUST 23D, 1892.
- 481,187. Mining Machine. George F. Myers, Pittsburg, Pa.
 - 481,438. Coal or Ore Jigger and Washer. Sebastian Stutz, Pittsburg, Pa.
 - 481,442. Chill for Casting Car Wheels. Cornelius A. Treat, Hannibal, Mo., Assignor to the C. A. Treat Manufacturing Company, same place.
 - 481,454. Brick Machine. Thomas T. Wood, St. Joseph, Mich.
 - 481,474. Magnetic Separator. Gordon Conkling, Glens Falls, N. Y.
 - 481,482. Well Drilling Machine. James W. Draper, Frederick Draper and Walter Ellsworth, Alden, Ia.
 - 481,499, 481,500. Process of Treating Sulphide Ores of Zinc and Lead. George T. Lewis, Philadelphia, Pa., and Carl V. Petraeus, Camden, N. J., Assignor to the Western Patent Company, Denver, Colo.
 - 481,532. Pulverizer. George H. Smith, Chicago, Ill.

* Abstract from article in the abstracts of papers published by the British Institute of Civil Engineers.

PERSONALS.

Dr. Willis E. Everette, of Tacoma, Wash., has just returned from Alaska, where he went to examine mining property for Eastern capitalists.

Mr. Leo Von Rosenberg, of 35 Broadway, New York, left for Rico, Colo., on the 23d inst., to complete his work in connection with the preparation of an annual report on the Enterprise Mining Company's property at Rico.

Prof. Henry Crew, who, ten months ago, went from Haverford College Observatory to the Lick Observatory, intending to make certain spectroscopic observations, has resigned, to accept the chair of physics at the Northwestern University.

The Executive Committee of the Cataract Construction Company has held several important meetings recently, relative to the best method to be adopted to bring electric power to Buffalo from Niagara Falls. Mr. George Forbes, an English electrical engineer of England, and Mr. W. C. Unwin, hydraulic engineer, are in consultation with the committee.

The fifth annual meeting of the Geological Society of America was opened August 15th at Rochester, N. Y., with G. K. Gilbert, of the United States Geological Survey, in the chair. Among the prominent men present were: Henry M. Ami, of the Canada Survey; John C. Banner, of Leland Stanford University; E. W. Claypole, Buchtel College, Ohio; James Hale, State Geologist, Albany; C. W. Hayes, United States Geologist; C. H. Hitchcock, Dartmouth College; Joseph LeConte, California; M. J. McGee, United States Survey; R. A. F. Penrose, Arkansas Survey; Warren Upham, United States Survey; David White, United States Survey; R. D. Salisbury, Professor-elect University of Chicago.

At the June meeting of the Engineers' Club of Cincinnati the subject, "What to Do with Mill Creek and Its Valleys," was taken up and discussed by Col. W. L. Robinson in a short paper. The valley is being slowly filled as new streets are made and improvements established within its limits, but no definite action looking to its ultimate availability has ever been taken. The valley within the limits of the city proper is a mile or more in length and a half a mile or more in width and from 20 to 40 ft. below the established grade of the streets in that vicinity, and the question as to the ultimate use to which it would be put has been and is a problem requiring for any purpose the expenditure of millions of dollars and years of time.

OBITUARY.

William Henry Rushforth, a well-known inventor of railroad appliances, died at Rutherford, N. J., on the 30th inst., aged 48 years.

Colonel Ebbin C. Smeed, of Omaha, Neb., chief engineer of the Union Pacific Railroad, died at Philadelphia, Pa., on the 24th inst., aged 62 years. Col. Smeed was formerly engaged in the iron industry in the Lehigh Valley.

Colonel Stephen States Lee, one of the oldest railroad constructors and coal mine operators in the country, died on the 22d inst. at Baltimore, Md., aged 80. Colonel Lee was born in South Carolina and was educated as a civil engineer. In 1835 he directed the construction of the Providence division of the New York, Providence & Boston Railroad. Upon the completion of that work he was sent, in the winter of 1836, to examine and report upon the projected railroads in Illinois, with a view to determine the advisability of Eastern capitalists contracting to build the roads and deliver them to the State completed. Mr. Lee reported that the scheme was inadvisable at that time, and the panic of 1837 justified his views. During the Dorr rebellion in Rhode Island Mr. Lee served as engineer on General McNeil's staff with the rank of major. In 1843 he began the developing of the Cumberland coal fields. He became the agent for the Mount Savage Coal and Iron Company, which was owned by English capitalists. In a few years his business assumed immense proportions. In 1869 he placed his business in the hands of his two sons and went to Europe, establishing himself at Tours, France. He was the owner of the Seranton Coal Mine and leaves a large fortune.

SOCIETIES.

The American Chemical Society held its fifth annual meeting at Reynolds Laboratory, Rochester, August 15th. The meeting was not so largely attended this year as usual, and papers presented were mostly short and on purely technical themes.

The Society for the promotion of Agricultural Science held its thirteenth annual meeting under the direction of its president, Professor I. B. Roberts, of Cornell University, at Rochester, N. Y., August 17th. The Association of Economic Entomologists met also, with Professor J. A. Liffner, State Entomologist for the State of New York, in the chair. This is the fourth annual meeting of the society. Among those present were Professor Forbes, of Champaign, Ill.; D. S. Kellicott, of Ohio; A. E. Weed, of Mississippi; E. B. Southwick, of New York; T. D. A. Cockerell, of Jamaica, all of these holding official State positions.

The forty-first annual meeting of the American Association for the Advancement of Science opened at Rochester, N. Y., on August 17th. The president, Professor Albert B. Prescott, of Ann Arbor, Mich., introduced the president-elect, Professor Leconte, of California, and made a short address. Professor Leconte then spoke for a short time, and was followed by Dr. E. M. Moore, the president of the local committee, in an address of welcome. The Hon. Richard Curran, the bright Mayor of the city, extended the hospitalities of the city. Dr. David J. Hill, president of the University of Rochester, also gave an address of welcome. The address before the section of mathematics was by Professor Eastman, of Washington, on a "Neglected Field of Fundamental Astronomy;" before the section of biology by Vice-President Professor Gage, of Cornell, on "Comparative Physiology of Respiration;" before the section of geology by Professor Williams, recently called to Yale to succeed Professor Dana, on "The Scope of Paleontology and Its Value to Geologists;" before the section of chemistry by Professor Albert Springer, of Columbus, O., on "The Micro-organisms of the Soil." During the evening session Professor Prescott, the retiring president of the association, delivered the annual president's address, taking as his theme "Immediate Work in Chemical Science."

INDUSTRIAL NOTES.

The Illinois Steel Company has signed the Amalgamated Association's scale for its North Chicago mills.

Several of the iron mills at Youngs own, O., lighted their fires on the 22d inst., and it is thought that within a week all the mills in Mahoning and Shingo valleys will have resumed operations.

The Gadsden (Ala.) Pipe Works are running on full time. The Gadsden Iron Company will close down its large furnace in Gadsden, Ala., on September 1st, thereby throwing a large number of men out of employment.

The Westinghouse Electrical Company is making two types of generators, together with a vertical Corliss engine, wherein the fly-wheel of the engine fans the revolving field of the dynamo. The Switch and Signal Company is enlarging its plant at Swisvale, Pa.

The Berlin Iron Bridge Company, of East Berlin, Conn., will design and build the new buildings for the New Orleans & Carrollton Electric R. R. Company, at New Orleans, La. The power house is 83 ft. wide by 130 ft. long, with brick walls and an iron roof. The car shed will be built entirely of iron, 130 ft. wide by 140 ft. long.

A report has been made to the Treasury Department showing that the production of tin and tinned plates proper in the United States for the year ending June 30th was 13,646,719 lbs., while there were manufactured and tinned articles of American sheet iron and steel amounting to nearly 5,000,000 lbs. The net imports amounted to 251,854,367 lbs.

The Peacock & Thomas furnace, at Lancaster, Pa., has shut down, owing to the condition of the iron trade, and it is doubtful if it will ever again be put in blast, being a furnace of the old style. For a long time past it is said that its owners have not been making any money. A hundred and twenty-five men, who were employed at the furnace and the ore mines at Quarryville and New Providence, will be thrown out of employment.

The experiments undertaken on behalf of the Bradford (England) Corporation to demonstrate the efficiency of electric energy in propelling tram-cars up steep hills have been brought to a successful conclusion, and arrangements are now being made for the construction and equipment of two miles of line where the average rise in the total length is 1 in 24, the road in many places being as steep as 1 in 13.3.

Professor Silvanus Thompson has found that if a copper wire be covered electrically with an infinitely thin coating of zinc, until it looks like a zinc wire, and then be held in the air, the zinc will gradually disappear by sinking into the copper. The operation may be repeated several times. Although the wire then contains more metal than before, it is a worse conductor of electricity.

Since 1880 the government has issued an annual report of strikes. Between 1796 and 1880, according to the report, 1,491 important strikes occurred, besides many times that number of small ones. From January 1, 1881, to December 25th, 1886, there were 3,902 strikes, involving 1,323,203 men and 22,304 business firms. In the last named year were 1,900 strikes that caused a wage loss of \$2,858,191 to the men and \$3,000,000 to the employers.

It is said that the Anhydrous Ammonia Motor invented some years ago is being experimentally tried on the railway from Manchester and Bolton, England. The estimated cost of running cars with it is a little less than 3 cts. per mile. The apparatus consists of a small box in which are placed in proper proximity jars of water and of ammonia, so arranged as to accumulate and direct the energy generated as described. The result is a power sufficient to run a train of cars.

According to the statistical year book of Canada for 1891, which has just been issued, that country has now 14,009 miles of railway in operation, an increase of 853 miles over the previous year. The train mileage for the year was 43,399,178; the number of passengers carried was 13,222,568; the tons of freight carried were 21,753,021. The gross earnings were \$48,192,099, and the working expenses \$34,960,449. All these figures were considerably larger than the previous year, there being an increase of 401,306 in the number of passengers and of 965,562 tons in the freight. The railway mileage is now double what it was in 1881.

Over 200 men from the Twenty-ninth street Carnegie mills, Lawrenceville, Pa., quit work August 25th in sympathy with the locked out men. Ever since the strike began the forge and bumper departments at the lower mill have been in operation. Part of the time double turn was run in these departments. The skilled men who went out this morning do not belong to any union, but are fully in sympathy with the strikers. They have not been required to work any of the steel or iron made by the non-union men, and had no reasonable opportunity to show their attitude in the late trouble until yesterday. At the Thirty-third street mill all departments are running full.

Owing to the increased demand for their elevating and conveying machinery, as well as their detachable and special chains, the Jeffrey Manufacturing Company have found it necessary to carry a stock of chains, sprocket wheels, boots, and other specialties in the East, and have, therefore, arranged for office and warerooms at No. 163 Washington street, New York City, between Cortlandt and Liberty streets. They will occupy their new quarters September 1st, and will be pleased to have their old friends, as well as all users of machinery in their line, call upon them at the above address. The works of the Jeffrey Manufacturing Company are located at Columbus, O., and cover five acres, most of which is covered by substantial buildings necessary for the manufacture of their machinery. They have now in course of erection a three-story, brick shop, 50 x 140, and an additional warehouse 40 x 170. This is one of the best equipped plants in the West for special machinery of their manufacture.

The fusion of the Giant Powder Company and Safety Nitro Powder Company, of San Francisco, Cal., has been effected at last. The destruction of the works of the former company a few weeks ago helped to bring about the action. The details of the consolidation are as follows: A new corporation will be formed on a basis of 20,000 shares, which may be afterward increased as is deemed best. Of the 20,000 shares the Giant Powder Company is to receive 14,400 shares, or share for share of its present capital stock, and the Safety Nitro Company, which now consists of 25,000 shares, is to receive 5,500 shares of the new capital stock. The remaining 100 shares are to be placed in the treasury of the new company. The par value of the new stock will be \$100 per share. All the property, stock, machinery, real estate, franchise, etc., of both the Giant and Safety Nitro Companies are to be deeded to the new company. The manufacture of explosives will be conducted upon the large tract of land near Sabrante now owned by the Safety Nitro Company. This tract embraces 320 acres, and the capacity of the works will be largely increased in the near future.

A curved railroad spike, designed and patented by Mr. S. C. Hill some two years ago, is now being put on the market. The spike is made with a continuous curve on the inside, and in driving the point is started a little away from the flange of the rail. The theory is that when the curved part of the spike begins to bear against the flange the point will take an outward path and the spike will be kept in close contact with the flange. The consequence is that up to the last blow there is a firm bearing of the spike against the flange, and the spike is in position to resist direct pulling much better than the ordinary spike. These claims were borne out by a number of tests that were made. The spike was put in the hands of the C. H. Dunham Railway Equipment Co., but owing to the failure of that company there was a delay in placing it on the market. The inventor has now made contracts with the Tudor Iron Works, of St. Louis, and the Tredegar Works, of Richmond, giving them the exclusive right to manufacture and sell in the United States and Canada. Probably it will be pushed now with such energy that its real merits will soon be a matter of actual demonstration.

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.

- 2,759. A bed lathe, 16-ft. bed and 36-in. swing; also a 24-in. back gear power feed drill press. Mississippi.
- 2,760. Machinery for mining, hoisting, washing and drying phosphate rock; complete plant, including engines, boilers and pumps. Florida.
- 2,761. Rolls, screws, jigs, etc., for cleaning and separating lead and zinc ores. Tennessee.
- 2,762. 16 hand dump carts or wagons to dump both sides. Virginia.
- 2,763. 2 miles 16-lb. rails or a relaying plant. Virginia.
- 2,764. A 100-H. P. locomotive boiler complete. Virginia.
- 2,765. A new 10,000-gallon wooden tank. Virginia.
- 2,766. A 100-H. P. return tubular boiler complete. Virginia.
- 2,767. Iron roofing and siding. Alabama.
- 2,768. A 10-ton ice machine. Virginia.
- 2,769. A second-hand diamond drill. New York.
- 2,770. A few 36-in. narrow gauge cars with wheels 8-in. face for wooden rails. Alabama.
- 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.

GENERAL MINING NEWS.

ALASKA.

From a late issue of the Juneau City "Mining Record" we take the following concerning the mines of Alaska: "On the placer claim of the Nowell Gold Mining Company the gravel bank is about 60 ft. in depth, and the two giants are kept going day and night. A mill is being erected as rapidly as possible, and when completed will be supplied with float quartz from the Basin, which will be transported through the 3,300-ft. tunnel until such a time as a tramway leading from the mill to the quartz claims on the mountain can be constructed. This tramway will be built on the Bleichert system and will have a capacity of 15 to 20 tons of ore per hour. With this tramway in operation the company will be enabled to work its several quartz claims at a low cost, and will also afford employment to a large number of men. The company has an abundance of water power to run a mill of large capacity. At the Queen mine near Wrangel a big strike is reported in the shape of a ledge 200 ft. wide, which has been traced for a distance of 1,500 ft. The ore is said to be of good quality. John Ellis and W. Whitaker have returned from the Yakutat country, where they had been mining and prospecting for more than a year. They met with little or no success. The "Mining Record" says: "Since the black sand excitement in 1888 the Yakutat country has been fairly well prospected, yet no discoveries have been made, and it is safe conclusion that it is not a mineral country." Considerable development work has been done on the Montana Boy's group of claims at Berner Bay, and it is probable that a mill will soon be placed on the property. The Sumdum group of mines has been sold by Silvester McMahan to a company in Spokane Falls and the first payment made. Mr. F. Carrell, a mining engineer, of Spokane Falls, Wash., reported on the property. The Eastern Alaska Mining and Milling Company, operating in Silver Bow Basin, has changed its name, and is now known as the Juneau Mining and Manufacturing Company. It is reported that improvements are being made which will greatly facilitate the work and reduce the expense in taking out ore. Hereafter an air compressor will be used to run the drills. The mill was started about the 1st of August. According to the same journal silver ore has been discovered in the country between Berner Bay and the Yukon. Messrs. Miller and Lawrence, who were recently prospecting in that district, have discovered a ledge of asbestos near the bay. In the Sheep Creek district a large quantity of ore is being mined and sacked for shipment. The ore in this district averages quite high in both gold and silver. Most of the properties are owned by men of limited means who cannot afford to work them on an extensive scale, but by shipping the ore in small quantities they do manage to develop their properties and at the same time realize good wages."

Alaska Treadwell Gold Mining Company.—During July this company crushed 18,825 tons of quartz, yielding gold to the value of \$59,500; 436 tons of concentrates quartz produced \$16,420; total, \$75,920; total expenses, \$25,500.

(From our Special Correspondent.)

The Omlak Gold and Silver Mining Company.—The property of this company is situated at the head of the Fish River, and in May, 1891, an expedition left San Francisco for the purpose of developing it. Captain A. M. Brown, U. S. A., and five men belonging to this expedition have just returned after passing 14 months on the edge of the Arctic circle, and after having suffered considerable hardship. In 1883 fifteen of the stockholders of the company started north for the purpose of working the mine but they never returned; their boat was upset on the Yukon; all perished. No further attempt was made to work the property until Captain Brown enlisted Eastern capitalists in the scheme, when the expedition of last year was fitted out. Up to that time about \$100,000 had been taken out of the mine, all of which was expended in development work. Of the two shafts sunk one is 70 and the other 35 ft. in depth. An incline also had been carried down 110 ft., out of which 40 tons of ore had been taken. On the other side of the mountain upon which the mine is situated there is a 335-ft. tunnel, but Capt. Brown did not attempt to extend it, as he found that it ran parallel with instead of cross-cutting the ledge. The mineral is an argenteriferous galena, the ore averaging 85% lead and 135 oz. of silver to the ton. On the opposite side of the mountain, however, there has been uncovered an 8-ft. ledge of ore which runs as high as 60% in antimony. Lack of supplies compelled Capt. Brown and party to return, the U. S. revenue cutter Bear relieving the little band just when it had been decided to start for Kodiak, 1,800 miles away. Next spring another expedition will go north to carry on the work which is being prosecuted under such great difficulties.

CALIFORNIA.

Butte County.

Rainbow.—In this mine at Yankee Hill 20 men are employed and the quartz mill runs night and day. The rock is said to be paying well.

Mono County.

Bulwer Consolidated Mining Company.—The latest official weekly letter from the superintendent says that 135 cars of ore were extracted from the stopes and put into the main ore chute. They have crushed to date 700 tons of Bulwer ore and 135 tons of Summit ore. Total since starting the mill, 835 tons. Average battery sample for the week, \$33.35 per ton; tailings, \$9.28 per ton. The mill has been kept running steadily.

Nevada County.

W. Y. O. D. Gold and Silver Mining Company.—The annual meeting of this company was held in Grass Valley on the 15th inst. The following were elected directors: Louis B. Parrott, of San Francisco; J. R. K. Nuttall, of San Francisco; Frank Spurling, of Portland, Ore., and Joseph and Jacob Weissbein, of Grass Valley. The following officers were then elected: Louis B. Parrott, president; Joseph Weissbein, vice-president; Jacob Weissbein, secretary, and the bank of Weissbein Bros. & Co., treasurer.

San Diego County.

Gold Prince Mining Company.—This company has been incorporated to mine in the Ferris gold field. The officers are: H. A. Thompson, president; Robt. L. Binkford, secretary, and R. A. Falkenberg, manager. The company's property is an extension of the Good Hope mines, and is said to have been developed to a considerable extent by its former owner, Mr. Doran. The new company has commenced work already.

Shasta County.

The developments being made at Quartz Hill, Old Diggings, says the Shasta "Democrat," are of an encouraging character. There has been exposed a body of ore which is said to run from \$40 to \$50 in free gold alone.

(From our Special Correspondent.)

Texas & Georgia Mines.—One of the owners of these properties, R. G. Hart, has just made some tests of the MacArthur-Forrest process. Concentrates from the Texas mine, assaying \$213.40, yielded 65.8% in 48 hours. There was no perceptible loss of cyanide, the strength of the solution being 2%. A test made by him with ore from his Bullychoop property was as follows: The ore, assaying \$51.48 per ton, yielded \$49.78 in 4 days and 12 hours, with 2% solution and a loss of 4½ lbs. of cyanide to the ton, or a cost of working the ore of nearly \$3 per ton. Mr. Hart has been satisfied with the tests made and is sending to the Bullychoop mine eight 10-ton tanks and four 2,500-gallon and one 3,500-gallon tank for the solution.

COLORADO.

Boulder County.

The long-lost Stewart placers have been found, according to a dispatch of August 25th, near the head of Wilson Creek. The report created the wildest excitement at Spar City, and in a short time 25 men were equipped and sent to the place.

Boston.—The water is being pumped from the property. The new owners are preparing for energetic work.

El Paso County.

We extract the following items of Cripple Creek news from our exchanges: The owners of the Golden Geyser have ordered 10 additional stamps for their mill, which will increase its capacity to 20 stamps. The mill has more ore now than it can handle, and even with its additional capacity it is doubtful whether it will be able to handle the ore that will be hauled to it because of its convenient location. The Plymouth Rock shipped a carload of sorted surface rock to the Omaha & Grant smelter. This ore has been treated in the mills at Cripple Creek with very good returns. The Shasta Mining Company has secured a mill site on Barnard Creek near the Joe Johnston mine, and is negotiating for the purchase of a mill, which will be erected and put to work on the company's own ore as speedily as possible. From a shipment of 22 tons to the Omaha & Grant smelter the Pharmacist management received a check for \$1,568 last week. This is a fair indication of the value of the Pharmacist ore; the mine is now a small but steady shipper. About 80 men are now employed on the Buena Vista, engaged entirely in development work. Assays taken from the different workings in the mine are said to average \$80 in gold to the ton. There are 20 men at work in the Gold King under the supervision of S. C. McDonald. They are sinking the shaft. The Gold King makes occasional shipments of ore taken out in the course of development, but it is not a regular shipper at present. The Blue Bell people are still at work on their tunnel, and expect shortly to strike the main vein, which has been followed for some distance along the surface of the ground. The surface rock in this vein runs well.

Hinsdale County.

The Lake City correspondent of the Denver "Times" writes as follows: So far only one property about Lake City has shut down. The property referred to is the Vermont, owned by an English syndicate, with T. E. Schwarz, of Denver, as superintendent. It appears certain that the mine was not shut down because it did not pay expenses. The upper workings of the mine, a drift, contains a large scope of stoping ground with a large lead of gray copper ore running at least \$250 per ton. The Vermont, it is understood, will be operated again in a short time. During the past week several bonds and leases on properties have been taken, and operations will begin on most of them at once. For a good round sum the Black Swan was bonded to C. M. Webb and W. A. Benjamin, of Creede. The mine is situated in Burrow's Park, owned by James Deck and John Mourer, and contains a strong lead. The only development on the property is a shaft down 15 ft., from which the lessees took out samples of the ore that gave from \$105 to \$195 per ton in silver. The new operators will begin drifting on the vein. J. W. Deck also bonded the Little Giant mine in the same district to W. G. Benson, and work has already been begun. Mr. Deck located this claim early last season, and has done one assessment on it—a 10-ft. face. The vein of the Little Giant is very strong, and already shows 18 in. of solid lead in the surface workings. Assays show 17 oz. of silver and 72% lead.

Champion, Lake City.—The machinery for this mine is all on the ground, and it is being put in position as rapidly as possible. The owners will begin sinking a new shaft on the vein as soon as their plant is in working order.

Golden Fleece.—This mine is running a force of about 15 men and regular shipments are being made. The ore bodies throughout all the workings are said to look well and work progresses night and day.

Hope, Lake City.—This mine is owned by Dr. D. S. Hoffman, J. Henderson and others. Recently, they cut the vein at the end of a 500-ft. tunnel, at a depth of over 300 ft., and struck a large body of ore. They have driven through about 15 ft. of ore and quartz, but have not yet reached the hanging wall. The ore is gray copper, with particles of bismuth impregnated in the quartz. It is the intention of the owners to operate the mine on an extensive scale.

Ute & Ulay Mines, Limited.—About 240 men are employed on the Ute & Ulay mines, and regular shipments of from 3 to 5 carloads of concentrates are made daily. The ore in the bottom of the Ulay shaft is said to have increased in richness during the past month. The shaft is down nearly 900 ft. and contains 10 levels, all of which show, it is reported, good bodies of ore.

Varden Belle.—At this mine a force of about 10 men is sinking on the vein on a good body of ore. The shaft is down about 50 ft. and a drift will be started soon.

Lake County.

According to our exchanges, there is considerable placer mining being carried on at present in California Gulch; some 50 men are working along that line and are said to be clearing up about \$400 a day.

Washington.—Some promising development work in Virgin ground is now going forward in this mine, Robinson district, while several carloads of high grade sulphides have recently been shipped.

Wolcott Mining Company, Leadville.—This company's property, embracing considerable ground, has been leased and will be developed by two shafts, which will assist materially in emptying the Leadville basin. The work will be carried on within the city limits. This shaft, says the Denver "Times," has been started and will be sunk 210 ft. into a known

body of mineral and a carbonate chute, and will give the management a large amount of stoping ground. The iron chute, which is 80 ft. thick, directly overlies a large body of galena at the second contact, but will not be touched until the shaft is sunk to the contemplated depth. When this is done the old body of ore can be developed by means of stopes. The Lucy B. Hussey shaft will then also be started up and the ground developed from both directions. It is also the intention to start in about three months another new shaft within 75 yds. of the present Sixth street shaft, which, beside aiding to drain the Wolcott ground, will also be of great benefit to the Sixth street people.

(From our Special Correspondent.)

Grey Eagle Consolidated.—The Sixth street shaft was recently greatly damaged by a sudden inflow of water, from the 410-ft. level down, and it has now been found necessary to replace the old timbers with much larger ones and to enlarge the shaft to 5x15 ft. in the clear from that point. This work has now progressed about 50 ft. and will be completed in 30 days. In the meantime, the water level is being held near the bottom in order to assist pumping at the Penrose, where a new station is being cut at a corresponding level, into which will be placed a compound pump of large capacity. The water level in the Penrose is yet over 100 ft. from the bottom, but the water is now under easy control and can be lowered at will. But little is being done at the Bohn shaft, and the water has been allowed to rise to its highest point and will remain there for a short time, until the Sixth street and Penrose are ready to begin sinking their shafts. From recent results it has been found that the Bohn shaft is entirely unable to cope with the water until the other two shafts have been sunk to its depth.

Leadville Tunneling and Drainage Company.—The long tunnel started about two months ago from Malta, three miles west of this city, by this company, which is to drain all the mines in Carbonate, Fryer and Yankee hills, is being driven rapidly, and is now probably 100 ft. under ground. The mouth of the tunnel is situated on slightly sloping ground, and it was necessary to erect a covered archway nearly half a mile in length before reaching the hills beyond. A large force of men is at work, which is being added to constantly, and the estimated period for the completion of this enterprise is placed at 2½ years.

Wolcott Mining Company.—The entire ground of this company, extending from Fryer Hill west to the South Park depot in this city has been leased to several well known mining men of this city, and a new shaft has already been started on East Sixth street, which has now attained a depth of about 40 ft. Machinery has also been obtained and will be in position during the following week. It is known that this shaft will break into a good 80-ft. body of iron ore at a depth of 120 ft. before any efforts are made to ship, as at that depth the shaft will have penetrated a 12-ft. body of fine carbonates underlying the iron. These calculations are made from an examination of the ore bodies in the Far Down workings, a few feet to the north, where the ore was worked to the Wolcott line a few months ago. This new shaft lies about 200 ft. east of the carbonate fault, and from it and the Lucy B. Hussey shaft all that ground east of the fault is to be developed. Another shaft is to be started in a short time within half a block of the Sixth street shaft for the purpose of draining the Wolcott ground. As this pump shaft will be located almost in the center of the great Leadville basin, much assistance will be rendered therefrom to the Sixth street, Penrose and Bohn shafts in solving the difficult water problem. This new shaft is also to be used in developing all that portion of the Wolcott ground lying west of the carbonate fault.

Ouray County.

American Nettie Mining Company.—The superintendent of this company, writing under date of August 19th, says that the ore shipments continue at the rate of about three cars a week, and from present indications he sees no reason to lessen this output. The various stopes in the mine, especially stope A, continues to produce largely, and the output is only limited by the capacity of the ore house. Stope A is hardly as large as at last report, but it nevertheless shows a continuous ore body. The developments in stope D are fully as favorable as could be expected, and prospecting and extracting of ore continues, the grade being about the same as it has been. The electric power station is now fully completed, and as soon as the balance of the machinery arrives a final trial will be made. In addition to the above the company received returns from two cars of copper ore netting \$2,491.11 and a car of lead ore going \$1,117.68, making a total of \$3,608.79.

Pitkin County.

Roaring Fork Mining Company, Aspen.—This company has acquired from the city the right to mine under certain streets. The consideration is a bonus of \$1,500 and 5% royalty on all ores. The lease extends for 20 years.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending August 20th have been: From Sheridan Con., cars, 37; Smuggler-Union, 38; Hector (Cimarron), 1; Boomerang, 1; total, 77 cars; total shipped since January 1st, 2,002.

IDAHO.

Boise County.

Lost Pilgrim.—This mine, the property of J. H. Hawley, Harry Behr and C. Rhoades, has been sold. A 45-ft. shaft has been sunk on the Lost Pilgrim and two tunnels, one 75 ft. and the other 45 ft. in length, have been run on the ledge, which is 5 ft. wide. These developments have shown it to be a good prospect, the ore carrying silver and gold in large quantities. The Payette mine, owned by W. H. Savage, of this city, has been sold to Montana capitalists. This mine has a 45-ft. vein on the surface of free milling ore.

Custer County.

Cinnabar Mining Company.—The mill is now treating ore by the cyanide process. It is proposed to increase the capacity if the process is a success.

Idaho County.

It is said that a marble quarry has been discovered in this county, in the northern part of the State.

Kootenai County.

Black Wouder.—The main vein measures 27½ ft. between walls of porphyry quartzite. It carries silver-galena and carbonates of lead and silver. The ore assays on the surface from 10 oz. to 45 oz. in silver, and will require concentration.

Lemhi County.

Twin Brothers.—This mine and the Sucker are being operated by Harvey & Co. A 10-stamp mill and vanners are also operated by this company. Three shifts are worked on mine and mill. The present run is an experimental one with the cyanide process. The ore is an iron sulphuret, carrying gold and the results as yet are only partially satisfactory.

Owyhee County.

De Lamar Mining Company.—The following shows the work performed during the month of July: No. of dry tons crushed, 2,050; assay value of pulp—gold, \$18.09; silver, \$20.71—\$38.80; percentage saved, 82.22%. No. of dore bars produced, 28 bars. No. of oz. of fine gold produced, 1,380 oz.; No. of oz. of fine silver produced, 38,814 oz.; value of the gold produced, \$27,607.57; value of the silver, \$32,992.58; surplus on bars sold, \$2,396.16—\$62,996.30. Ore shipped during the month, \$19,000; miscellaneous receipts, \$661.28—\$82,657.58 total. Deduct expenses for the month, including labor and supplies, \$36,625.35; estimated profit for the month, \$46,032.23.

Pittsburg Mining and Milling Company.—In 1890 and 1891 a cross-cut was run 1,200 ft. to cut the Black Jack ledge. An air drill plant was erected at the mouth of the tunnel. The Black Jack ledge was cut 945 ft. in, but was comparatively barren. A drift was started south on the Black Jack vein, and it was in this, 312 ft. from the cross-cut, and 1,257 from the mouth of the tunnel, that rich ore was struck a few weeks ago. The drift has been run 70 ft. further, and the ore continues in a large body and even richer than when first opened. For 70 ft. now there is from 6 to 18 in. of ore, valued at \$200 per ton. The ore that is now being sacked for shipment has an average assay value of over \$600 a ton, it is claimed. The ledge is between solid granite walls, and the present workings are 800 ft. below the surface. The 10-stamp mill erected in 1891 will now be remodeled to adapt it to the change in the character of the ore, which is slightly base.

Shoshone County.

Mineral Point.—A great deal of work has been recently done on this mine, says the Spokane "Review." It was bonded in March from William Osborn and others to St. Paul parties for \$40,000. Two tunnels have been worked. Tunnel No. 1 is now in near 250 ft., from which all the ore that has been shipped was taken. This amounted to four carloads, which ran an average of \$70 to the ton. Tunnel No. 2 is in 150 ft., with a 25-ft. cross-cut where the ledge has been struck lately. It shows some very good ore. Tunnel No. 3 was started within the last month. From it ore is being taken daily and sacked for shipment.

ILLINOIS.

Peoria County.

Wesleyan City Coal Mine.—The Wesleyan City coal mine caved in on August 22d. Several miners are imprisoned in the mine.

KANSAS.

Cherokee County.

During the week ending August 20th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,127,630; rough ore, pounds sold, 2,145,290; zinc ore, pounds sold, 666,090; lead ore, pounds sold, 375,760. Sales aggregated a total value of \$15,781.

MICHIGAN.

Copper.

Calumet & Hecla Mining Company.—The work of removing the old shaft at No. 5 has begun. One of the new pattern will be erected in its place. The railroad will pass to the east of the rockhouses. Another departure in the laying of tram roads underground has been introduced. The old method was to lay stringers in the direction of the track and tie them together. They often spread and contract, making the tramping hard. Now they will lay ties and ballast the road as in the ordinary railroad. This is partly a preparation for the introduction of the electric haulage system, which it is expected will be experimented on soon.

Franklyn Mining Company.—The lower openings in this mine toward south, and not far from the boundary with North Quincy, are reported rich. The lode is said to be a tangle of small masses and barrel copper, says the Torch Lake "Times."

Osceola Mining Company.—This company has declared a dividend of \$1 per share, or \$50,000, payable September 1st, 1892. This is the second dividend of the year and make the total amount of dividends paid to date \$1,647,500, as against an assessment paid in of \$480,000.

Tamarack, Jr., Mining Company.—The Red Jacket "Conglomerate" says: "The miners say that they can hear the drills and the shots of the miners in the north drifts of No. 5 Calumet. If this is the case the two drifts must be not further than 1,000 ft. apart, and are estimated to be within 800. The best drifts in the mine are said to be at No. 5 Calumet. The company has ceased sinking No. 2 shaft at a depth of about 3,015 ft., and drifts are being opened on the lode, which is as yet unprofitable. Latest advices are that No. 1 shaft south is rich. The lode in No. 2 has widened, but shows no improvement in grade. To the first of the month 108 ft. of drifts has been opened in No. 2."

Iron—Gogebic Range.

Zenith Iron Company.—This company made its first shipment at Two Harbors early in the month. The Vermillion "Iron Journal" says advices from the East do not indicate the extent of the probable shipments, but a considerable amount will be sent out.

Iron—Marquette Range.

Champion Iron Company.—Orders have been received at this mine, which closed down recently, to ship 275,000 tons of ore to Cleveland at once, as an early sale of that quantity of ore is very probable. Should the negotiations which are now pending prove successful the mine will be reopened at once with a full force. In the meantime all of the employees that have been laid off are privileged to leave their families in the company's houses, rent free, while they themselves may be employed elsewhere, the object being to give the men this inducement to return to the employ of the Champion when the mine reopens. To move the 275,000 tons of ore to Cleveland about 60 men will be employed on the stockpiles, and probably 40 men will be retained as caretakers and pump men about the mine.

East New York Iron Company.—A fire broke out in shaft No. 1 of this mine on August 13th. This shaft, as well as No. 2, was closed and water pumped into the mine during the day. The mine had been idle for a number of weeks on account of labor troubles, according to the Ishpeming "Mining Journal," and no one was in the mine. On the following Saturday, August 20th, B. C. Sullivan, the pump foreman, and two miners descended the shaft to examine the condition of the mine pumps. One of the number was overcome by foul air and the others lost their strength. They managed to regain the shaft, from which they were rescued with great difficulty.

Iron—Menominee Range.

The ore body at the 12th level of West Vulcan, on the south vein, is fully as long as it was at the 11th level, and is of somewhat better grade. At the 12th level on the north vein, a large stope is being opened out, which is somewhat irregular in size and shape and contains numerous bunches of rock. The 16-in. plunger pumps which were in the burnt shaft are being taken out, and will be put into the new shaft at the 12th level to replace the 12-in. ones now in use. The amount of water has materially increased in this mine, owing, perhaps, to the cutting of the north vein at the 11th and 12th levels.

An option on the "Edwards forty" has been acquired by a syndicate of Florence capitalists. A number of test pits are being made. Some good ore has already been encountered.

Chapin Iron Company.—This company is employing about 1,100 men. There has lately been a lessening in the cost of production. The engine for the pump is in place, but it will require about three months before the entire plant will be ready. The first of the large tanks or cisterns was sent underground recently. This pumping engine, with the shaft, hoisting plant, etc., will cost the company about \$375,000. The shaft was sunk by means of the freezing process.

Commonwealth Iron Company.—The present daily output from this mine is from 1,400 to 2,000 tons, and will probably average 1,600 tons. Various explorations by shaft and diamond drill are being conducted under the direction of Superintendent Davidson, and one shaft is producing fine ore at a depth of 50 ft., says the Norway "Current." The Davidson mine is not now worked, and at the old Commonwealth the force is small.

Dayton Mining Company.—The property now being operated by this company was formerly known as the Buckeye. It was considered to be a promising mine, but owing to lack of funds explorations were abandoned. It is now being explored by D. W. Ingersol.

Mansfield Iron Company.—The season's shipments to date amount to 45,000 tons, with 6,000 tons on the stock dock, says the Crystal Falls Diamond Drill. It is understood that the company has contracted to ship 80,000 tons of fine Bessemer ore; there yet remains nearly three months in which to send out the 35,000 tons necessary to complete the contract. Mining is being done in the fourth, fifth and sixth

levels. The fourth level is at a depth of 368 ft. Stopping has been carried 184 ft. to the south and 200 ft. to the north. The fifth level is 75 ft. below and has been stoped south 120 ft. and the same to the north. Stopping is now going on at a rapid rate. The shaft is down 443 ft., and is in the hanging wall to the west of the vein, and a cross-cut from the shaft to the ore is in and stoping commenced. It will be continued down to the seventh level as soon as possible. The level will bring the workings of the mine to a depth of 518 ft. At the south end of the workings in the fourth level a drift starts in and runs 160 ft., the entire distance being in merchantable ore. From the north end of the workings a drift is in 60 ft., also in good ore. The width of the ore vein in the drifts has not yet been proved. There is a strong demand at the mine for another shaft, and possibly two, and it is among the probabilities that a shaft will be sunk to the north of the present shaft.

Penn Iron Company.—The total output from the mines of this company for the season is 230,000 tons, says the Norway "Current." At the East Vulcan the foundation for the pumping plant is nearly completed. At Southeast Vulcan the shaft is down to the 6th level and the station is about cut out. The ore body at the 5th level is growing small, and another month will about finish the stop. When the station is finished at the 6th level, a cross-cut will be driven north. The work at the 7th level of the Curry has so far not developed anything except non-Bessemer ore. The ore body at the 6th level has, so far, shown an increased length over the 6th level ore of about 175 ft.

MINNESOTA.

Iron—Mesaba Range.

Lake Superior Iron Company.—This company has developed another large mine. The vein has so far been shown up for a length of 1,600 ft., and for a width of 400 ft.

Little Mesaba Iron Co.—One pit is 60 feet deep and bottomed in soapstone. Another is the same depth and 15 feet in ore. Three others are down to the ledge and bottomed in ore. Samples from the bottom of the deepest pit run 60 per cent. in iron and .003 in phosphorus. The ore is very similar to that of the Chandler at Ely. Also three pits are sunk in section 7. They run from 22 to 28 feet in depth, and all have struck the ledge.

Iron—Vermillion Range.

Cincinnati Iron Company.—This company, according to the Vermillion "Mining Journal," filed with the Register of Deeds, on August 15th a lease of the property to Henry P. Barbour, of New York. The royalty is 55 cts. per ton, and minimum output is to be 150,000 gross tons. The lessee agrees to mine at a profit to him of 25 cts. a ton, as much as practicable, and is allowed the sum of 10 cts. per ton on all ore mined during seasons of 1893-4.

Virginia.—This mine was leased on August 12th to William H. Yimlin, of Milwaukee, James Sheridan, John B. Weiner and some others. An advance royalty of \$25,000 was paid. The lessees of the Virginia will work the mine at once.

MISSOURI.

The following is the report for July of Arthur Winslow, State Geologist.

Field work on the iron ore has been prosecuted in Howell, Douglas and Texas counties. This about completes the necessary examinations for the season. At the same time the preparation of the report on this subject has been vigorously pushed and is now nearly completed. The mapping of the crystalline rocks in the southeast has been continued and is now about finished; the report on these is also well advanced. The study of the clays has been continued in Ripley, Butler, Wayne, Jefferson, Iron and other southeastern counties, and in Warren, Montgomery, Jackson, Carroll and Audrain counties north of the river. Stone quarries have been examined in Caldwell, St. Louis and Ste. Genevieve counties. Detailed mapping has been prosecuted in Jasper, Newton and Polk counties, and about 130 square miles have been covered. In addition, the preparation of the zinc and lead report has been advanced in the office and much chemical work has been done in connection with this report. Work on the report on the paleontology of the State has also progressed. The Higginsville report and accompanying maps has been received from the printer and a large number of copies have been distributed. The reports next to be issued by the Survey will be the one on Iron Ores and the one on the Mineral Waters of the State. These are now being revised and prepared for the printer.

Jasper County.

(From our Special Correspondent.)

JOPLIN, Aug. 22.

Saturday evening closed an average week of productions in the lead and zinc mines of the belt. There was a decline of \$1 per ton in the price of zinc ore, the top price for extra high grade being \$24.50, while the average was about \$23 per ton. Lead ore declined 25c. per 1,000, and closed at \$23. The following are the sales from the different camps: Joplin mines, 2,062,580 lbs. zinc ore and 256,290 lead; value, \$29,614.25. Webb City mines, 445,650 lbs. zinc ore and 74,490 lead; value, \$6,838.25. Carterville mines, 970,080 lbs. zinc ore and 106,970 lead; value, \$14,030.25. Zincite mines, 175,240 lbs. zinc ore and 2,930 lead; value, \$1,607.65. Leligh mines, 43,440 lbs. zinc ore; value, \$541.30. Oronogo mines, 15,920 lbs. lead; value,

\$358. Carthage mines, 65,190 lbs. zinc ore, value, \$728.30. Galena Kansas mines, 686,090 lbs. zinc ore and 400,760 lead; value, \$15,781. District's total value, \$69,553.

The Rex. M. & S. Co. are steadily gaining on their output every week as their development advances, and last week produced 672,650 lbs. of zinc ore and 70,540 lead of this amount. One mine, that of Mr. F. M. Sharp, produced 167,000 lbs. zinc ore and 28,000 lbs. lead.

Captain Hemenway's Daisy mine on the Empire land is steadily improving, and last week produced a total value of \$2,013.55. The captain is still pushing development as rapidly as possible on his Columbian property on the Rex. M. & S. Co. land and will soon be in the list of producers.

MONTANA.

Deer Lodge County.

Anaconda Mining Company.—This company has instituted numerous improvements at Anaconda. The improvements in process of construction are the increasing of the capacity of the electrolytic copper refinery some 900 tons per month; increasing the capacity of the electric power necessary to operate the refinery, and the building of a new converter. The contract for the flume which will furnish the increased power has been given out for \$130,000. A station will be located at "Coyote" Brown's ranch. This station is expected to add from 900 to 1,200 H. P. to the refinery. The flume will be six or seven miles long, and from the power station the electric current will be transmitted through wires to the refinery. The water thus used is turned into Warm Spring Creek again and is used to generate the electric power at the present station, about four miles from Anaconda. It is understood also that the Anaconda company has located and purchased water rights at Race Track of Mr. Hardenbrook, and that another electric power station will be established on Race Track Creek and additional power will be conducted to the refinery on six or seven miles of wire and poles. These undertakings would appear to make it plain that the Three Forks refinery scheme has been abandoned.

Hope Mining Company.—The superintendent of this company's mine writes that in superintending a new street near the mine indications of ore were found upon the Caledonia, a patented Hope claim, 200 ft. by 1,400 ft. In developing this find the vein was discovered to be 5 ft. wide of good looking ore, assays from which went 10, 20 and 85 oz. of silver per ton. A drift will be made from a tunnel upon an adjoining claim to cut this vein at about 70 ft. The superintendent also writes that at the Jubilee the large body of ore is gradually getting smaller.

Jefferson County.

Indiana Mining Company.—At present this company is only operating the Stumbling Block mine, but it will shortly begin operations on an extended scale. The shaft on this property is being developed under contract to the 150 ft. level. A short time ago another contract was let for the further development of the mine to the 300-ft. level.

Madison Co.

Garnet Gold Mining Co.—In the tunnel which the company has been driving for the past 16 months on the Galena, the vein has been found and drifts are now being run in on a body of ore 15 feet wide. This tunnel is located 140 feet below the old tunnel in which the vein is 7½ feet wide.

Meagher County.

Paymaster.—Arrangements have been made to deepen the shaft 200 ft. This mine was abandoned a year ago after a fine hoisting engine had been put up and a contract let to do the work.

Queen Mining Company.—They are now cross-cutting on the 100-ft. level of the Queen and expect to strike the lead at a distance of 50 ft. They are cutting at the rate of 2 ft. per day. A tramway is in course of construction from the mine to the track, which will give easy facilities toward loading ore on the cars. They expect to be in a position to ship 14 cars of ore per week as soon as railroad communication is established. There are at present only 43 men employed, but in a short time the force will be largely increased.

Missoula County.

Iron Mountain.—This mine shipped 36 carloads of concentrates during July, which was the heaviest shipment made by this mine since the mill was put up.

Keystone & King Mining Company.—Shipments are now being made from the Keystone. The King and Queen mines, belonging to the company, are the properties, however, on which the future prosperity of the company is most largely based, says the Helena "Independent." The two claims join, and a 300-ft. shaft has been sunk at the common end line. The greater part of the depth shows ore in large quantities, and at the bottom the body is larger than at any point above. It is a concentrating ore. A cross-cut tunnel has been driven 900 ft. to connect with this shaft, and now lacks about 40 ft. of connecting, which will be completed in the next 15 days. A 100-ton concentrator will be erected, it is said.

Little Pittsburg.—This mine was recently bonded to Wm. Smead for \$40,000, a portion of the purchase money being paid down. Work has been commenced and will be prosecuted continuously. The present depth of the shaft is 175 ft., showing a continuous streak of ore from top to bottom. A carload of ore

shipped from this mine about four weeks ago ran 166 oz. in silver.

Park County.

Emma.—This mine has been bonded by A. M. Haverly for the Boulder Electric Power Company and others. The consideration of the bond is \$20,300. The purchasers have put a force of men to work developing the lead. As soon as sufficient development is secured to insure an adequate supply of ore, a stamp mill will be purchased by the company.

Emigrant Gulch.—According to the Anaconda "Standard," more systematic work is being done among the quartz properties of this camp this season than ever before, with the result that several exceptionally good strikes have been made. The Great Eastern mine and roads, so seriously damaged by high water in July, are again being put in shape by a large force of men employed by the owners of that property.

Henderson Mountain Milling Company.—Preparations for the new mill. Roads are being constructed from the proposed site of the mill to the mines of the Alice E company, the ores from which will be treated at the mill.

Silver Bow County.

Butte.—The double-handed drilling contest held during the session of the Mining Congress at Helena was won by Messrs. Burns and McKee, employees of the Boston & Montana Mining Company. The record made by them was 33 11-16 in. in 15 minutes in a hard granite rock. This record was, according to the Butte "Daily Miner," beaten at Butte on July 24 by Peter Feague and James Davey, who competed against the record made by Burns and McKee for a prize of \$200 offered by the Turn Verein of that place. The record made by these men was 38 9-15 in. in 15 minutes, also in a hard granite rock.

Butte and Boston Mining Co.—In regard to the report that the First National Bank of Butte had refused to cash checks of the Butte and Boston Mining Co., the Boston News Bureau says: "We can state officially that the bank reconsidered its action and did discount the draft on Boston and cash the checks drawn against it."

The draft was for about \$33,000, and in view of the fact that the company has over \$100,000 cash on hand, and has always met its obligations promptly in the past the first action of the bank is inexplicable.

The company is now producing at the rate of 1,000-000 lbs. per month with only three furnaces, and expects to get its whole plant running on or before Sept. 15, which will give it a capacity of 1,500,000 to 2,000,000 lbs. per month.

NEVADA.

Churchill County.

It is reported that the copper mine at White Cloud is about to be opened by New York men.

Douglas County.

The Genoa "Courier" says that a new placer discovery has been made near Signal Mountain, north-west of Pine Nut district. Twenty-eight placer locations have recently been filed with the County Recorder. The locators are principally Carson people.

Elko County.

(From our Special Correspondent.)

Commonwealth Mining Company, Tuscarora.—For some time past no developments of importance have been made in the mine, and the stock has sold as low as 5 cts. per share. Probably to rescue the stock from obliteration, and spur the investing public, the directors announce that in the south drift, from No. 1 raise, third level, some good ore has been exposed. Last week 5 cars of first-class ore, assaying \$175, and 42 cars second class, assaying \$28 per ton, were hoisted.

Dexter Gold and Silver Mining Company, Tuscarora.—A dividend (No. 2) of 30 cts. per share, payable at once, has been declared by the board of directors.

Nevada Queen Mining Company, Tuscarora.—There were hoisted last week and shipped to the concentrating plant 207 tons of ore, assaying \$24 per ton; also four tons of ore, assaying \$265 per ton.

Humboldt County.

Eagle.—According to the Reno "Gazette," the Eagle gold mine and mill in Spring Valley has been sold to California people, who expect by a new process of milling to get good returns from the ore. It has been impossible heretofore to work the ore profitably.

Lincoln County.

Magnolia.—Since this mine passed into the hands of J. C. Eames, James Hutchinson, John Sevenoaks and others, of San Francisco, the shaft sunk by the locators has been enlarged and timbered. After sinking it some distance deeper, a level was started to the north, and is now in the rich ore chute found near the surface. So far neither wall has been reached, the entire drift being in ore, but cross-cutting to the east and west will commence shortly. Recently some prospecting work was commenced on the surface about 600 ft. southwest of the main workings, on a small outcrop of an entirely different vein. At a depth of 8 ft. the vein had widened to 6 ft., and samples taken assayed 20 oz. in silver and \$6 in gold. The recent lot of ore shipped from the mine went \$774.50 in gold and 178 oz. in silver. A lot of second class returned \$125.20 in gold per ton and 74 oz. in silver. There is at present nearly 100 tons of ore on the dump.

Pioche Consolidated Mining Company.—According to the Pioche "Record" there has been a slight reduction in the working forces at the different mines belonging to this company, and the output of ore has been reduced, but all development work is being pushed.

(From our Special Correspondent.)

Quite a number of moneyed men have been recently investing in properties scattered through the Ferguson mining district. The April Fool claim, sold not long ago, made a shipment of 2 tons of high grade ore that ran 40 oz. in silver, 214 oz. in gold; and 5 tons of second-class ore which ran 265 oz. in silver and 9 oz. in gold. The ore was shipped to Salt Lake City, and the result was highly gratifying to the owners. Other mines in the district are showing up quite as well, hence the interest being displayed.

Storey County—Comstock Lode.

The following items are extracted from the latest official weekly reports of the superintendents: In the Ophir mine, the west cross-cut 84 ft. south of the Mexican line, on the 1,565-ft. level, is in 100 ft., and continues in a quartz formation, giving a low assay value. On the corresponding level of the Mexican mine, the north drift is in 224 ft., and continues in porphyry with some clay. On the 900-ft. level of the Union shaft the joint Union Consolidated and Sierra Nevada west drift has been extended during the week 23 ft.; total length west from the joint shaft, 2,300 ft. The face is in soft porphyry, with small stringers of quartz of low grade. East cross-cut No. 2 started by the Sierra Nevada Company from the Kenosha tunnel is in 106 ft. and the face is in porphyry. In the Utah Consolidated mine, on the 340-ft. level, west cross-cut No. 2 is in 172 ft. and continues in clay, quartz and porphyry. In the Andes mine east cross-cut No. 1, north on 420 level, advanced 19 ft. Total length, 55 ft.; formation porphyry and quartz. In the Best & Belcher mine, on the 900-ft. level, they have resumed work in the north drift started from east cross-cut 100 ft. from switch and extended the same a distance of 16 ft.; total length, 70 ft.; face in porphyry and stringers of quartz. On the Sutro tunnel level the joint north drift with the Savage Company has been advanced 20 ft.; total length, 497 ft.; face in porphyry.

Alta Mining Company.—At the annual meeting of the stockholders of this company, held at San Francisco, Cal., on the 18th inst., 93,686 shares were represented, and the following directors elected for the ensuing year: Monroe Thompson, R. N. Graves, S. G. Whitney, J. E. Jacobs and J. W. F. Peat. Mr. Thompson was chosen president. L. Osborn was re-elected secretary, E. D. Boyle superintendent. The secretary's financial statement showed an actual cash balance of \$19,638.

Consolidated California & Virginia Mining Company.—From the latest official weekly letter it is seen that there has been an increase of \$5.47 per ton in the average battery assays of the ore milled; an important development of good ore in the upraise from the 1,750 level in the south part of the mine, and the starting of a new west cross-cut on the 1,100-ft. level, midway between the old Con. Virginia shaft and the Ophir south line.

Occidental Consolidated Mining Company.—The latest official weekly letter says: "From the stopes on 350, 400 and 450 levels have extracted and milled 175 tons of ore of the average assay value of \$21.20 per ton as per battery samples."

Overman Mining Company.—The latest official weekly letter says: "On 1,300 level, northwest drift has been advanced 23 ft. through porphyry and quartz, the latter assaying from \$5.10 to \$8.66 per ton. Incline upraise from west drift above 1,200 level has been extended 40 ft. on a seam of ore of a fair grade. Have resumed work again in the face of the northwest drift on the 1,100-ft. level. Face is in porphyry and seams of clay and quartz. On third floor of 1,100 stopes, at a point 52 ft. north of No. 2 chute, have run a cross-cut to the eastward 17 ft. and cut about 10 ft. of quartz of a fair grade. At a point 250 ft. in on northwest drift, 42 ft. above 1,100 level, have started a west cross-cut and extended the same 10 ft. through porphyry and seams of quartz. On 600 level have repaired 468 ft. of the south drift. At a point 500 ft. south of the north line have started a west cross-cut from the main south drift." The face is in a mixture of porphyry and quartz.

(From our Special Correspondent.)

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

Mine.	Hoisted, tons.	Car. assay.	Milled, tons.	Battery assay.	Product, dollars.	Bullion shipped.	Bullion retained.
Con., Cal. & Va.	991	28.28	980	24.89	.....	115,819.84	14,200
Gould & Curry	277	23.79	.....	.....	.....	.....	.....
Overman	.....	.....	18	11	.....	.....	.....
Occidental	175	.....	175	21.20	.....	.....	.....
Potosi	368	26.72	400	24.53	.....	.....	.....
Savage	2608	23.53	545	20.50	7,533.75	4384 1/2 lbs.	.....
Y'W Jacket	.....	.....	.....	.....	.....	.....	.....
Belcher	.....	.....	.....	.....	.....	32,689.74	.....

¹ First shipment on August account. ²⁻³ Cars of ore. ⁴ Crude Bullion.

Gould & Curry Mining Company.—This week shipments have commenced to the Occidental mill. This ore has been obtained, for the most part, from the old stopes on the 200 and 400 levels.

Overman Silver Mining Company.—This has been the one company that has made it a habit to publish the car as well as the battery assays of the ore worked. A new departure has been made, however, this week that, it is to be hoped, will not be followed out. No report has been made of the amount of ore hoisted or the car assay. The mine is looking well, and on the third floor, 1,100 stopes, north of No. 2 chute, a cross-cut run to the eastward has cut about 10 ft. of fair grade quartz. On the 1,300 level also the northwest drift has been carried 23 ft. through porphyry and quartz, the latter assaying up to \$8 per ton.

Savage Mining Company.—A few weeks ago Directors Wells and Miles were appointed a committee to investigate how the mine might be worked more economically than heretofore, with a view to inaugurate a system of reform. The report of this committee was submitted to the board of directors this week, and it is a most interesting document. To a proper understanding of the situation it may be stated that, in a general way, while the Jones faction in the Savage directorate have not been quite at one with "Jim, the Reformer," and his following, they appear to have taken common ground against the D. O. Mills ring for the simple reason that while they have been at endless trouble, have incurred some expense, and have risked all the chances of legal suits instituted by irate stockholders to recover stolen bullion, the D. O. Mills contingent have been at neither trouble or expense, comparatively speaking, but have robbed the mining companies (practically speaking) by due process of law at their leisure. The report referred to states that the Comstock mining industry is suffering from "an incubus of monopoly and excessive charges." The railroad, lumber and water companies continue to maintain the same tolls as during the "bonanza" period, and attention is drawn to the fact that while the cost of milling has been reduced from \$14 to \$5 per ton, the latter being the present ruling rate, all other rates remain unchanged. This is, briefly, the cry made in the report, and in concluding it reads: "The mines of the Comstock cannot prosper under the double burden of enormous discount on silver and excessive charges on everything necessary for their operation. We suggest that the company, through its officers, join with other companies in the inauguration of a combined movement looking toward organized opposition to the excessive rates and charges that are now prevailing and discuss some practical remedy therefor." The end aimed at is by reducing the working expenses to enable the company to pay dividends on \$20 ore. The companies who will suffer by any such drastic reforms as proposed are the following: The Comstock Mill and Mining Company, controlled by J. W. Mackay, J. Flood and J. P. Jones; the Nevada Mill and Mining Company, controlled by the Hobart estate, Alvin Hayward and J. P. Jones; the Virginia and Gold Hill Water Company, controlled by J. Mackay and the Hobart estate; the Virginia & Truckee Railroad, controlled by D. O. Mills and the Sharon estate; Wheeler, Hall & Co., the Virginia wholesalers, who are supported by J. P. Jones. So oddly are things mixed up on the Comstock, and so closely connected are the interests of the different corporations, that one cannot be touched without the others, in lesser or greater degree, also being affected. W. S. Wood, who is attorney for the Virginia & Truckee R. R., is also a director of the Savage Company, and so it is to be presumed that he will protest against any steps being taken that will reduce the profits of his millionaire clients. This, too, albeit that the railroad was built by the donations of the people, and has paid for 25 years past enormous dividends. The whole matter will be gone into at a meeting of the Board of Directors to be held on Saturday, when, it may fairly be anticipated, some very vigorous language will be indulged in.

White Pine County.

The Ely mill is running on ore from the Johanna mine.

NEW MEXICO.

Grant County.

The Mountain Key, Mammoth and Wagner mills are all running on full time at Pinos Altos, and the Bell & Stephens mill is running 12 hours a day on account of lack of water. As soon as there is water enough to supply the mill it will commence running on full time on ore from the Ohio mine. The output of the mines at Pinos Altos, according to the correspondent of the New York "Sun," is now nearly two-thirds as much as it was at this time last year. The Skillicorn & Snyder, Davis and Atlantic mills are idle at Pinos Altos, and the Pacific mill at Silver City, which was in operation for a few days this month, has been closed down again because of an insufficient water supply. The Manhattan mill will not be started up before next spring, as no ore will be taken out of the company's mines until after the completion of the tunnel which is now being driven.

Hinton, Georgetown.—It is reported that an important strike has been made by the lessees of the Hinton mines. The lessees have struck a body of high grade silver chloride. The lease has 18 months to run, and the lessees are not required to pay a royalty until after the expiration of 12 months from its beginning.

¹ Texas.—Some good silver ore is being taken out

of this mine, in the Central district, and a shipment has been made to the sampling works at Deming. The ore contains wire silver, and is said to be the richest that has yet been taken out of the mine. Since this ore was found the owners of the Grand Central, which joins the Texas, have determined to resume operations. Both mines are on the same vein.

Lincoln County.

American, Nogal.—At this mine 17 men are at work. The shaft is down 35 ft. on the vein recently uncovered, and work on a level at that depth has been commenced. The vein has widened out from 4 in. when first struck to 12 in. at the present depth, with free gold throughout. A mill run of about 15 tons will be made shortly.

Sierra County.

The first shipment of copper matte from the new smelter at Hillsborough was made recently to the Argo works at Denver, where it will be refined. The shipment consisted of 20 tons, and another shipment will follow this week. The output of the mines owned by the Standard Company which built the smelter is over 40 tons a day, and is steadily increasing. The production of these mines is said to be as large as the entire output of the Hillsborough district a few months ago. The output would be much larger, but the mills there are not of sufficient capacity to handle the ore which cannot be treated in the smelter.

PENNSYLVANIA.

Coal.

Work continues to run slow in the Houtzdale section of the Clearfield coal district. A general complaint of scarcity of cars is heard all over the district.

Bell, Lewis & Yates Coal Mining Company.—This company has extended the ropes of the Rochester mine haulage plant near Du Bois, until now there is 12,000 ft. of haulage and 24,000 ft. of tail rope running on one set of drums. This makes a distance of over two miles the mine cars travel in coming out, while the usual speed of about 8 miles an hour is kept up the entire distance. A train of 35 cars holding nearly 4 tons of coal each is brought out each trip.

SOUTH DAKOTA.

Lawrence County.

Black Hills Tin, Metal and Development Company.—This company was incorporated in Chicago with a capital stock of \$1,000,000 to develop the tin deposits of the Black Hills. According to the Black Hills "Times," the company controls 25 tin claims and 60 acres of placer ground. The claims are situated near the Etta tin mines at Kearney City.

Deadwood & Delaware Smelter.—The fires were started and furnaces charged on August 19th for a continuous run.

Enos Mining Company.—This company, which owns the Minnesota property in the Rochford mining district, is making preparations for extensive development work. A tunnel will be driven in to intersect the ledge at a distance of from 300 to 400 ft. from the surface, and as soon as this is completed a 100-stamp mill will be erected to treat the ore.

Esmeralda Mining Company.—For the past two months the lessees of this property have been pumping out the mine with a large Cornish pump and mining operations have been virtually suspended. A force of men will now be put to work getting out ore from the newly opened workings, from which they were driven by the water two months ago.

Hawkeye Mining Company.—The mines and mill of this company are to be connected by an electric tramway, work upon which has already commenced, says the Black Hills "Times." The tramway will be constructed with the grade of Gold Run gulch, which is fully 8%.

St. John.—Machinery for hoisting works to be erected on this mine has arrived, and during September a force of men will be put to work enlarging the old shaft to two compartments. This mine was recently bonded by Graham Bros. to Eastern parties for \$200,000, says the Deadwood "Daily Pioneer."

Stewart Mining Company.—According to the Deadwood "Daily Pioneer" Mr. Thos. H. White has offered to buy this property for a price approximating \$100,000. The control of the stock is owned by T. J. Grier, Orange Saulsbury, D. A. McPherson and Judge Moody.

TENNESSEE.

Tennessee Coal, Iron & Railroad Company.—This company filed on August 24th its answers as lessees to the notice served by the Board of Prison Inspectors indicating the purpose of the Board to declare the lease of the convicts forfeited. The answer says, "It will accept and work said convicts at said branch prisons, or such others as they may determine on, and will pay promptly to the State all future installments accruing on the lease, after retaining for the time being the items above specified to be retained. If you prefer, the convicts shall not be worked in our mines, and think it to the interest and advantage of the State that the lease we now have may be terminated, it may be done. The company will agree to an immediate cancellation upon the fairest and most equitable terms. If, however, it is the State's desire to have the lease executed, you will please direct the return of the convicts to the mines." The Board and representatives of the lessee and attorneys and the adjutant general, representing the Governor, met and discussed the proposition of the lessee. Their conclusions were not made public, but

it is understood that three members of the Board at the meeting to-day will vote to make the proposed agreement and it will be ratified.

Buchanan County.

Virginia, Tennessee & Carolina Steel and Iron Company.—Chancellor McGill, of New Jersey, has appointed Charles B. Thurston receiver of this company, which is incorporated under the laws of New Jersey. It was organized to work coal and iron mines in the South, but it has had financial difficulties from the start. The company owns coal mines at Dumps Creek, Buchanan County, Tenn., and has an option on the Carter and Campbell grants in Wise and Dickinson Counties, Va. A mine at Looney's Creek was purchased and \$40,000 paid on it. Litigation followed and the purchase was set aside on the ground of irregularity. The corporation then purchased 1,200 acres of land at Bristol and spent large sums in laying it out in city lots. The company made a contract for the erection of a furnace at Bristol for \$16,000. The money was not paid, and consequently the furnace was not put in operation. Roads leading to the company's mining property were begun but never finished. Car trust certificates amounting to \$98,000 will fall due at brief intervals beginning September 1st, and the company will not be able to meet them. A number of suits brought by discharged employees are pending. It was represented that the property of the company is exceedingly valuable, and a proposition was made that the stockholders pay in 50% of their subscriptions in order to tide over the difficulties, but the proposition was rejected.

TEXAS.

Burnet County.

Texas Capital Granite Company.—This company has brought the granite quarries of Westfall, Norton & Laney for \$250,000.

UTAH.

Juab County.

Peru Mining Company.—According to the Salt Lake "Tribune" rich ore has been found on the Yorkville claim worked by this company. At a depth of 100 ft. in the shaft a vein of copper ore was encountered. The vein is a strong one and gives signs of becoming a permanent producer. A whim is now being put in the Manhattan, which belongs to the same company. This claim is showing up well and in the face of a drift from the 100-ft. level there is a vein of good ore. Three shifts of men are being worked on each of these properties.

Undine.—The engine and boilers are in position and will soon be in operation. The new shaft is now down 75 ft. The gallow's frame is up and the shaft house will be completed in a short time. A force of men is at work on ore, besides two shifts running drifts and working in the shaft. About 25 tons of ore have been broken out in readiness for the hoist.

Pi Ute County.

Duquesne Mining Company.—This company owns the Robert E. Lee, the Belle of Marysvale and the American Girl. The principal work is now being done on the Lee on a 6-ft. vein. The shaft is down 18 ft. and promises well.

Salt Lake County.

Onyx Discovery on Salt Lake.—Enough work has, says the Salt Lake "Herald," been done on the beds of Onyx recently discovered on the shores of Salt Lake, to prove the permanency of the deposit. Slabs 3 by 5 ft. can be taken out and some as large as 3 by 10 ft. The thickness varies from 3 in. to 3 ft. The onyx displays a great variety of color.

Peruvian Mining Company.—The body of ore recently discovered in this mine is, according to the Salt Lake "Tribune," getting constantly larger. A cross-cut from wall to wall, a distance of 152 ft., has already shown the ore to be between 50 and 60 ft. wide. A letter from the mine dated August 17th said that a solid body of ore 14 ft. wide had been cut through, and that the drift, after entering broken limestone, is again in a full face of ore.

South Fork Consolidated Mining Company.—A meeting of the directors of this company was held August 15th. A contract was let to run a 100-ft. tunnel on the Harrison claim. This claim is developed by a tunnel over 200 ft. long on a vein which is streaked with mineral.

Sunmit County.

The Anchor Mining Company has completed the ditch for the pipe in Deep Lake, and will soon commence laying pipe. The line is 3,000 ft. long, and all on Anchor ground. It will convey water to the Anchor mine, the reservoir being on the old White Pine ground. While the property of the Anchor company, this line will form part of a water system that is contemplated to furnish the Ontario, Daly and Anchor mines and also Park City with water. The system will be put in by the mining companies. The shaft is now down 1,100 ft. and sinking still continues, although retarded considerably by water. An uprise is also being run from the tunnel level to connect with the bottom of the shaft. There are only a few feet more to be run before the connection will be made. As soon as this is done the Anchor will be in the condition that the company has worked for during the past few years. The mine is making the usual shipments to the concentrator.

Daly Mining Company.—This company has leased the dump to Thomas Clark et al., who are making good concentrates ore by chloriding, jigging and sorting.

Kerr.—The tunnel being driven by John Farish on this mine has reached a distance of 400 ft., and work is still being pushed. The face is now in porphyry.

FOREIGN MINING NEWS.

AUSTRALIA.

Hydraulic mining is being experimented with on a large scale in New South Wales at a place called Nelbothery, by the Delegate Hydraulic Mining Company. The gold-bearing strata here consist of beds of gravel, some 20 ft. to 30 ft. thick, which are said to show gold to the value of 2 dwt. per cu. yd. The only method of extracting this gold economically is by the hydraulic system, but the only water available lies at a lower level than the auriferous strata. The owners of the mine have therefore determined to erect powerful pumps and to pump it from a reservoir formed by damming the Little Plains River to another reservoir 300 ft. above the river, and some half a mile distant. This latter reservoir lies about 150 ft. higher than the mine and upward of a mile from it. The pumps to be used are said to be the largest yet built in Australia, and have been constructed by the Austral Otis Engineering Company, of Melbourne. They are designed to pump 4,500,000 gallons per day. The engines are of the triple-expansion type having cylinders 10½ in., 18½ in. and 29½ in. in diameter. The pumps are 13½ in. in diameter and the stroke is 21 in. Three sets are being supplied. Steam will be supplied to the engines at a pressure of 120 lbs. per sq. in. by means of four steel multitubular boilers 16 ft. long by 6½ ft. in diameter designed for burning wood fuel.

GREAT BRITAIN.

London, Aug. 26.—An explosion, which it is feared may be attended by enormous loss of life, occurred on the 25th at Aberkenfig, near Bridgend, in the county of Glamorgan, Wales. One hundred and forty-one miners are entrapped in a coal pit, owing to an explosion which shattered the exit galleries. Nothing is known as to their fate. When the explosion took place a volume of coal dust arose from the mouth of the pit, and this, along with the rumbling noise, gave notice to the inhabitants that something serious had occurred. The cause of the accident and its results have not yet been ascertained.

NOVA SCOTIA.

An important change has just been made in the length of time for which leases are granted of mineral lands. Section 29 of the act to amend and consolidate the acts relating to mines and minerals provides that "all leases hereafter granted shall be for the term of forty years." This new policy will, no doubt, react favorably on the gold mining industry of this country. Formerly leases of gold lands were given for 20 years only. According to the Halifax Critic, however, some one has blundered, as in the form of lease to be granted Schedule A, page 53 of the act, the term of the lease is made 21 years instead of 40. Lessees should carefully examine their leases and see that this error is corrected in all leases granted since the passing of the act.

Dufferin Mining Company.—It is reported that at a depth of 270 ft. a rich lead has been cut in this mine. For some time steady returns have been received from low grade ore, but it now looks as though this great mine was again to pass through a period of rich returns, says the Halifax Critic.

TRANSVAAL.

Witwatersrand.

Robinson Gold Mining Company.—During July the production of the company was 8,203 oz. gold from 8,627 tons of ore; 746 oz. by chlorination and 3,036 by the cyanide process from tailings. Concentrates purchased yielded 975 oz. by chlorination, making a total production of 12,945 oz.

Witwatersrand Central Ore Reduction Company.—This company has been formed with Mr. Chas. Butters, chlorinator of the Robinson Gold Mining Company, for its Director; capital \$200,000. A number of works will be constructed to treat ores, concentrates and tailings by the chlorination and by the cyanide methods. It is said that the capital will be increased to \$2,000,000 if necessary.

WALES.

Swansea.

Swansea, Aug. 25.—Seven miners were crushed to death and three others terribly bruised by the falling in of the roof of a coal mine at this place to-day.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, August 26th.

Heavy Chemicals.—The condition of the market for heavy chemicals continues as last reported. No change has occurred to make us alter our review of last week. On the whole, trade has been very quiet; a few sales for forward shipments are reported. Prices are absolutely unchanged as follows: Caustic soda, 60%, 3-17½@3-20c.; 70%, 2-95@3-12½c.; 74%, 2-97½@3-12½c.; 76%, 3-12½@3-25c.; 77%, 3-12½@3-25c. Carbonated soda ash, 48%, 1-60@1-62½c.; 58%, 1-52½@1-55c. Alkali, 48%, 1-50@1-55c.; 58%, 1-47½@1-52½c. Sal soda, English, 1-07½@1-15c. American, 1-05@1-10c. Bleaching powder, 2-15@2-20c. on the spot, according to quantity.

Acids.—Business in the various acids continues good and manufacturers hereabout report that their

plants are running on full time. Although acid is scarce in some quarters, prices are no higher and we repeat our last quotations as follows: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.50@1.75 according to quality; muriatic, 18", 80c.@\$1; 20", 90c.@\$1.10; 22", \$1@1.25; 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 \$3.25@3.50; alum, lump or ground, \$1.55@1.80. Glycerine for nitro-glycerine, 11¼@12¼c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone is stronger, owing to cable advices reporting firmness on the other side. During the past week sales have been made at the following figure: Best unmixed seconds, on the spot, \$25; to arrive, near due, \$24.75; shipments, \$24. Best unmixed thirds are 75c. less throughout.

Fertilizers.—More activity has been experienced in this market during the week under review than has been the case for some months past. Prices are very firm and somewhat higher. We quote this week: Sulphate of ammonia, \$2.87½@2.95 for bone goods and \$2.90@2.95 for gas liquor. Dried blood, \$2.05@2.10 per unit for high grade and \$2 for low grade; acidulated fish scrap, \$13.50 f.o.b. factory dried scrap, \$23@23.50. Azotone, \$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%, \$1.13½@1.23½; 90-95%, \$2.13@2.23½.

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.—During the past week arrivals have been as usual. The prices fixed by the Sales Syndicate prevail as follows: Fifty ton lots or over, New York and Boston, \$1.81½; Philadelphia and Baltimore, \$1.84; Southern ports, \$1.86½.

Nitrate of Soda.—This market has been quiet owing to the advance of last week. It will not be long, however, before buyers will be forced to supply their wants. Prices are somewhat higher and at the close \$1.97½ to \$2 was quoted for goods on the spot.

Liverpool.

August 17.

Special Correspondence of Joseph P. Brunner & Co.)

Trade in heavy chemicals continues very slow all round, but, in spite of scarcity of orders, quotations are practically unchanged.

Soda ash, so far as Leblanc makes are concerned, is in small compass, and on account of this scarcity quotations are quite nominal, as follows, viz.: Caustic ash, 48%, \$5 6s. 3d. per ton; 57%, \$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.—all net cash.

For prime brands of caustic and carb. ash a considerable premium on the above quotation would have to be paid.

Soda crystals are moving more freely at £3 7s. 6d. to £3 10d. per ton less 5%. Caustic soda is quite neglected, but quotations are nominally unchanged as follows, viz.: 60% £9 2s. 6d. per ton, 70% £10 5s. per ton, 74% £11 5s. 0d. per ton, 76% £12 5s. to £12 10s. per ton, all net cash.

These quotations apply to all quarters except the United States and Canada. For parcels under 10 tons 5s. per ton extra is charged.

Bleaching powder in request and also scarce, quotations being firm at £7 15s. @£8 per ton, net cash, for hard wood packages, for all quarters except United States and Canada.

Chlorate of potash continues in good demand and sales are reported for prompt delivery at 6½d. to 6¾d. per lb., less 5%, but it is not easy at the moment to get on at the lower figure. For September to December delivery quotations are about same as for prompt, but the tone is rather firmer than it was a short time ago.

Bicarb. soda is in request at £6 15s. per ton, less 2½% for one cwt. kegs, with usual allowances for larger packages. Sulphate ammonia is depressed and again rather easier. The nearest values for prompt delivery are about £10 to £10 2s. 6d. per ton for good gray 24%, and £10 3s. 9d. to £10 5s. for 25%, both in double bags, less 2½% f. o. b. Liverpool.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo., Baltimore, Pittsburg, Deadwood, Dak., St. Louis, Helena, Mont., London and Paris, see pages 214 and 216.]

NEW YORK, Friday Evening, August 26, 1892.

Mining shares have been neglected during the past week. Nothing savoring of speculation has taken place. The dullness seems to increase daily.

The Comstocks have been quiet and in some cases have suffered a decline. Consolidated California & Virginia opened at \$3.40 and declined to \$3.10; total sales amounted to about 200 shares. Comstock Tunnel stock was dealt in to the extent of 1,800 shares at 12 to 13c. The bonds were sold at 17 and 18%. There was a solitary transaction of 100 shares of Ophir at \$2.05. Other sales were as follows: Two hundred shares of Savage at 65@75c.; 100 shares of Sierra Nevada at \$1.10; 100 shares of Yellow Jacket at 50c.; 200 shares of Best & Belcher at \$1.25@1.35; 100 shares of Chollar at 50c.; 100 shares of Potosi at 50c.

Of the Tuscarora stocks there were sales of 200 shares of Bell Isle at 15c. and 300 shares of Navajo at 5c.

The Colorado stocks were in better demand this week. Leadville consolidated shows sales of 1,600 shares at 14@16c. Of Little Chief 300 shares were sold at 25@26c.

Among the California stocks traded in during the week we note sales of 400 shares of Bodie Consolidated at 32@34c. Of Belmont there were sales of 200 shares at 35c.

The Black Hills shares were not in much demand during the past week. There was a sale of 50 shares of Caledonia at \$1.20. An equal number of shares of Homestake was sold at \$14.

Horn silver was in good demand during the week; 800 shares were sold at \$3.55@3.65. Ontario was dealt in for the first time in many weeks: there were sales of 40 shares at \$39.50 to \$41.

Phoenix of Arizona shows sales of 600 shares at 50 to 55c.

From officials connected with Phoenix of Arizona, we have received the following information:

"Mr. E. C. Chamberlin, of Port Huron, Mich., has been elected president of the Phoenix Mining Company. It is understood that the new president, who represents large interests in the stock of the company, and who has been instrumental in completing the financial arrangements for providing the large stamp capacity now being added to the company's mill, will proceed to Arizona and take personal charge of the company's business interests at the mine.

Boston. August 25. (From our Special Correspondent.)

There was a little more activity in copper stocks this week, but no feature. The little demand for investment is soon supplied, while the speculative element is entirely wanting, and there is no indication of a present revival of interest in this class of stocks.

Calumet & Hecla declined on small sales from \$300 to \$295 without any other reason than an absence of orders to purchase.

Tamarack also dropped to \$160, a decline of \$7 for the week. Both of these stocks are influenced by the supply and demand.

Tamarack, Jr., sold up to \$26 1/2 this week, and declined to \$25 on later sales. We do not hear of any new developments this week from the mine, and buyers prefer to wait until something more definite is known regarding the work now going on.

Oscuela declined for no special reason from \$32 to \$31 1/2, closing at \$31 1/2.

Atlantic sold at 10 1/2, a gain of 5/8. Kearsarge declined 1/4 to 11 1/2 and Franklin held firm at 12 1/2.

Allouez sold at \$1 and Arnold at \$1 1/2. The latest report from Capt. Moyle of the Arnold says: "The openings under ground are looking very rich. The shaft is down about 260 ft., showing good copper ground the entire distance."

P. M.—There was a little spurt in Boston & Montana after the noon hour, and it advanced to 37 1/2, followed by a reaction to 36 1/2 and closing at 36 1/2.

Tamarack advanced on an order to buy a round lot from \$160@165, closing at \$163 bid, \$167 asked.

San Francisco. August 19.

(From our Special Correspondent.)

No advance in the prices of mining stocks has been made until to-day, when a slight movement on the part of the Gold Hill stocks developed some strength

for the time being. The news from the Comstock just now is unimportant, but in several mines on the lode the showing being made is of a nature to stimulate the market when the powers that be see fit to make the news public.

Within the last few weeks the evidences are all in favor of the assumption that the insides have been quietly gathering in the line of stocks they require and any day now a spurt in prices may occur.

The North and Comstocks have remained steady throughout the week. Consolidated California & Virginia sold to-day for \$3.35, a five cent advance on the highest ruling rate of the previous week.

The middle group of Comstocks have been exceedingly quiet, and only Hall & Norcross at 70 cents; Potosi at 50 cents and Savage at 70 cents, were dealt in to-day.

The advance in the Gold Hill block of stocks commenced this morning in the Pacific Board, when Belcher led with sales totaling up 2,500 shares. At the opening 95 cents was the ruling rate, gradually advancing to \$1, and then declining to 90 cents.

Scattering sales of outside stocks were made as follows: Mono at 10 cents, North Commonwealth at 5 cents, and Nevada Queen at 15 cents.

The San Francisco Mining Stock Board, after a stormy debate, decided on the 22d inst., by a large majority, to sell its fine building, built in the big bonanza days. The building, which is of granite, with very handsome interior fittings, cost about \$800,000, but it will be offered for \$460,000.

SAN FRANCISCO, Aug. 26.—(By Telegraph.)—The opening quotations to-day were as follows: Best & Belcher, \$1.15; Bodie, 30c.; Belle Isle, 5c.; Bulwer, 25c.; Chollar, 45c.; Consolidated California & Virginia, \$3.20; Eureka Consolidated, \$2; Gould & Curry, 75c.; Hale & Norcross, 95c.; Mexican, \$1.05; Mono, 10c.; North Belle Isle, 10c.; Navajo, 10c.; Ophir, \$2.05; Savage, 65c.; Sierra Nevada, \$1.15; Union Consolidated, \$1; Yellow Jacket, 55c.

ASSESSMENTS.

Table with columns: COMPANY, No., When levied, D't'ng't in office, Day of sale, Amt per share. Lists various mining companies and their assessment details.

Meetings.

Butte & Boston Mining Company, at the office of the company in Boston, Mass., September 20th at 12 o'clock noon.

Tennessee Coal and Iron Company at the office of

the company at Tracy City, Tenn., September 12th at 10 A. M.

DIVIDENDS.

Champion Mining Company, paid dividend No. 23, of 15 cents, \$3,400, August 15th, at the office of the company in Grass Valley, Cal.

Enterprise Mining Company, dividend No. 7, of 10 cents per share, \$50,000, payable September 6th, at the office of the company, No. 33 Wall street, New York. Transfer books close September 1st and reopen September 7th.

Golden Reward Mining Company, paid dividend No. 9, of two cents per share, \$5,000, on August 25th at the office of the company in Deadwood, S. Dak.

Mollie Gibson Consolidated Mining and Milling Company, dividend No. 26, of 15 cents per share, \$150,000, payable September 15th, at the office of the company in Colorado Springs, Colo. Transfer books close September 8th and reopen September 16th.

Oscuela Mining Company—A dividend of \$1 per share, \$50,000, payable September 1st at the office of the company in Boston, Mass.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, August 26th.

Statement of shipments of anthracite coal (approximated), for week ending August 20th, 1892, compared with the corresponding period last year.

Table with columns: Regions, Aug. 20, 1892, Aug. 22, 1891, Difference. Lists regions like Wyoming, Lehigh, Schuylkill and their coal shipment data.

PRODUCTION OF BITUMINOUS COAL for week ending August 20th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

Table with columns: Region, 1892 (Week, Year), 1891 (Year). Lists regions like Phila. & Erie R. R., Cumberland, Md., etc.

WESTERN SHIPMENTS.

Table with columns: Region, 1892 (Week, Year), 1891 (Year). Lists regions like Pittsburg, Pa., Westmoreland, Pa., Monongahela, Pa.

Grand total..... 426,566 12,991,496 13,516,756

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending August 20th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 85,702 tons; year, 3,427,947 tons; to corresponding date in 1891, 2,470,265 tons.

Anthracite.

The decision of Chancellor McGill, of New Jersey, in the case of the State against the Reading coal combine was filed on Thursday. It grants the preliminary injunction asked for to restrain the coalers from operating together under the leases entered into last winter, breaks up the tripartite agreement, forbids the Philadelphia & Reading and the Port Reading from operating the Central, and directs that the latter resume control of its own property, franchises, etc. The Court's decree is to hold until the judgment on the final hearing is rendered.

The Chancellor defines the bounds of the injunction which he grants, saying: "I will continue the present injunction to final hearing, adding to it, however, the further direction that the defendants, their officers and agents do desist from further performing and carrying into effect the lease and tripartite agreement, and that the Port Reading and the Philadelphia & Reading companies do desist and refrain from continuing to control the property and franchises of the Central, and from otherwise intermeddling therewith, and that the Central do refrain from permitting the Port Reading and Philadelphia & Reading to use, control or operate its road and franchises, and that the Central do again resume control of all its property and franchises, and the performance of all its corporate franchises."

The following is the syllabus attached to the decision: (1.) A corporation created by statute possesses no rights and can exercise no powers which are not expressly given or to be necessarily implied. (2.) Such a corporation cannot lease or dispose of any franchise, needful in the performance of its obligations to the State, without legislative consent. (3.) The act of March 11th, 1880, which amends the seventeenth section of the act, entitled "An act to authorize the formation of railroad corporations and regulate the same," is free from constitutional infirmity in its title and is sufficiently broad in its terms to confer power upon railroad corporations chartered by special laws. (4.) The act of May 2nd,

1885, entitled "An act respecting the leasing of railroads" is constitutional. (5.) Equity looks at the substance and will disregard names and penetrate disguises of form to discover and deal with it. (6.) Where a corporate excess of power tends to the public injury or to defeat public policy, it may be restrained in equity at the suit of the Attorney-General. A railroad company of this State leased its franchise to a railway corporation of another State. The lease was not only unauthorized, but was expressly forbidden by law. Its effect was to combine coal producers and carriers, and to partially destroy competition in the production and sale of anthracite coal, a staple commodity of the State. Held to be a corporate excess of power which tends to monopoly and the public injury.

In reply to inquiries as to their future course of action, the authorities in the combine state that they will take the case to the Supreme Court and afterward to the Court of Errors and Appeals. In the meantime Mr. Maxwell will take over the management of the Jersey Central and things will nominally assume the same state as before the lease. We say nominally because there is nothing to prevent a private arrangement not to cut prices. Though naturally an unwritten and presumably illegal agreement or at least an agreement that cannot be enforced in the law courts is not so likely to be mutually sustained as a lease. As yet it is too early to say with any security what will be the future course of events in the anthracite coal trade. It goes without saying that the decisions as noted in the syllabus if upheld by the superior courts will be of a very wide-reaching character in its effects on trusts and combines generally.

The Eastern and Western anthracite sales agents met on Thursday for the purpose of considering an advance in prices and decided to raise prices all around. The Western agents voted an advance to the West of 25 cents a ton net, and to Buffalo 30 cents a ton gross. The Eastern agents decided to advance the price of egg 20 cents, of broken 10 cents, of chestnut and stove 25 cents a ton. The new prices will take effect on September 1. On the same day the production for September was fixed at 3,000,000 tons, the same as for August. The output for September, 1891 was 3,333,404 tons.

In the following table the new prices at New York are compared with those in July and August of this year and with those in September of last year.

	Aug., 1892.	Sept., 1892.	Sept., 1891.
Broken.....	\$3.90	\$4.00	\$3.65
Egg.....	4.20	4.40	4.00
Stove.....	4.50	4.75	4.25
Chestnut.....	4.40	4.65	3.90

The state of the anthracite coal market is still far from brisk, and if it were not for the combine the atmosphere would be one of rate cutting to secure business. Coal is moving away very slowly, and cars, barges and stocks are all as full as they can be. The production is being genuinely restricted; in fact, there would be nowhere to put the coal if any more were brought up. Producers are now expecting the usual fall increase in consumption, but so far there are no indications of its advent. The strike at Buffalo is practically over, so that the temporary stagnation of Western shipments is removed. The effect of the strike is somewhat reflected in the statement of Reading's shipments of coal last week. They show a decrease of 127,287 tons as compared with the coal movement in the corresponding period in 1891. Still, the shipments in the same week of last year were large, having been 582,979 tons; so the reduction is more the result of comparison with a heavy period than actual shrinkage. The shipments were 455,692 tons last week.

On Wednesday the agents of the anthracite carrying roads advanced freights on coal to tidewater 15 cents a ton and to Buffalo 25 cents a ton.

Bituminous.

The bituminous coal trade is becoming brisk, as is usual at this time of year, but it is badly fettered by the great scarcity of cars. The railroads offer a totally inadequate freight service to the majority of bituminous producers, and the consequence is that the production is not anywhere equal to the amount of business offered. In the Cumberland district the mine owners complain very much of this enforced restriction of the output and claim that they could do double the business if only the railroads would place the necessary cars at their disposal. At Philadelphia coal is quite scarce on account of this blockade of cars and vessels are plentiful. The consequence is that freights are low. To Boston and Sound ports the freights are 55@60c.; to Portland, 55@60c.; to Portsmouth, 60@65c.; to Bangor, 60@65c. At Baltimore, Newport News and Norfolk the supply of coal cars is also oad, but the freight rates by sea are 10c. higher all round than the Philadelphia ones.

NOTES OF THE WEEK.

A contract has just been made for the building of an extension from Nordmount, the northern terminus of the Williamsport & North Branch Railroad, to Bernice, Pa., the southern terminus of the State Line & Sullivan Railroad. The length of the new extension will be 20 miles. The State Line & Sullivan Railroad is one of the coal roads in the anthracite region which have been largely benefited by the Reading deal. It runs from Bernice, Pa., through a rich field of anthracite coal of free-burning quality, to Monroetown, a distance of 25 miles. From Monroetown it uses the tracks of the Barclay Coal Company for a few miles

for an entrance into Towanda. The railroad is leased to the Lehigh Valley for a rental of \$40,000 a year and all taxes, but the company has reserved the development of its coal lands for its own operations. These lands embrace 5,000 acres, and geologists estimate that they contain 5,000,000 tons of coal. It is to reach this coal that the Williamsport & North Branch extension is being built.

Boston.

August 25.

All the Boston coal trade know by this time the full particulars of the agents' meeting held this afternoon. As was generally expected, advances were made. The advance of 25c. per ton on stove and chestnut, 20 on egg and 10c. on broken brings prices up to a basis which may be considered quite profitable for the companies. This will make the price of stove \$4.75. The advance is likely to stimulate huying from now up to the time the new prices go into effect. The retail dealers here are generally well stocked, and cannot take on much more coal, but those who can will certainly buy. The allotment of 3,000,000 tons production for September is generally considered fair. In my next I shall quote the new price list, which does not go into effect until September 1st.

We quote f. o. b. prices at New York: Stove, \$4.50; egg, \$4.20; free broken, \$3.90; chestnut, \$4.40; Lykens Valley (at Philadelphia), broken, \$4.75; egg, \$5.25; stove, \$5.75; chestnut, \$4.75.

There is very little doing in soft coal at present, but with the expected good September trade an advance is looked for. I am inclined to think that those who buy their fall soft coal supplies now will be saving money. Spot prices are easy. Clearfield is unchanged at \$3.15; George's Creek, \$3.45 per ton on cars here.

Freight rates are on the whole steady. Some very low prices are quoted, but it is only by those who are probably cutting the market f. o. b. prices. No change is noted. From New York to Boston, 60@70c.; from Baltimore to Boston, 75@80c.; Newport News to Boston, 70@75c.

In a retail way there is very little doing. Consumers have been light buyers this month, but will realize their mistake presently. The retail coal dealers, as I have stated several times before, have said that they would advance their prices if the coal producing companies advanced theirs. The retail dealers have been giving the trade the benefit of its wise and cheap purchases in June before the July advance took place. This afternoon the retail coal dealers took a trip down the bay, and, in all probability, they will fix a new schedule of prices to go into effect by September 1st. The advances will probably be 25 cents per ton all around, except on those grades with which soft coal is apt to compete, and then the advance will be less. We quote old prices this week.

We quote: Stove, \$6; nut, \$6; egg, \$5.75; furnace, \$5.50; Franklin, \$7.25; Lehigh, egg, \$6; Lehigh, furnace, \$6.

The receipts of coal at this port for the week ending Aug. 20 were 45,637 tons of anthracite and 21,178 tons of bituminous, against 28,114 tons of anthracite and 19,993 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,348,262 tons of anthracite and 502,463 tons of bituminous, against 1,275,586 tons of anthracite and 685,476 tons of bituminous for the same period of last year.

Buffalo.

August 24.

(From our Special Correspondent.)

The newspapers have had full particulars, truthful and untruthful, of the affairs in connection with the railroad switchmen's strike in Buffalo. The eastern part of our city is really an immense encampment covering 22 square miles. But little damage has been done, doubtless caused by the presence of from 3,000 to 10,000 of the national guard, drawn from all parts of our State. It is a fact that over one-fourth of the area of our city is owned by the railroads centering here.

Anthracite coal is getting scarcer and scarcer, bituminous is following suit. Prices unchanged. The former expected to advance September 1st, and the cost of the latter may increase at any moment. It will be the old story of "supply and demand" with quotations in accordance.

Reports are floating around that several factories, mills, etc., are working half time or have stopped entirely for lack of freight accommodations, and in some cases from the short supply of fuel at interior and near-by points. The strike, of course, has curtailed receipts and shipments of coal to a serious extent. Our vessel men are at their wits' ends to arrange for freight, etc.

The Lehigh Valley Transportation Company and the Northern Steamship Company, running on the lakes, have consolidated under the management of Mr. John Gordon. The former was a "water" branch of the Philadelphia & Reading Railroad, and the latter of the Great Northern Railway. This management gives us through line from New York to Puget Sound via rail and lakes, under the joint control of presidents McLeod and Hill, who are too well known to need further introduction.

Lake freights on coal declined 5c. per net ton to Chicago, Milwaukee and Racine. The shipments of coal by lake westward from this port from Aug. 17 to 23, both days inclusive, aggregated only 47,630 net tons, distributed about as follows: 19,660 to Chicago, 14,200 to Milwaukee, 4,000 to Duluth, 250 to Detroit, 400 to Marine City, 850 to Sault Ste. Marie, 2,650 to Toledo, 1,525 to Bay City, 900 to Saginaw, 435 to Kin-

cardine, 700 to Marinette, 1,010 to Racine, 1,050 to Green Bay. The rates of freight were as follows: 60@55c. to Chicago, 35c. to Duluth and Bay City, 65c. to Racine, 55c. to Marinette and Green Bay, 60c. to Menominee, 40c. to Saginaw and Marine City, 50c. to Sault Ste. Marie, and 25c. to Toledo and Detroit.

Chicago.

August 25.

(From our Special Correspondent.)

The opinion prevails among the agents that the advance will not have any immediate effect on trade as buying will be large during the next 60 days. Some representatives of Eastern shippers state that they are not receiving all the all-rail car coal they could use; the strike at Buffalo is greatly interfering with coal shipments. Several agents incline to the belief that the one thing needed to stimulate country trade is an advance. Demand from outside points is certainly improving and while the number of cars ordered is small, orders are numerous enough to aggregate a fair tonnage, but as a large shipper's representative remarked business is still decidedly slow as compared with what it should be at this season. On the whole it may be stated truthfully that there is a better tone to the market, inquiry and volume of orders are increasing, but the situation at present is still unsatisfactory. The idea which has prevailed so long, that the combine will go to pieces, is gradually being given up, even by dealers who were most persistent in their helief and rancorous in their talk. Nevertheless they huy just as few black diamonds as possible. Retail trade has greatly improved during the week, and most of the dealers claim to have all the business they can comfortably attend to. Some state that their orders exceed their teaming capacity. Much of this activity has been brought about by the expected advance September 1st, and all dealers have advised their patrons to place their orders before end of month, as rates are almost sure to go up. Circular rates are steadily maintained.

Bituminous coal continues dull, though there is some little improvement for steam sizes, as many factories and plants which have been running on short time during the heated term are now working to full capacity. Country demand is also steadily increasing, and, while not active, it is better than a week ago. Railroads are taking their full quota, and some exceeding it, so that they can have more cars at liberty next month for commercial coal. Reports are current that some scarcity exists in Indiana block coal of best grades on account of some mines becoming exhausted; this may be true with some, but there is an abundance of good quality. Miners in some sections of the State are scarce. Circular price on block coal will be advanced September 1st to \$1.50 at mine, \$2.50 on track Chicago or group points. Hocking, Pittsburg and other first-class steam coals are quiet, but increased activity is fully assured in the very near future. Prices on these are shaded 10 or 15c., according to tonnage wanted.

Coke is still dull and no improvement in foundry grade is expected until foundries take in more work. Connellsville is steady, but all other brands are shaded. Domestic crushed coke is in better inquiry, and the outlook for this fuel as a substitute for anthracite, is very encouraging.

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, \$5.60; small egg, range and chestnut, \$5.55. Retail prices per ton are: Large egg, \$7; small egg, range and chestnut, \$7.

Prices of bituminous per ton of 2,000 lbs., f. o. h. Chicago, are; Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogeny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.35.

Pittsburg.

August 25.

(From our Special Correspondent.)

Coal.—We have to report a dull and unsatisfactory market all along the line. The advance noted last week at Cincinnati did not hold out. The large amount of coal at that point and Louisville decided parties interested to continue selling at the old rates, at least for the present. It is estimated that within 10 miles of Cincinnati, counting the amount in yards and stored, there are fully 12,000,000 bushels of coal. There are 630 barges and 126 boats, the latter being equal to 250 barges. It is again reported that prices will be advanced before the first of October unless there is boat water at Pittsburg. Coal men have held meetings with closed doors; they have decided to pay 3 cents for mining, a cut of 1/2 cent. It is probable that there will be a strike. The river coal operators have long considered that they stood at a disadvantage in competing with the railroad operators since they paid half a cent more per bushel for mining. Yet it has only been recently that this sentiment grew into sufficient strength to talk of reducing.

Connellsville Coke.—The coke trade continues in the same unsteady condition as reported for some time past. The past week closed with the least number of ovens in blast and the smallest shipments of any week since the resumption of work after the last big strike. The shipments last week were in excess of the coke production. This is accounted for by operators clearing up their yards of the stock coke. Their is an abundance of cars, both open top and box cars. The coke trade is practically in the hands of the iron and furnace men. The recent strikes among the iron men are now beginning to tell upon

the coke trade of this region. Week's shipments, 93,636 tons; previous week, 96,264 tons; deficiency, 2,628 tons, week's shipments to Pittsburg, 1,500 cars; east of Pittsburg, 1,150; points west of Pittsburg, 2,552 cars; Eastern shipments decreased 129 cars; Pittsburg 100 cars, while the Western shipments increased 83 cars, making the total decrease 146 cars. Price unchanged.

METAL MARKET.

NEW YORK, Friday Evening, Aug. 26, 1892.

The United States Assay Office at New York reports the total receipts of silver for the week to be 98,000 oz.

Prices of Silver Per Ounce Troy.

Aug.	Sterling Exchange.	London, Pence.	N. Y. Cents.	Value of sil. in \$.	Aug.	Sterling Exchange.	London, Pence.	N. Y. Cents.	Value of sil. in \$.
20	4'88	38	82 3/4	.641	24	4'87 3/4	37 1/2	82 3/4	.640
22	4'88	38	83 3/4	.644	25	4'87 3/4	38 1/2	83	.642
23	4'88	37 3/4	82 3/4	.640	26	4'87 3/4	38 1/2	83 3/4	.645

After improving to 38 3/4 d., the London market again suffered a sharp relapse last Tuesday, 23d, falling to 37 1/2. This was caused by weakness in Eastern exchanges, the withdrawal, as a buyer, of our Government till September, and pressure to sell smelter's product. On Wednesday the tenders were at such a low figure that the India Council refused to sell, and this caused a reactionary movement, carrying silver up to 38 1/4, at which price the market closed. Eastern banks, however, are fearful of a relapse in exchanges, and as the Council are making sales again at current prices, silver may sag off again. Some 700,000 oz. have been shipped to London this week.

Government Silver Purchases.

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

August 21st, 415,000 oz. at 83'60 to 83'63.

The government having purchased the full amount of silver required by law for the month of August, no further offers can be considered until September 2d.

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

	H.	L.	Sales.
August 20.....	83 3/4	83 3/4	120,000
August 22.....	83 3/4	82 3/4	115,000
August 23.....	83	82 3/4	61,000
August 24.....	83	83	25,000
August 25.....	84 1/4	83 3/4	10,000
August 26.....	.....	.....	.....
Total sales .....	.....	.....	306,000

Gold and Silver Exports and Imports at New York for Week Ending August 20th, 1892, and for Years from January 1st, 1892, 1891.

	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
Week....	\$1,975,000	\$31,704	\$297,431	\$6,880	\$2,233,847
1892.....	53,829,363	6,420,314	13,611,260	1,336,563	59,693,746
1891.....	74,817,056	2,956,845	10,207,234	1,346,552	80,720,893

During the week ending Aug. 27 the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$1,520,000; silver, \$635,875. Imports, gold, \$7,066; silver, \$1,263. All of the gold, with the exception of \$20,000, went to Germany, the silver all to England.

NOTES OF THE WEEK.

There seems to be a widespread feeling abroad that the coming International Silver Conference will accomplish nothing of importance. Although the time of the holding of the conference is near at hand, neither France nor Austria has named its delegates.

One paper calls attention to the fact that both the English and United States government have appointed as delegates men of widely divergent views, and argues from this fact that no decisive stand will be taken by the conferees, and that none is looked for by either government.

If this be true, it is difficult to understand the motives for such a policy.

In the United States the continued exports of gold in amounts unprecedented at this time of the year are causing some alarm. It is a fact that some of the gold exported during the present week has been shipped at a loss, as far as ruling rates of exchange show. The shipments were induced by the offers of 1/2% premium by German banks.

The situation in India continues to grow worse, and the movement in favor of a gold standard is spreading.

The London "Times," in an editorial on this phase of the question, says:

The closing of the Indian mints against the coinage of silver would be a dangerous expedient, as inducing a considerable difference between the value of the coined and that of the uncoined metal, thus stimulating unlicensed coinage. It also declares

that the artificial value given the rupee would deprive India of a monetary standard of any kind.

As to the proposal to adopt bimetalism, the "Times" says that India's trouble is no concern of England except on the ground of sympathy. It agrees with Sir David Barbour, of the Indian Council, that a common standard of value for England and India is absolutely essential, and adds: "The adoption of a gold standard in India would be the best possible remedy, but it would raise difficulties. For example, what is to be done with the silver coinage now in private hands?"

Canada is at present much exercised over the quantity of American silver circulating in her markets, and the banks have started a movement to drive it out. The amount now in circulation, between \$4,000,000 and \$5,000,000, is larger than at any time since 1870, when \$3,000,000 of American silver was driven out of the country by the impost of a heavy duty. Since then a duty of 20% has been laid on it, but this act has become a dead letter on account of the inability to enforce it. President Weir, of the Montreal Ville Marie Bank, said in an interview: "The worst feature is the silver certificates. At present it does not affect us particularly, but the trouble will come when the United States fails to carry out its engagements in gold. It cannot long continue to carry a dual standard." For much of the alarm concerning silver and its depreciation all over the world we have undoubtedly to thank our free coinage advocates.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars.....	69 3/4	67
Peruvian soles and Chilean pesos.....	61	63
Victoria sovereigns.....	4.86	4.90
Twenty francs.....	3.87	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.79	4.81

Copper is very quiet, the same conditions prevailing now as when last reported. Consumers are still doing extremely little, and though the mining companies are not yet pressing with sales, it looks more and more as if they will have to give in as to price, if sales of any magnitude are to be consummated, as with the general unsatisfactory trade conditions, manufacturers are willing to load up with raw material only at such prices as appear perfectly safe. Lake Copper can be bought in moderate quantities at 11'60@'65, though quoted, in a wholesale way, nominally at 10 1/2. Casting is still freely offered at 10 1/2 delivered with Arizona quoted at 9 1/2@10c. The foreign market opened as it closed, at £44 2s. 6d.@5s. and £44 12s. 6d.@15s. for spot and futures, and after slightly fluctuating has to be quoted just the same at the close. Manufactured sorts we quote as follows:

English Tough, £46@46 5s.; Best Selected, £47 15s.@48 5s.; Strong Sheets, £52 15s.@53; India Sheets, £50@50 10s.; Yellow Metal Sheets, 5d.

The exports of copper from the port of New York during the past week were as follows:

To	Copper Matte.	Lbs.	\$
To Liverpool.....	2,258 bags	244,218	\$12,000
S. S. Cufic.....	2,384	253,738	13,000
To Rotterdam.....	Copper.	Lbs.	
S. S. Sparrdam.....	324 pigs	112,060	\$4,000
Hamburg.....	Copper.	Lbs.	
S. S. Suevia.....	54 casks	67,500	\$3,300
To Havre.....	Copper.	Lbs.	
S. S. La Bourgogne.....	63 casks	78,400	\$8,100
To Bordeaux.....	Copper.	Lbs.	
S. S. Plissy.....	26 casks	77,500	\$9,300

Tin has fluctuated but slightly. It was steady early in the week at 20'40, later on advancing to 20'55, in sympathy with the improvement abroad. It closes somewhat easier at 20'55 cents for spot, August and September, and 20'60 for October-December, the best bids, and 20'50@'55 for spot and 20'75 for the later deliveries asked; this in spite of the higher cables from abroad. The more prominent holders here are still anxious sellers—for what reason we know not—and as neither dealers nor speculators seem ready to accumulate supplies at prices, the manipulators have no trouble in keeping values at their present level. The foreign market opened at higher figures, viz, £93 10s.@12s. 6d. for both spot and future, and on Tuesday jumped up to £94 2s. 6d. for spot and £93 17s. 6d. for futures. It then receded somewhat, but is now gaining once more, closing at £93 15s.@17s. 6d. for all deliveries.

Chicago Lead Market.—The Post, Boynton, Strong Company telegraph us as follows: "The market has ruled steady at 3'95c., with sales of 1,000 tons of spot, and September delivery at that price. At the close prices are firmer, with 3'97 1/2c. to 4c. asked."

Lead.—Although there is not much demand, the market is decidedly firmer; the offerings are exceedingly light and at such prices as will not permit of much business, a little of which has been done at 4'15, the closing figure at which small quantities of the metal can be obtained. Abroad the market is also firmer, Spanish lead being quoted at £10 5s.@6s. 3s., with English at 2s. 6d. more.

Spelter is again easier, and we quote all deliveries at 4'40@45 East St. Louis, the purity of 4'65@4'70 New York. The foreign market is quoted at £20 15s. for good ordinary brands and at £20 17s. 6d. for specials, the decline being due to an accumulation of supplies without an increased demand.

Antimony is steady at 12 1/2 for Cookson's, 11 1/2 for L. X., and 10 1/2 for Hallett's.

Nickel is quiet at 70c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Aug. 26, 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, August 22d, 1892, and for the corresponding week ending August 20th, 1891. 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 American 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.
	Aug. 22, '91.		Aug. 20, '92.			
	F'cs.	Tons.	F'cs.	Tons.	Tons.	Tons.
Anthracite.....	94	39,454	68	29,000	1,202,165	1,157,365
Coke.....	165	134,151	132	118,100	3,207,713	4,491,775
Charcoal.....	54	11,120	40	8,200	342,887	350,881
Total.....	313	181,705	240	155,200	4,752,765	6,000,021

The characteristics of the pig iron market are very much the same as last week, but if anything the volume of business transacted is greater. Buying is almost entirely hand-to-mouth, and consumers cannot be induced to go in for long contracts. This is about the time of year when the pig iron trade begins to assume its greatest briskness, and the signs of this annual improvement are commencing to show themselves. The output is decreasing, and the consumption is smaller than the output, and is by no means so good as it should be. The price of northern brands continue at \$15, No. 1; \$14, No. 2; \$13, \$13.50, grey forge. The agents of the southern iron manufacturers here are complaining of the poor trade in their productions, and even grey forge of which they have sold considerable quantities in Pennsylvania lately is very dull.

The Carnegie mills at Homestead and in the Pittsburgh are at work again, but the output is, as yet, of small quantity and poor quality. The consumption of pig iron in that district is still therefore much lower than ordinarily. It will probably be many weeks before things are in the same old state of prosperity as they were in three months ago.

Spiegeleisen and Ferromanganese.—There is nothing to report in spiegeleisen. Some dealers in ferromanganese report a fair amount of transient orders, but nothing worthy of note is to be recorded. About \$58 is the lowest price for 80% ferromanganese that would be accepted.

Steel Rails.—Eastern mills report that next to nothing in the way of new business has been transacted during the past week and that there are no signs of inquiries for some time to come. The price is still maintained at \$30 at mill and \$30.75 at tide-water.

Rail Fastenings.—No new business is reported in rail fastenings. The prices are as follows: Fish and angle plates, 1'55@1'65c., at mill; spikes, 1'40@2c.; bolts and square nuts, 2'50@2'70c.; hexagonal nuts, 2'70@2'80c., delivered.

Tubes and Pipes.—The market for tubes and pipes is regular, but nothing in the way of an increase of business is reported. Things are in about the same state as they have been for some time now.

Merchant Iron and Steel.—The market for merchant iron and steel is slow, and does not show much sign of an improvement. Orders are for small parcels chiefly. There is no variation in prices, which stand as follows: Mushet's special 45c.; English tool steel, 15c. net; American tool steel, 6 1/2@7 1/2c.; 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.; toeclarks, 2'25@2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Material.—The market for structural material is in a very healthy condition. The demand for all sorts is excellent and the deliveries are very slow. Eastern mills report a great deal of work which would be expected to go to Carnegie's under ordinary circumstances, and this fact accounts for some of the exceptional briskness which is to be noted everywhere. Prices are stiff especially for quick delivery. They stand about as follows: Beams, 2'3@2'5c., except for 20-inch beams, which are 2'8c.; angles, 2'15c.; sheared plates, 2'0@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.

NOTES OF THE WEEK.

A very large steel billet mill is to be erected at Youngstown, Pa., by the Ohio Steel Company. It is the intention of the company to put up works with a capacity of 1,000 to 1,200 tons daily of soft steel billets exclusively. It is believed that this will be the first complete works in the country built for the special production of billets. All the other billet mills were originally rail mills or else are parts of plants devoted to miscellaneous purposes. The billets produced by this company will be rolled from the initial heat. The stockholders of the company are the various rolling mills in the Mahoning Valley at Youngstown and in its vicinity, who will take the product and work into finished forms.

The details of a big steel combine have just been completed at Wheeling, Pa. The Wheeling Iron and Steel Company, composed of LaBelle, Benwood, and Top Mill companies, and the Wheeling steel plant took formal possession of the four companies

on the 20th of August. The combined capital of the four concerns is more than \$8,000,000. The company will be the largest in the Ohio Valley, after the Carnegies. The projectors of the company state that the combine was made necessary by the efforts of the Carnegie Steel Company to crush out its smaller competitors.

Chicago. August 26.

Mills generally all over the country resuming operations and the latest one to start up in this State is the Tudor Company at East St. Louis, all departments going into operation this week. The beam mill of the Illinois Steel Company, at their North Chicago Works, will start up Aug. 29. The demand for structural material has been such that their usual heavy stocks are nearly depleted. Some sizes are hard to get, and they have a large tonnage contracted. Chicago advancement in shipbuilding is noteworthy and she will soon take a prominent position as one of the great shipbuilding points in the lakes. There are now several first-class steel ships under construction and contracts for two or three more are under consideration. One boat for the America-Brazil syndicate is well under way, and will be ready for service Nov. 1. The "Maritana," of 4,500 net tons, belonging to the Minnesota Steamship Company, will make her maiden trip to Escanaba for ore for the Illinois Steel Company this week. Her dimensions are: Keel, 330 ft., 353 ft. over all; beam, 45 ft.; hold, 24 ft., making the largest ship on these inland seas.

Pig Iron.—While it cannot be said that the market is actually dull, it is nevertheless marked by a quietude characteristic of the season and that which usually succeeds an active buying movement. There is, however, every indication that consumption is well maintained, which is borne out by the fact that contract iron is freely taken and in some instances smelters are urging more prompt shipments. Local coke iron is in fair demand in small quantities from carloads up to several hundred tons; for such amounts orders are frequent. There are also several round lots pending—500 to 1,200 tons—which will be placed this week. Competition is sharp and it is somewhat difficult to find out what prices are made, as concessions are the rule. Lake Superior charcoal iron is very quiet, so far as regards new business, but deliveries on contracts are large. Southern iron is in some demand and prices on most all brands and grades rule low. There are many influences at work which combine to render the market weak and unsatisfactory as a whole. Regular quotations are no criterion as to what prices govern on actual sales.

Quotations per gross ton f. o. h. Chicago are: Lake Superior charcoal, \$16.55@17.00; Lake Superior coke, No. 1, \$14.50@15; No. 2, \$14@14.25; No. 3, \$13.75@14; 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 silverles, 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.—Increased inquiry is noted for billets since mills have resumed and prices are steady at \$24.20. Rods are quoted at \$34 and mills here well sold up.

Structural Iron and Steel.—Demand is active and consumers are busy endeavoring to cover on central work. The starting up of beam mills will soon relieve the situation. Regular quotations, car lots f. o. h. Chicago, are as follows: Angles, \$2@2.25; tees, \$2.30@2.40; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.25@2.50.

Plates.—Some large orders are expected for ship plates which will probably be placed with Eastern mills. Demand for boiler and tank steel is good from mill and warehouse. 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 1/2 in. and smaller, 60%; 7 in. and upward, 70%.

Merchant Steel.—There is a good demand for steels for immediate shipment as well as for later delivery. Much of this was unexpected, as the regular season is nearly over. Tool steel of better grades are 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.—Business is all that could be desired from mill and warehouse, though discounts are lower at 7 and 5% off on mill lots, and 6 1/2% on Juniata, and 6 1/2% and 5% off on charcoal from warehouse.

Black Sheet Iron.—Demand is excellent and some jobbers are already placing supplementary orders, and shipments from stock large. Quotations remain steady at 2'90@2'95c. for No. 27 Common, f. o. h. Chicago. Steel sheets are 10c. higher. Dealers quote 3'10@3'20 from stock, same gauge.

Bar Iron.—Some large contracts have been given out during the week, ranging from 250 tons to 1,200 tons, and these were not on car specifications either. Quotations range from 1'62 to 1'64c., and some mills

ask 1'70c Chicago for quick shipments. Demand is fairly active from both consumers and jobbers; the latter quote 1'90@1'95c. rates from stock.

Nails.—Steel cut are in good demand from manufacturers and from jobbers at \$1.60@1.62 1/2, 30c. average, and \$1.70 from stock. Wire nails are in better inquiry from factory at 1'70@1'72 1/2 base Chicago, and 1'80@1'85 from stock.

Steel Rails.—Orders for steel rails are still confined to small lots. The outlook is not particularly bright, though if some of the business pending goes through, a good tonnage will be assured for late delivery. Quotations are unchanged at \$31@32. Track supplies are moving in small quantities 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.—Outside of a few sales for future delivery, there is nothing doing. Quotations are nominal, No. 1 railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$9.50; fish plates, \$17; axles, \$19; horseshoes, \$15.50; pipes and flues, \$7; cast borings, \$6.50; wrought turnings, \$9; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.60; coil steel, \$14; leaf steel, \$15; tires, \$14.50.

Old Material.—Not a sale of iron rails is reported, and but few offerings. A fair quotation would be \$17.71@18. Steel rails are a drug at \$12@14, as to condition, etc. Car wheels are inactive at \$14.50@14.75.

Louisville. August 26.

(Special Report by Hall Brothers & Co.)

A very quiet market has prevailed during the past week, with no indication for any early improvement in prices. It is conceded that any general active buying movement would bring about enhanced prices. It is also undoubtedly true that an advance, well founded, would create an active buying movement, but the query is how can this be brought about. The trade has been accustomed for so long a time to make each purchase lower than the one previous, that they hesitate lest they might lose a bargain, consequently in place of the consuming trade carrying a portion of the surplus stocks, as they did formerly, they now buy from hand to mouth and let the producers carry the burden. This can and will of course right itself in time, but meantime prices will drag.

Hot Blast Foundry Irons.—Southern coke No. 1, \$13@13.50; Southern coke No. 2, \$12.25@12.50; Southern coke No. 3, \$11.75@12; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.00@15.50.

Forge Irons.—Neutral coke, \$11.50@12.00; cold short, \$11.25@11.50; mottled, \$10.75@11.

Car Wheel and Malleable Irons.—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.50.

Philadelphia. August 26.

(From our Special Correspondent.)

Pig iron conditions are slowly improving under increasing consumption, but at the rock-bottom prices of July. The large stocks make buyers feel comfortable in view of the reduced output. Several offerings continue to be made from southern quarters without much selling. Makers anticipate an active demand in September. No. 1 is \$15, \$15.50; No. 2, \$13.25 to \$14.25; forge, \$12.50, \$13.25; phosphorus, \$17.25; Bessemer, \$16.50.

Muck Bars.—Business is active at \$25.25.

Billets.—Actual sales are light, but anticipations of big business at a slight advance are entertained in many quarters. Quotations range from \$26@27.

Merchant Iron.—Work is abundant at all points at prices ranging from 1'60 to 1'85. It is doubtful whether the present strong tone will continue as long as was thought two months ago.

Nails.—Nails continue active.

Skep.—A moderate amount of business is done at 1'60 for ground and 1'75 for sheared.

Pipe.—Small orders are received at 60 and 10 for butt welded.

Sheet.—Sheet mills are doing a fair business and at good prices. Card rates 2'40@3'50 for best refined.

Plates.—For immediate deliveries prices are high and firm at 2@2'10 for iron or steel tank. For late deliveries the same firmness does not exist, as manufacturers are anxious for large orders.

Structural Material.—Quotations are firm and likely to creep up a little further to new comers who want iron quickly delivered. Mineral plates have been booked at 2'15. Beams, tees and channels, 2'30@2'40.

Steel Rails.—There is nothing to report.

Old Rails.—The market is well supplied at \$19.50 for iron and \$16 for steel.

Scrap.—A liberal supply of railroad is offered at \$17.

Pittsburg. August 25.

(From our Special Correspondent.)

Raw Iron and Steel.—There has been but little appreciable change in the condition of the iron market since our last report. For certain description of material the demand is improving. The labor troubles are slowly but certainly drawing to a close. The time for inaugurating the fall trade is near at hand; during the week a number of plants

have started up, some on single turn, others on double. This movement has given employment to thousands of workmen, most of them having been idle since the first of July. The change from intensely warm to temperate weather will undoubtedly have an invigorating effect on trade generally. A better feeling has already been aroused and confidence of a much healthier character than has been obtained for some time past is making its appearance. Cheerfulness quickly generates a better tone. Production will have to come down.

The demand for all kinds of finished material still continues large, and with most of the mills full of work there is certainly a bright outlook for this branch of trade. There has been no material increase in the request for pig iron, but the great activity in manufactured iron and steel, and the fact that the weekly output of the furnaces has shown a marked falling off, argue strongly for higher prices for crude material. There is a firmer feeling on the part of leading producers in various sections, but the offerings on the part of the Southern furnaces, at prices below anything previously reported, tend to keep values at their present low level. Many consumers appear to take a different view as to the future course of the market and limit their business in pig iron to the actual requirements of the purchasers who do not seem to look very far ahead in regard to these supplies. There is another class of consumers who take an advanced view of this subject. Many of them have made liberal purchasers of billets. Bessemer and mill iron, as the sales published in this paper, show this fact. Stocks of unsold pig iron continue heavy throughout the country, but the decreasing production and the increasing consumption will tend to eliminate in a measure this important check to improved prices. Finished material holds up better than might have been expected, at the same time the crude article has been less responsive than was looked for. But it is a difficult market to estimate as regards its immediate movements, although it is confidently expected to turn out favorable as the season advances.

There is a vast amount of business in sight, and in hand, and prices will soon begin to show an encouraging degree of firmness. There is irregularity, of course, and in places where strength was confidently looked for it has failed to materialize; but on the other hand there is increased strength where weakness would not have caused any surprise. The scale being signed by the "Valley Mills" work has been resumed in many of them; others will follow just as soon as the necessary arrangements can be made. The outlook taken as a whole, is decidedly more favorable. There is a larger inquiry and sales show up fairly well. There are a few sales of Grey Forge at a slight advance over last week's prices. The amalgamated men are beaten at Homestead beyond a doubt; some parties are disposed to deny it—the fact still remains.

Coke Smelted Lake and Native Ores.

2,000 Tons Bessemer, City Furnace.....	\$14.00 cash.
2,000 Tons Grey Forge, Sept., Oct.....	12.50 cash.
1,500 Tons Grey Forge, City Furnace.....	12.50 cash.
1,500 Tons Grey Forge, City Furnace.....	12.50 cash.
1,000 Tons Grey Forge, City Furnace, Sept.....	12.50 cash.
1,000 Tons Grey Forge.....	12.50 cash.
1,000 Tons Bessemer, City Furnace.....	14.00 cash.
1,000 Tons Bessemer, at Valley Furnace.....	13.75 cash.
1,000 Tons No. 2 Foundry, City Furnace.....	13.75 cash.
1,000 Tons Bessemer, City Furnace.....	14.00 cash.
500 Tons Grey Forge, City Furnace.....	12.50 cash.
500 Tons Grey Forge, City Furnace.....	12.55 cash.
500 Tons Grey Forge.....	12.60 cash.
500 Tons Bessemer.....	3.90 cash.
250 Tons Off Bessemer.....	13.50 cash.
200 Tons No. 2 Foundry in Valley.....	13.50 cash.
200 Tons No. 1 Foundry, City Furnace.....	14.50 cash.
200 Tons in No. 2 Foundry, City Furnace.....	13.75 cash.
200 Tons No. 2 Foundry, City Furnace.....	13.75 cash.
100 Tons No. 3 Foundry.....	13.00 cash.
100 Tons Grey Forge.....	12.75 cash.

Steel Slabs and Billets.

1,500 Tons Billets, Sept., f. o. h. at mill.....	23.00 cash.
1,000 Tons Steel Billets, Nov., f. o. h. at mill.....	23.25 cash.
1,000 Tons Billets, Sept., Oct., f. o. b. at mill.....	23.00 cash.
1,000 Tons Billets, Sept., Oct., Nov., at works.....	23.25 cash.
500 Tons Billets, delivered.....	24.25 cash.
500 Tons Billets, Sept.....	23.75 cash.

Charcoal.

100 Tons No. 1 Foundry.....	20.00 cash.
100 Tons No. 2 Foundry.....	19.00 cash.
100 Tons Cold Blast.....	26.00 cash.
100 Tons No. 3 Foundry.....	19.00 cash.
75 Tons No. 2 Foundry.....	19.00 cash.

Muck Bar.

500 Tons Neutral, prompt.....	24.90 cash.
375 Tons Neutral, prompt.....	24.80 cash.
150 Tons Neutral, prompt.....	25.00 cash.
150 Tons Neutral, Nov.....	25.00 cash.

Steel Skep.

500 Tons Wide Grooved.....	1.47 1/2 6 m.
250 Tons Wide Grooved.....	1.50 4 m.

Blooms, Beams and Billet Ends.

375 Tons Billet Ends.....	15.50 cash.
200 Tons Beam Ends.....	15.25 cash.
100 Tons Beam Ends.....	15.50 cash.

Steel Wire Rods.

500 Tons American Fires, Soft, at Mill.....	32.00 cash.
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Sheet Bars.

500 Tons Sheet Bars, Sept. to Jan.....	29.50 cash.
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Old Iron and Steel Rails.

550 Tons American Ts, in Valley.....	19.00 cash.
500 Tons Old Steel R. ls, long lengths.....	16.10 cash.
500 Tons Old Steel Rails, short lengths.....	15.50 cash.
200 Tons Old Steel Rails, short lengths.....	15.00 cash.

Scrap Material.

475 Tons No. 1 W. R. R. Scrap, net.....	14.00 cash.
250 Tons Leaf Scrap, gross.....	19.75 cash.
200 Tons Coil Springs, gross.....	18.00 cash.
100 Tons Iron Axles, net.....	19.50 cash.
100 Tons Cast Borings, gross.....	9.00 cash.

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

Table with columns for Name and Location of Company, Aug. 20-26, and Sales. Includes entries for Adams, Colo., Alice, Mont., and various other mining companies.

*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 8,230. Non-dividend shares sold, 3,700. Total shares sold, 11,930.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Aug. 19-25, and Sales. Includes entries for Atlantic, Mich., Bonanza Development, and various other mining companies.

Dividend shares sold, 4,504. Non-dividend shares sold, 2,419. Total shares sold, 6,923.

COAL STOCKS.

Table with columns for Name of Company, Aug. 20-26, and Sales. Includes entries for Cambria Iron, Cameron Coal & I. Co., and various other coal companies.

Total shares sold, 569,339.

San Francisco Mining Stock Quotations.

Table with columns for Names of Stocks, Aug. 19-25, and Sales. Includes entries for Alpha, Alta, Belcher, and various other mining stocks.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date & amount of last), and NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last).

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 of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. ¶ This company paid \$190,000 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. Aug. 20. The closing quotations were as follows: Agnes C., Argenta Juneta, Aspen Deep Shaft, Aspen Contact, Best Friend, Bimetallic, Bushwacker, Carbonate Chief, Empire Champion, Justice, Little Annie, Mollie Gibson, Nolan Creek, Park, Mamie & Queen, Pontiac, Sheep Mountain S. & M. Co., Smuggler, St. Joe & Mineral Farm, Yellow Boy.

Baltimore, Md. Aug. 25.

COMPANY. Atlantic Coal, Balt. & N. C., Big Vein Coal, Conrad Hill, Cons. Coal, Diamond Tunnel, George's Creek Coal, Lake Chrome, Maryland & Charlotte, North State, Silver Valley.

Pittsburg, Pa.

Prices highest and lowest for the week ending Aug. 25:

COMPANY. Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas., Columbia Oil Co., Consolidated Gas Co., East End Gas Co., Fisher Oil Co., Forest Oil, Hazlewood Oil Co., Hidalgo Mining Co., La Noria 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., Pine Run Gas Co., Pittsburg Gas Co., Red Cloud Mining Co., Silverton Mining Co., South Side Gas Co., Sterling Silver Mining Co., Tana Oil Co., Union Gas Co., Washington Oil Co., W'moreland & Camb., Wheeling Gas Co., W'house A. Light, W'house Air Brake Co., W'house Brake Co., Ltd.

Deadwood, August 20.

Bullion, Caledonia, Calumet, Cambrian, Caribage, 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, Spanish R., Stewart, Tornado, Troy.

St. Louis. Aug. 24.

The closing quotations were as follows:

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 highest and lowest for week ending Aug. 20:

Bald Butte (Mont.), Benton Group, Mont., Bi-Metallic, Mont., California (Castle), Mont., Champion (Oro Fino), Mont., Combination (Phillips), Mont., Copper Bell (Cataract), Mont., Cornucopia, Mont., Cumberland (Castle), Mont., Elizabeth (Phillipsburg), Mont., Florence (Neihart), Mont., Fourth of July, Wash., Glengary (Butte), Mont., Helena & Victor, Mont., Ingersoll, Mont., Iron Mountain (Missoula), Mont., Jersey Blue (Butte), Lone Pine Consolidated, Moulton, Mont., Polaris (Beaverhead Co.), Mont., Poorman (Coeur d'Alene), Idaho, Queen of the Hills (Neihart), Southern Cross (Deer Lodge), Mont., Whitlach Union & MacIntyre, Yellowstone (Castle), Mont.

Foreign Quotations.

London. August 18.

Alaska Treadwell, Amador, Cal., American Belle, Colo., Appalachian, N. C., Can. Phosphate, Can., Colorado, De Lamar, Idaho, Dickens Custer, Idaho, Eagle Hawk, East Aravao, 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., Kohmor, Colo., La Luz, Mex., La Plata, Colo., La Valera, Mex., Maid of Erin, Colo., Mammoth Gold, Ariz., Mount McClellan, Montana, Mont., Mona Lake Gold, New California, Colo., New Consolidated, 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, Plumas Eureka, Cal., Richmond Con., Nev., Ruby, Nev., Sam Christian, N. C., Sierra Buttes, Cal., Plumas Eur., Cal., Silver King, United Mexican, Mex., West Argentine, Colo., Yankee Girl, Colo.

Paris. August 11.

East Oregon, Ore., Forest Hill Divide, Cal., Golden River, Cal., Laurium, Greece, Lexington, Mont., Nicksel, New Caledonia, Rio Tinto, Spain, Tbarsis, Spain, Vieille-Montagne, Belgium.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, No. 3, pure, 1,040, Chromic, chem pure, Hydrobromic, dilute, U. S. P., Hydrocyanic, U. S. P., Hydrofluoric, U. S. P., Alcohol-95%, Absolute, Ammoniated, Alum-Lump, Ground, Powdered, Lump ton, Liverpool, Amalgamating solution, Ammonia-Sul., in bbl. lots, Carbonate, white, English and German, Muriate, white, in bbls., Aqua Ammonia-(in cbsys), Antimony-Oxymur., Regulus, Arsenic-Red, powdered, Arsenic-White, powdered, Red, Yellow, White at Plymouth, Asbestos-Canadian, Italian, Ashes-Pot, 1st sorts, Pearl, Asphaltum-Prime Cuban, Hard Cuban, Trinidad, refined, Egyptian, Californian, at mine, at San Francisco, Barium-Carbonate, pure, Chlorate, crystal, Chloride, commercial, Iodide, 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, Bichromate of Potash-Scotch, Bichromate of Soda, Borax-Refined, San Francisco, Concentrated, in car lots, Refined, Liverpool, Bromine, Cadmium Minion, Cadmium Iodide, Chalk, Precipitated, China Clay-English, Domestic, Chrome Water, Chrome Yellow, Chrome Iron Ore, Francisco, Chromalum-Pure, Commercial, Cobalt-Oxide, Copper-Sulph. English Wks. ton, Vitriol (blue), ordinary, extra, Nitrate, Copperas-Common, Best, 100 lbs., Liverpool, Corundum-Powdered, Flour, Cryolite-Powdered, Emery-Grain, Flour, Epsom Salt, Feldspar-Ground, Fluorspar-Powdered, No. 1, French Chalk, Fuller's Earth-Lump, Glauber's Salt-in bbls., Glass-Ground, Gold-Chloride, pure, crystals, oz., pure, 15 gr. c. v., doz., liquid, 15 gr. g., s. v., doz., Chloride and sodium, 15 gr. c. v., doz., Oxide, oz., Gypsum-Calcined, Land Plaster, Iodine-Resublimed, Iron-Nitrate, 40%, 47%, Kaolin-See China Clay, Kieserite, Lead-Red, American, White, American, in oil, White, English, in oil, Acetate, or sugar of, white, Granulated, Nitrate, Lime Acetate-Am. Brown, Gray, 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-bbl, Metallic Paint-Brown ton, Red, Mineral Wool-Ordinary slag, Ordinary rock, Ground, Mica-In sheets according to size, 1st quality, Naphtha-Black, Nitre Cake-ton, Ochre-Rocbelle, Washed Nat Oxfrd. Lump, Washed Nat Oxfrd. Powder, Golden, Domestic, Oils, Mineral-Cylinder, light filtered, gal., Dark filtered, gal., Extra cold test, gal., Dark steam refined, gal., Phosphorus-Red, Precip., red, white, Plumbago-Ceylon, American, Potassium-Cyanide, Bromide, domestic, Chlorate, English, Chlorate powdered, English, Carbonate, by casks, Caustic, lb., pure slick, Iodide, Nitrate, refined, Bichromate, lb., Yellow Prussiate, Red Prussiate, Pumice Stone-Select lumps, Original cks., Powdered, non-cuprous, p. units, Pyrites-Non-cuprous, Quartz-Ground, Rotten Stone, Powdered, Lump, Original cks., Rubbing stone, Sal Ammoniac-lump, in bbls., Salt-Liverpool, ground, Domestic, fine, Common, fine, Turk's Island, bush, Salt Cake-ton, Saltpetre-Crude, Soapstone-Ground, Block and slab according to size, Sodium-Prussiate, Phosphate, Stannate, Tungstate, Hyposulphite, in casks, Strontium-Nitrate, Sulphur-Roll, Flour, Sylvinit, 23@27%, S. O. P., per unit, Tale-Ground French, American No. 1, Terra Alba-French, English, American, No. 1, American, No. 2, Tin-Crystals, in kegs or bbls., feathered or flossed, Muriate, single, Double or strong, 64° B., Oxy, or nitro., Vermillion-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-lb., 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., Didymium-(Metallic), per gram, Erbium-(Metallic), per gram, Gallium-(Metallic), per gram, Glucinum-(Metallic), per gram, Iridium-(Metallic), per gram, Itridium-(Metallic), per oz., Lanthanum-(Metallic), per gr., Lithium-(Metallic), per gram, Magnesium-(Powdered), per lb., Manganese-(Metallic), per lb., Chem. pure, per oz., Molybdenum-(Metallic), per gm., Niobium-(Metallic), per gram, Osmium-(Metallic), per oz., Palladium-(Metallic), per oz., Platinum-(Metallic), per oz., Potassium-(Metallic), per lb., 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 gram, Tungsten-(Metallic), per lb., Uranium-(Oxide), per lb., Vanadium-(Metallic), per gm., Yttrium-(Metallic), per gram, Zirconium-(Metallic), per oz.