

THE ENGINEERING AND MINING JOURNAL



Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. LIV. SEPTEMBER 17. No. 12.

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THE SCIENTIFIC PUBLISHING CO., Publishers.

SUBSCRIPTION PRICE

Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$7.

Monthly Export Edition, all countries, \$2.50 gold value per annum. REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

THE SCIENTIFIC PUBLISHING COMPANY.

OFFICERS: R. P. ROTHWELL, Pres. & Gen'l Mang. SOPHIA BRAEUNLICH, Sec'y & Treas. P.O. Box 1833. 27 Park Place, New York. Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition

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THE article on the Calculation of Charges for the Lead Blast Furnace, published September 3d, taken from the forthcoming "Metallurgy of Lead" by Prof. H. O. HOFMAN, undoubtedly the best work on the subject yet written in any language...

Unfortunately, a table which should have accompanied and was referred to in the article in the JOURNAL was omitted, but we publish it in this issue in order to complete the extract from Prof. HOFMAN's admirable work.

WHEN we consider the strained relations between the employers and the employed existing at present in many parts of our country, it is pleasant and instructive to read of the action of German workmen, so often referred to by our agitators as downtrodden, degraded and oppressed by their masters...

A monument had been previously erected by the town, yet so great was the veneration of these workmen that they determined to erect another, built by the product of their own toil, to the memory of their friend as well as employer.

Mr. F. A. KRUPP showed that he is a worthy successor of his father and proposes to carry out his benevolent plans, by subscribing \$120,000 to erect a number of cottages for invalided workmen and for the widows of men who had died in his employ.

IT IS hardly surprising after the success of Gen. BENJ. F. BUTLER in lending his name to unsound companies with perfect immunity from disastrous consequences that other citizens of Massachusetts should follow his example. The latest to do this are the Hon. ANDREW J. WATERMAN, president of the Pittsfield National Bank, and JOSEPH H. ALLEN, of Boston, Mass., president and treasurer respectively, of the Black Wonder Gold and Silver Mining Co., of Hinsdale County, Colo., to the utter worthlessness of whose property we have repeatedly called the attention of investors.

We are told in parentheses that the dyke is a true fissure vein as well as a dyke, but without discussing this peculiar view, we fear that the investors will miss their money almost as much as this poor, almost relationless dyke must miss its sister in Austria. We do not wish to be hard on one who is apparently of the feminine gender, but we have no hesitation in repeating our former remarks, that the Black Wonder and its black trachyte dyke are unqualified humbugs.

THE TREATMENT OF ZINC-LEAD-SULPHIDE ORES.

The abstract of the report of Dr. SCHNABEL on the zinciferous ore of the Barrier Range, Australia, which we print in this issue of the ENGINEERING AND MINING JOURNAL, will prove extremely valuable to many of our own miners; for his resumé of existing processes for the treatment of these complex sulphide ores, many occurrences of which exist in this country, is the most complete that has yet been written.

Concentration and electrical methods are dismissed at once by Dr. SCHNABEL, and a recommendation is made of a wet process involving the use of sulphurous or sulphuric acid as a sulphating agent, either rare agent to be derived from the roasting of the sulphide ores.

The metallurgists of the company, however, are not confident of suc-

cessful results from the adoption of the distinguished scientist's plans, and with the directors' approval propose to offer a substantial prize for the discovery or demonstration of a process which will successfully and economically work these ores. This opportunity will certainly stimulate the efforts of metallurgists the world over. The reward of the successful metallurgist is not to be measured by the prize of the Australian Company; large bodies of similar ore, at present unworkable, are to be found in nearly all silver-lead mining districts in every part of the world. It is an extremely important question, and Doctor SCHNABEL's contribution to its solution, which we are enabled through the courtesy of the Proprietary Company to lay before our readers, will be highly valued by metallurgists.

#### LABOR AND SCIENCE.

Doubtless, some people sincerely believe that special privileges and protections must be granted to a certain, somewhat ill-defined, minority of wage-earning workers; that the wage system must be radically changed in justice to this class; and that the established principles of legal responsibility must give way in its favor. Such honest and earnest thinkers have been led to believe that the progress of civilization has brought peculiar hardships to the wage-earner. Labor, they say, has become, by the use of machinery, so highly specialized in many industries that the workman, having acquired skill at a particular subordinate operation only, can do nothing else; depends upon that one thing for his livelihood; and has therefore acquired a "moral" or "equitable" claim to be continued in his occupation, irrespective of the wishes or the voluntarily assumed obligations of his employer. Nobody has ever proposed a practicable application of the principle (unless thoroughgoing Socialism is practicable). I have never heard anybody advocate it for his own business. It is invariably for "large establishments, like that of the Carnegies," or for "vast railway systems," or for the "operations of great corporations," that the proposition is set up. Nor do I hear any suggestion that if the workman should be guaranteed in his continued employment, the employer is entitled to a corresponding guaranty. The vague talk about "arbitration," in this connection, seems to mean that if employés (not under legal contract otherwise) refuse to continue work on the same or lower terms, and the employer (likewise not under special voluntary contract) declines to yield to their wishes, the question of the terms he should offer ought to be settled by a committee; after which the workmen who are not suited can peacefully go away, while the employer must keep and pay those who choose to stay! A decision unfavorable to him binds him: a favorable decision brings him no benefit.

It is easy enough to show the impracticability of any such scheme, proposed as a comprehensive and obligatory system. And it is easy to show (as I may take another occasion to do) that the various examples of co-operation, profit sharing, joint ownership, joint management, government by arbitration, or other arrangements for increased permanency of the relation between employer and employed, even if they were all and always successful (as they unquestionably are not), would furnish no argument for a general reconstruction of the legal rights and responsibilities of individuals. Three significant facts destroy their value for such a purpose: First, when they are successful it is by reason of local conditions which do not exist for industries in general; secondly, they are always voluntary agreements, created and maintained because they suit both parties, and therefore utterly irrelevant as arguments for any scheme of a forced arrangement; thirdly, their great variety of details is a significant proof that the atmosphere of individual liberty and responsibility is the only one in which such adjustments can thrive.

But I wish at this time to examine the ground on which the theorists base their proposals of radical change: the proposition, namely, that the progress of science has so changed the condition of the wage-earner as to require some corresponding general remedy. They may, perhaps, admit the difficulty of applying their particular cure; but they turn triumphantly upon us, saying, "Here is the colossal evil; something has got to be done; now what else do you propose to do?"

At my present stage of enlightenment, and with regard to the lines of business with which I happen to be acquainted, I answer, frankly: "Nothing at all, except to stop fooling!" And my further answer is, that the alleged evil, in the spheres known to me, practically does not exist. It is not easy to conceive a more humiliating occupation for enthusiastic philanthropists than a crusade in behalf of impracticable reforms for imaginary evils. Yet that is exactly what the proposition now under consideration amounts to, from the partial, yet not inconsiderable, range of my observation. Let us look at the facts.

1. Skill, as distinguished from science, may be defined as an unreasoning aptitude, or a habit, acquired by practice. The merely skillful workman knows, under familiar conditions, what to do, but not why to do it. And skill, even in those who know, or have known, the reason of their acts, is expressed in an automatic action of brain or hand, which supercedes reasoning.

2. The operations of skill in any department are always very impressive to those who have not that particular kind of skill; and skill is conse-

quently always more or less overrated by the laity. The man who can add a column of three figures at a glance, almost "without thinking," looks with awe upon the blacksmith who knows, "without thinking," just how to make a horse shoe, and *vice versa*! Every man of middle age realizes how little mystery there is in his own acquired readiness, but cannot help wondering at the accomplishments of other people.

3. The time required for acquiring skill has been overrated since the Middle Ages, when a trade was really a "mystery," and its few recognized principles and many dogmatic traditions were handed down as a secret trust. The old guilds did indeed take pride (as their modern successors usually do not) in turning out thorough workmen; but they occupied, partly through ignorance and partly for their own convenience, a much longer period for the purpose than would now, at least, be required.

4. Contrary to the impression prevailing in some quarters, the tendency of scientific improvement, and notably of the introduction of machinery in manufacturing industries, has been to diminish the need of skill. Instead of being more difficult, it is now (apart from foolish and tyrannical artificial restrictions) less difficult than ever for a man to change his occupation. And the increased facility of change is, so far as my observation goes, proportional to the scientific improvement of the industry concerned. It is fortunate that such is the case; for the ideas and inventions of a century, bearing fruit simultaneously during the last twenty years, have forced nearly one-half the labor of the civilized world to seek, not merely new engagements in the old occupations (which was formerly the usual style of change), but new occupations altogether. These stupendous effects exceed those of all other causes, such as currency, coinage, tariffs and special legislation, put together; and no man who appreciates them can fail to perceive that the undeniable improvement which has taken place in the condition of wage-workers, in spite of the great incidental losses involved in the revolutionary change of so many industries, would not have been possible if science, which made such change necessary, had not made it also practicable.

5. Direct evidence is not wanting to confirm this *a priori* argument. Why is it that so many non-union workmen are available at once (unless prevented by threats or force) to take the places made vacant by a strike? It is not because there is at all times an army of men, accustomed to that particular occupation only, and out of work, but because it is possible for men not so accustomed to learn the comparatively simple duties involved. At the Homestead mills, clerks and college graduates are successfully doing the "skilled" work of which they knew a few weeks ago nothing at all. Not even great muscular strength is required of them. Machinery lifts and hauls and handles everything for them, and their actual exertion is mainly in the handling of levers to set that machinery in motion.

6. I make no sweeping assertion that "skill" has been superseded in all industries, or entirely in any one industry; but I assert as an indisputable fact that this has occurred in a vast number of instances, and that it is the characteristic effect of scientific improvements to generalize, not to specialize, ordinary labor. In place of the qualification of skill, to be acquired by practice in a given occupation only, the chief requirements are now general intelligence and fidelity. The chemist, the metallurgist and the mechanical engineer can give directions for the production of a desired result with greater certainty than mere skill could compass. What they need is to be sure of the faithful and intelligent execution of such directions.

7. These supreme requirements of intelligence and fidelity do not belong to any particular trade-training. They can be developed in one occupation for use in another; and they are everywhere more important than skill, even where skill is still highly important. For instance, in an industry supposed to be controlled by the laboratory, the draughting-room, and the orders of the directing metallurgist or engineer, a workman who, being "skilled," knows too much to obey orders, and takes his own way without saying anything to anybody, is likely to do more harm than good, even though he be right in his particular action, as tested by its immediate results. For his practical knowledge, which might be highly valuable as affording data for scientific study, if communicated to his employers, becomes, when merely acted upon in secret, a source of error to those who may be led to attribute the results to other causes.

8. Now, the intelligence to comprehend directions, and the fidelity to execute them, are personal and individual virtues. Membership in a given "union" does not confer or guarantee them; and, unfortunately, many labor unions (not all) seem scarcely to recognize them as essential. Yet men who have proved themselves intelligent and faithful are not only unlikely to lose employment in one place, but likely to obtain it without difficulty in another.

9. Under the head of fidelity should be included a due regard for the interest of the employer, as part of an honorable fulfillment of the contract made with him. This need not be regarded as a moral virtue merely, though I think "business principles" are based on moral laws. But, to look at it in a purely selfish light, I have shown, in my article on "Labor and Business," that employer and employés have common interests as against competitors and consumers. If the workman ignores these, while thinking only of immediate gain for himself—if the labor

union studies incessantly and only how to get more pay for less work—no just or permanent arrangement is possible, because an irresistible natural law is defied; the law, namely, that the progress of science makes the value of labor more and more dependent upon brains and moral qualities.

10. Many of the labor conflicts of recent times are essentially futile attempts to resist this law. But the law is beneficent, as well as omnipotent. At another time it may be convenient to inquire what real hardships are caused by its operation, and to what extent any of them can be artificially mitigated. For the present I stop with the declaration that science has both necessitated and facilitated the mobility of labor; and that, since such perpetual changes must be, it is evidently the part of wisdom, not to wage useless and costly resistance to them, but to try to make them easy, and to diminish the friction which attends them.

R. W. R.

#### THE TARIFF ON SILVER LEAD ORE.

In our issue of July 27, 1889, in commenting upon the rules issued by the Treasury Department on July 17, governing the entry of silver-lead ores into this country, we said "ultimately the basis for duty rating will probably come to be recognized as the actual cost price of the lead in the ore, with the necessary checks on the accuracy of these invoices, just as is done with all other goods imported."

This prediction is now an accomplished fact, the Board of General Appraisers having recently decided that "if possible the classification of the ore should be determined by the value of its components at the time and place of importation."

As a review of the legislation and rulings on this class of ore cannot fail to be of interest to our readers we give it, the more willingly in that such a summary shows how just was our position three years ago, notwithstanding the abundant abuse showered upon us by the Western newspapers at that time.

By the Tariff act of 1883, lead ores and lead dross imported into the United States paid a duty of 1½ cents per pound. (Vide section 2,502 Revised Statutes, Schedule E, 188.) Silver ores were by the said act admitted free. Following the enactment of this law the importation of Mexican silver-lead ores, used in smelting our dry silver ores, assumed considerable importance, over 70,000 tons of ore being imported through El Paso in 1888.

Meanwhile, certain owners of carbonate of lead mines in this country, wishing to exclude competition to their ores, sought to exclude Mexican ores by having them classed as lead ore, dutiable at 1½ cents a pound, instead of silver ore which came in free. Under rulings made from time to time the ores imported from Mexico had been classed as silver ores and admitted free, but so great was the opposition they raised that on June 11, 1888, a Senate resolution was passed, asking the Judiciary Committee to report upon the subject. Senator EDMUNDS, the chairman of the committee, handed in its report in July. It stated "that lead ore in a legal and commercial sense is dutiable at 1½ cents per pound," but in regard to ores of gold and silver containing lead it said, "When such ores contain more lead in quantity but less in value than the gold and silver the lead is not subject to duty."

There was much discussion as to this decision for which we refer our readers to the JOURNAL of that year and 1889. It being proposed to change the law and put a duty on this class of ores, a hearing of both advocates and opponents of such a duty was held by Secretary of the Treasury WINDOM in May, 1889. At this meeting, the advocates of free ores, the men who had built up a large smelting industry and were using the foreign silver-lead ores, proved conclusively that as far back as 1880, Secretary SHERMAN had decided that the value of the silver determined the classification, and that if the value of the silver predominated the ore was free (Synopsis 4,491); that Assistant Secretary FAIRCHILD held the same view in 1886 (Synopsis 7,327, 7,543), and the Director of the Mint, in 1888. To this was added the report of the Judiciary Committee in July of the same year.

Notwithstanding this clear proof the Treasury Department issued a circular of instructions (Synopsis, 9,492) to the Collectors at El Paso and other places of entry, which, while ostensibly making clear the provisions of the law, in reality offered many difficulties—as it was intended to do—to the further importations of lead ores. The instructions given were vague and in many cases impracticable, as we at the time pointed out. It was in commenting upon this circular that we made the prediction given above. Importers, however, did derive one great benefit from these instructions. Paragraph 5 said that the officer in charge shall obtain proper and adequate samples upon which to make the classification. Up to this time only "grab" samples had been taken with the result that frequent fault was found with the appraisement and many protests entered.

The other paragraphs of these "instructions" were unqualifiedly bad, more especially the 6th, which has given rise to much trouble. Part of it was to this effect: "It is further advised that in determining the relative values of silver and lead contained in the same ore the value of the silver component, in the absence of more accurate data in the invoice or otherwise, be rated at 95 per cent. of the latest known value of silver in

the New York market, and the value of the lead component at the latest known price of bar lead in the same market less one cent per pound." The chief objection to this ruling was that the price so obtained for lead would be far too high, and would consequently cause the ore to be classed as a lead ore, on which a duty of 1½ cents per pound would be exacted. The very object of the "instruction" was to exclude ores which came in under the old rulings.

The question remained in this condition until the passage of the McKinley Bill on Oct. 1, 1890. This law enacted the following duties: "Paragraph 199.—Lead ore and lead dross 1½ cents per pound; provided that silver ore containing lead shall pay a duty of 1½ cents per pound on the lead contained therein, according to sample and assay at the port of entry."

This would seem simple enough. Lead ores pay a duty of 1½ cents per pound on the ore, whether it contained much or little lead; silver-lead ores to pay the same duty on the lead contained in the ore. But the question again appeared, What is a lead, and what a silver ore? Various rulings were made by the collectors of El Paso, Eagle Pass and San Francisco which gave rise to protests concerning the classification of silver-lead ores. The objection was also made that in estimating the value of lead in the ore, according to the Treasury circular of instructions of July 17, 1889, many silver ores were classed as lead ores. These protests came before the Board of General Appraisers in 1891, the points raised by the appellants being: 1st, The method of sampling; 2d, the high value given the lead, in consequence of the old ruling of 1889. General Appraiser Wilkinson, in handing down his decision, said, G. A., 485:

"The citation of two cases will show the importance of securing accurate data in determining whether an ore is a silver or a lead ore. In his report on the protest of the St. Louis & Zacatecas Company the surveyor at St. Louis gives his determination of values in 22,000 lbs. of ore as: silver, \$230.42, and lead, \$231.88, thus making it a lead ore dutiable at \$30 a ton, which is a duty of about five cents a pound on the lead in the crude ore. On another invoice of this company (protest 2,868b), a duty of \$330 was assessed upon the crude ore containing 22 oz. of silver and 31.5% of lead, and valued in all at \$331.10. The duty on the lead in the ore in this instance, also, is nearly five cents a pound, or about two and one-half times as much as the duty provided for lead in pigs and bars."

"The appellants complain that classification was determined upon assays made from 'grab samples,' and upon a valuation of the lead in the ore at one cent a pound less than the value of bar lead in New York. In the reports of collectors upon the protests, one or the other of these allegations, and sometimes both, are either admitted or contradicted."

"The Honorable Secretary of the Treasury, in Department decision, Synopsis 9,492, prescribed certain rules for the sampling of silver-lead ores. He styled the 'grab process' a very irregular method of sampling, and ordered that upon the unloading and at the time of unloading, the officer of the customs assigned to that duty shall supervise the work, and shall obtain proper and adequate samples from those taken for commercial purposes by the importer or consignee—that is to say, they shall be taken in the manner approved and practiced by miners in the handling and reduction of ores, by thoroughly mixing and quartering ever tenth shovel, or more, repeating the operation until the usual commercial sample be obtained."

"In testifying before the Board, representatives of both importing and domestic interests all agree that the 'grab' sample is utterly unreliable and that in such process the chances are against the rights of the importer. It appears, therefore, that collectors who have sampled according to the 'grab method' have not only violated the instructions of the department, but have committed an act of manifest injustice to the importers. The Board is of the opinion that invoices covered by protests on this point should be reliquidated, and that in the absence of accurate official data the assays upon which the ores were sold and purchased should form the bases for reliquidation. It appears from the testimony that invoice weights are accepted by the custom houses on the frontier because of the inconvenience and expense of re-weighing the ore. It would be equally proper to accept commercial samples or assays where the government has not made due provisions for securing accurate official data."

Regarding the second point raised he said:

"After determining the amount of silver and quantity of lead in the ore it becomes necessary to ascertain the value of the silver and of the lead in order to decide whether the ore should be classified as a silver or a lead ore."

"In the department instructions, already referred to, the Honorable Secretary advises that, in the absence of more accurate data in the invoice or otherwise, the value of the silver component be rated at 95 per cent. of the latest known value of silver bullion in the New York market, and the lead component at the latest known value of bar lead in the same market, less one cent per pound. It is contended by importers that the values should be based on the values of the minerals in the crude ore in the mines of the country of exportation."

"The question of whether an ore is a silver or a lead ore is not a matter of foreign market value, but is a fact to be determined, if possible, at

the time and place of importation. In such markets for ore as El Paso and San Francisco there should be no difficulty in establishing the value of these two minerals in the crude ore. It appears, however, that collectors of customs at these ports, instead of endeavoring to obtain more accurate data, have construed the advice of the Department to be a mandatory order, and have taken the value of the silver to be 95 per cent. of the value of silver bullion in New York, and the value of the lead to be the value of bar lead in that market, less one cent a pound.

"There is no complaint as to the valuation of silver, which, as a precious metal, has an almost uniform standard of value throughout the country. But it is contended, and the testimony of representatives of both importing and domestic interests establishes the fact, that an injustice has been done to the importers of ores at El Paso in assuming the value of lead in the ore at that point to be only one cent a pound less than the New York price for bar lead. Considering the evidence on this subject as to the value of lead at the time, the Board is of the opinion that the invoices covered by protests on this point from that port should be reliquidated on a value of not exceeding two cents and a half a pound for the lead in the ore. The invoices covered by protests from other ports should be reliquidated on the basis of the value of the lead in the ore at the time and place of importation.

"The questions involved in these cases are largely administrative matters. In such matters the Board, while having the power to correct injustice, is without authority to prescribe regulations. It is, therefore, deemed expedient in this decision to treat the subject in other than a general way, leaving the appellants the right to further protest should classifying officers fail to be guided by the principles that we have enunciated."

Following this decision, the Treasury Department, recognizing the fact that the value of the lead at the place of importation was less than that obtained in Synopsis 9,492, amended its former ruling so that it read, "in determining the value of lead contained in Mexican ores, such value will be computed at the latest known price of bar lead in New York, less 1½ cents per pound." (Vide Synopsis 11,481, July, 1891.)

In February of 1892 the Mexican Ore Company imported a quantity of Mexican ore, which by the collector at El Paso was classed as a lead ore, dutiable at 1½ cents per pound, gross weight, and to this appraisement protest was made. The question involved was the manner of valuing the lead.

At that time lead was worth 4½ cents per lb. in the New York market but only 2½ cents at El Paso, according to invoices of other lots of ore. The Collector disregarded the local price and based his valuation on the New York market, interpreting the circular given above as mandatory. Appraiser Wilkinson, in his decision July 13th, 1892, says:

"The Collector appears to have regarded the advisory circular of the Department as mandatory, and to have given no consideration to the El Paso value of the lead content of argentiferous ore. He consequently estimated the value at the price of bar lead in New York, less 1½ cents a pound. This rating made the importation dutiable as a lead ore at 1½ cents a pound.

"The importers have furnished us satisfactory evidence that the value of the lead content was 42 cents per unit of 20 lbs. at the time and place of importation. This valuation, according to the proportion of the components, entitles the ore to classification as a silver ore.

"We find, accordingly, that the merchandise in question is a silver ore containing lead, and hold that it is dutiable, under paragraph 199, at 1½ cents a pound for the lead contained, as claimed by the appellants."

Thus the Treasury Department strained the meaning of the law in order to exclude Mexican ores at the request of certain lead ore mine owners in Colorado. The result of this brilliant piece of statesmanship and patriotism was to build up metallurgical works in Mexico, largely with American capital; to increase the smelting charges for our own "dry" silver ores by an average of about \$2 a ton, thereby increasing the cost of silver; and, by adding the Mexican output of both silver and lead, it added to the demoralization of the silver and lead markets.

The price our silver miners have paid and are paying for their folly in allowing themselves to be fooled into helping the millionaire owners of carbonate mines to get temporarily higher prices for their ores, was and is the paying much more for producing silver and getting much less for it when produced. They will probably see through this business after awhile, and recognize that the ENGINEERING AND MINING JOURNAL, in advocating the free entry of lead ores, was their best friend, even while they were abusing it. The carbonate bonanzas having now been exhausted or nearly so, and the smelters being all in want of lead ores, the Treasury Department has discovered that its former "instructions" which excluded silver-lead ores by imposing a duty of say 5 cents a pound on the lead in them was erroneous, as the ENGINEERING AND MINING JOURNAL claimed at the time, and they now decide that silver-lead ores are to be valued for duty as other articles of merchandise are, namely, at their market value. Thus some needed lead is allowed to come in as "silver ore" at 1½ cents per pound of lead, and the Western papers are silent.

So also it will be with the free coinage craze. The silver miners will earn in time that the ENGINEERING AND MINING JOURNAL is their best friend and that no greater evil could befall them than to have this country alone adopt free silver coinage, and the howling papers which are ready to advocate any foolishness that they think is popular at the moment will relapse into silence. The miners will discover in time that they are again being fooled by the millionaire mine owners who want to unload 70 cents worth of silver on them at \$1.29, in payment of wages.

## 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.

## Variations in the Milling of Gold Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Complying with your request to call attention to any inaccuracies in Mr. Rickard's paper on gold milling, I should like to raise an objection to the last paragraph in the issue of Sept. 3d, p. 224, col. 1, where the corrosion of the screen-openings is attributed to the action of bicarbonate of iron, which is found in some mysterious way by the carbon dioxide of the battery water acting on acid sulphate of iron. It would seem that the latter was competent to corrode any screens, if only sufficiently acid.

BOSTON, Mass., Sept. 15, 1892.

H. O. HOFMAN.

## The Cost of Pocahontas Coal and the Census Report.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I note the abstract which you gave of the Census Report of the cost of coal and coke in the Pocahontas field of Virginia, and I quite agree with you that the figures given are not correct. I have a very accurate knowledge of the cost of coal mining in that and other districts in the Eastern States, and from this special and general knowledge I am satisfied that the census report of the cost of Pocahontas coal is wholly unreliable and is based on statements which the company, of course, knew perfectly well were not true. The figures, in other words, are "doctored" in order to deceive miners as well as consumers and the stockholders of the companies. As a matter of fact, the Pocahontas company pays the miner 75 cents per car, which holds nearer three tons, than two tons, which it is stated in that report to contain. The miner is fully aware of this fact. The actual mining price is about 50 cents per ton; and the dead-work cannot exceed 15 cents, for they have the cheapest possible conditions for working. With 10 cents royalty, the actual total cost does not exceed 55 cents, without credit from rents, store, etc., which would reduce this figure very considerably; this as against 72½ cents, which is the census figure. It is much to be regretted that the census returns should be so erroneous where they have had every opportunity for obtaining correct figures. An error of 33½% in the cost of producing coal is a rather bad result, and it is no wonder that the census work is discredited when such errors are found in it.

N.

## The Kittson-Browne Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have noticed your recent reference to the Kittson-Browne process, and to your lack of knowledge of what it consists of. I beg to supply this need from a circular widely distributed by the Kittson-Browne Process Company, of Boston, Mass., which has been seeking to get capital into the scheme. It is a very suspicious feature to find a company endeavoring to get money into a process which they apparently desire to keep secret from the highest authority on such subjects, and especially when a favorable notice by the ENGINEERING AND MINING JOURNAL would be the means of securing the attention of capital. Do the promoters fear that the JOURNAL would expose the hollowness of their claims? It looks like it. I send you the following extracts from which you can judge of the merits of the new process, and I hope you will express your opinion of it with your usual frankness:

In this process no chemicals are used except those which are generated during its operation, the results being accomplished by the gaseous products from burning fuel, a small amount of which is used to heat the ore to dull redness.

Many processes have been devised to amalgamate ore after the removal of the contaminating sulphur, arsenic, antimony, etc., but a salient feature has heretofore been overlooked, namely, the fact that by removing the sulphur in the ordinary manner (roasting in air) a large amount of oxygen is substituted (as oxides), thereby covering and holding the precious metals in almost as complete a manner as they were originally.

This oversight is what the inventors of the Kittson-Browne process have endeavored to correct. Their fundamental principle is that a sulphide ore to be rendered "free-milling" must be deoxidized as well as desulphurized. Carbonic oxide gas is remarkable for its affinity for oxygen, a fact which is taken advantage of not only in the chemist's laboratory, but in various metallurgical operations on a commercial scale.

The apparatus used to accomplish the deoxidation of ores by means of this gas may be described as a brick furnace, provided at one end with a suitable hopper, from which the ore is fed into revolving cylinders which pass through the furnace upon a slight incline.

Carbonic dioxide gas, the principal product of combustion from the fire which heats these cylinders, is caused, by means of a rotary pump, to pass through a heated air-tight compartment termed the "carbon chamber," where it absorbs an atom of carbon, becoming carbonic oxide. This if passed through the ore cylinders, where it combines with the oxygen of the ore, becoming once more carbonic dioxide, which escapes up the chimney.

The ore dropping from the lower end of the cylinders is, in the great majority of instances, ready for amalgamation; but one of the greatest advantages of this method is that it admits of a subsequent treatment, which the condition of the metal in some ores demands.

It is evident that whatever oxides of iron may have existed in the ore originally will, upon emerging from the cylinders, have been reduced to the corresponding metal, while the sulphurets (or bi-sulphide) of iron has in turn been reduced to ferrous-sulphide. Both of these substances are soluble in dilute sulphuric acid, which affords a cheap and simple method of freeing the ore from their presence if such a step is desirable.

Such is a brief sketch of the Kittson-Browne process as applied to sulphide gold ores. Many modifications, such as prefacing the process by a calcining roast in instances where a metal might otherwise be disadvantageously precipitated by the hydrogen-sulphide gas in the sulphuric acid bath will suggest themselves to the thoughtful reader.

It seems to me that from the description of the process it is easy to see why the Process company did not furnish you with any information concerning it.

J. R.

**The Use of Oil Engines in Mines.**—A "Priestman" oil engine has just been successfully put to work in the underground workings of Messrs. Brooks & Pickup's Waterloo Main Colliery, near Leeds. It is used to drive a 6-in. double-acting single ram pump, and forces the water for a distance of 1,500 yards. This kind of plant, being self-contained, can be taken into the workings and put down at any convenient position, and as the workings extend and the limit of suction is reached, it can be moved on from point to point. The great expense of pipe which inevitably follows when steam, electricity or compressed air is employed for pumping in pits is entirely saved. Of course, such a plant can only be used where petroleum is easily obtained and where there is no fear of explosions.

## AN ENGLISH ELECTRIC LOCOMOTIVE FOR MINES.

A somewhat novel electric locomotive for mines has been made by the General Electric Power and Traction Company, of London, for use in the coal mines of the Greenside Mining Company, Cumberland. A fairly strong motor was required, but as the road along which it was to run was as narrow as 32 in. in some places, it was clearly impossible to use an ordinary type in which the armature shaft was coincident with or parallel to the axle. Therefore, a motor was designed with the armature shaft at right angles to its usual position, and the distance between rails was fixed at 22 ins. The motor here shown is of 15 brake H. P., and its armature is placed longitudinally on the frame of the car. Three speed-reduction gears are employed, one, of course, being a bevel gear. The whole frame work of the machine is hinged from the driving axle, which is made exceptionally strong for the purpose; and the weight on the other wheels is taken through strong spiral springs on the top of gun metal axle brasses. The motor is of the usual Immisch type, well known in England. The field windings are efficiently protected in this type of motor. The current is supplied to the motor at 200 volts through a bare overhead copper conductor 1,200 yards long. The current comes from a source which is used for other mining purposes, and as it is generated at 500 volts it is transformed at the commencement of the motor track to a current at 200 volts. The electric generator station at the surface consists of a four pole Immisch dynamo of 100 electrical H. P., working at 600 revolutions per minute and generating a current at 500 volts. The power is supplied by a large "vortex" turbine, which is fed by water through 15 in. pipes. In addition to the underground locomotive the current is used for driving the pumping and winding plants and for lighting the works both above and below ground.

**Idaho Opals.**—On exhibition at a prominent jewelry manufacturing and sales-room establishment in this city there are several exceedingly

## THE TREATMENT OF ARGENTIFEROUS ZINC-LEAD SULPHIDES.\*-I.

By C. Schnabel.†

In the lower levels of the mines, working on the Broken Hill line of ore deposits are found minerals carrying lead, silver, zinc, and sulphur, generally known as "sulphides." These minerals occur in such quantities that their metallurgical treatment has become a vital question for several of the mines of the Barrier Range. As it is most probable that below a certain depth the whole mineral bearing contents of the Broken Hill ore deposits will consist of sulphides, the future existence of the Broken Hill mining industry will depend upon the metallurgical treatment of these ores.

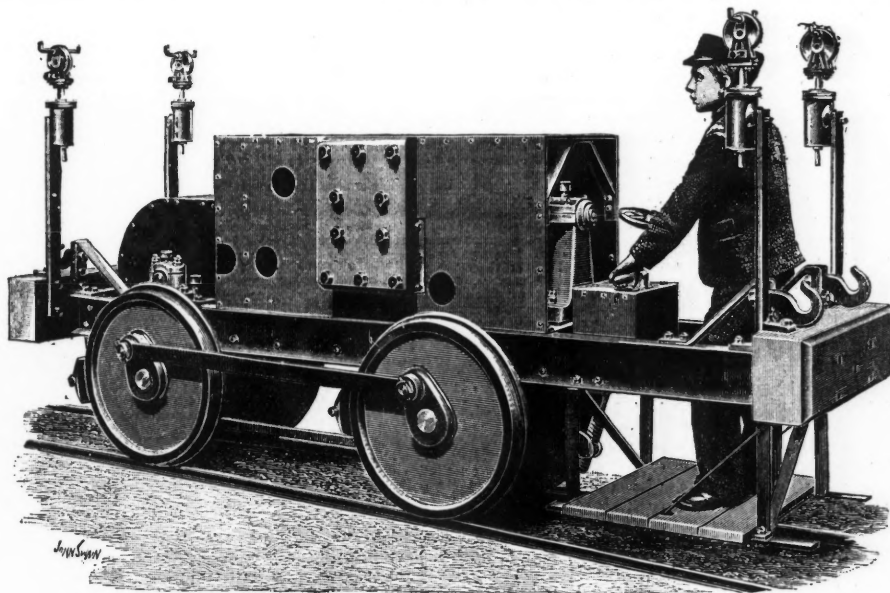
So far as they have been developed, these sulphides consist mainly of a silver-bearing mixture of galena and zincblende. The mixture of galena and zincblende in the majority of the ores is so intimate that the naked eye cannot distinguish the individual minerals, and the whole makes the impression of a single mineral. Only in exceptional cases the minerals are present in coarser particles.

Partly the mixture consists of dense masses of granular structure, and, again, on account of the partial solution of the component parts, as porous masses.

The combination in which the silver exists in the sulphides has not been definitely determined. Native silver has been recognized. It is most probable that some of the silver also exists in the ores combined respectively with sulphur, antimony, and arsenic, while the balance is no doubt present in an isomorphous mixture of sulphide of lead and sulphide of zinc. The other minerals known to occur in the sulphide ores are: Iron, copper, and arsenical pyrites, arsenide of cobalt, rhodonite, garnet, opal, fluor spar, and different feldspars.

As the sulphides have not been mined to any great extent, it is difficult to determine the average contents of silver, lead and zinc. As far as determined the silver varies from 8 to 32 oz. to the ton, the lead from 15 to 40 per cent., and the zinc from 15 to 30 per cent.

As only small quantities of zinc occur in the oxidized portions of the



ENGLISH ELECTRIC MINE LOCOMOTIVE.

beautiful specimens of cut opals which have been recently found in Northern Idaho, near the Montana line. In luster and general character, according to the opinions of gem connoisseurs and experts, they are equal in every respect to the finest and most valuable Hungarian and other foreign products. It is understood that an opal syndicate is being formed to prospect and work the location of the new discovery.

**Dangers of Dynamite.**—Theoretically, nitroglycerine when exploded decomposes into oxygen, nitrogen, steam and carbonic acid. Mr. P. F. Charon, in an article in the *Genie Civil*, states that practically a complete explosion is never obtained, and that the gas produced always contains the vapor of nitroglycerine, which is extremely deleterious to the health of those breathing it, producing headache, nausea and even vomiting. Carbon monoxide and nitrous oxide vapors are also formed, the former being a poison and the latter acting upon the mucus membranes, produces suffocation and violent coughing. According to the researches of Berthelot, Vielle and Sarrazin, one kilogramme of nitroglycerine will produce when exploded 713 litres of gas and steam, calculated at 0° C at 760 mm. pressure, but as the temperature is raised by the explosion to 6,980° C. the volume occupied by the expanded gas at the time of the explosion is 18,900 litres, or nearly 20 cubic metres. If this explosion takes place in a tunnel or drift of 3 metres cross section, the gases produced would be driven forward and displace at least double the volume evolved, that is to say, for a length of 13 metres the air would be partly replaced. Now, although this gas is quickly condensed, it undoubtedly does linger sufficiently long to, in many cases, endanger the health of the miners. After citing the experiences of Dr. Darlington on the tunnel of the New Croton Aqueduct, Mr. Charon advises that in the treatment of miners poisoned in this manner, they be given strong, black coffee, or, better, that they should cautiously inhale ammonia, sulphurous acid, or concentrated acetic acid. Prevention is, however, better than cure, and he advises that the ventilation be made more perfect in order to more quickly carry away the gases formed and that the noxious gases be reduced in quantity by the use of an increased quantity of detonator,

lode, it is possible that it will be found by further development that the zinc exists in large quantities only in certain levels of the ore deposit. Altogether millions of tons of zinciferous sulphides are opened up in the different mines.

The existing intimate mixture of the sulphides of lead and zinc make the ores unsuitable for treatment by the ordinary metallurgical processes, the separation of lead and silver being impossible without material losses of these metals. As the treatment of these ores in Europe, with cheap labor, power, and fuel, is expensive and difficult, the difficulties of economical manipulation reach their maximum in Australia under present existing circumstances.

While the treatment of the oxidized ores of the Barrier is simple and combined with large profits, the treatment of the complex sulphides involves more difficult and complex operations, and can never be expected to throw off as large profits as have been accomplished in the treatment of the oxidized ores. Sulphides, the silver contents of which drop below a certain amount, can never be expected to be treated profitably unless containing a large per cent. of lead.

The cost of mining of the sulphides in the ordinary routine of work should lie between 12 and 20 shillings per ton. The higher cost of mining the oxidized ores should, of course, be borne by these ores alone. Silver and lead are to be economically recovered from the sulphides when the percentages present reach a certain amount to be determined later on. The economical recovery of the sulphur as such or as sulphuric acid is impossible under existing Australian conditions. As the value of metallic zinc is from 22 to 23 per ton in Europe, the question arises whether its recovery as zinc or as some other marketable product is not possible.

Concentration.—The first proposition naturally occurring would be the possibility of separating the zincblende from the galena by dress-

\* From an exhaustive report on the ores of the Barrier Range, Australia.  
† Director of the Royal School of Mines, Clausthal, Germany.

ing, and of converting the same into metallic zinc in Australia, or exporting the ore as such to Europe. It has been found by experiments in Germany on Broken Hill ore that it is impossible to make a complete separation of the zinc from the lead, and especially from the silver, by concentration, the zincblende produced not only being found to carry a high percentage of the silver, but also a certain percentage of lead and garnets, so that the total contents of zinc cannot be brought above a maximum of 35 to 40 per cent. The cost of concentration will necessarily be high, on account of the intimate mixture of the zincblende and galena, making it impossible to accomplish their separation by coarse jigging.

Lead-bearing zincblendes containing only 35 to 40 per cent. of zinc could not be utilized as a zinc ore in Australia, nor would it be profitable to export them to Europe. Zinc works are not inclined to pay for the silver contained in zincblende.

In the event of the individual minerals of the sulphides, zincblende and galena, becoming coarse-grained at greater depths in the mine, the separation of zincblende by dressing would only be economical if the loss of silver in the zincblende, which is at the present mixture of the minerals about one-half and more of the silver contents of the sulphides, was small.

The Production of Metallic Zinc.—The methods to be considered under this heading are:

(1) The distillation of zinc from the roasted ore; (2) the decomposition of the sulphides by metallic iron; and (3) the decomposition of the sulphides by means of the electric current.

1.—On account of the low percentages of zinc contained in the sulphides, and the proportionately high percentage of lead, the ores are unsuitable for distillation. In Freiberg ores containing less than 25 per cent. of lead cannot be treated at a profit by this method, and the zinc of such ores is lost in the slag of the blast furnaces. For the same reason the zinc ores, with about 20 per cent. zinc, are smelted in blast furnaces (after a lixiviation of the neutral sulphate of zinc) in the smelting works of the Lower Harz.

From the experience gained in Germany, we see that it is impossible to recover the zinc economically from intimate mixtures of zincblende and galena, even with the cheap labor and fuel existing there. Should the zinc contents of these ores be higher, the economical production of metallic zinc would be still a matter of impossibility by this method; the lead, in the process of roasting, would be converted principally into oxide, which at the high temperature necessary for the reduction of the zinc oxide, would attack the clay retorts in which the process of distillation is carried out, the oxide of lead and the silica of the retorts combining and forming an easily fusible lead silicate, thus destroying the retorts. It will thus be seen that lead contained in zinc ores must be very detrimental in the process of distillation, causing a large consumption of retorts and material losses of zinc, lead and silver. Attempts to produce metallic zinc in blast furnaces have been carried out at different times during the past half century, but, so far, always without success; and on account of the facility with which zinc fumes at certain temperatures are oxidized by carbonic acid, necessarily contained in the gases of the blast furnaces, it is improbable that success will ever be attained in this direction.

2.—The direct decomposition of zincblende by means of metallic iron or lime has never been carried out on a commercial scale. In the first instance, the result of this decomposition would be zinc vapor, an iron matte and bullion. As these operations would have to be carried out in closed vessels or retorts, it is improbable that this process would show any material advantages over the distillation of the roasted ores, as before described. The technical difficulties to be overcome in the carrying out of this operation would be to find suitable material for the construction of the tools. On account of the high temperature necessary for the operation, and the facility with which molten sulphate of iron attacks clay vessels, this material would be necessarily excluded from the process. The heat produced by the electric current, either by means of the electric arc or by means of poor conductors, is confined to too small areas to make it possible to operate with larger quantities.

3.—The decomposition of the molten sulphides by means of the electric current has never been attempted on a large scale, and (judging from the analogous operation of the aluminum production) could only be carried out on a small scale at the present state of development of electrotechnics.

To electrolyze the sulphides in a bath of sulphate of zinc, using the ores as anodes, can never give favorable results on account of the poor conducting properties of the mixture of galena and zincblende. According to experiments carried out by Mr. Ashcroft, the electrician at the Proprietary Mine, the decomposition by the above means is only partial.

The electrolytic production of zinc from a solution of sulphate of zinc, to be produced from the roasted ores by dissolving the zinc by means of sulphurous or sulphuric acid, can only then be carried out economically when the power necessary for the production of the electric current can be produced at a very low cost, and when the sulphate of zinc is produced as a valueless by-product from other processes. As

the soluble anodes of sulphides of zinc are excluded on account of their poor conducting properties, the whole of the power necessary to decompose the sulphate of zinc must be produced from mechanical power. The energy expressed in heat units necessary for the decomposition of chloride of zinc is 121,250 grammes calories; for sulphate of zinc, 106,090 grammes calories. To produce one kilogramme of zinc from sulphate of zinc per hour it is necessary to use five horse power. This power would be expressed by the consumption of 10.5 kilogrammes of coal for the production of steam. (2.1 kilogrammes coal per horse-power hour.)\*

The consumption of coal by the direct distillation of zinc ores per kilogramme of zinc is less than the above figure. As the necessary plant is expensive and large compared to its capacity, the electrolytic production of zinc is necessarily excluded if the power is produced by the consumption of fuel. The above process can only be thought of if the power and sulphate of zinc are procurable at a very low cost. Besides the above difficulties, the process is hampered by technical irregularities. The electrolytic decomposition of solutions of zinc in alkaline solutions or acetic acid is excluded on account of the high prices of these solvents. From the above it will be seen that the economic production of metallic zinc from the ores under consideration offers little hope of being carried to a successful issue.

The question, therefore, arises, whether it will not be possible to obtain the zinc as a marketable compound.

\*Modern practice should give at least double this result, or one kilogramme of coal per H. P. Hour.—Ed. E. and M. J.

Separation of Iron and Alumina.—Professor Beilstein, of St. Petersburg, has recently proposed the following new method for the separation of the oxides of iron and aluminum: The mixed oxides are dissolved in nitric acid and the solution is then evaporated to dryness on a water bath. The drying is cautiously continued until the odor of the nitric acid is no longer discernible. The residue is now boiled with water, a few drops of ammonium sulphate being added. By this treatment the aluminum nitrate is changed to a basic nitrate, which is soluble in water, while the ferric nitrate is changed to an insoluble sub-nitrate.

Specific and Latent Heat of Aluminum.—For the following formulae on the specific heat of aluminum we are indebted to an article by Mr. J. Pinchon in a late issue of the *Moniteur Industriel*. According to the author, the quantity of heat required to raise 1 gram of the metal at 0° to any required temperature up to 580° is represented by the formula:

$$q_0 = 0.393t - \left( \frac{219.86t}{1517.8+t} \right)$$

in which  $q_0$  is the quantity of heat and  $t$  the required temperature.

From 630° to 800° the quantity of heat is represented by the equation  $q_0 = 0.308t - 46.9$ . The figures obtained by these formulae agree very closely with experimental observations, the differences varying from +0.36 at 94° to -0.4 at 273°.

The specific heat at any given temperature is obtained by dividing  $q_0$  by  $t$ . The line joining the different values of  $q$ , commencing at 0°, is a gentle curve, becoming slowly crescent shape as the line approaches 580°, but near that temperature the line rises rapidly and at 623° to 628° it is nearly vertical, which shows that at 580° the metal is preparing to fuse. At 628° fusion is complete. This period preparatory to fusion is longer and more marked than for any other metal. Upon this point Pinchon made a particularly interesting experiment. Upon slowly heating a piece of aluminum with a blowpipe, its physical structure was seen to change just before fusion. The metal took on a granulated appearance and seemed to consist of small spherical grains but slightly cohesive and it became friable and crushed easily. When the metal cooled it retained its granular structure, yet nevertheless regained its solidity. When the metal was heated to the fusing point a globule was obtained, which was perfectly fluid and covered by a thin pellicle of oxide. This change in molecular condition explains why, when aluminum is forged (hammered) it is necessary in reheating to keep the temperature within a certain limit, which in practice is marked by the complete volatilization without decomposition of a drop of oil thrown on its surface. If the metal be heated above this point and forged it will crumble to powder. The experimenter states that although various authorities have given the fusion point at from 600° to 800°, his experiments show 625° as the correct temperature. The most remarkable fact, however, resulting from his observations is the high latent heat of aluminum. He places it at 80 (Cals.), which is equal to that of water and much higher than that of any other metal. If this be true, Person's method of obtaining the latent heat from the modulus of elasticity is of no value in the case of aluminum, for the result obtained is too low by half.

THE CALCULATION OF CHARGES FOR THE LEAD BLAST FURNACE.

The following table, inadvertently omitted from the abstract from H. O. Hofman's Metallurgy of Lead in our issue of September 3d, makes a valuable addition to that previously published, and clears up what otherwise might have been obscure. It should be inserted before line 42 from the bottom of column 1, page 226:

Material.	SiO <sub>2</sub>		FeO		CaO		ZrO		Al <sub>2</sub> O <sub>3</sub>		Ag		Pb		As		Cu		S	
	Dry weight. Lbs.	Per cent.	Lbs.	Per cent.	Lbs.	Per cent.	Lbs.	Per cent.	Lbs.	Per cent.	Ozs. per ton.	Ozs.	Per cent.	Lbs.	Per cent.	Lbs.	Per cent.	Lbs.	Per cent.	Lbs.
Coke ash.....	15	40.3	6.04	26.5	3.97	10.26	1.54	.....	20.04	3.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Slag.....	100	30.0	30.00	40.0	40.00	20.00	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lead ore.....	510	32.6	166.26	19.1	97.41	10.16	51.82	2.4	12.2	2.5	12.75	50.5	12.8	20.7	102.5	0.5	2.5	2.9	14.8	4.4
Iron ore (SiO <sub>2</sub> ).....	185	4.3	7.95	74.1	137.18	3.1	5.73	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron ore (AsS) <sub>2</sub> .....	75	4.3	3.22	74.1	4.29	3.1	2.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Limestone.....	115	2.7	3.10	4.5	5.17	53.9	62.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	1,000	.....	216.57	.....	287.92	.....	143.46	.....	12.2	.....	15.81	.....	12.8	.....	102.5	.....	2.5	.....	14.8	.....
Coefficient.....	0.1385	{	29.99	{	39.87	{	19.87	{	1.69	{	2.21	{	249 ozs. bullion.	{	11.3 lbs. spicific.	{	.....	{	7.27 lbs. matte.	{

THE NEW CUNARD STEAMSHIP "CAMPANIA."

The new Cunard steamship "Campania" was launched last week from the yard of the Fairfield Shipbuilding & Engineering Company of Glasgow. She is 600 ft. long, or forty feet longer than the "Teutonic" and "City of Paris," and 65 ft. broad, or only eight feet narrower than the "Great Eastern." Her depth of hold is 41 ft. and her gross tonnage 14,500. Her engines are already completed and are at present being placed in position. They consist of two separate triple expansion engines, each capable of indicating from 12,000 to 15,000 H. P., and each driving a screw of manganese-bronze. Each engine has five cylinders and three cranks. Of these five cylinders two are high pressure, one intermediate and two low pressure. The first crank is driven by a high pressure and low pressure piston and cylinder, arranged tandem, and so also is the third; while the second or intermediate receives the steam from the two high pressure cylinders, and exhausts into the two low pressure cylinders. The propeller shafts are 25 ins. in diameter, and are carried outboard in casings, which are worked in the skin of the ship, so that the whole shaft up to the sternbushes will always be under observation. The screws do not overlap, and a large opening is made in the deadwood between them to facilitate the motion of the water. The rudder is made from a single steel plate, weighing ten tons. Curiously enough, after the specifications were drawn out, it was found that no rolling mill in Great Britain had a pair of rolls wide enough for the rudder plate, and after inquiries it was discovered that Krupp, of Essen, was the only firm in the world whose rolls were capable of executing such a huge piece of work. The speed of the engines, 100 revolutions per minute, will be very high for marine practice. Consequently it has been necessary to design the moving parts in such a way as to obtain the very smallest dimensions consistent with the great strength required. The steam is supplied from twelve double ended boilers, which have each eight furnaces in them. Each pair of furnaces will have separate uptakes, and there

DAY'S REVERSIBLE GAS ENGINE.

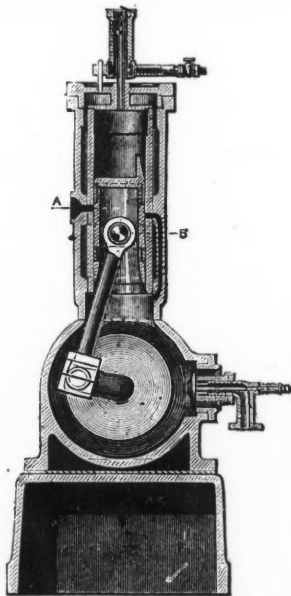
A new gas engine has been brought out in England by an influential syndicate, and as it is of a distinctly novel type, a description and illustration of it will be of interest to our readers. The new engine is reversible, there is only one moving valve, and an impulse is obtained every revolution, although there is only one cylinder.

The crank works in a closed chamber, in whose wall is an automatic reflex-acting beat valve for admitting the mixture of air and gas. On the upstroke of the piston a charge of air and gas is drawn into the closed crank chamber. On its descent the mixture is trapped and compressed slightly. Under this pressure the charge rushes through the port B, when the piston descends at the next revolution, into the working cylinder. On the next upward stroke the charge is trapped and compressed, and at the beginning of the next descent it is exploded. About three-quarters of the way down on the descent the exhaust valve A is opened by the piston, and just afterward the port B is opened, introducing a new charge. Thus one charge is used in clearing out the products of combustion of the previous explosion. The explosive charge on its entrance to the working cylinder impinges on a deflector fin on the end of the piston, and an eddying motion is thus imparted to the charge. The governor is of the spring pendulum type and actuates a circular grid, covering the air entrance in the valve, thus varying the amount of air introduced at each charge.

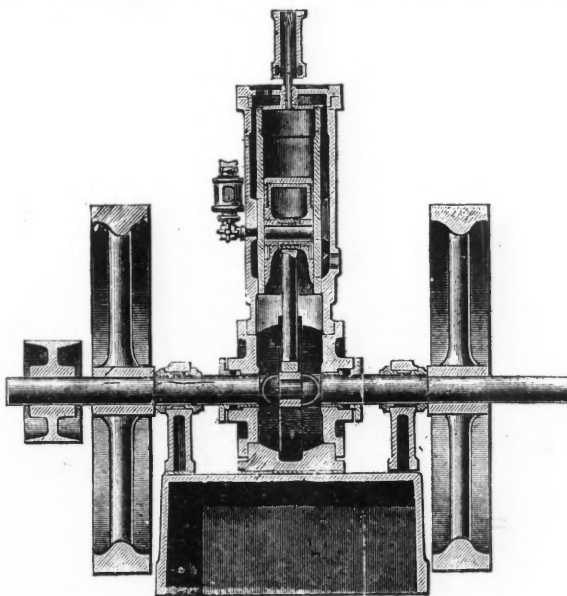
An engine of 1 H. P. nominal, with a cylinder  $4\frac{1}{2}$  in. diameter and a stroke  $7\frac{1}{4}$  in. gave an indicated horse power of 3.3 when working at 180 revolutions per minute. The compression pressure was 50 lbs. and the explosion pressure 120 lbs.

This engine is being made by Day & Co., Bath, England. For our illustration we are indebted to the London "Engineer."

Estimation of Sulphur in Coal.—Eschka's method has been always considered one of the best for this important, but by no means particu-



SIDE VIEW IN SECTION THE ENGINEER



END VIEW IN SECTION

DAY'S REVERSIBLE GAS ENGINE.

will be six stokeholds and two funnels. The lines of the hull are exceedingly beautiful, and they give great promise of a high speed. There will be two shelter decks, one above the other, and the flying bridge will stand 60 ft. above the water level.

The "Campania" and her sister ship "Lucania," which will be launched in a few months, are really remarkable vessels, and will create a great sensation when they are placed in the transatlantic service. Not only are their general dimensions much greater than any existing steamship, but the horse power of their engines will probably be found on trial to be 33% higher than that of the "Teutonic" or "City of Paris." The design of their engines is something quite novel, and the arrangement of the cylinders almost makes each engine a double one in itself. In all probability these vessels will reduce the transatlantic steaming record by six hours, and thus make the passage from Brow Head to Sandy Hook in 5 days 10 hours.

**Treatment of Discolored Pearls.**—It is a common belief that if pearls are left unworn for any great length of time that they become sick or lustreless, and paragraphs are not infrequently seen which state that somebody's famous pearls are being soaked in the sea in order that they may recover their lost brilliancy. According to Mr. Geo. F. Kunz, author of "Gems and Precious Stones of North America," this belief has no foundation in fact, and, as for the treatment, he says: "It will not help the pearls unless they were in a pearl oyster receiving new layers of nacre, otherwise a dish of salt water would do as well as the sea." Pearls frequently become yellow through absorption of grease, from packing in wool or woollen things. Mr. Kunz recommends that such pearls be cleaned with a little carbonate of soda, orris root or by bleaching in the sun. Pearls have been artificially bleached and also dyed black, but either operation requires great care, as, if the chemical solution be too strong, it will destroy the animal matter that forms the alternate layers with the nacre, thereby destroying the pearl.

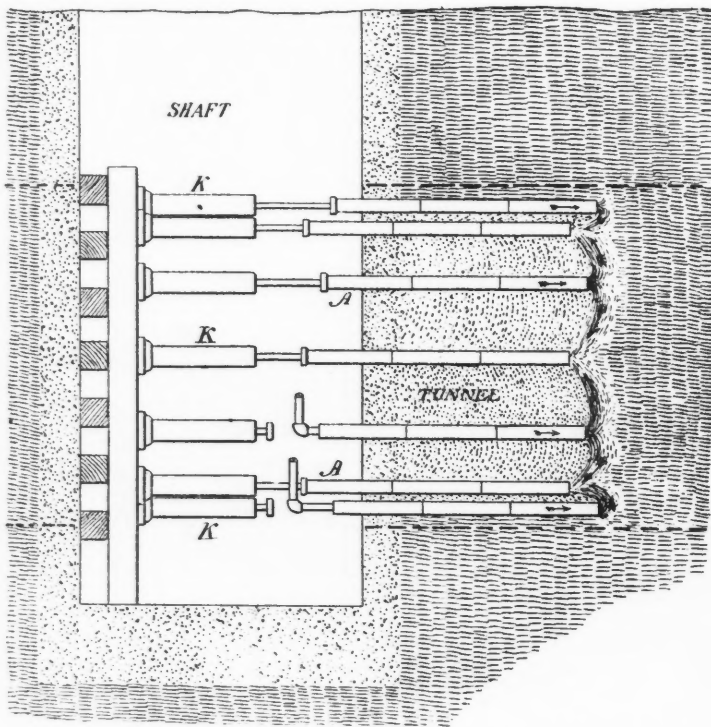
larly certain, determination. It now appears, says *Industries*, that there is usually a loss if the use of a mixture of sodium carbonate and magnesium be adhered to. By substituting potassium carbonate for the sodium salt the difficulty is overcome, the sulphur being completely retained.

**Boring for Bitumen in France.**—A correspondent to the English technical papers writes from Prompsal, Puy de Dôme, as follows: Experimental borings show that bitumen exists in great quantities in this district. There are three varieties equally abundant, viz., liquid bitumen, bituminous limestone and bituminous sandstone. The mineral is met with at a few feet from the surface. The seams of bituminous limestone are in some places 200 ft. thick, but the mines have never been worked beyond 80 ft. or 100 ft. The mineral gives oil and gas by distillation, but as experiments have been made only on the bitumen near the surface, of course it gave but small quantities of light oil. The bitumen extracted by boring deeper contains more volatile oil. At a depth of from 500 ft. to 600 ft. inflammable gas comes up through the bore. The only use to which the mineral is turned, at present, is for the manufacture of paving blocks. The bituminous limestone is used for this purpose; it is crushed into powder, a small quantity of liquid bitumen and sand added, and then the mixture is put into molds and submitted to very high hydraulic pressure, and the blocks thus turned out are in the form of bricks or tiles, as required. They resist perfectly well the action of heat; the trials made in different towns where they have been employed for paving the streets have turned out most satisfactory. The work is very neat, and it costs less than the ordinary paving-stones. This year there is a great demand for these blocks. The boring in search of petroleum continues very slowly, on account of the pressure of the gas, which drives up the sand and soil into the tubes to a height of 100 m., and prevents the working of the bores. They have not got the proper machinery for the purpose; neither have they experience in such work. The writer concludes by asking whether it would not be possible to get some one who has had experience in such mineral enterprises to go over and see if something could not be done to work either the petroleum or the bitumen,

## HARRIS' METHOD OF SOLIDIFYING QUICKSAND.

A new method of dealing with quicksand, so as to make it possible to form a firm floor on it and to sink a shaft through it has been invented by Mr. Robert L. Harris, of 1 Broadway, New York. It is a very ingenious process and has great promise. It has been applied in the construction of a sewer through the quicksand surrounding Providence, R. I., and great satisfaction has been expressed with the results.

Mr. Harris' method depends on the great permeability of confined quicksand to water and other liquids. If two pipes are forced down vertically into a stratum of quicksand, at a reasonable distance from each other, and water is forced down one of them, it will find its way along the line of least resistance until it ultimately reaches the bottom of the other pipe. The current thus formed gradually carries the sand up the second pipe until eventually there is a chamber in the earth full of water instead of quicksand. The walls of this chamber, of course, are prevented from falling in on account of the hydrostatic pressure. Mr. Harris' idea is to force a cement down the first pipe after the chamber has been thus formed, and when it has filled the chamber to exert hydraulic pressure on the body of cement, and so force the cement in the chamber into the surrounding earth. In this way a hard cement is made to take the place of quicksand. If the quicksand consists of a material that could be used as a constituent of a hydraulic mortar then it would not be necessary to take it out by the water current, and the process would then consist in forcing in a cementing fluid which would combine with the sand and form a solid



SECTION SHOWING METHOD OF PRODUCING TUNNEL WALLS.

precipitate. The proper fluid to force in depends, therefore, entirely on the character of the material of the quicksand. If it is approximately a pure sand, the best fluid would be a pure cement grout; but if the material is muddy, a proportion of sand or plaster of paris would also have to be forced in. It will be seen that by variations and extensions of this principle solid-walled shafts can be sunk through quicksands, floors may be formed for trenches through them, foundations for buildings can be made, and in other ways the bugbear of a quicksand can be successfully combated.

This method was put in practice for the first time in March last at Providence, R. I., for the purpose of obtaining a floor for the main out-fall sewer pipes that went through the quicksands surrounding the town. This quicksand, when dry, consisted of an impalpable powder. When saturated with water it is very hard and compact until disturbed. Under the pressure of a thin layer of superimposed earth it becomes apparently solid. When agitated, however, it runs like mush and is almost irresistible. All sorts of methods of excavation had been tried, but all were unsuccessful, and an excellent opportunity thus offered itself to Mr. Harris for the demonstration of the correctness of his theory. The experiment was carried out at the bottom of an excavation, just where the quicksand was reached. Four 2-in. pipes were driven into the quicksand four feet apart to the distance of 17 ft. below the excavated surface, or 1 ft. below the grade of the proposed sewer. After a circulation of water had been obtained from pipe to pipe, thinner pipes were inserted in the 2-in. pipes, and through them the cementing material was forced. After three weeks' time the excavations for the sewer reached this point, and it was found that the quicksand had been made solid for some distance round the lower ends of the pipes, and a solid floor had been thus made for the sewer excavation. The rock, which had been formed, showed the lines of flow of the cement, and pieces of it taken out of the cutting presented a striated appearance as shown.

The general method of forming a floor for an excavation in quicksand

is shown in plan and vertical section. The method of producing a solid wall, where the pipes are gradually raised 2 or 3 ft. at a time, forming quadrangular blocks of rock, at the same time is shown also. The cost of this process for dealing with quicksand is very small. The plant is not expensive and the materials used are cheap. The results obtained at Providence gave great satisfaction to everybody, and completely met all expectations.

Mr. Otis F. Clapp, Assistant City Engineer of Providence, R. I., in charge of the Sewer Department, thus indorses the process: "At the second attempt of the first experiment in April, 1891, Mr. Harris obtained channels, as desired, at 25 ft. below the surface of the ground, between pipes driven at 4, 10 and 14 ft. distances. At a trial of the method, as a whole, made under adverse circumstances in the middle of March, 1892, in quicksand and fine sand, there was found upon excavation for construction in April that he had cemented the natural material at 10 ft. below the surface into fair artificial stone, 3 to 6 in. thick with horizontal strata, and at a depth of 17 ft., the original bottom of four pipes, there was a thin hard continuous floor of cemented material embracing practically the area between the pipes driven; the above was done without further disturbance of the surface of the ground than that required by the introduction of four 2-in. pipes placed 4 ft. apart in diamond shape. He has demonstrated to my satisfaction that by his method, strong floors, inclosures, monoliths, etc., can be readily formed in and of the fine earthy materials, where and as he wishes underground and below water level, without serious disturbance of the surface."

For the illustrations accompanying this article we are indebted to the courtesy of the "Engineering News."

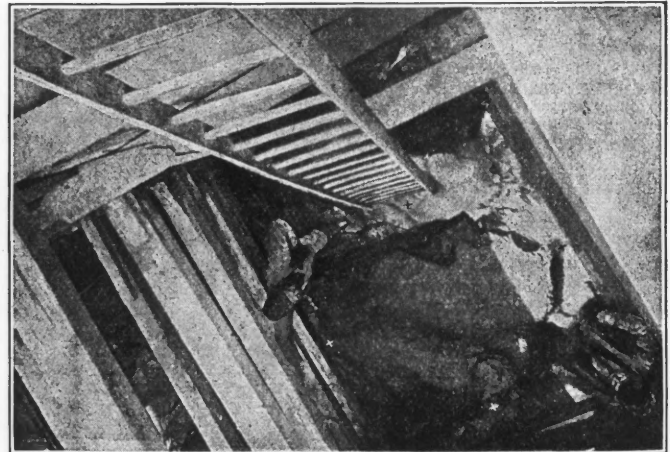
## RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

(Digest of Decisions of the Secretary of the Interior.)

## MINERAL ENTRY—SEC. 2,336, R. S.—DIVIDED TRACT—INTERSECTING LODGE.

1. Under the provisions of Section 2,336 (U. S. Rev. Stat.), a mineral entry may be allowed of tract that is divided by a patented intersecting lode.

2. In the case of Col. Hall Lode claim [2 L. D., p. 736.] it was held that a location which is separated along the line of the lode by a patented lode-



VIEW OF FLOOR, LOOKING DOWN SHAFT.

claim is invalid as to that portion beyond the patented claim. That ruling, however, was made upon the theory that the lode in the location was identical or parallel with that in the patented claim.

3. A lode claim must be located along the lode. Judgment of Commissioner of the General Land Office is reversed.—*In Re Patten (George A.) Extension Lode* [Secretary's decision July 29th, 1892].

## COAL LAND ENTRY—REPAYMENT.

It has been the uniform ruling of the Department that where an entry has been canceled by reason of its fraudulent character, or, because it had been secure through illegal and false testimony, repayment of the purchase money will not be permitted. Decision of General Land Office Commissioner of October 7th, 1891, sustained.—*In Re D. A. and G. W. Mulrane* [Secretary's decision, August 4th, 1892].

## MINING CASE—PRACTICE—REVIEW—MINERAL CHARACTER OF LAND, HOW ESTABLISHED—BURDEN OF PROOF.

1. Concurring decisions of the local office, the General Land Office and of the Interior Department will not be disturbed on a motion for a review on the ground that the decision in question is not supported by the evidence, where the testimony is of such character that reasonable minds might differ as to the conclusion that should be drawn therefrom; and this rule is not limited to those cases wherein the testimony is submitted before the local (land office) officers.

2. The mineral character of land is established by good proof of the existence of mineral therein in paying quantities, and actual mining operations are not requisite to such a conclusion.

3. On proof of the mineral character of a tract of land and allowance of mineral entry therefor, the burden of proof is upon one who asserts the non-mineral character of the land, even though it was originally returned as agricultural land.

4. It is not necessary to meet the requirements there should be upon the land entered as mineral a mine in working order, from which ore is being actually produced. It is sufficient if it be shown by satisfactory proof that mineral exists in paying quantities, and such proof will usually be based on mining operations or explorations.—*JOHNS vs. MARSH et al.* [Secretary's decision, August 20th, 1892.]



THE CANADIAN ASBESTOS INDUSTRY.

Until 1879 Italy supplied nearly all the fibrous asbestos required by the world, but in that year a number of companies were formed to work the veins known to exist near Thetford and Black Lake, in the Province of Quebec, Canada. Since then, owing to the constantly extended use of woven asbestos, the mining of this mineral has become of considerable importance. According to the official statistics of the Canadian Geological Survey, the value of the asbestos mined in Canada in 1891 was \$1,000,000, being exceeded only by that of coal, nickel, copper and petroleum.†

This industry is now in the hands of 13 incorporated companies, having an authorized capital of about 3½ million dollars, of which 2¼ million are, according to Mr. Klein, invested in the industry in Canada.

To prepare the asbestos for market two operations are necessary, viz.: the mining proper and cobbing or separation of the asbestos from the adhering serpentine. At most of the mines the drilling is done by steam or compressed air, 45 ft. of hole per day of 10 hours in the former case and 50 to 55 ft. in the latter being considered a fair day's work at an average cost of seven to eight cents per foot of hole drilled. At present there are in use seven compressors, with a total capacity of 44 drills, and there are 44 steam drills.

The average cost of drilling amounts to three and one-half cents per ton of rock broken.

Dualin, which contains 35% nitro-glycerine, and costs 20 cents per pound, is the explosive used; it is fired by electricity. The expense for explosives is about 3 cents per ton of rock. The broken rock is roughly sorted in the pit, the waste rock being sent to the dump by wheelbarrows, or in the larger mines by derricks and the crude asbestos to the cobbing sheds. The cost of this averages 25 cents per ton of rock.

The second and most important part of the work is the dressing or cobbing of the asbestos and then grading it. This grading is generally done by hand by boys. Some of the mines have, however, partially or entirely adopted machinery for this purpose, in order to avoid the loss of asbestos

screening plant has been put in, which produces now a very clean product of one grade.

The Anglo-Canadian also runs a crusher and a set of sieves, and the Johnson's Company has recently put in a couple of crushers to overwork the old dumps. None of the processes at their present state, however, may as yet be considered complete, the main difficulties being two:

1. That, if asbestos is crushed with a considerable amount of stone, until the latter is reduced to powder—the long and most valuable asbestos is partially destroyed.

2. If the stone is not entirely reduced before grading, it is nearly impossible to free the fibre from the stone, and a large amount of waste is the result.

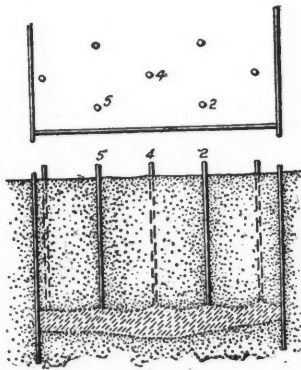
The cost of cobbing, according to Mr. Klein, varies considerably, according to the quality of material. While some asbestos will break from the stone very easy, other requires considerable labor; then larger veins will sooner be gathered than small ones. He places it, including the breaking of the cobbing stones, at \$7 per ton at the leading mines.

The asbestos after being graded, which is, however, in the entire discretion of every particular mine, is put in bags of 100 lbs. each. Cost of bags are from 5 to 6 cents each; cost of bagging, 20 to 25 cents per ton. The cost for transport to cars and loading vary from 10 to 60 cents a ton, according to distance from railroad.

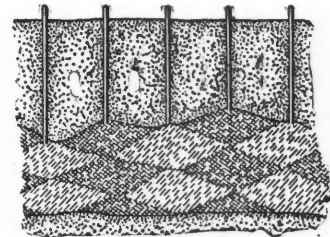
In estimating the cost per ton of asbestos Mr. Klein says: "On this subject the opinions of the asbestos miners are very different, and while some claim to mine only on 50 or 60 tons of rock to the ton of asbestos, others go as high as 150. I am of the opinion that as a rule the quantity of rock mined to the ton of asbestos is greatly underestimated. Basing, on the capacity and actual work of our machinery appliances, the known quantity of lorry loads removed from a mine during a year, and the known average weight of each load, in relation to the totals of asbestos produced, I hold that one ton of asbestos to 100 tons of rock is a fair average. If we accept this the cost of production of asbestos may be set down as follows: drilling, 3½ cents; blasting, 3 cents; labor for removing rock and gathering asbestos in the pits, 25



BLOCKS OF QUICKSAND STONE SAWN ACROSS TO SHOW STRATIFICATION.



METHOD OF PRODUCING FLOOR.



METHOD OF PRODUCING WALL.

contained in the so-called cobbing stone, i. e. large pieces of rock with a vein of asbestos in it, which did not separate by the blast, and which can only be separated by heavy sledge hammers or by crushing.

The first to try to solve this problem was the Scottish-Canadian Asbestos Company. Their plant consisted of a Blake crusher, traveling picking tables, Cornish rolls, revolving screens, elevators, chokers and blowers.

The mines of this company were closed during 1888, and it was not until the winter of 1890-91 that the American Asbestos Co. started to experiment in this direction, the main object being to do away with what is known as Grade No. 2. At this plant the crude asbestos is conveyed by an inclined railway, and automatically dumped in front of a Blake crusher, the jaws of which are set at 1½ inches. The crushed ore drops on an inclined sieve in shaking motion, which separates all the loose fibre and the dust from the larger pieces of rock and asbestos veins, the former going directly to the cleaning or grading machines, the latter dropping on a revolving picking table, where the barren rock is removed by hand to one side of the table, the asbestos veins being left on the other. At the end of the table is a receiving chute which is divided into two compartments, and into which rock and asbestos are discharged respectively. The rock drops from the chute directly into a lorry and is wheeled to the dumps, while the asbestos is conveyed either to the dry kilns, necessary in winter time or rainy weather, or to the fine crushers for further treatment. These latter are of unique construction, of which the object is to allow particles of a certain size and loosened fibre to go through, without being further crushed, as thereby the asbestos fibre is likely to be injured. This so reduced stuff is brought to the cleaning and grading machines, consisting mainly of a set of inclined sieves in rapid shaking motion in connection with blowers, fans, etc., while the remaining unbroken stone and unloosened fibre goes back to a set of still finer crushers to undergo the process again. The plant at King Bros.' mines in Thetford, which was principally erected for the extraction of asbestos out of large pieces of rocks on the old dumps, which some years ago did not warrant the expenses for block-holing and further handling, consists of a Blake crusher, from which the stuff is conveyed on a set of Cornish rolls, with the intention of having all stone reduced to powder, from there to a revolving screen, of which the object was to screen out all the dust and leave the clean fibre. This object, however, has not been fully realized, owing to the failure of the rolls to break up the rock entirely, and an additional blowing and

cents, making a total of 31½ cents to the ton of rock, or \$31.50 to the ton of asbestos: \$7 for cobbing; \$1.50 for bags and bagging; 50 cents for loading; \$5.50 for supplies, which includes fuel, tools, iron, steel, timber, other materials and repairs; \$6 for general business expenses, such as management, insurance, offices, marketing and others; \$3.55 10% wear and tear, calculated on a total of of \$355,000 in plant, making a total of \$55.55 to produce one ton of asbestos. If we calculate now that we have to pay interest on a total invested capital of about two and one-quarter millions of dollars, for which at least 10% must be expected, we have in our sales to average a price of at least \$80 per ton of asbestos."

The output of asbestos in 1880 was but 380 tons, valued at \$24,700. Since then, the industry has steadily increased, with the only exception of 1888, and reached in 1890 8,860 tons with a value of \$1,200,240. During the period between 1880 and 1890, the increase has been nearly 2,600 per cent. in tonnage and 5,100 per cent. in value.

Since 1880, the prices have been as follows: 1880, \$65; 1881, \$65; 1882, \$65; 1883, \$72; 1884, \$65; 1885, \$58; 1886, \$59.75; 1887, \$49; 1888, \$60; 1889, \$69.75; 1890, \$127; 1891, \$111.

During this time the imports of asbestos by the United States has increased from \$9,736 in 1880 to \$254,935 in 1890.

**Another Voyage to the North Polar Sea.**—Dr. Nansen is making preparations for a new voyage of discovery to the North Pole. His plan is based on the theory that a current flows north through Baffin's Bay and Smith's Sound toward the Pole, and that a ship once in the course of this current will be carried along by it.

**A Raising Drawbridge.**—A drawbridge which is to be raised bodily in the air, and not swung round on a pivot, is proposed for the Chicago river at Halstead street, Chicago. It is the invention of Mr. J. L. Waddell. It is to consist of a truss span 250 ft. long, which can be lifted to a height of 140 ft. above the water. The plans contemplate at each end a steel tower 195 ft. high, carrying at their tops pulleys 15 ft. in diameter. Over these pulleys 48 steel ropes 1½ in. in diameter pass. One end of these ropes will be attached to an end pin in the truss and the other to the counter weights, which will be so weighted as to just balance the dead-weight of the span. The weight of the cables is counter-weighted by iron chains, which pay out below the bridge. It is estimated that but from 20 to 30-horse power would be necessary to move the bridge, and that it could be raised to its full height and lowered again in five minutes or even less.

†Abstracted from a paper read before the General Mining Association of Quebec, by L. A. Klein, M. E.  
†The ENGINEERING AND MINING JOURNAL, May 15th, 1892.

## THE MINERAL PRODUCTION OF RUSSIA FROM MAY 1890 TO APRIL 1891.

We are indebted to Mr. W. A. Abegg, of St. Petersburg, for the following figures of the production of minerals in Russia during the years May 1889—April 1890 and May 1890—April 1891.

It will be seen that there has generally been a slight increase in the production during the year 1890-91 over that during the previous year. In some cases, as in lead, manganese ore, cobalt ore, iron and steel, coke, quicksilver, sulphur, bitumen, and phosphorite, the increases have been considerable, whereas there has been a falling off in chrome ore, pyrites, iron castings, rock-salt, lake-salt, glauber's salt, asphalt and kaolin.

MINERAL PRODUCTION IN RUSSIA FROM MAY, 1890, TO APRIL, 1891, AND FROM MAY, 1889, TO APRIL, 1890.

	1890-91. Metric tons.	1889-90. Metric tons.
Gold: Ural, Siberia, Orenburg, Finland.....	39,379	37,214
Platinum: Ural.....	2,849	2,636
Silver: Siberia, Kirghiz-steppes, Caucasus, Finland.....	14,578	13,856
Lead: Siberia, Kirghiz-steppes, Caucasus.....	837,525	578,443
Tin: Finland.....	13,169	11,809
Spelter: Poland, blocks.....	3,773,329	
sheets.....	3,167,236	
white.....	713,758	
Total.....	7,654,324	7,359,828
Copper: Ural, Siberia, Poland, Caucasus, Finland.....	7,044,971	6,184,614
Manganese ore: Ural, Orenburg, Caucasus, Ekatherin- oslaif.....	182,468,392	77,942,392
Cobalt ore: Caucasus.....	14,708	2,979
Chrome ore: Ural, Orenburg.....	2,369,645	4,156,129
Sulphur pyrites: Ural, Toola, Novgorod, Tomsk.....	17,145,518	25,209,238
Pig iron: Ural, Siberia, Moscow, Poland, South Russia, Finland.....	862,473,207	719,798,575
Worked iron: Ural, Siberia, Orenburg, Moscow, Poland, South Russia, St. Petersburg, Finland.....	433,178,026	397,386,287
Manufactured from iron:		
Castings: Siberia.....	80,148,166	89,991,692
Telegraph wire: St. Petersburg, Riga.....	22,776,653	5,798,273
Enameled ware: Kalonga, Toola, Poland.....	4,732,772	4,161,043
Iron and steel manufactured, Ural, Siberia, Orenburg, Moscow, St. Petersburg.....	112,119,478	92,076,468
Including: Guns: Ural.....	123,472	
Guns: St. Petersburg.....	1,083,143	
Agricultural implements: Ural.....	278,050	
Shovels: Poland, Orenburg, St. Petersburg.....	42,997	16,380
Nails: Wologda, Orenburg, St. Petersburg, Nijni Novgorod, Finland.....	15,274,547	10,160,963
Steel: Ural, Siberia, Orenburg, Moscow, Poland, South Russia, St. Petersburg, Finland:		
Rolled steel, bars, etc.....	62,794,793	
Plates.....	20,905,662	
Rails.....	166,107,516	
Tires.....	10,944,022	
Total.....	260,751,993	258,734,418
Coal: Taganrog, Donetz, Kharkoff, Bakhmut, Lugan, Poland, Ural, Siberia, Kirghiz, Sakhaline.....	5,271,221,337	597,636,671
Anthracite: Toola, Kalonga, Donetz, Don-Kosaks, Bozhead: Hiazan, Kieff, Kutais, Kuban, Turkistan, Ferghana, Samarkand.....	145,311,460	6,214,135,474
Coke: Donetz, Ekatherinoslaif, Ural, Siberia.....	295,950,231	181,957,018
Salt: Rock salt: Orenburg, Ekatherinoslaif, Caucasus, Salt extracted from lakes, marshes, etc.: Astrak- han, Crimea, Kherson, Bessarabia, Ural, Siberia, Kuban, Baku, Daghestan, Ferghana.....	778,765,434	781,623,246
Saltery salt: Perm, Bakhmut, Arkangel, Poland, Daghestan, Tersk, Yeniseisk, Irkutsk, Zab- aikel.....	1,390,046,022	372,481,989
Naphtha: Baku, Tiflis, Dhagestan, Kuban, Tscheleken Island, Ferghana, Crimea.....	3,996,663,063	3,311,057,817
Quicksilver: A. Auerbach & Co., Zaizevo.....	292,154	167,115
Sulphur: Daghestan, Ferghana.....	161,031	94,382
Glauber's salt: Tomsk, Tiflis, Tourgai.....	3,271,282	10,189,260
Asphalt (refined): Zimbirsk, Karan, Kutais, Baku, Fer- ghana.....	11,518,989	16,058,330
Tar.....	2,217,852	1,399,063
Bitumen: Tiflis, Teesk, Bala, Tschem, Ferghana.....	3,915,278	1,866,041
Ozokerite.....	7,371	
Kaolin: Volhynia, Tchernigoff, Kherson, Crimea.....	4,524,811	4,838,864
Phosphorite: Podolsk, Kosirama, Kursk.....	11,624,935	6,691,213
Asbestos: Ekatherinburg.....	323,244	

## ABSTRACTS OF OFFICIAL REPORT.

## Compagnie des Mines du Huauchaca.\*

The official report of this company for 1891 shows that notwithstanding the revolution in Chili during that year that the quantity of tons crushed was, as usual, greater than that of the preceding year. At the outbreak of the revolution payment of dividends was suspended, but were resumed on the 5th of October. Among other items we note two important steps which will tend to give more of an international character to this company. When the company was reorganized 80,000 of the new shares were set aside to be sold in Europe. The Bolivian government has now given its consent to this measure by approving the new statutes of the company, and arrangements have accordingly been made to dispose of the shares. Secondly, the company has opened offices in London and Paris. At present the shares of the company are divided among 8 countries, as follows: France, 99,680; Chili, 90,400; Bolivia, 36,760; England, 7,160; Argentina, 2,960; Germany, 1,800; United States, 800, and Spain, 440.

For the year the gross profit was \$2,049,690, as compared with \$2,275,097 for 1890, but this decrease was due not to a falling off in output, nor to that of the richness of the ore, but to the arrest of transportation during the Civil War, and to the decreased price of silver bullion. At the Huauchaca Reduction Works, 58,108.54 or 1,868,189 oz. kilograms of silver were produced at a cost for reduction of \$1.99 per kilogram, or 6.2 cents per ounce, against 46,850 kilos., or 1,506,227 oz. of silver in 1890, at a cost of \$2.32 per kilo. or 7.2 cents per ounce, which shows a saving in the cost of production of 1 cent per ounce troy.

There were exported 15,818 metric tons of ore containing 124,115.45 kilograms of silver, against 14,382.29 tons in 1890, containing 119,570 kilos. of silver. The total sales were 182,224 kilos. or 5,858,501 oz., against 619,380 kilos., or 5,445,567 oz. in 1890.

The gross output for the year was valued at \$4,464,051; gross profit, \$2,049,690, out of which there were paid in dividends \$1,045,628. The

\*From the Bulletin des Mines.

working expenses amounted to \$2,414,360, of which the most important items were mining, \$902,496; reduction of ores at Huauchaca, \$503,066; repairs and new work, \$183,398; mining machinery, \$147,172, and taxes and imposts on bars and ores exported, \$256,379. Beside the taxes above mentioned the company pays a 2% tax upon dividends paid.

At the Pulcayo Mine the work on the "Napoleon Pero" shaft has reached a depth of 120 metres. It will ultimately be carried to a depth of 600 metres to cut the San Leon zone.

At the central shaft a 350-H. P. engine has been installed, which will give additional power and reduce the cost of mining.

The work of extraction has also been facilitated by running in a broad tunnel, 370 metres long, all of which is of masonry. Both this tunnel and that of Pulcayo are lighted by electricity. The railroad now comes to the mine, and the ore can now go directly to Antofogasta. The report states that special effort has been directed toward the accumulation of new ore reserves, with the result that the ore now in sight is calculated to contain 1,053,637 kilos. of silver, being 67,143 kilos. more than at the end of 1890.

The work on the Playa Blanca reduction works was considerably retarded by the Civil War, which has also greatly increased its cost. This establishment will when completed be one of the most complete in the world. The system of treatment will be that now in use at Huauchaca, known as the Tina method of amalgamation. It is located at Antofogasta in Chili, and will consist of 6 crushers, and 4 rolls, which will feed 10 batteries of 10 stamps each; 43 furnaces of different types, besides 5 for drying the ore and salt, 30 copper pans of 2 tons capacity, 15 settling tanks, 12 retorting furnaces. The establishment also possesses 3 brick kilns, 2 cupellation furnaces, and 2 silver refining furnaces. There has been expended upon it up to the present time \$1,567,311.

Since 1877 this company has produced bullion to the value of \$43,033,899, and has paid \$14,168,038 in dividends; besides setting the sum of \$1,776,765 aside as a reserve and industrial fund.

## HARNEY PEAK TIN MINING, MILLING AND MANUFACTURING COMPANY.

Some time ago we mentioned the fact that Lord Thurlow and party, which included Capt. Josiah Thomas, of the Dolcoath tin mine, Cornwall, were in this city en route to the Black Hills, South Dakota, for the purpose of examining the properties of the Harney Peak Tin Co.

Lord Thurlow's report, which bears date of July 25, has now been made public and from it we take the following:

The company owns 1,100 mineral claims of 10 acres each. The principal groups of mines on which the greatest development work has been done are the Addie, the Tenderfoot or Japanzy, the Gertie, the Coats and the Cowboy. From the particulars given we learn that the Addie has a shaft 600 ft. deep; that the drifts, aggregate 1,600 ft. in length, with an upraise of 545 ft. and 280 ft. of crosscuts. This mine is considered one of such importance on account of the strong body of ore on which it is sinking. The levels vary in richness, but the well defined lode goes down between clearly defined continuous walls. The shaft of this mine being divided into compartments, admits of sinking for attaining greater depth, and of stopping and hoisting ore simultaneously. It is decided to sink this mine 1,000 ft. or more as an experimental test of the depth of the ore deposit of the Black Hills.

The Tenderfoot is the next mine dealt with, and it is regarded as the representative mine of a very powerful group contiguous to the line of railway, and embracing the Darwin, Czar and several other important lodes. The main lode, strongly marked, can be traced for a considerable length, and has been tapped from below by the Japanzy tunnel of about 1,000 ft. in country rock. From the point of contact there extend drifts on the vein for 972 ft., with an upraise of 145 ft. It has also a 95-ft. shaft and other development works of about 500 lin. ft. This important group produces rich ore, and is expected to prove a large and valuable source of supply.

The Gertie is stated to be the richest mine yet opened in the district. The Cowboy, it is explained, is a comparatively narrow quartz vein, yielding magnificent stones of tin of exceptionally fine color. The engine is of 130 H.P., and is just now fully employed pumping from the bottom of the 315-ft. shaft. There are 938 ft. of drifts on the vein. In the case of the Coats mine, the shaft is 425 ft. deep, with 900 ft. of drifts, and an upraise of 120 ft. in ore. Taking the Gertie, Cowboy and Coats together, Lord Thurlow is of opinion that a "large amount of very high grade ore could be daily put into the mill, raising the average milled to a high percentage."

The supply of ore to the new mill is next dealt with. It is explained that it is from the five mines just referred to that it is intended to supply the new mill with 250 tons a day, there being sufficient ore available to do so for one year without further development. The boiler power in this mill is sufficient to work up to 500 tons a day, and additional milling plant will be added as soon as practical experience proves the class of machinery selected. According to the proportion of ore taken from each of the above mines, the average return of black tin will vary from 3 to 5 per cent.

Speaking generally on the subject of the tin ore-bearing zone, the report continues: "I have no doubt that the above five mines will prove fair samples of the great majority of the whole. They embrace quartz and mica lodes, and afford examples of the rich but narrow veins of ore, say from 1 to 4 ft. in width, as well as of the stronger lodes of lower grade ore varying from 4 to 12 ft. in width. The selection of these mines for first development is due to their being among the first discovered, and to their proximity and accessibility."

It is further announced that the company has executed a mortgage to New York and London capitalists to secure the \$4,800,000 of bonds issued by the company. This mortgage includes all tin claims, both

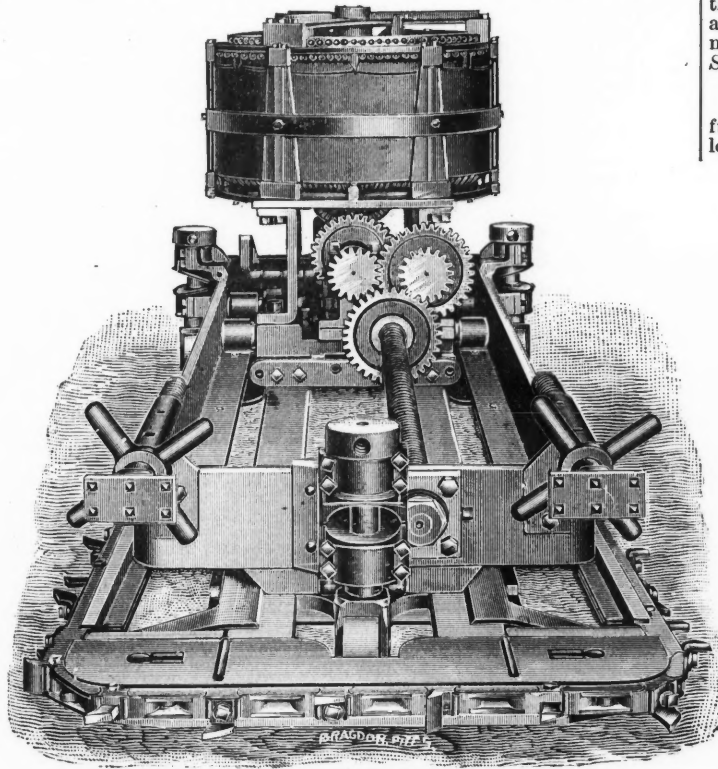
placer and quartz, and all other property owned by the company. The company, with the money thus obtained, will develop their property.

As usual, a great part of the report is made up of "estimates of hypothetical quantities of ore and of profits, it is hoped will be realized on the hypothetical ore." The time during which the patient stockholders are still to continue the exercise of their admirable faith, and when they are actually to receive some tangible "evidence of the things hoped for" are not stated in this report, nor does Captain Josiah Thomas tell us his opinion of the mines or his estimates of their profits, nor whether he is anxious to sell out his Dolcoath stock and invest in Harney Peak.

There are many other things curious people would like to know, but if the Harney Peak stockholders are satisfied others probably should be.

**THE BROWN COAL MINING MACHINE.**

About a year ago, Captain Samuel S. Brown, of W. H. Brown Sons, of Pittsburg, enlisted the services of Mr. Adam Keil to supply an electric coal cutting machine. This machine is here shown. It consists essentially of two parts, viz., a bed and a movable part. The last named part of the machine consists of a supporting frame, a motor, sprocket wheel, feed gearing and a chain carrying cutting bits. In operation the bed rests immovable upon the floor of the mine, and the portion carrying the motor and cutting chain is fed forward against the coal. The motor running at a speed of only 150 revolutions per minute drives the cutting chain directly through a sprocket wheel attached to the revolving field shaft. There is no immediate gearing



THE BROWN COAL MINING MACHINE.

beside the sprocket wheel between the motor shaft and the cutting chain; the gearing shown is that of the feeding mechanism. The manufacturers call particular attention to the fact that the only gearing employed on this machine, outside of the sprocket wheel on the armature shaft, is that shown in the cut and employed to drive the feeding nut on the screw.

The motor is a 220-volt 15-H.P. machine, and weighs about 500 pounds. As before stated, it runs at only 150 revolutions per minute. This motor is of the multipolar field type, and the field revolves with its shaft in a vertical position, while the armature remains stationary. The dimensions are 8 ft. when the machine is closed up, and 30 ins. in height. When the cutting mechanism is projected to the fullest extent it will make an undercut 5 ft. deep by 3 ft. wide by 3 ins. high. A valuable feature of the machine is that, it advances on its own level, making a smooth floor without any offsets, and it is claimed that it can cut into a solid breast without partings.

As to the operation of the machine, it may be said that it has been working since the 3d of March in the mines on Youghiogheny coal, which, near the limestone is extremely hard, and cuts are being made in 2½ minutes each.

It is reported that a factory for the manufacture of these coal cutters will shortly be built in Pittsburg or Chicago.

**Prince Edward Island Tunnel.**—The work of testing the formation through which the tunnel must be excavated is now being carried on by the Electric Mining Company of Ottawa. The test holes are being drilled at a distance of one-third of a mile apart, the depth of water varying from 60 to 100 ft. The diamond drills take out a core of 1½ in. in diameter, the boring being carried to a depth of 110 ft. So far the formation has been proved to be sandstone with intervening layers of clay.

**A NEW FORM OF WIRE ROPE.**

In steel wire ropes as usually made the external bearing surface is often confined to one wire in each strand, and these exposed wires become unduly worn in a short time. To obviate this drawback an English firm, Messrs. Latch & Batchelor, of Birmingham, has adopted a new form of rope with flattened strands, one form of which is shown in the accompanying illustrations. The wearing surface is considerably increased by this new arrangement of wires in the strand. The increased surface thus obtained also allows of much smaller wires being used, and thus the ropes are made more flexible. The liability to brittleness in the wires while in use is minimized. Very satisfactory results are said to have been obtained in long distance haulage in mines. There is no tendency to spin a kink and they are easily spliced. The illustrations here given are taken from a number of different forms of this new rope illustrated in "Industries."

**DIGEST OF RECENT DECISIONS.**

**DUTY OF MINING EMPLOYER.**

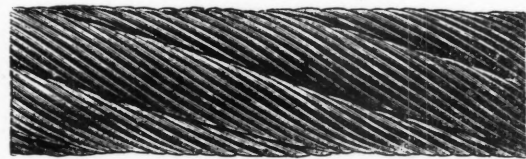
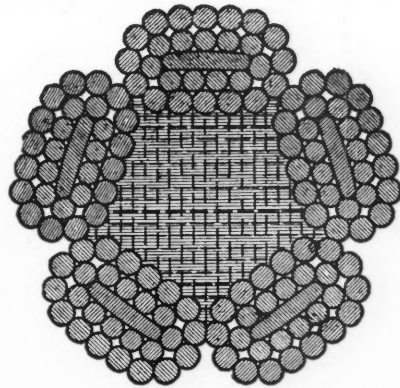
Where a person is engaged in a dangerous occupation, it is the duty of his employer to exercise reasonable care and diligence in providing for his safety. This duty includes the exercise of reasonable care in procuring and keeping in repair the machinery and appliances by which mining employees are carried to and from their work. *Tenny vs. Moffatt, Supreme Court of Colorado, 30 Pac. Rep., 348.*

**MINING LEASE AND MUNICIPAL ASSESSMENTS.**

Under a lease of a coal mine, providing that the lessee "shall pay all and every the United States, State and local taxes, duties and imposts on the coal mined, the mining improvements of every kind, and the surface and coal land itself," the lessee is not required to pay municipal assessments for constructing a sewer or for paving a street. *Pettebone vs. Smith, Supreme Court of Pennsylvania, 24 At. Rep., 693.*

**INSUFFICIENT DESCRIPTION OF MINING CLAIM.**

The location notice of a mining claim described the claim as being "1,500 ft. in length on this ledge, . . . and 300 ft. on each side of the center of location," and as running east 300 ft. and west 1,200 ft. "from monu-



LATCH AND BATCHELOR'S FLAT STRANDED WIRE ROPE.

ment." the ledge being "situated up near the head of the right-hand fork of what is known as 'Tie Canyon,' about five miles from" a certain railroad is insufficient, under a statute which requires such a description of a claim as by reference to some "natural object or permanent monument" will identify it.—*Darger v. LeSieur, Supreme Court of Utah, 30 Pac. Rep., 363.*

**FOLLOWING VEINS IN ADJOINING MINING CLAIMS.**

The right of a mine owner to follow a vein whose apex lies within the boundaries of his claim beyond the vertical side lines thereof, and within the lines of other claims, is not confined to cases in which the claim thus entered is held under a junior patent or certificate, and the relative dates of the patents or certificates is immaterial. Where a vein upon which a location rests, after being followed for a considerable distance, forks and passes out through the side line of the location, so that the outcrop of one fork is on the adjoining claim, this whole fork belongs to the owner of the latter claim.—*Colo. Lent. Consolidated Mining Co. v. Truck, U. S. Circuit Court of Appeals, 8th Circuit, Fed. Rep., 888.*

**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, SEPTEMBER 13TH, 1892.  
 482,363. Heating Furnace. Peter Keil, Jr., Philadelphia, Pa.  
 484,364. Apparatus for Making Metal Tubes. Peter Keil, Jr., Philadelphia, Pa.  
 484,372. Process for Recovering Nitro-Glycerine from Waste Acids. James Lawrence, Paulsborough, N. J.  
 482,477. Process for Bleaching. Carl J. E. de Haën, List, near Hanover, Germany.  
 482,489. Apparatus for Pickling Metal Plates. Daniel M. Somers and William H. Atkinson, Brooklyn, N. Y.  
 482,577. Composition of Matter for the Extraction of Gold and Silver from Ores. Edward D. Kendall, Brooklyn, N. Y.  
 482,582. Feeding Device for Ore Washing Machines. Carl A. E. Meinicke, Clausthal, Germany.  
 482,652. Feeder for Coal, Ore, etc. Louis Rosenfeld, New York, N. Y.

## PERSONALS.

Mr. H. C. Frick, chairman of the Carnegie Steel Company, was in New York on Tuesday and Wednesday of this week.

Mr. E. E. Olcott, mining engineer, who recently made an exhaustive examination of the Pioche, Nev. mines, has returned to this city.

Mr. Leonard Lewisohn, of this city, was among the passengers of the Normannia who were subjected to such discomfort during quarantine.

Mr. Frank Pearce, formerly of Montana, has been appointed superintendent of the Sheridan and Mendota Consolidated mines, vice Mr. B. D. Maye.

Mr. Otto F. Pfordte, late of Pueblo, has been appointed to the position of fuel foreman of the Hector mine, in Ouray County, Colo., made vacant by the resignation of Mr. W. W. Hooper.

Mr. John E. Rothwell, mining engineer, has returned to New York from Oregon, where he erected a chlorination works at mines near Baker City, where the cyanide process has been tried and failed.

Mr. Robert M. Thompson, president of the Oxford Copper Company, and Mr. C. J. Harrah, of the Midvale Steel Company, were among the passengers on the Normannia, who underwent such unexampled hardships during the past week.

Mr. B. B. Thayer, formerly mine superintendent of the Bi-metallic mine, Phillipsburg, Montana, but recently superintendent of the Sheridan and Mendota Consolidated mines of Marshall Basin, Colo., has been appointed general manager of the Poorman Mines, Limited, of Owyhee County, Idaho.

Lieut. R. E. Peary, C. E., U. S. N., and party which includes Mrs. Peary, Dr. Cook and Mr. Astrop, have returned from their exploring expedition to Greenland, having reached St. Johns, Newfoundland, on September 11th, after an absence of 15 months. Lieut. Peary was eminently successful in his quest, which was to determine the north coast outline of Greenland. In a telegram to the Navy Department he claims the honor of the discovery of Independence Bay, on July 4th, in latitude  $81^{\circ} 37'$ , longitude  $34^{\circ} W$ . for the United States Navy. Mr. Verhoef, one of the members of the party, lost his life, it is supposed by falling into a crevasse. The work accomplished is extremely important to geographers and ethnologists.

Professor Bernard Moses has been selected for president of the University of California by the committee of regents. Professor Moses was born in Connecticut in 1846. He graduated from Ann Arbor University, Michigan. Afterwards went to Europe, taking a course of special studies at Leipzig University. After traveling in various European countries he went to Heidelberg, from which university he received the degree of Ph. D. in 1874. In the following year he became professor of history and political economy at Berkeley, and has occupied that chair ever since. Professor Moses is an able speaker. He has delivered a number of addresses, which have created attention, and was the Labor Day orator at Sacramento to-day. He has written a number of books on civil polity and political economy.

The following appointments have recently been made at the Michigan Mining School: Dr. George A. Koenig, late of the University of Pennsylvania, as professor of chemistry; Edgar Kidwell, professor of mechanical and electrical engineering; Fred. F. Sharpless, professor of metallurgy; Fred. W. Denton, professor of civil and mining engineering. The three latter gentlemen have been connected with this institution for several years as instructors and have earned their promotion. Dr. Horace B. Patton has been appointed instructor in mineralogy and petrography. Dr. Alfred C. Lane, instructor in petrography and geology. Those two gentlemen have been connected both with the State Survey and with the Mining School for several years. Mr. Carroll L. Hoyt a graduate of Cornell University in the mechanical engineering department, as instructor in drawing and mechanical engineering.

At the last prize contest instituted by the City of Paris for the best electric meter the prize of 5,000 francs was awarded to Prof. Elihu Thomson. With the desire that this sum should serve for the development of the theoretical knowledge of electricity, he has requested Ernest Thurnauer, General Manager for Europe of the Thomson-Houston International Electric Company, to offer a prize for the best work on a theoretical question in electricity, and to organize a committee who should propose the subjects, examine the productions and decide the prize. The following gentlemen have been chosen and have kindly consented to act as members of the Committee: J. Carpentier, President of the Societe Internationale des Electriciens; Hippolyte Fontaine; E. Hospitalier, Professor in the School of Physics and Chemistry of the City of Paris; E. Mascart, member of the institute; A. Potier, member of the institute, examiner; B. Abdank-Abakanowicz, Consulting Engineer, Secretary of the Committee.

The committee has decided that the prize should be given for an investigation on one of the following subjects: 1. The heat developed by successive charges and discharges of condensers under different conditions of frequency, nature of dielectric and quantity of charge. 2. It has been shown theoretically that when the two surfaces of a condenser

are connected by a conducting body, the condenser becomes the source of alternating currents as soon as the resistance of the conducting body decreases below a certain limit. The formula that permits calculating the period of oscillation has not yet been completely verified. The period of oscillation should be investigated experimentally under conditions such that the exact measure of resistance, capacity and coefficients of self-induction may be possible, in order to arrive at a complete and precise verification of this formula. 3. When a condenser made with an imperfect insulating material has been charged and then left to itself, the charge is gradually dissipated. The time necessary for the charge to be reduced to a given fraction of its initial value depends only on the nature of the insulating material. It is proposed to investigate whether, as certain recent theories would seem to indicate, analogous phenomena do not present themselves in metallic conductors, and whether these can be shown experimentally. 4. It is proposed to arrange and systematize our present knowledge of the graphical solutions of electrical problems, and deduce from them some general methods as in graphical statics.

The theses presented may be written in any one of the following languages: English, French, German, Italian, Spanish or Latin. They may be in manuscript, or printed. Each thesis presented must be signed by a pseudonym and accompanied by a sealed envelope bearing the same pseudonym on the outside, and with the name and address of the author inside. The papers must be sent before the 15th of September, 1893, to B. Abdank-Abakanowicz, Consulting Engineer, the Secretary of the Committee, at 7 Rue du Louvre, Paris, who will furnish any further information required.

## OBITUARY.

Henry S. Livingood, mining engineer, died very suddenly from heart failure at Reading, Pa., September 4th. Mr. Livingood was educated at Princeton College, Freiberg, and Berlin, with the expectation of becoming a coal mining expert and was, at the time of his death, just beginning what promised to be a most successful career.

Mr. Origen Vandenberg died September 10th in New York. He spent much of his life in trying to establish an underground railway in New York. In 1866 he secured the passage of a bill authorizing the construction of such a road, and when in 1868 others tried to have another similar law passed by the Legislature, Mr. Vandenberg's rights as the framer of the preceding measure were insisted upon and recognized, from which he derived the nickname "Original" Vandenberg.

Gen. James R. Anderson, of Richmond, Va., died recently at the Oceanic House, Isle of Shoals, where he had been since the middle of August. General Anderson was a graduate of West Point. He entered the Confederate service at the beginning of the war. Later he resigned his commission and established a plant for the manufacture of cannon, which were supplied to the Confederate army. He retained the principal ownership of this plant through the war. For many years past he has been the president of the Tredegar Works, at Richmond. He was one of the enterprising and progressive men of the South and had done much since the war to build up the shattered business of the Southern States. He had led a very active life, but retained remarkable vigor for a man of 80 years.

## SOCIETIES.

The Vereins Deutsche Ingenieure held its 33d special meeting at Hanover, August 31st. Papers were read by Dr. W. Kohlrausch on "Dynamos," and by Dr. Grabau on "Steam Engines for Working Dynamos." A two days' excursion to Bremen and Bremerham had to be abandoned on account of the cholera.

The 63d, and October meeting of the American Institute of Mining Engineers, will be held in the Schuylkill Valley, Pa. It promises to be a most will be given to see the operations of his anthracite district as well as various large iron and steel works. The headquarters will be at the Navesink Mountain Hotel, Reading.

## INDUSTRIAL NOTES.

The San Antonio, Texas County, commissioners, invite bids for the construction of three iron bridges across the Medina River.

The Bristol Iron Furnace, of Bristol, Tenn., has been placed in the hands of J. J. Cox, receiver, upon the application of Cadwalader & Co., of Pulaski.

The Bellington Coal and Coke Company, of Custer, W. Va., has sunk a slope to their coal seam; twenty new coke ovens have been completed and will be fired.

The Cumberland Iron and Steel Shafting Company has been organized at Cumberland, Md., with a capital stock of \$100,000 subscribed. The officers are Merwin McKaig, president; W. J. Muncester, vice-president, and Albert Charles, secretary.

The United States Projectile Company, of Brooklyn, N. Y., have placed an order with The Berlin Iron Bridge Company, of East Berlin, Conn., for an addition, 240 ft. long, to their present building. The addition will be entirely of iron.

The new tin-plate works of Somers Bros., at 3d avenue and 3d street, Brooklyn, N. Y., have been put in partial operation. The company are now successfully making black plates of a superior quality, and would be cold-rolling and tinning had not an accident caused a delay of a week or ten days.

The Egypt Coal Company, of Chatham County, North Carolina, has built a branch railroad from its mines at Egypt to connect with the R. & A. A. line near Osgood. The company's engineer reports a probable output of 500 tons per day in the course of a short time. The quality of the coal is said to be good, as it is in use by the railroads in that section for fuel.

The plant of the old United States Rolling Stock Company, at Hagevich, Ill., was on September 10th turned over to the United States Car Company, a New Jersey corporation. Work at the Hagevich plant, which has been suspended since the failure of the United States Rolling Stock Company over a year ago, will be resumed as soon as the property can be put in good working order.

The Ellwood Steel Company, of Ellwood, Pa., has been granted a charter with a capital stock of \$100,000. As already stated in a previous issue, this concern proposes to put up a very extensive plant for the manufacture of steel sheets and have given the contract for the erection of the mills to the Leechburg Foundry and Machine Company, of Pittsburg.

It is reported that the Holston Salt Works, of Saltville, Va., has been sold to a syndicate, who will enlarge it and manufacture salt, soda ash, bleaching powders, acids, etc. The charter has been made under the name of the Mathieson Alkali Works, with a capital stock of \$2,500,000. E. W. Arnold, of Providence, R. I., is president; G. W. Palmer, vice-president, and W. P. Robinson, secretary.

Last week ground was broken for the erection of a new foundry and machine shop to be built by the Carnegie Steel Company, Limited, at Braddock, Pa. The new foundry will be one of the largest in the country, and will be built in close proximity to the blast furnace plant. It has been the custom of this firm to have their castings made by outside parties, but with the completion of this foundry they will make all the castings they need in their various establishments.

All departments of the Pittsburg Iron Works of the J. Painter Sons Company, at Pittsburg, are now in full operation, with the exception of the puddling department. This department contains 67 single puddling furnaces and is still idle, with no prospects of an early resumption. This firm for some time past have been using Bessemer steel billets almost exclusively and have had under consideration the erection of a Bessemer plant. No definite action in the matter, however, has yet been taken.

During the year 1891 there were only 103 passengers killed and 1,612 injured on the railways in the British Isles out of a total, exclusive of season-ticket holders and commuters of 845,463,668. In addition to this 549 servants of the railway companies were killed and 3,448 injured. The number of people killed at level crossings was 66 and injured, 81; 306 trespassers were killed and 161 injured, and there were 87 suicides. As regards accidents to trains, it is noticeable that the number of collisions with buffer stops owing to the train entering the depot at too great a speed have appreciably increased.

The annual meeting of the stockholders of the Westinghouse Air Brake Company was held at Wilmerding, Pa., last week. The old officers were re-elected, as follows: George Westinghouse, president; Robert Pitcairn, vice-president; John Caldwell, treasurer, and W. W. Card, secretary. All the old directors were re-elected. It is stated that the gross earnings of this concern for the past year approximate \$5,000,000, the expenses being \$2,600,000, leaving the net earnings \$2,400,000, which shows an increase of about \$700,000, and that the company have between \$1,000,000 and \$1,250,000 cash on hand. It is intimated that a dividend of 10 per cent. will be declared for the quarter ending September 30th.

The Clayton Air Compressor Works has issued a new catalogue of the Clayton air compressors. It describes in detail the various styles of steam and belt-actuated air compressors for use in mining, tunneling, railway and bridge building, pumping natural gas, supplying pneumatic tubes, operating pneumatic riveters, tools and cranes, creating water, elevating water, acids and other liquids, submarine work, operating oil fuel burners, refrigerating and ventilating, charging automatic sprinkler systems, stripping rubber hose in rubber factories, testing tinware, agitating liquids of all kinds, finishing silk ribbon, etc. It also illustrates and describes the new Clayton high pressure compressor, suitable for air or carbonic acid gas. The field of usefulness for compressed air is constantly broadening, and this catalogue shows several new designs representing

the latest and most enlightened features of air compressor practice; it also contains information and data of interest to users of compressed air, illustrations, tables and price lists, not only of the Clayton air compressors, but of the Clayton steam and belt-actuated vacuum pumps, of the Clayton fly-wheel steam pump, especially suitable for pumping coal tar, and also of air receivers, boilers, rock drills, smiths' tools, hose, couplings, etc.

#### 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 their 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 of goods of any kind.

#### Goods Wanted at Home.

- 2,774. Steam trap. South Carolina.
- 2,775. Mining tools for a mine in United States of Colombia. Michigan.
- 2,777. Pumps and boilers. Louisiana.
- 2,778. A 30-H. P. boiler and a 25-H. P. engine. Massachusetts.
- 2,780. Switchboard and telephone wires. South Carolina.
- 2,782. A hydraulic passenger elevator and hot air heating apparatus for a \$75,000 Opera House. Louisiana.
- 2,783. A cheap concentrator and mill. Montana.
- 2,784. A 30- or 40-H. P. engine and boiler. Virginia.
- 2,785. Spoke machinery; lathes, tenoning, throating, tapering and facing machines; 6 and 18 in. belt sanding machines; also equalizing sawing machines with 2 saws. Virginia.
- 2,786. Line shafting, 2 3-16 hangers, belting and 1 in. wrought iron pipe. Virginia.
- 2,787. About 5,000 ft. second-hand 4 in. cast iron water pipe to stand about 100 lbs. pressure. Alabama.

#### Goods Wanted Abroad.

- 2,776. Illustrated catalogues of ditchers, graders, electric apparatus, agricultural implements of all sorts, rock crushers, and automatic wire-rope tramway. West Indies.
- 2,781. Catalogues of mining machinery, more especially relating to electric coal cutting machines; diamond drills for deep boring, say 2,000 ft., and the best kind of water motors. New Zealand.

#### GENERAL MINING NEWS.

##### ARKANSAS.

Chlorination works are being built on Bear River, 20 miles from Hot Springs, by Maurice Barnett, at one time connected with the Deadwood and Delaware Smelter. The Deadwood "Daily Pioneer" says concerning it: "The Ozark Mountains in and around Hot Springs are claimed to contain ore, but whether any of it is rich enough to pay is a question. Samples sent to Deadwood & Delaware smelter for assay, from the Bonanza mine, eight miles west of Hot Springs, did not even yield a color. Considerable development work is being done."

##### ARIZONA.

(From our Special Correspondent.)

Assessments on mining properties falling delinquent during the current month amount to \$5,000.

##### Cochise County.

Tombstone Mill and Mining Company.—The diamond drill, in the Lucky Cuss, is working on the 5th level. Although they have not discovered any ore with it, they have saved a great expense in proving ground to be barren at a trifling cost that would have cost a large sum to have demonstrated by the slow process of crosscutting.

##### Pima County.

(From our Special Correspondent.)

Silver King Mining Company.—Quijotoa.—For some time past the report has been freely circulated that the mine of this company was showing up better than appeared in the weekly reports. Such a shipment has been made of 9,000 lbs. concentrates and the mill keeps running steadily. The stope and winze on west drift of open drift are in good ore, and the drift, 70 ft., is also in milling ore of good grade.

##### Yavapai County.

The Castle Creek Gold Mining Company has an ore body over 8 ft. wide in one of the claims of their group, upon which development work is being done, which assays about \$135 per ton, free gold, it is claimed. The ore body is widening as depth is attained.

Butler Milling Company.—This mill is now running steadily on ore from the American Flag mine, which yields \$40 per ton, gold; but will shortly start

in to run on ore from the Plata Bonita mine, which ore yields \$60 gold; there is a lead streak in this mine which goes over \$200 per ton. Drifting is being done in the Plata Bonita at the 75-ft. level, where a 22-in. vein of ore has been exposed. This camp is blessed by an abundance of water.

##### CALIFORNIA.

(From our Special Correspondent.)

The mining assessments falling delinquent in the State during the month amount to \$11,000.

##### Amador County.

The Amador "Ledger" publishes the following Sutter Creek items: The mining outlook in this section is gradually improving. While there is no new prospecting, yet the exploring that is going on is showing signs of permanent results. At the South Eureka developments continue to improve. The managers are drifting north yet on the gouge beside the ledge, which is soft and makes their headway rapid. From the course of the footwall it is evident that the ledge is increasing in width, and they feel confident that it is not less than 10 ft. wide and the quality of the rock is improving. The last assay gave about \$6 per ton. They are still crosscutting west, with the hope of encountering another ledge very soon, as the ledge a considerable distance north of them is known to be divided. At the Hector active preparations are being made to open up one or two drifts between the 200 and 600-ft. levels. The management will soon be able to get to work on ore and the mill will be in motion again.

##### Butte County.

(From our Special Correspondent.)

Blue and Gold Mine, Bangor.—Rich dirt has been struck continually during the last few weeks, 50 cents to the pan being not at all unusual. The 20-stamp mill, in connection with a large rock crusher, is kept constantly at work on the hard blue cement. An experienced amalgamator has been engaged and a rich clean up is anticipated.

Palo Alto Mine.—An electric plant is about to be put in as the water power is not proving sufficient. At present 20 stamps are running night and day, but under the new order of things 40 stamps will be in operation. Enough ore is in sight to keep the mill running for two years, the extent of the ore body, too, not being yet fully known. It runs from \$6 to \$20 per ton.

##### Mono County.

Standard Consolidated Mining Company, Bodie.—A shipment of bullion, being the product for the month of August, valued at \$24,132.84, has been received at San Francisco.

The Bulwer Consolidated Mining Company.—During the past week, a total of 125 tons of ore was crushed. The stopes are yielding as usual. Average battery sample, \$21.64 per ton; tailings, \$7.48 per ton. Shipped during the week, \$11,836.56.

##### Nevada County.

Federal Loan Mining Company.—This company has struck pay ore at a depth of 600 ft. It has a ten-stamp mill and employs a good force of men.

Live Oak Consolidated Gold Mining Company.—This company has purchased the Live Oak mine, situated at Pleasant Ridge, formerly owned by Davis & Company. The mine has been worked for the past twenty years, but only to a superficial depth. The ledge in the bottom of the shaft is 3 ft. in width, and a test crusher of the ore at the Peabody mill, some ten days ago, yielded \$35 per ton. Active operations will be instituted immediately. The new company will erect a large hoisting plant and a quartz mill. The directors are: J. A. Moffitt, H. J. Goethe, Emil Heinrich, Anthony Gerber, Geo. H. Clark, R. J. Gordon and Thomas Rudock.

##### San Bernardino County.

##### San Jacinto Estate, Limited.

The Temescal Mines.—A temporary reduction of the force at San Jacinto has been made. The unfavorable statements published have had the effect of frightening the owners in London, who have sent out word that the working expenses should be reduced to a limit of £1,000 per month. This has necessitated the laying off a number of men. It is stated that sufficient men have been retained to carry on work in the three drifts now being run from the main shaft to cross cut several ledges which outcrop on the surface within 500 ft. of the shaft. There are 15 or 20 of these croppings. Smelting is still in progress and the 5-stamp mill is running steadily.

##### Siskiyou County.

(From our Special Correspondent.)

Spencer Mine.—This property, situated on Humboldt Creek, is paying exceedingly well just now. From the last four clean-ups over 600 oz. have been realized, the last being 160 oz. for an eleven days' run of the 5 stamp mill.

##### COLORADO.

##### Clear Creek County.

According to the Denver "Republican," considerable activity in mining circles is being displayed at Idaho Springs. The mills are all crowded and are kept running constantly. Several mining deals have taken place recently. A force of 10 men is now employed by Allen Bros. on the General Thomas. Smelting ore is being shipped. The Edgar Union is turning ore from a 15-in. streak, which returns from \$125 to \$150 a ton. Large bodies of smelting

ore have been encountered in the levels of the Lake tunnel. A rich vein has been opened up in the west drift of the Lexington. The Mattie mine and mill are undergoing repairs, and operations will be resumed shortly, with an increased force. Some milling and smelting ore has been encountered in the Newton, and two sorters are kept busy on first-class ore.

The Mayflower has again been started up, and the Kitty Clyde continues to produce under the management of G. S. Raymer. The Gem extension has broken into the workings of the Gem mine proper. About 35 men were at work in the latter, and were taking out considerable ore. The Gem extension has been sunk over 300 feet the past year. From the surface down good ore was encountered, which averages about \$50 per ton net.

##### El Paso County.

Incorporation papers of the Canyon City & Cripple Creek Railway Company were filed recently. The company proposes to build, equip and operate a railroad running from Canyon City to Four-Mile Creek and from there to Cripple Creek. The names of the persons forming the company are: Eben Smith, Leadville; C. T. Harkison, S. H. Hastings, Denver; L. D. Roudebush, Cripple Creek; B. T. Rockafellow, G. N. Nikerk, Canyon City; Chas. Henkel, Robert Gibson, David Wood, Pueblo. The capital stock will be \$500,000 in 5,000 shares of the par value of \$100 each, and the offices of the company will be in Pueblo, Colo.

Ophir Mining Company.—It is reported, on good authority, that Mr. J. J. Hagerman has procured an option on a controlling interest of the stock of this company at Cripple Creek. The principal claims of this company are the Dead Pine and the Carbonate, both of which have been developed to a considerable extent. The price to be paid for the stock is not known, but it exceeds 10 cents. The report of the sale sent the stock quickly to 20 cents.

##### Hinsdale County.

The following items of Creede news have been taken from our exchanges: The Amethyst has reached its third level, 300 ft. deep, and in the north drift a 5-ft. vein of quartz, carry an abundance of leaf silver and sulphurets, valued at over \$300 per ton, was found. They are now 760 ft. from the Last Chance vein.

The World is preparing to ship sorted ore. Gus Odor, the owner, says he will have a carload moving in two weeks. The ore averages 250 oz. out of a 16-in. vein, which has neither increased nor diminished in width during the 40 ft. of shaft work.

##### Ouray County.

Rico-Aspen Consolidated Mining Company and Enterprise Mining Company.—The controversy existing between these companies has been taken into the United States Circuit Court upon an application for an injunction against the Enterprise company, a New Jersey corporation, to restrain it from encroaching upon the underground workings of the Rico-Aspen company. Judge Hallett has issued a restraining order against the Enterprise company, enjoining them from working in the disputed territory pending a hearing, which was fixed for last Monday. The complaint is a voluminous affair, covering many pages of typewritten matter, and recites the fact of the ownership by the Rico-Aspen company of the Vestal lode in Rico County. It is charged that the Enterprise company August 1st last extended their workings into this lode secretly and fraudulently, and extracted a quantity of valuable ore; that armed men drove the workmen of the Rico company from the workings, and by the use of smudges, combustibles and dynamite jeopardized the lives and safety of the men, and that the Enterprise company is continuing to extract ore from the plaintiffs' ground.

Shipments of ore and concentrates from Telluride since January 1st, 1892, to August 25th, 1892. Week ending September 1st, tons, 21,553; Smuggler-Union, 418; Sheridan Consolidated, 506; Hector Mining Company, 11; Boomerang, 11; Sandy Thompson, 11; total, 957.

##### Pitkin County.

The Aspen "Times" estimates the output of ore of the various mining companies as follows: Mollie Gibson, 3,300 tons; Aspen M. & S., 2,050 tons; Smuggler, 3,000 tons; Della S., 1,550 tons; Park-Regent, 750 tons; Bushwhacker, 541 tons.

Aspen Mining & Smelting Company.—Mr. J. B. Wheeler, president of this company, is quoted by the Aspen "Times" as saying that unless the neighboring properties start up their pumps soon, the company will find it necessary to suspend the payment of dividends which now amount to \$20,000 monthly. The company, which has been paying water tolls to the Deep Shaft & Drainage Company whose pumps are now drowned, has experienced a great deal of annoyance since the latter yielded to the flood, and while the lower levels are showing large amounts of marketable ore, it is impossible to reach them under present conditions.

##### Summit County.

Pennsylvania.—This mine has reduced its force to one-third the former number, only enough men being kept at work to keep the workings clear and open.

St. John.—This mine has been closed down for an indefinite time owing to the low price of silver. The St. John formerly gave employment to over 200 men, but the force had been reduced as the price of silver fell below 90 cents, until last Saturday the

remaining 78 men who were at work were discharged, as it was impossible to make a profit at 82 cents, less 5%, or about 78½ cents per oz.

War Eagle.—This property, producing 48 oz. of ore, has been closed down.

#### Telluride County.

Lake View Mining Company.—This company has brought suit against L. L. Nunn, of Telluride, for \$100,000. The plaintiffs allege that the defendant has wrongfully taken ore to the amount claimed from their possessions.

#### GEORGIA.

##### Floyd County.

(From our Special Correspondent.)

I am reliably informed that a local company is being promoted, at Rome, in this county, by George Stuck, of Selma, Ala., as local promoter and one of the prospective heavy stockholders, for manufacturing schiedbarengus and aluminum from a cupola furnace. The man who started this enterprise and enlisted Mr. Stuck's name and capital is Charles Hartsfelt, promoter of Schiedbarengus Company, at Newport, Ky.; also of the Charles Hartsfelt Smelting Company, at Newport. The same man has also promoted a like company at Chicago Heights, Ill., which was advertised in a late number of "Scribner's," and is now operating at Rome, and, as I am informed, presumably at some point in Texas. In a future correspondence I will give fuller particulars of this prospective enterprise after I have personally investigated the same.

(This is the same Chas. Hartsfelt who has started so many humbug concerns.—Ed.)

##### Haralsau County.

The Georgia-Alabama Investment and Development Company is to be reorganized, this step having been decided upon in consequence of the report of the special committee sent to Georgia to investigate the condition of affairs. This committee reported on assets as follows: "On the mineral lands near the city of Tallapoosa, Ga., are found iron ores of the finest grades, which are reported to be and which we believe are in abundant quantities. A furnace for the production of pig iron, and supplied with all the latest improvements, cost about \$190,000, and is capable of turning out from 35 to 40 tons per day. A glass plant, costing about \$63,000, is supplied with every improvement and convenience for producing glass of superior quality of all kinds used in prescription, flint and green bottle trade.

"The company has also built, at a great cost, large buildings of brick and wood (see assets), suitable for other industries. These buildings were erected at comparatively large cost, and this, added to the money recklessly given in subsidies to some of the locating industries, also aided in depleting the company's treasury. The bonds owned by this company, taking them at a very low estimate, are worth, in the judgment of your committee, at least \$313,250. The assets as given are \$519,079.74, while the liabilities are represented as \$275,000."

##### Polk County.

(From our Special Correspondent.)

On the line of the E. T., V. & G. R. R., in this county, are situated some very extensive and valuable brown hematite iron ore deposits, accompanied or associated with manganese in a few instances, as well as bauxite, but as prospecting of these has not been carried on to any extent the quantity and quality of both are undetermined. One of the oldest furnaces built in the South is located on this railway, about one mile from the State line between Georgia and Alabama. It is owned by the Etna Furnace Company, of which D. B. Hamilton, Sr., of Rome, Ga., is president. The furnace was originally erected in 1870 for the manufacture of car wheel pig iron exclusively. The stack is 45 ft. high and 10 ft. in diameter. Its capacity is 30 tons of warm blast charcoal iron daily. The company owns 8,000 acres of land adjacent, of which at a rough estimate 25% is mineral bearing, but only about 200 acres have been thoroughly prospected. The results of this prospecting were the discovery of an extensive deposit of a high grade ore analyzing 0.135 in phosphorus, known as the Pond district, which has been prospected to a depth of upward of 50 ft. below the base of the hill in which the deposit occurs, and I am informed by Mr. Joseph Hamilton, who with his brother manages the property, that the floor was still ore of a finer quality than that through which they had sunk. At the present time these workings are filled with surface water, as during the depressed state of the iron market the furnace and banks have remained idle. Although at the present time the management is discussing the questions of repairing the furnace and building an ore washer, yet it is matter of conjecture, dependent principally on the demand for car wheel iron, when such work will be commenced. Prospect work on the mineral deposit at other points showed ore which, while it analyzed higher in metallic iron than the Pond district, yet also went too high in phosphorus for use in their own furnace. However, no efforts to ship this ore to coke furnaces have been made, owing chiefly to the lack of an ore washer and unsatisfactory results of shipping screened ore. The work of this company, although it can only be called prospecting, is more extensive in character and covers a larger area than most of the work in this section. The product of this work was used in the furnace. One mile east from the Etna property lies the Chas. A. Woods property,

consisting of 840 acres, of which about 400 acres have been prospected thoroughly; the product after being screened was shipped, up to two years since, to the Tennessee furnaces, the analyses showing too high a per cent. in phosphorus for use in any except coke furnaces. So far as my investigations have gone, I find the extent of ore deposits analyzing low in phosphorus in this section to be quite limited. The deepest workings on the Woods property is about 50 ft. below the apex of the hill covered by a deposit of brown ore; at this depth the floor of the workings are still in ore. In fact, as no deep workings have ever been sunk on any of the properties through this brown ore district, it is impossible to estimate the depth of deposits, but as the dip is generally regular at an angle of about 25 degrees from the surface down, the theory that the deposits attain great depth would hold good. The deepest hole I have found in this section is in the Incline bank of the Stouevall property, in Cherokee County, Ala., which is over 80 ft. in depth and still in ore, as I am informed by the owners, which I cannot substantiate by personal examination owing to the accumulation of surface water, which drove out the miners and stopped the work at that portion of the bank. However, at present pumps are being kept continually working.

#### IDAHO.

##### Lemhi County.

Haidee.—Work has been resumed at this mine. The development work consists of a 90-ft. shaft from the bottom of which two drifts have been run. The drifts show a vein from 10 to 12 ft. wide. It is now proposed to sink a shaft north of the tunnel which cuts the vein at a depth of 45 ft.

Hercules.—A contract has been made with F. E. Beck to build a 50-ton mill using the cyanide process to work the ores of this mine and those of the War Eagle and Delta.

Yellow Jacket.—It is reported that this mine has been sold by J. B. Haggitt to Thomson & Ingersoll, of Salt Lake City, for \$150,000.

##### Shoshone County.

Coeur d'Alenes.—The litigation between the Apex Mining Company claimants and the owners of the Sierra Nevada mine has been finally ended by Judge Beatty dismissing the appeal of the Apex company. This, while it forever settles a fight that never did have any merit, still furnishes a conspicuous example of the capricious, vexatious and annoying system of litigation that has from time to time interfered with legitimate operations in our mining regions, says the Coeur d'Alene "Barbarian."

Coeur d'Alenes.—All the mines are once more working nearly a full complement of men and the recent labor troubles have left no traces, as far as the development of the properties is concerned, says the Spokane "Miner." The places of the strikers have been filled by experienced non-union men and the stagnation that resulted from the strike has disappeared. The Bunker Hill and Sullivan has opened a large body of ore. The Morning Mine mill is progressing favorably. The heavy timbers are nearly all in place and the masonry work is finished. The railroad grade is also nearly completed. A prominent feature of interest is the new water supply from the south side of the river, which will have a head of between 800 and 1,000 ft. The grade for the flume is almost done.

A force of men is working on the ruins of the Frisco mill, blown up by the rioters. The mill will be rebuilt. Work has been commenced on the Idaho mine near Murray, which has been idle for some time. A stamp mill was built on the property some years ago, but owing to complications among the owners all work was stopped. Lately John A. Finch, A. L. Gross, C. W. O'Neill, A. B. Campbell, and W. E. Mann bought five-eighths interest in the property and now work has commenced. The Gem, Custer, Granite, Sierra Nevada and Last Chance mines are making regular shipments. The Spokane Hydraulic Company has shut down its works on Dream Gulch, below Murray.

Helena & Frisco and Gem Mining Companies.—It is reported that the Helena & Frisco and Gem mines have been sold to a syndicate composed principally of large stockholders in the Granite Mountain and Bi-Metallic companies. The price is not stated.

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

Monte Cristo Mining Company.—The first ore from the Monte Cristo mines other than from development work, was taken recently from the Pride of the Mountain mine. The company, it is said, has averaged 100 tons of ore per day. It will require a tramway two miles long to carry the ore to the bins and these are to be constructed immediately.

Nellie.—Eighty tons of first-class ore were shipped from this mine recently. It is reported that

some very good ore has been found in the face of No. 3 tunnel.

Stemwinder.—This mine at Wardner started up recently. A full force of men will be put on at once. A wagon road will be built immediately to the ore bin of that mine. The mill is at Wardner Junction, two miles down the gulch and 900 ft. below. It has a capacity of 80 tons in 24 hours, and will start up within two weeks. The ore will be transported to the mill by a tramway (a single seven-eighths of an inch steel cable, 22,000 ft. long, to which some 175 buckets are attached). Power for the tramway will be furnished by the mill. This starts the only mine remaining idle in Wardner which has a mill.

#### IOWA.

##### Adair County.

The discovery of a vein of coal in Eureka township seems to be a genuine and not a bogus "find," says "Black Diamond." The vein is 3 ft. in thickness and is 260 ft. below the surface. The coal is of excellent quality and the "roof" above it is of such a nature that it can be easily supported. Mine Inspector Morgan pronounces the coal excellent and says that it is claimed that at a further depth of 40 ft. a still better vein is found. He thinks that that is quite probable, as the dip of all coal measures in Iowa is toward the southwest. There is considerable excitement in the vicinity of the discovery and lands have advanced \$70 to \$80 per acre. One company has optioned 1,000 acres. At Red Oak a company has been engaged in drilling for several months. The Crescent Coal Company, of What Cheer, have options on several hundred acres of coal land at Hawarden, and have been prospecting during the past three months and have met with good results, finding a 6-ft. vein of coal at a depth of 250 ft.

##### Washington County.

The prospectors for coal at Nira, have met with considerable success. Four shafts have been sunk to about an average depth of 160 ft. In one an 8-ft. vein was discovered. In another 7 ft. and in the other 3½ ft. of coal were found. The coal is said to be a fine specimen of the bituminous and is covered with a roof of 1¼ ft. of slate.

#### KANSAS.

##### Cherokee County.

During the week ending September 10th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,915,260, rough ore, pounds sold, 1,204,690, zinc ore, pounds sold, 752,850; lead ore, pounds sold, 480,840. Sales aggregated a total value of \$18,965.

#### MICHIGAN.

##### Copper.

Adventure Mining Company.—At this mine there is a good showing of copper, says the Ontonagan "Miner." Mine work of late has consisted of sinking a shaft on the Knowlton vein. This shaft has recently reached the 2d level and miners are now drifting on the vein.

Atlantic Mining Company.—The strike of the trammers at this mine was undoubtedly most ill-advised, says the Lake Superior "Democrat." In the first place, it appears that the men can scarcely give any tangible reason for their actions. As is well known to all residents of this section, the Atlantic is not making any money for its shareholders. The vein is comparatively poor and the output as given monthly shows that no money can be made by the company. Although the wages paid by the company are not large, it is without doubt as much as can be paid. Besides this, the strikers only represent one-fourth of the men at the mine and the others are anxious to work at the wages now being paid. The strikers not only demanded that their pay should be raised \$5 per month, but also that one or two bosses should be discharged and that none of the instigators shall be dismissed. All of the demands are respectfully but firmly denied, and the company is upheld in its decisions by the people in general. Every man who has any knowledge of the Atlantic mine knows that the rock only produces three-quarters of 1% in copper and with copper at the low price it is to-day, it is almost impossible for the management to make both ends meet.

Calumet & Hecla Mining Company.—The combined rock and shaft house, at No. 4 Calumet, will be ready for duty in a short time. The work of removing the old buildings and timber, at No. 5 shaft, has begun and as soon as they are out of the way work on a new combination shaft and rock house, similar to those recently built at the other shafts, will be commenced.

Centennial Mining Company.—The water is pumped out to the 2d level on the amygdaloid, and the vein where exposed in places shows considerable heavy copper.

Hungarian Copper Company.—A special meeting of this company was held September 12th, and it was voted to renew the charter of the company 30 years. The present charter expires in October, 1893, and the company has to give one year's notice of renewal. This mine is not being worked, but is held as real estate, in the hope that the state of the copper market may at some future period make it profitable to start mining again. The capital of this company is 20,000 shares, par \$25, and there has been paid in about \$47,000 or a little less than

\$2.50 per share. The last sale was at 10 cents per share.

**Kearsarge Mining Company.**—The work of straightening No. 1 shaft goes forward practically, and yet in a manner to cost very little to the company. It may pay for itself, as the rock coming from a couple of points is very rich in copper, says the Torch Lake "Times." The mine is looking well and has two shafts in operation. Owing to an accident at the E. P. Allis & Co.'s works, Milwaukee, the machinery for the new rock house will be delayed.

**Quincy Mining Company.**—The product of this mine for August was 500½ tons of mineral, the same as for July, as against 570¼ tons for August last year. Since January 1st the product has been 4,003¼ tons, against 4,178½ tons last year, a decrease of 175¼ tons.

**Tamarack, Jr., Mining Company.**—The showing at No. 2 shaft does not seem to improve, as fast as could be desired, says the Torch Lake "Times." The vein is fairly wide but poor.

#### Iron—Gogebic Range.

**Blue Iron Company.**—The shaft has reached a depth of 300 ft. It will be driven through the ore body but no drifting will be done this year.

**L'Anse.**—There is considerable excitement at this place in consequence of the discovery of natural gas in the vicinity. During the course of exploratory work of the Detroit Brownstone Company's quarry a drill hole had been put down to a depth of 90 ft., when a flowing water well was struck and the drill transferred to another point near by. As the company desired a supply of pure water, it was decided to pipe this hole and run the water into a barrel. This was done, but the water did not come up in a continuous flow, and thus it was discovered that both gas and water were coming through the pipe, alternating in currents every few seconds. Upon lighting a match at the mouth of the pipe a steady flame would be produced until the flow of water would shut off the gas.

#### Iron—Marquette Range.

**American Iron Company.**—This company has closed down its mine. The Ishpeming "Iron Ore" says of it: "This mine in reality has been nothing more than a prospect. Its vein was narrow, and continual sinking was necessary to securing a product amounting to several thousand tons annually. It was an expensive property to handle by reason of its narrow vein, but hopes were entertained that it would show larger ore lenses as greater depth was attained, and in this the hope has been realized. It is a fact that the mine never looked as well as now. But the capital of the company has been exhausted and it is unable to longer proceed. It will try to dispose of the lease to others, who are now investigating it and the mine. The royalty of 40 cts. per ton is too high."

**Iron Center.**—This property has passed under the control of the Ames Iron Company. A horse of rock which cut the ore body was once considered the wall, but this has now been shown up in its true form. The company has gone through it and is in 18 ft. of clean ore upon the opposite side. The ore body is being cut diagonally upon its trend and has been drifted upon for 80 ft. The company is now arranging for a railroad track in order to ship ore directly from the mine.

**Lake Angeline.**—The water is now being lowered at a rapid rate. The Howell pump is working at 136 strokes. Huge boulders are showing up in the bottom of the lake.

**Republic Iron Company.**—This company is shipping some ore and mining is going on at a moderate rate. There are in the neighborhood of 75,000 tons of ore on stockpile that is unsold.

#### Iron—Menominee Range.

**Appleton Iron Company.**—This company has now about 65 men on its payroll. There is about 8,000 tons of ore in stock. Captain Bryant thinks that if the spur track is completed by October 1st that 10,000 tons can be shipped from the mine this year.

**Chapin Iron Company.**—At this mine the stockpiles have all been shipped and the trestles and tracks are being arranged for next winter's output, says the Norway "Current." The high trestle across the railroad tracks is being raised about 10 ft. and will carry one grade of ore from "B" to "C" shafts to the stockpile grounds at D. The ore from D will be dumped on the same pile and another grade from C and B, will be piled between those two shafts. The new pump is being put in as speedily as is possible with such heavy work. It was rumored recently that "the Chapin had lost a level" and investigation disclosed the fact that several hundred feet of the 7th level between C shaft and No. 2 timber shaft has begun to show some signs of giving out, but this is already being provided for by the driving of a new level, although the rope haulage is still working satisfactorily in the old level, and no immediate trouble is anticipated. This dropping of levels will necessarily go on as long as the mine is wrought. The 7th level was indeed a fine one when completed, but its usefulness is about ended. The 8th level is still a good one, the 9th is equal to anything on the peninsula, and the 10th will soon be added to the list.

**Commonwealth Iron Company.**—This company will shortly commence the erection of a new engine and boiler house at the Badger mine and put in

considerable new machinery. Two large new boilers and a new air compressor will be purchased and the three 10-ft. drums will be removed from the old Commonwealth engine house to the new structure, and the smaller drums now in use at the Badger are to be transferred to the engine house at the old mine. The company's exploration, near the Quinnessee road, in the vicinity of the Badger, is looking well and bids fair to develop into a mine, says the Florence "Mining News." A crosscut at a depth of 50 ft. penetrated an ore body for a distance of 22 ft. north and south, and a drift now being made to the west is breasted in ore.

**Curry Iron Company.**—The outlook for this mine as far as the bottom of the mine is concerned, is not much better, says the Norway "Current." It will be remembered that the lowest level has been shown to be high in phosphorus.

**East Vulcan.**—At this property from 400 to 500 men are now employed. New machinery is being put in which will not, however, be ready until the coming season.

**Ludington.**—It is reported on good authority that D. M. Wells and associates purchased the Ludington mine at the last meeting of the Lumbermen's Mining Company, and that the work of unwatering the mine will soon be commenced, says the "Iron Range." The consideration paid was \$100,000. Negotiations are in progress looking toward the Ludington and Hamilton mines uniting and pumping out the water and resuming mining operations.

#### MINNESOTA.

##### Iron—Mesaba Range.

**N. D. Moore** is reported to have paid to A. E. Humphreys, John McKinley and others, representing the New England Iron Company, \$50,000 cash, as advanced royalty on a lease covering 20 forties on the Mesaba, from which the minimum production is to be 150,000 tons per annum.

#### MISSOURI.

The following is the report of Arthur Winslow, of the Missouri Geological Survey, for August: In the field, inspections of iron ore deposits have been made in Pulaski, Phelps, Dent, Crawford, Iron and Madison Counties; the clays of the northern and central portions of the state have received much attention and final visits to mineral resorts in Johnson, Henry, Vernon and Laclede counties have been made. About 40 square miles have been covered by detailed mapping. Most of the work of the past month, however, has been in the office and laboratory. The first draft of the report on the iron ores is now completed and its revision and preparation for the printer is in active progress. Much advance has also been made in the preparation of other reports. The field work for the detailed mapping in Jasper and Newton counties was finished last month, and the plotting of this work is now well advanced in the office. In the laboratory the chemical work, in connection with the study of the zinc and lead ores, has been continued.

#### Jasper County.

(From our Special Correspondent.)

Joplin, Sept. 11.

There was a heavy production of ore through the entire lead and zinc belt during the past week. There was no change in the zinc ore market over the two previous weeks. The ore buyers do not seem inclined to bid above \$24 per ton for extra clean high grade ore, so that the average price is \$23 per ton. Snyder Bros. sold a lot of 300 tons to the Lomyons at \$23.50 per ton. Lead ore declined 25 cents per thousand, closing at \$23. Following are the sales of ore from the different camps: Joplin mines, 2,197,325 lbs. zinc ore and 291,730 lbs. lead; value, \$31,979. Webb City mines, 464,820 lbs. zinc ore and 73,300 lbs. lead; value, \$6,966.35. Carterville mines, 1,360,500 lbs. zinc ore and 49,400 lbs. lead; value, \$17,112.10. Zincite mines, 97,890 lbs. zinc ore and 8,470 lbs. lead; value, \$1,345. Lehigh mines, 42,120 lbs. zinc ore; value, \$505.55. Oronogo mines, 27,160 lbs. zinc ore and 85,680 lbs. lead; value, \$2,198.80. Alba mines, 84,000 lbs. zinc ore; value, \$946. Carthage mines, 187,500 lbs. zinc ore; value, \$2,156. Burch Center mines, 37,090 lbs. zinc ore; value, \$426.50. Galena, Kan., mines, 752,580 lbs. zinc ore and 480,840 lbs. lead; value, \$18,935. District's total value, \$82,570.30.

The Bell Boy mine, located on the Crossman Bros. & Porter lease of the Rex. M. & S. Co.'s land is promising to be a wonderful steadily productive property. At present the ore as it comes from the mine is washed and cleaned by hand jigs, but the general manager finds this process too slow and has let a contract for the building of a concentrating plant. When this plant is completed it will be the fourth built on the Rex. M. & S. Co.'s land within the past five months. The Keller Mining Company, operating on F. M. Sharp's land, has come into the list of producers and last week in five and one-half days produced 32,150 lbs. of lead.

**Carterville District.**—This camp made an unusually small sale of ore last week, as all of the large operators are holding the ore in their bins for better prices, in fact there is now a very large surplus stock on hand and it would be a splendid field for some of the European ore buyers to visit, as they could secure lots of 500 to 1,000 tons at one purchase. The famous old Victor mine is now entirely owned by the syndicate from Toledo, O., who purchased the remaining one-eighth interest of Mr. Walton for \$12,500. The new company are making a general overhauling of the old plant of

machinery and are erecting a complete new set of jigs and a process for saving the slimes and when completed will be one of the model plants of the Carterville district.

#### MONTANA.

##### Deer Lodge County.

**Anaconda Mining Company.**—The Butte "Inter-Mountain" says that there is little doubt that the building of the refinery at Anaconda has promoted the building of the Butte Anaconda & Pacific Railroad, which is a continuance of the Montana Central. The course of this line will be from Butte to Anaconda, thence to the lumber region of the Bitter Root Valley and Boise City, Idaho.

**Block Pine and Combination Mining and Milling Company.**—This company, it is said, is now contemplating the addition of 20 more stamps to its plant.

**Granite Mountain Mining Company.**—The work on this company is being carried on in a manner indicative of continuance, says the Phillipsburg "Mail." The Granite-Rumsey tunnel is being pushed to completion; the Cleveland shaft, midway on the tunnel line, is attaining a greater depth every day. Developments in the mine are being systematically carried on, and 100 tons of ore are being treated daily at the Rumsey mill.

**Southern Cross.**—Reports from the Southern Cross ore under the cyanide treatment continue to be encouraging, says the Phillipsburg "Mail." The ore has been regarded as one of the most refractory in the State and the loss has been so great by all processes that have been previously tried that many of the stockholders have been discouraged.

##### Jefferson County.

**Elkhorn Mining Company, Ltd.**—The following is Captain Plummer's report upon visiting the mine: The vein standing between the 550 ft. level, and the 1,050 ft. level south of shaft, is gradually growing narrower, although it occasionally opens out into fair-sized boulders.

**1,150 ft. Level, South of Shaft.**—This is producing both milling and smelting ore, as follows: Seven feet milling ore valued at 37½ oz.; 11 ft. smelting ore, valued at 55 oz. silver, and 8 per cent. lead.

**1,250 ft. Level South.**—The average of the ore body throughout is 13 ft. wide. Average value estimated at 75 oz. per ton. The main shaft is down 140 ft. below the 1,350 ft. level, the sump and station have yet to be finished. The raise between the 1,350 ft. and 1,250 ft. levels is 180 ft. in height on the incline; this increased height is caused by a flattening of the vein. No work has been done from this vein, except a little at the back of the 1,350 ft. level, where they are breaking shipping ore. The vein between the 1,250 and 1,150 levels still stands in large proportions. Its full inclined height was 118 ft., and of this about one-third has been removed by stopping. The whole roof presents a uniform appearance.

**Recompense.**—A promising strike has been made in this mine, a wide vein running \$18 in gold having been uncovered.

##### Lewis and Clarke Counties.

**Montana Company, Limited.**—Two agitators have been placed in the 50-stamp mill of this company to facilitate the work and increase the savings of the precious metal. This and the work of constructing a tramway to the tailings dam has delayed the commencement of operations on the Bluebird and Hickey.

**Red Mountain Milling Company.**—This company owns three mill-sites on the northeast side of Red Mountain, on a tributary of Lump Gulch. It covers a water right of 100 ins. It owns a 60-ton concentrator, with buildings and machinery complete, 13 miles from this site. The company proposes to move this plant to one of their mill-sites adjacent to the Frohner mine, upon which the company has a lease and bond. The company also has a contract to concentrate 10,000 tons of ore on the Frohner dump for which they are to receive \$2.50 a ton.

##### Meagher County.

**Alice No. 2.**—It is reported that a vein of galena has been discovered in this mine at a depth of 60 ft. The galena ore taken out is of a good grade mixed with zinc.

**King Placer.**—This placer property has, according to the Castle "Tribune," been sold to Eastern parties.

**Queen of the Hills Mining Company.**—The company is taking ore out of the tunnel and will ship one carload a day to the Great Falls smelter. It is crosscutting to the vein at a depth of 100 ft. It is the intention of the company to drift on the vein when it is reached.

Of late a large number of coal locations have been made, says the Castle "Tribune." The measures here lie to the south of the town and to the northeast and southeast of this place. Fifteen miles in a northeasterly direction from here are some good veins, over a foot in width outcrop. From there the coal indications are traced to within 2½ to 3 miles of Castle. Near the town, veins from 4 to 6 ft. wide have been exposed within a few feet of the surface. From there south for 17 miles there are abundant external evidences that large measures of coal underlay the country. On Sixteen Mile Creek, the deepest workings exist. There a 12 ft. seam within 100 ft. of the surface has been uncovered. The grade of coal of this district is supposed to belong to the Laramie period of the Cre-

taceous age. That as yet extracted is of an inferior quality.

Silver Bow County.

The discovery of a new sapphire and ruby district has been reported. This find is at Rock Creek, near the line of the Butte, Anaconda & Pacific Railway.

Alice Mining Company.—The 60-stamp mill is receiving its supply of ore from the Alice mine proper and the Magna Charta, owned by the company.

Butte & Boston Mining Company.—It has been decided to add the bessemerizing process to the works, similar to that at the Parrot, and for this purpose a 150-horse power engine and compressor have been ordered. At present operations at the works are progressing on nearly the same scale as before the fire. A few men are being put on at the mines each week as the capacity of the smelter increases.

Butte and Deer Lodge Placer Mining Company.—This company at a recent meeting, arranged for more extensive development. At present there are 15 men at work. The pay gravel is now reported to be 200 ft. wide.

Boston & Montana Mining Company.—At the Leonard shaft the pump station is being cut at 600 level, and it is expected that when the work is completed the new pumping machinery will be ready to be placed in position. The new boilers have been ordered. At present the shipments from the Leonard mine to Great Falls will average about 24 railroad cars of ore daily.

Boston & Montana Consolidated Copper and Silver Mining Company.—The Boston "Commercial Bulletin" has quite a gloomy article upon the affairs of this company, which a director of the company says is substantially true. The company expended \$100,000, it is claimed, upon a gravity plan of unloading cars at Great Falls, whereas an elevator plan would have answered and cost only \$20,000. That money was injudiciously expended upon the Great Falls works had been acknowledged, and the former engineering department has been blamed therefore. It would clear the situation greatly if the exact position of the company's affairs could be authoritatively declared. If the facts are not otherwise revealed, the management ought to embody a statement in the annual report, to appear next month, sparing neither itself nor any one in declaring the truth.

Parrot Silver and Copper Mining Company.—A special meeting of this company was held at the company's office in Butte, September 5th, at which the question of increasing the capital stock to 500,000 shares, was considered says the Butte Daily "Inter-Mountain." With the exception of about 100 shares all the stock was represented by Franklin Farrel, A. F. Migeon, A. M. Holter and J. E. Gaylord, who were present at the meeting. The object for increasing the stock was to purchase the stock of the Bridgeport (Conn.) Copper Company. It appears that some stockholders in the mine are also stockholders in the Bridgeport works and others who are not, and vice versa, and it was deemed advisable for the best interests of the stockholders to unite both plants into one and make all stockholders interested in each. The motion to increase the stock was carried. The capital stock of the Parrot company has been 1,800,000 shares and now it is 2,300,000 shares.

Societe Anonyme des Mines de Lexington.—This company has now caught up with its supply of custom ore and is again prepared to make prompt returns. During the past three or four months the company has been so crowded with custom ore that a customer had to wait as long as three weeks for returns.

NEVADA.

(From our Special Correspondent.)

The mining assessments falling delinquent during the current month amount to \$162,080.

Esmeralda County.

(From our Special Correspondent.)

Mt. Diablo Mining Company, Candelaria.—Another shipment of bullion consisting of 6,566 oz. silver has been received from the mine.

Mt. Diablo Mining Company, Candelaria.—The mine continues to turn out the usual amounts of ore, the average assays being from \$30 to \$50 per ton. The mill is handling considerable quantities of custom ore in addition to crushing ore from the home mines. This week 5,653 oz. of fine silver were received in San Francisco. Last week a lot of four tons of ore from St. Louis district was run through the mill with the following excellent result: 1st class ore, 1,133 1/2 oz. silver; 2d class ore, 659 1/2 oz. silver per ton.

Eureka County.

Dunderberg Mine, Eureka.—The surface tunnel has reached the east and west fissure, but no ore has been found up to this writing.

Eureka & Palisade Railroad, Eureka.—During the month of August there were 1,996 tons of ore shipped over this line to Salt Lake City and California for treatment, as follows: Eureka district, from the Diamond mine, 841 tons; Eureka Consolidated mine, 441 tons; Richmond mine, 151 tons; Jackson mine, 75 tons; Alexandria mine, 63 tons; Hamburg mine, 29 tons; Bullwhacker mine, 29 tons; Silver Connor mine, 27 tons; Dunderberg mine, 19 tons; Phenix mine, 15 tons; Williamsburgh mine, 15 tons; Matamoros mine, 13 tons; Bowman mine, 13 tons; and Lord Byron mine, 10 tons. Total Eureka District, 1,741 tons.

White Pine District, from Tom Cornell's mine, 91 tons; Rocko Krangnazo, 75 tons; Paul Ross & Co., 34 tons; Ross & Siri, 26 tons, and miscellaneous, 11 tons. From H. A. Coken, Morey, Nye County, 18 tons.

Storey County—Comstock Lode.

Bulwer Consolidated Mining Company.—Ducial letter for the past week says: The 1,200 west drift from the northeast crosscut has been extended 39 ft. through bright, lively quartz, showing ore in spots. At a point 394 ft. in on the northwest drift from the shaft, have started crosscut No. 4 to the east and extended the same 25 ft. through quartz assaying \$6 to \$8 per ton. On the 1,100 the northwest drift from the south drift from the shaft, has been extended 26 ft. on a seam of ore about 4 ft. wide, of a fair grade. The Overman report of operations for the month of August states that 95 tons and 550 lbs. of ore were shipped to the Vivian mill during that month. The mill worked 294 tons and 1,090 lbs. of ore and returned \$5,547.26 in bullion, being a yield of \$18.62 per ton. The battery assays averaged \$17.65 per ton.

Consolidated California and Virginia Mining Company.—The report of the operations for the fiscal month of August, ending September 6th, is at hand. There was 4,350 tons ore worked, yielding \$9.35 in gold and \$7.39 per ton in silver, or a total of \$17.84, against average battery assays of \$22.64. The yield for August was \$72,849 and for the first eight fiscal months of the year \$668,599 against \$103,183 and \$1378,580 for similar periods of 1891. There has been no dividend from the mine in upward of a year. After paying expenses for the last fiscal month, there will be only a small cash balance to go forward, if any.

Crown Point Mining Company.—Have advanced the east crosscut from the south drift, 160-ft. level, a distance of 38 ft. It has passed through a width of from 2 to 3 ft. of quartz, which it is thought is of high enough grade to warrant saving it. Samples from it run from \$11 to \$35 per ton.

Justice Mining Company.—The pay streak in the north slope on the 822 level maintains a width of from 2 to 3 ft., and the assays from the face range from \$20 to \$40 per ton. We are saving from this point about 4 tons of pay ore per day. The south slope on the 622-ft. level shows a width of 2 ft. of ore, assaying from \$10 to \$25 per ton. We have now on hand, in various chutes in the mine, from 200 to 250 tons of ore, which will be shipped to the Washoe mill for reduction at once.

Savage Mining Company.—The official letter from the Savage mine for the past week states that there were hoisted 534 cars of ore from the 950, 1,100, 1,400 and 1,450 levels. Shipped to the Nevada mill 525 tons and milled 583 tons. Average car sample assay, \$27.18, average battery assay, \$22.30. Bullion yield for the week, \$9,100.63. Shipped to the United States Mint at Carson, 559 lbs. of bullion. The repairs to the Suro tunnel are not yet completed; until this is done they cannot advantageously resume work in th joint north draft with the Gould & Curry Company.

(From our Special Correspondent.)

There is a lull just now on the lode. The "Reformers" are quiet, probably maturing their plans, and affairs in the several mines are as they were a week ago. Strange to say, the scandal of the "three lost bars of bullion" has not yet been cleared up, and it is perfectly safe to say never will be. The president of the Consolidated California & Virginia Mining Company has not seen fit to make any inquiries as to whether his company had been defrauded, any such action not falling, according to his assertion, within his province. Presumably, therefore, the mining company has gobbled the bullion and everyone is aware of the capacious maw the milling companies have for such solid food.

The revolt against the Pumping Association bids fair to develop. When the Association was formed about three years ago, the mining companies were induced to join by the inducement held out that only \$150,000 would be needed to drain the lower levels of the Gold Hill mines, and one year from that date the pumping operations would be completed. Three years have elapsed, half a million dollars have been expended and the water is still in the 1,700 level. Some of the mining companies have become tired of throwing a monthly contribution down the Crown Point incline, and have retired from the Association; others are to follow.

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

Mine.	Tons hoisted.	Car sample assay.	Tons milled.	Av. battery assay.	Bullion product, week.	Bullion shipped.
Con., Cal. & Va.....	996	26.77	980	23.69	.....	126,281.24
Gould & Curry.....	243	18.66	105	17.70	.....	.....
Occidental.....	175	.....	175	9.80	.....	.....
Potosi.....	224	24.79	257	24.83	.....	.....
Savage.....	543	27.18	583	22.30	9,100.63	459 lbs.
*Yellow Jacket.....	.....	.....	.....	.....	.....	.....

\*No report. <sup>1</sup>Total shipments on August account, \$72,549.27. <sup>2</sup>Cars. <sup>3</sup>Crude Bullion.

Sierra Nevada Mining Company.—The joint west drift, Union 900 level, is cutting into softer material

as it advances below Cedar ravine. It is composed of porphyry, clay and quartz streaks, the latter giving low assays. The flow of water from the face of the drift is becoming stronger and the temperature is increasing as the advance is made. In the Steel drifts on Cedar Hill, a streak of quartz ranging from 4 to 6 ft. wide and which assays from \$15 to \$40 in gold, is being followed.

Yellow Jacket Mining Company.—The management continue to maintain silence regarding its operations however. It is known that recently quantities of ore, assaying from \$50 to \$60 per ton, have been extracted. While it is sufficiently curious that no report of such rock should be made public it is still more curious that at the mill this same valuable ore only pulps \$18. The evaporation during the transport of the ore from the mine to the mill ranges, therefore, somewhere in the neighborhood of \$32 per ton.

NEW MEXICO.

Dona Ana County.

Stevenson-Bennett Mining and Milling Company.—This company has leased the Stevenson-Bennett properties for five years, holding a bond as well, and propose to open up and systematically work the entire group, handling the ores in their own concentrator, on the ground. Thirty thousand dollars have already been expended in putting the mines in a safe condition, but the company calculates enough ore is on the dumps and blocked out to reimburse them for expenditures already made.

Grant County.

Ralph Mining Company.—This company, operating on Eagle Mountain, near Silver City, have let a contract to Joseph Hawkins, for the construction of a 30-ton mill. This property consists of the Ralph, Ruth, Hoyt, Farming Hill, and War Eagle, well-known mines that have yielded over \$1,000,000. The new company is composed of Chicago men. M. S. Leech is superintendent.

Sierra County.

The Crawford mechanical gold extractor which was recently put into the Richmond mill, at Hillsborough, is giving satisfaction, it is said. It has been tested on runs of ore from different mines in the district with uniform results. The Standard Company is making a test run of 50 tons of ore from its Opportunity mine with a view to putting in these mills to treat the ore from the company's mines.

Illinois Mining Company.—This mine, which has been one of the largest silver producers in the Kingston district, has been closed down indefinitely.

PENNSYLVANIA.

Coal.

A coal discovery which promises to be of great importance to Pittsburg has been made in Potter and McKean Counties, Pennsylvania. The State geologist states that there are several fine veins of coal underlying about 2,000 acres and estimated to yield nearly 10,000,000 tons of merchantable coal.

John S. Newmayer, of Dawson, Pa., has commenced the erection of 100 coke ovens on Washington run, in Perry township, where he owns over 2,000 acres of coal lands. The new works will be located about three miles from the Vanderbilt and the Baltimore & Ohio railroads, but both the companies will erect branch roads to the new works.

Newton Coal Mining Company.—Fire broke out at 10 o'clock, p. m., September 11th, in the engine house of the twin shaft at Pittston Junction, and in a couple of hours the entire plant, consisting of the engine house, head house, boiler house and part of the trestle leading to the breaker, was consumed, causing a loss of \$40,000.

Oil.

The chief of the Bureau of Statistics reported the total value of the exports of mineral oils from the United States for the month of August, 1892, and during the eight months ending August 31st, 1892, as compared with similar exports during the corresponding periods of the preceding year as follows: August, 1892, \$3,707,472; August, 1891, \$4,698,348; eight months ending August 31st, 1892, \$26,847,587; eight months ending August 31st, 1891, \$30,176,878.

SOUTH DAKOTA.

Lawrence County.

The past year has witnessed a great change in the operations on the refractory ore belt in Lawrence County, says the Deadwood "Daily Pioneer." The fact that these ores can be worked at a profit has stimulated development work throughout the entire district, and there are now 500 men employed either prospecting or developing ore bodies previously discovered. The Portland company, with eight full claims, is working a large force of men extracting ore and prospecting. The output of the mine is shipped to the plant of the Consolidated Mining Company in Deadwood, which is working from 60 to 75 tons per day. The Clinton company is doing a large amount of steady development work, exposing large ore bodies of considerably higher grade than the average in these districts. The Mark Twain, with a force of about forty, is extracting ore from the mine and shipping to the Welcome Chlorination Works at Rapid. At Terry's Peak, the deep cut made by the B. & M. Railroad on its extension from Portland to Englewood has shown some hitherto unsuspected bodies of ore. The McDonald Mining Company's



ground shows large bodies of ore, on which extensive development work is being done, and the same is true of the properties belonging to the Equitabel and Lew Wallace Mining Companies. The Boscable and Mariposa mines, recently purchased by the Golden Reward Company, are producing large quantities of ore that is being shipped to the Golden Reward chlorination plant in Deadwood. In Nevada gulch, the Oxford Mining Company is sinking a shaft with excellent indications of encountering mineral. The Comet property on the opposite side of the gulch already has ore bodies uncovered, from which shipments have been made, but which are not being worked at present, waiting for the erection of plants to treat custom ores. In Fantail, the Buxton and Retriever on one side show extensive ore bodies on which much development work has been done. On the other side are the Golden Reward, Maggie, Bonanza and Little Bonanza, all of which are shipping ore to either the Golden Reward works or the D. & D. smelter in Deadwood. The Florence, in this same vicinity, is operating a diamond drill as a guide to future development. The Tornado, Double Standard and Harmony properties, recently purchased by a syndicate of Chicago and Deadwood men, are in active operation with largely increased forces. The Welcome Mining Company is extracting ore and making daily shipments of ore to the chlorination plant of that name at Rapid. This company is also operating a diamond drill on its claims that extend over to Whittail, prospecting the ground with a view to future development. The property recently acquired by the White syndicate, south of the Welcome, and comprising about 30 claims, is undergoing extensive operations. A two-compartment shaft is being sunk with a view to striking the ore body already uncovered in the Welcome. This syndicate has also lately bought property on Green Mountain, on which work is being done.

Elgin.—Regular shipments are being made from this mine to the Deadwood and Delaware smelter. The ore carries \$25 in gold and \$5 in silver.

Two Bears Mining Company.—As soon as the new pumping tank is in place the shaft will be carried down, commencing at the 250-ft. level.

Victory.—A new strike has been made in this mine. A 4-ft. vein was struck 60 ft. below the surface.

#### UTAH.

##### Beaver County.

A consolidation was recently made in the Pruess district of the Red Cloud, Sitting Bull, Ogalallah and Pocatello claims. This group is on the same vein and by working one, all are developed. The Sitting Bull, of this group, has a shaft 40 ft. deep, out of which some ore has been extracted with a good bunch of ore now showing in the bottom. The Red Cloud shaft is 150 ft. lower at its mouth than the Sitting Bull.

##### Cache County.

Rich-Cache Mining Company.—This company owns 9 claims through which run 7 veins. One vein has been stripped for 100 ft. and one of the three shafts is down 36 ft. There is 18 in. of ore at the bottom of the shaft.

##### Juab County.

Colorado Chief.—In this mine, on the north part of the Gemini ground at Eureka, at a depth of about 600 ft., an immense cave has been penetrated, containing a large body of water, which is in some places 47 ft. deep. This discovery would seem to indicate that mines hereafter developed in the north part of the district will have water to contend with.

Herkimer Mining Company.—This company has ordered new machinery. Twenty-four tons are now on the way. It is proposed to sink the shaft 500 ft. deeper and to then drift on the Centennial-Eureka vein.

##### Summit County.

Ontario Mining Company.—An accident to the machinery at the No. 3 shaft will cause delay and inconvenience in the operations there. The walking beam of the engine which runs the Cornish pump broke in two and went down the shaft, causing considerable damage to the pump machinery. The other pumps and tanks were immediately brought into requisition to keep the mine from being flooded. While the first tank was being raised from the 1,000-ft. level it came out of the guides and was not stopped until it reached the 600-ft. level, and in its passage upward it ripped and tore out a considerable portion of the shaft. This damage has been repaired, and the tanks and pumps are now in working operation. It will be some time before the large pump will be in operation, as a new walking beam will have to be obtained from the factory at San Francisco. On a previous occasion a similar accident stopped work at the shaft for nearly 6 weeks. And had it not been for the efficiency of the Knowles pumps the mine would have been flooded to the 600 ft. level.

#### WASHINGTON.

##### Okanogan County.

A 6-ft. ledge of galena carrying sulphuret ore, has been discovered on Mineral Hill, south of the Jumbo mine.

Concunully, an important mining center and the county seat of Okanogan County, was burned to the ground September 6th.

Allison.—Work has been resumed on this group of mines on the Similkameen.

Arlington.—The development work on this claim consists of a 300-ft. shaft and a 450-ft. tunnel, which taps the ledge at 200 ft. About 2,000 ft. of drifts have been run. But little work has been done on the 300-ft. level. Two hundred tons of ore are stored in the ore house and 500 are on the dump. This ore will now be hauled to the crusher at the First Thought mine.

#### WYOMING.

##### Fremont County.

Homestake.—On this claim, in the La Plata district, the shaft is now down 35 ft. and the ore has constantly improved with depth, it is claimed.

Lucky Six Mining Company.—This company is sinking a shaft on the Ontario, in the new camp at La Plata. It is now down 20 ft. and shows an antimonial ore running \$20 per ton.

##### Sweetwater County.

Rock Springs.—The coal shipments from this place for the month of August amounted to 6,700 car-loads, which is 500 cars in excess of any previous month's shipments.

#### FOREIGN MINING NEWS.

##### BRITISH COLUMBIA.

Wellington Coal Company.—The galleries of this mine are now 600 ft. below the Pacific Ocean and extend a distance of six miles under it. Nearly 1,000 miners are employed, at wages running from \$3 to \$4.50 per day. The company labors under a great disadvantage on account of the large amount of combustible gases given off. Three years ago 100 miners lost their lives in an explosion of firedamp.

##### Kootenai.

Increased activity about the Nelson mines is noticeable of late, say the Spokane "Miner." Work on the Grizzly Bear and Silver Queen is progressing rapidly, and a boarding house and offices for the latter are under construction. A new strike has been made south of the Silver Queen. Although the croppings were small, a large body of ore has been uncovered by stripping the lode and in character the ore resembles that of the Silver King. The location has been christened the Anchor. The Sloacan country is still absorbing much interest among mining men and prospectors. About 1,000 lbs. of ore has been shipped from the Washington and work is being pushed. Very rich samples of dry ore have been taken from the Grand Republic at the head of Spring Creek. It is said that the ore runs very high in silver, and that a solid body has been encountered. The Blue Bird, lately purchased by John M. Burke and O. D. Garrison, is being uncovered. It is reported that several sales of properties in Jardine's camp have been made of late.

#### MEXICO.

##### Chihuahua.

Compañia Minera de Sabinal.—This company is working full time and continues to ship bullion.

##### Michoacan.

From the "Minero Mexicano" we learn that the National Mining Company is about to erect a Chilean mill of a capacity of 25 tons daily. At present there are 700 tons on the dumps, running 50 oz. silver per ton. At the Santa Rosa the shaft is being lowered to reach below the body of ore discovered on the upper levels. The principal vein passes on one side of the shaft and will be reached by cross cuts when the shaft has reached a sufficient depth. The Concepcion mine is being unwatered in order to explore the northern part of the claim, which is said to be virgin ground. It is stated that the Minas de Colorado, Aztecas, etc., including in all 24 claims, have been sold to a syndicate of Chicago capitalists. At the Luz de Borda the shaft is being lowered. It has already cut a vein of almost a metre in width, the ore of which is said to have a value of \$116 per ton. The tunnel is being advanced rapidly in order to cut the Trigueros vein. At the Santa Gertrudis the shaft is being sunk to get below the ore body discovered in the tunnel. Regular shipments of rich ore are being sent to Germany.

Hidalgo Mining Company.—This company has declared a dividend of one cent per share, payable Tuesday, the 10th inst. The headquarters are in Pittsburg.

Yonteh Mining Company.—The Colorado Iron Works shipped recently a smelting plant, consisting of one furnace and equipments, to this company at Cadereyta, Mendez, Mexico. This plant will be increased soon. Mr. H. J. Cameron is president of the company.

##### Zacatecas.

Motolina Mining Co.—The stockholders of this company, at a recent meeting, passed a resolution authorizing the directors to issue a circular to stockholders announcing an extension of the time in which to subscribe for the 75,000 shares of stock (par \$1). The circular will state that of this stock the creditors of the company will take 40,000 shares, thus wiping out the indebtedness, and that unless the stockholders subscribe for the remainder within 60 days the lease will be surrendered to the original La Noria Mining Co., and the Motolina Co. will quietly pass out of existence.

#### CHEMICALS AND MINERALS.

Heavy Chemicals.—The market for bleaching powder is in quite an excited state. The cholera scare caused a very great demand last week and this week the news that the epidemic has actually broken out in New York City has made people still more anxious to obtain supplies. There is a total absence of stocks and shipments are seriously delayed in the bay. It is quite impossible to give a price, as the situation changes so rapidly. Many transactions are reported at 10 cents. There is very little stock of carbonated soda ash, and business mostly takes the form of forward contracts over the remainder of the year at 1.57½ to 1.60c. for 48% test. There is a good deal of difficulty in getting deliveries of alkali, and stocks have been drawn on; consequently the price has gone up 1.75c. for 48% and 1.85c. for 58%. The stocks of caustic soda are also getting low, and the price may be put up shortly if shipments are delayed much. Our quotations this week are:

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%, 1.57½@1.60c.; 58%, 1.47½@1.52½c. Alkali, 48%, 1.75@1.85c.; 58%, 1.65@1.75c. Sal soda, English, 1.07½@1.15c.; American, 1.05@1.10c. Bleaching powder, 6@10c., according to quantity.

Acids.—There is no alteration to be noted in the state of the trade in acids. As for some months past the demand and supply have been about equal, and there is consequently little change in prices. Our quotations are: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60 @ \$2 according to quality; muriatic, 18", \$1@1.25; 20", 90c.@1.10; 22", \$1.25@1.50; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 85c.@1.10; mixed acids, according to mixture; oxalic, \$7.25@7.75. Blue vitriol is quoted all the way from \$3.50@3.75; alum, lump or ground, \$1.70@2. Glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

Brimstone.—There is a sufficient supply of brimstone for present needs, so that any delay on shipments will not introduce complications. The market is dull and quiet. Quotations this week are as follows: Best unmixed seconds to arrive near due, \$24.50; future shipments, \$24 for best unmixed seconds; thirds are held at 75c.@1 less.

Fertilizing Chemicals.—There is a general stiffening of the market in fertilizing chemicals owing to the delay in sending vessels up to their piers. The stocks on hand are not very great, but there has not been any advance in price. Sulphate of ammonia is in good demand and the prices are firm. At present the delay in shipments is causing trouble all round. Our quotations are as follows: Sulphate of ammonia, \$2.87½@2.95 for bone goods and \$2.90@2.95 for gas liquor. Dried blood, \$2@2.05; per unit for high grade and \$2 for low grade; acidulated fish scrap, \$13.50 f. o. b. factory; dried scrap, \$23@23.50. Azotine, \$2. Tankage, \$18@22, according to grade. Bone tankage, \$22.50 @23.50; bone meal, \$23.50@25.50. Double manure salts are delayed in delivery and there is a probability of a rise in price as the demand is good.

The market for kaint is fair and prices remain at \$8.75 for invoice weight and \$9 for actual weight. The market for muriate of potash remains quiet; forward sales are satisfactory and the shipments are delayed. The prices remain as follows: For 50-ton lots or over New York & Boston, \$1.81½; Philadelphia & Baltimore, \$1.84; Southern ports, \$1.86½. Nitrate of soda is not very strong, owing to the higher prices having caused buyers to hold off. Quotations are as follows: \$1.95 to \$2 on the spot and \$1.95 to \$1.97½ to arrive, according to quality.

##### Liverpool.

Sept. 7.

(Special Correspondence of Joseph P. Brunner & Co.) Since our last report, the excitement in bleaching powder and chocolate of potash has continued, with the result that prices have had a further and considerable advance. Soda ash is almost unobtainable so far as Leblanc makes are concerned and prices are quite nominal as under, viz: Caustic ash 48%, £5 6s. 3d. per ton and upward; 57 to 58%, £6 7s. 6d. per ton and upward; carb. ash, 55 9s. 9d. per ton and upward; 58%, £6 12d. 9s. per ton and upward; ammonia ash 58%, £6 7s. 6d. per ton net cash. Soda crystals are quiet at £3 7s. 6d. to £3 10s. per ton, less 5%. Caustic soda is inactive, buyers holding aloof, looking for lower prices shortly. Newest spot quotations are as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. 0d. per ton; 74%, £11 5s. per ton; 70%, £12 5s. to £12 10s. per ton net cash. For parcels under 10 tons, 5s. per ton extra is charged. These quotations apply to all quarters, except United States and Canada, which are "barred" by "Union."

Bleaching powder, owing to the active demand from the continent on account of the cholera scare, has been jumping daily, and at the close the nominal quotations are about £9 15s. to £10 for September, and £9 5s. for October. Makers are closed out for this month, in spite of all the works available being going full swing. Chlorate of potash has also participated in the excitement, and with a very active demand prices have been run up, until to-day sellers quote 7½d. for any position this year. Makers state they are now fully sold to the end of the year. A very large business has been done during the last week, and orders at 7d. have to-day been refused.

Bicarb. soda is steady at £6 15s. per ton less 2½% for one cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia is flat and newest values about £10 to £10 1s. 3d. per ton for good grey 24%,

£10 3s. 9d. to £10 5s. per ton for 25%, both in double bags, less 2 1/4% f. o. b. Liverpool.

**MINING STOCKS.**

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo., Baltimore, Pittsburgh, Deadwood, Dak., St. Louis, Helena, Mont., London and Paris, see pages 285 and 286.]

**NEW YORK, Friday Evening, Sept. 16, 1892.**  
There is no noticeable feature in the New York mining stock market this week. There has been a run on Leadville, and the market for Phoenix, of Arizona, has improved. Comstocks have fallen off a little. Sullivan still keeps itself in evidence among the Black Hill stocks, and every day a sale of 100 shares at \$1.05 is reported; no doubt these are wash sales, at least we hope so. Generally speaking the market has been dull, and nothing like speculative sales are to be reported.

Among the Comstocks the following rules have been recorded: 300 Consolidated California & Virginia at \$3.20; 3,000 Comstock Tunnel at 13c.; 100 Yellow Jacket at 80c.; 100 Hale & Norcross at \$1.55; 100 Scorpion at 5c.; and 200 Crown Point at 80c.

The following advices have been received from the Comstock mines. Belcher: The raise from the north lateral drift on the 400 level is now 102 ft. above the track floor. Imperial: Repairs are being made in the 300 level. Yellow Jacket: No ore is being shipped as yet; some prospecting is going on. Crown Point has advanced the east crosscut from the south drift 200 ft. level by 38 ft. Savage: Shipped to the mill last week 525 tons of ore; milled 583 tons; average car sample assay, \$27.81; average battery assay, \$22.30; in the main south drift 750 level, a winze has been started to connect with the upraise from the 950 level.

No transaction is recorded in the Tuscarora group. Among California stocks a large amount of Brunswick Consolidated have been sold, viz.: 4,300 at 10c. and 500 at 9c. Sales of 400 of Belmont at 36c. are reported, also 800 of Astoria at 1c., and 3,200 of Hollywood at 1c.

Very little has been done in Colorado stocks. The only transactions recorded are: 100 of Small Hopes at 95c.; 100 of Leadville at 20c. and 600 at 18c.

In the Black Hill group a sale of 300 Father de Smet is reported at 25c. Sales of 100 Sullivan Consolidated occurred every day at the following prices: \$1.05, \$1, \$1.05, \$1.05, \$1.

A sale of 100 shares of Alice at 62c. is reported. Horn Silver sold to the amount of 400 shares at \$3.65. El Cristo was dealt into the extent of 600 shares, and the price varied from 35c. to 45c. Five hundred shares of Phoenix of Arizona have been sold: 100 at 49c., 200 at 50c. and 200 at 51c.

The following assessments have been made: Alpha Consolidated, 10c. delinquent October 6th; Independence, 5c., on September 5th; Best & Belcher, 25c., September 17th; Navajo, 10c., September 22d; Silver King, 25c., September 26th; North Belle Isle, 10c., October 3d.

The Aspen Mining and Smelting Company have declared a dividend (No. 29) of 10c. per share (\$20,000) payable on and after the 15th inst.

**Boston.** Sept. 15.  
(From our Special Correspondent.)

The market for copper stock continues in a demoralized condition incident to the decline in the general stock market and there is no indication of a revival of speculative interest, or an improved investment demand in sight at present. The Montana stocks continue to absorb the greater part of the business, and prices for this group have been fairly well maintained. Boston & Montana sold \$32 early in the week, an advance of \$1, 1/4 of which was, however, lost later, the closing sale to-day being at \$31 1/4.

Butte and Boston held quite steady at \$8, at which price all the sales were made.

Calumet & Hecla declined from \$285 to \$280 1/2, recovered later to \$285, closing at \$281.

Tamarack advanced on the announcements of a dividend of \$4 per share to \$155, but a lot of 25 shares coming on the market and pressed for sale, caused a decline again to \$151.

Osceola declined from 30 to 29, with recovery later to 29 1/2.

Kearsarge sold down to \$10.

Centennial advanced to \$5 1/2 for a few hundred shares early in the week, but the past four days there has been no quotation.

Franklin advanced 1/4 @ \$12 1/4 for a lot of 50 shares only. Atlantic declined 1/2 to \$9 1/2 for small lot.

Arnold sold at \$1 1/4 @ 1 1/4 and Allouez at \$1.

Santa Fe steady at 10c. Wolverine sold at \$2. It is rumored that mass copper with handsome harred work has been encountered in the new openings.

A sale of 50 shares National is reported at 75c.

Tamarack, Jr., is neglected, a sale of 5 shares only reported at \$22.

In silver stocks the only sale for the week was 1,000 shares Cœur d'Alene at 79c.

The market closed dull and lifeless, with more orders to sell than can be executed. Unless there should be a marked change in the price of ingot copper, we see nothing to revive interest in this class of securities or any prospect of higher prices.

**San Francisco.** Sept. 9.  
(From our Special Correspondent.)

Generally the price of Comstock shares have remained firm throughout the week, albeit trading has been very dull. During the current month there will be a heavy call for assessments, those falling

delinquent making a total of \$211,080. Of this amount Nevada claims \$162,080; California, \$11,000; Arizona, \$5,000; Idaho, \$3,000; British Columbia, \$20,000, and Mexico, \$10,000. All these assessed properties are not listed in the San Francisco Board, but, nevertheless, the calls for money has an influence on the market generally.

The decline of stock trading, however, during the present year has, in very large measure, owing to the terrible exposé of Comstock mine management, what the public suspected before was proven to be a fact and consequently stocks have been left alone by monied men and manipulators and "chippers" have had things their own way. The decrease in sales since the opening of the year has been about 40% under the sales of 1891.

This can hardly be considered a sign of healthy life, but when the causes leading up to this large falling off are remembered, it can not be matter for wonderment.

To-day being a general holiday (Admission Day), the Board was not in session. At the close yesterday prices were steady. The north end Comstocks have fluctuated slightly with Sierra Nevada quoted still strong on account of the interesting work being done in the mine. Consolidated California & Virginia was steady at \$3.25, Mexican at \$1.30, Ophir at \$2.35, Union Con. at \$1.30 and Utah Con. at 30 cents. Sierra Nevada scored a 10 cents advance on the week's trading, selling for \$1.60.

The Middle Comstocks have, during the week, strengthened to a trifling extent. Best & Belcher has been in light demand, selling for \$1.55, Chollar at 60c., Gould & Curry at 95c., Hale & Norcross at \$1, Potosi at 60c., and Savage at 85c., have sold in small lots.

Of the South End Comstocks and Gold Hill stocks Bullion sold most freely yesterday, a block of 1,200 selling at 15c.—a 10c. decline during the week. Belcher at \$1.15 and Crown Point at 55c. have sold moderately well, while Caledonia at 35c., Alpha at 15c., Challenge at 35c., Overman at 40c., and Yellow Jacket at 55c., have all sold steady, with little alteration in values.

The outside stocks have continued to be neglected, quotations being as follows: Bodie Con., 35 cents, Bulwer Con., 35 cents, and Mono, 10 cents.

Of the Tuscaroras, Commonwealth sold as low as 5 cents; Nevada Iron, 10 cents, and North Commonwealth, 5 cents.

In the Quijotoa group Peer and Peerless have been selling at 5 cents each.

**MEETINGS.**

Grand Prize Mining Company, at the office of the company, No. 331 Pine street, San Francisco, Cal., September 20th, at 12 o'clock noon.

Gray Eagle Mining Company, at the office of the company, No. 303 California street, San Francisco, Cal., September 21st, at 10 A. M.

Pacific Coast Borax Company, at the office of the company, No. 101 Sansome street, San Francisco, Cal., September 19th, at 10 A. M.

**ASSESSMENTS.**

COMPANY.	No.	When levied.	D'tnq'l in office.	Day of sale.	Amt per share.
Alpha, Con., Nev.	9	Sept. 2	Oct. 6	Oct. 27	.10
Belle Isle, Nev.	15	Aug. 22	Sept. 26	Oct. 20	.10
Best & Belcher, Nev.	62	Aug. 17	Sept. 22	Oct. 13	.25
Bullion, Nev.	39	.....	Sept. 2	Oct. 4	.25
Challenge Con., Nev.	12	Aug. 24	Sept. 27	Oct. 18	.10
Comm'nwe'lth Con., Nev.	9	Sept. 7	Oct. 13	Nov. 9	.10
Confidence, Nev.	12	Aug. 13	Sept. 15	Oct. 6	.50
Crocker, Nev.	12	.....	Sept. 2	Oct. 18	.05
Evening Star, Cal.	2	Aug. 19	Sept. 21	Oct. 8	.01
Del Monte, Nev.	6	.....	Aug. 26	Oct. 5	.10
Eschequer, Nev.	33	July 27	Aug. 31	Sept. 20	.10
Florida Hill Gravel, Idaho.	4	July 27	Sept. 2	Sept. 28	.30
Gold'n Fleece Gravel, Cal.	17	July 16	Aug. 24	Sept. 30	8.00
Gover, Cal.	3	July 28	Sept. 1	Sept. 28	.10
Guasucaran & California, Hon. C. A.	7	Aug. 9	Sept. 15	Oct. 8	1.50
Halc'n' Norcross, Nev.	102	Aug. 11	Sept. 15	Oct. 7	.50
Independence, Nev.	17	Aug. 15	Sept. 29	Oct. 13	.05
Justice, Nev.	51	July 26	Aug. 31	Sept. 19	.10
Keystone, Cal.	3	Aug. 22	Sept. 26	Oct. 18	1.00
Mountain Tunnel Gravel, Cal.	5	July 23	Sept. 5	Sept. 26	.07
Navajo, Nev.	22	Aug. 17	Sept. 21	Oct. 14	.10
North Belle Isle, Nev.	2	Sept. 1	Oct. 6	Nov. 7	.10
Northwestern, B. C.	5	Aug. 17	Oct. 24	Oct. 15	.20
Peer, 'riz	13	July 19	Aug. 25	Sept. 22	.10
Peerless, Ariz.	18	July 6	Sept. 1	Sept. 20	.05
Silver Hill, Nev.	31	Aug. 29	Sept. 6	Sept. 27	.05
Silver King, Ariz.	8	Aug. 26	Oct. 7	Nov. 4	.25
Teresa, Mex.	8	July 19	Sept. 22	Oct. 8	.10
Western Star, Cal.	1	July 25	Aug. 30	Sept. 21	.02
Yellow Jacket, Nev.	52	Sept. 5	Oct. 7	Nov. 10	.25

**DIVIDENDS.**

Colorado Central Consolidated Mining Company, dividend No. 34 of five cents per share, \$13,750 payable October 10th at the office of the Farmers' Loan and Trust Company, 20 William street, New York. Transfer books close September 30th and re-open October 11th.

Homestake Mining Company, dividend No. 170 of ten cents per share, \$12,500, payable September 26th at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York.

Minnesota Iron Company, dividend of one and a half per cent., \$210,000, payable October 1st, to stockholders of record September 17th.

Napa Consolidated Quicksilver Mining Company, dividend No. 48 of 20 cents per share, \$20,000, payable October 1st, at the office of the company, No. 86 State street, Boston, Mass.

The total sales of Pipe Line certificates at the Consolidated Stock and Petroleum Exchange for the week ending September 16th amounted to 48,000 barrels.

**COAL TRADE REVIEW.**

**NEW YORK, Friday Evening, Sept. 16.**  
Statement of shipments of anthracite coal (approximated) for week ending September 10th, 1892, compared with the corresponding period last year.

Regions.	Sept. 10, 1892.	Sept. 12, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region.....	410,177	380,735	Inc. 29,442
Lehigh Region.....	115,212	113,487	Inc. 1,725
Schuylkill Region.....	230,253	210,502	Inc. 19,751
Total.....	755,642	704,724	Inc. 50,918
Total for year to date	27,687,806	26,234,317	Inc. 1,453,489

**PRODUCTION OF BITUMINOUS COAL** for week ending September 10th, and year from January 1st.

Regions.	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.....	1,558	58,601	128,590
Cumberland, Md.....	96,639	2,576,617	29,573,320
Barclay, Pa.....	791	37,276	132,298
Broad Top, Pa.....	12,273	410,097	351,760
Clearfield, Pa.....	71,497	2,717,987	2,828,318
Allegheny, Pa.....	28,214	879,412	917,145
Beach Creek, Pa.....	36,127	1,683,671	1,706,419
Pocahontas Flat Top.....	53,469	1,666,046	1,643,191
Kanawha, W. Va.....	59,167	1,639,925	1,666,870
Total .....	359,675	11,699,631	37,331,911

\* Week ending September 19th.

**WESTERN SHIPMENTS.**

Regions.	1892.		1891.
	Week.	Year.	Year.
Pittsburg, Pa.....	22,950	881,992	885,394
Westmoreland, Pa.....	39,448	1,163,846	1,417,142
Monongahela, Pa.....	16,714	439,292	433,706
Total.....	79,112	2,485,130	2,736,242

Grand total ..... 438,787 14,184,761 40,068,153

**PRODUCTION OF COKE** on line of Pennsylvania R. R. for the week ending September 10th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 102,604 tons; year 3,717,327 tons; to corresponding date in 1891, 2,791,467 tons.

**Anthracite.**

The anthracite market shows some signs of improvement. During the last fortnight there have been a good many more inquiries from local dealers and steam users, and orders are now beginning to come in more readily. The retail dealers report an increased consumption and a considerable diminution in stocks, so that they are now finding it necessary to buy more coal. The increase in business among coal agents is not very great as yet, however, and there is nothing in the way of an autumn boom. The increased briskness is only a taste of what is to come. The stocks at all points are very great, and the production is still abnormally restricted.

There is a general impression abroad that the "ring" will force prices up again on October 1st. Those in authority do not make any definite statement, but say in general terms that an effort will be made to put prices up another 25 or 50c. There is no signs of weakness in the "combine," if anything it is stronger than ever, and outside producers suffer severely at the hands of the transporting companies. For instance, Haddock, Shonk & Co. complain that they cannot get the Delaware, Lackawanna & Western R. R. to deliver the coal which they supply to Stickney, Conyngnam & Co. The amount sent yearly is 100,000 tons, and none of this is being delivered. The idea is of course to get all the outsiders into the ring by coercion.

The Pennsylvania Railroad are not troubling themselves at all about the action of the Reading and Jersey Central in the matter of joint rates. They have more than sufficient freight themselves and do not care at all if the Reading and others wish to quarrel. Mr. Joyce, the general manager of the freight department, says: "We have issued our tariffs from Reading junction points to points on the Pennsylvania Railroad, naming our old rates without any change whatever. I cannot say what the result of the action of the other companies will be, and I can only state that we do not intend to make any change whatever in our rates. If the other companies persist in carrying out the advance they have made, consumers on the line of the Pennsylvania Railroad receiving coal from the mines located on the other companies' roads will be compelled to pay an advance of 30 cents a ton in freight rates to the other companies. The cause of this controversy on coal rates was the refusal of the Pennsylvania Railroad to consent to the advance of railroad rates on an-

thracite to Philadelphia." The Pennsylvania officials do not offer any information as to the future and Mr. Joyce's statement about certain consumers on their lines having to suffer looks as if they did not intend to increase the output of the mines under their control. People connected with the coal trade in Pottsville, however, state that there are indications of such a step and that all the collieries are to be forced.

A wire from Pottsville also states that the Reading has instructed its agents at transfer points, such as Pottsville, New Boston, Schuylkill Haven, etc., to handle no more Pennsylvania coal cars. Thus five to ten thousand tons of coal a day are cut off. Much of this was used in Pennsylvania passenger engines, and they will hereafter burn bituminous. The Pennsylvania is offering empty cars to the Reading the same as usual, but they are not being taken from the transfer sidings. All shipments of Lehigh and Schuylkill coal, excepting from the one Van Winkle colliery at Hazleton, have been stopped.

Last week we quoted Mr. McLeod's official statement before the committee but refrained from criticising it in detail on account of our inability to look through the books of the Philadelphia & Reading Co. and Iron Company. Mr. McLeod gives the average cost of a ton of coal at Jersey City at \$3.95, made up as follows: Cost on cars, \$1.55; freight to Jersey City, \$1.60; commission to middlemen, 15 cents; loading on boats, 15 cents, and loss on small coal 50 cents. In the first place, we may say that \$1.55 is an extravagant cost of mining when compared with other companies; and we may recommend the Reading people to see if they cannot be more economical in their methods of mining if they desire a profit instead of obtaining a profit by artificially forcing up the prices.

The items of commission to middlemen and loading on boats we have no reason to find fault with; nor with the item \$1.60 for freight except to say that the large profit here obtained goes into the same pockets as the profit on mining the coal. The item of 50 cents for loss on small sizes is, however, absurd. The lowest price for pea at the mine is about \$1.10 and of huckwheat about 65 cents. The proportionate amounts of pea and buckwheat are about 18% and 8% respectively of the whole production, so that something like 95 cents is the average price of small coal at the mines. This is 60 cents less than Mr. McLeod's figure for the cost of production. Supposing that 30% of the coal is of small size and produced at this loss of 60 cents a ton, then this loss of 60 cents on 30% of the output must be distributed among the 70% remaining. The amount that must be added to the cost of every ton of large coal is therefore  $\frac{30}{70} \times 60 = 26$  cents. Substituting this 26 for the 50 of Mr. McLeod we get \$3.71 as the average cost at Jersey City of a ton of coal. The present prices are: Broken, \$4.00; egg, \$4.40; stove, \$4.75; chestnut, 4.65. Thus the profit per ton on each sort is 29 cents, 69 cents, \$1.04 and 94 cents respectively. These four grades represent 63% of the whole production and each grade (broken, egg, stove and chestnut) represent 15, 14, 22 and 12% of the production. For every 100 tons produced therefore there is a profit from these four grades, representing 63 tons, of \$48.17.

These prices give plenty of profit, and there can be no excuse for any further raises. Even at the prices scheduled in July, 1891, there is a sufficiency of profit. These prices were: Broken, \$3.90; egg, \$4; stove, \$4.05; and chestnut, \$3.75. If any further margin of profit was required let the managers see to a judicious economy in production.

The schooner "Benjamin A. Van Brunt," of 2,000 tons, with a cargo of 1,328 tons of coal on board, was sunk by collision with the "Providence," a Fall River steambot, at Fall River, on September 10th. The schooner was cut clean in two, and she sank in less than five minutes after the collision. The "Providence" had very slight damage done to her.

The trouble among the engineers and employees of the Reading Railroad which we referred to last week has blown over, and all prospect of a strike is now fortunately at an end. On Tuesday Mr. McLeod had a conference with twenty-five committeemen, headed by Mr. Arthur, head of the Brotherhood of Locomotive Engineers, and the dismissal of certain engineers being explained, the meeting transformed itself into one of mutual admiration. In all probability the labor question will run smoothly on the Reading and allied systems for some time to come.

#### Bituminous.

The producers of bituminous coal all report a great briskness of demand; in fact, there is a healthy autumn boom. The difficulties of railway transport greatly interfere with the trade, and not anywhere near the amount of coal is brought to market that could be disposed of. From the 14th to the 19th all freight transport will be suspended on the railways, owing to the excursion trains carrying the Grand Army of the Republic to Washington. In addition to the difficulties attending transport on land there is now the cholera scare to hinder large and schooner traffic. Then, again, less coal is being used on ocean steamship lines to Europe, owing to the detention of cholera steamers at quarantine.

Prices of coal are stiff at \$2.40 at lower ports and \$3 at New York, both f. o. b. There are plenty of vessels at all ports, and freight rates are about the same as last week, viz.: From Philadelphia to Boston, Salem and Portland, 55 to 60c., and to Sound ports, 60c.; from Baltimore, Newport News and Norfolk to Boston, Salem and Portland, 60 to 65c., and to Sound ports, 70c.

#### Boston.

Sept. 15.

(From our Special Correspondent.)

Anthracite coal is still rather quiet, although very firm. The trade here was expecting a strike on the Reading Railroad, but as differences have been settled the market seems to have lost its only redeeming and interesting feature. The yards here are still full of coal, and it will take a few weeks of trade such as we are having at present to impair stocks to any extent. When a dealer has a chance to buy coal he will most assuredly do so, because he seems to be firmly fixed in the belief that with October comes another advance from the companies.

We quote f. o. b. prices at New York: Stove, \$4.75; egg, \$4.50; free broken, \$4.10; chestnut, \$4.65. Lykens Valley (at Philadelphia): broken, \$4.85; egg, \$5.45; stove, \$5.90; chestnut, \$5.

There is a feeling here that soft coal is decidedly weak. We hear of Clearfield being offered at \$3.05 on cars here, while George's Creek will not bring over \$3.40 at the most. The action of the Baltimore & Ohio and the Pennsylvania railroad companies refusing to ship coal between the 14th and 18th inst. should strengthen the market some just now, but whether it will or not remains to be seen.

Tonnage is so plentiful that freight rates are actually 5 cents per ton lower in a number of cases. From New York they are 40@45c.; from Philadelphia, 55@65c.; from Philadelphia to Portland, 60@65c.; to Bath, 75@80c.; to Providence, 60@65c.; from Baltimore, 65c.; Newport News, 60@70c.; to Sound points, 65@70c.

In a retail way there is but little doing in coal as yet. Within a few days there has been an increase in orders, and it may be the commencement of a good fall business.

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

The receipts of coal at this port for the week ending September 10th were 41,772 tons of anthracite and 31,529 tons of bituminous, against 39,709 tons of anthracite, and 13,923 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,456,300 tons of anthracite and 554,121 tons of bituminous, against 1,394,816 tons of anthracite and 742,593 tons of bituminous for the same time last year.

#### Buffalo.

Sept. 15.

(From our Special Correspondent.)

The anthracite coal trade is very dull, principally on account of the advance in quotations, local consumers holding off with the hope that something may occur before winter sets in to cause a reduction in prices. The quantity arriving by railroad is light.

Bituminous coal in fair demand, with firm market, as supply is only about adequate to meet requirements. Dealers expect that receipts will be freer by the end of the week and they will then be enabled to work off their helated orders.

Incidents connected with the trade are hard to find. Matters connected with coal transportation between the Reading and the Pennsylvania railroads are familiar, doubtless, to your readers, therefore need not be further alluded to.

In 1892, from the opening of navigation to September 1st, 1,972,239 net tons of coal passed through the Sault Ste. Marie Canal. In 1891 the figures were 1,671,357 and in 1890 1,300,351 net tons.

The imposition of tolls by the United States Government on cargoes passing on Canadian vessels through the Sault Ste. Marie canal has had no detrimental effect on commerce. During a few days after the President's proclamation there was a slight decrease in tonnage, but now trade has returned to its normal condition as far as freighting is concerned.

Lake freights on coal steady; volume of trade restricted by the short supply of hard fuel for shipment eastward. The movement of coal by lake to western ports from September 7th to 13th, both days inclusive, aggregated 75,320 net tons, distributed about as follows: 28,250 to Chicago, 19,520 to Milwaukee, 11,100 to Duluth, 1,050 to Sault Ste. Marie, 5,600 to Superior, 450 to Kincardine, 2,675 to Racine, 1,100 to Washburn, 750 to Green Bay, 900 to Bay City, 125 to East Tawas, and 200 to St. Clair. Closing with many vessels leaving light for want of coal. The rates of freight were as follows: 55c. to Chicago, Milwaukee and Green Bay; 50c. to Sault Ste. Marie; 35c. to Duluth, Superior, Bay City and Washburn; 40c. to East Tawas and St. Clair; 60c. to Racine; 50c. to Kincardine, and 25c. to Toledo.

The coal movement to and from this port by canal for the second week in September as follows: Receipts, 1,589 net tons; shipments, 912 net tons.

#### Chicago.

Sept. 16.

(From our Special Correspondent.)

It is the best of good news to the coal trade generally that the threatened strike of the trainmen on the Philadelphia & Reading Railroad company has been arrested. The hand to mouth policy of the dealers in city and country, and the "annual scarcity of cars" from which the Western markets have suffered for years at this season, together with the limited shipments of coal being brought by vessel and all-rail here, left Chicago, and the territory tributary to it, ill prepared for any further scarcity of coal. Grave fears were entertained if the strike had or should take place as to the ability to fill necessary orders in any way, and prices would probably have soared into the figures of twenty years ago. It is indeed the best news that the dealers and consumers who have not supplied

their necessities have had since the organization of the present detestable combination.

Demand is only moderately fair and cannot by any stretch of the imagination be called fairly good in a wholesale way, either locally or from the outside. Particularly is this noticeable from and in the neighborhood of the Missouri River, where already the semi-hard coal of Colorado has displaced a large tonnage of anthracite. An operator in this coal states that the consumption of the Pennsylvania article in that region will be reduced fifty per cent. this season. As to prices, it is stated that they are well maintained, but it is a notorious fact that orders are still being delivered in last month's circulars, and this applies also to retail trade as well. City retail business is light and will probably remain so until the latter end of the month, when the usual rush will be seen to get in supplies before the advance, October 1. This would appear to be a foregone conclusion and all dealers are advising customers to be prepared for it. Many of the latter, though, will wait until frosty weather admonishes them that fuel must be purchased.

Bituminous coal is active, though the scarcity of cars is interfering very seriously with demand from all classes of dealers, manufacturers and railroads in securing their necessary supplies. There have been several days during the past week when it was practically impossible to secure a wagon load let alone a carload of medium block coal in this market. From present indications this condition of affairs is liable to continue for the remainder of the season. Owing to the increased cost of anthracite, the West and Northwestern country trade are ready and willing to take more soft coal than ever before, while the immense crops, large passenger traffic and the generally increased movement of merchandise over all railroads centering here, make the requirements of the latter probably 25 per cent. greater than they were last year. A continuance of this condition of affairs will make the prospect for mine operators, dealers and railroads brighter than for a long time past. Should there be a severe winter, the difficulties in filling orders with any degree of promptitude will seriously increase. Demand is quite good for all descriptions of steam sizes—Eastern as well as Western—but is more or less curtailed by the poor car service, which is felt in all directions. Prices are much firmer on all grades.

Coke is in better inquiry, demand from foundries increasing, receipts larger, and the tone of the market perceptibly improving. There is, however, no activity, but a steady gain is noticed each week. Domestic crushed coke is in better demand and many heads of families are substituting this fuel for the higher-priced hard coal.

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

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

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

#### Pittsburg.

Sept. 16.

(From our Special Correspondent.)

Coal.—The strike of the Mononghela Valley miners is now on. Of course both sides are firm; both consider they have right on their side. Strikes are curious affairs and very costly. The miners have been working at 3½ cents per bushel, which gives them \$3@3.50 per day while they are working, and at 3 cents a bushel they would be in downright distress. So they will strike against the cut, and then it will be a question of endurance. There is no use in arguing with men who are going on a strike. They are carried away by enthusiasm, they will not hear of anything but victory and the discomfiture of the other side. But in cold reason, does it not seem strange that men who cannot live on a slight reduction of wages are prepared to lie idle for weeks and months without any income at all? The history of miners' strikes in Pennsylvania has generally been defeat for the miners, they have remained out for a long period, themselves and families suffering terrible privations and have then gone back to work on the operators terms or on a compromise.

O. A. Blackburn, W. G. Wilmot, W. J. Wood, T. J. Wood and R. W. Wilmot, all well known coal operators, have made application for a charter for "The Southern Transportation Company." The new company will ship coal to Southern ports, and especially to Havana, Cuba. The depression in the prices of coal in the lower Mississippi market has induced this move.

Connellsville Coke.—The increase in production and shipments indicates a healthy growth and that the depression is passing away. Prices, however, remain nominal. It is, as we have before stated, an open secret that prices are hadly cut more or less. The smaller operators have been selling under market rates for many months, and indications are not lacking that some of the larger leaders have recently succumbed to the pressure and are now doing likewise. There is considerable stock coke in the yards though it is being worked off.

The foundry trade is good and the resumption of a number of hitherto idle valley furnaces has given the Western shipments a boom. Week's increase, 570 cars; ovens in blast, 10,542; and idle, 6,711. Th

week's shipment aggregated 109,260 tons, distributed as follows: To Pittsburg, 1,500 cars; east of Pittsburg, 1,333 cars; west of Pittsburg, 3,237 cars; total, 6,070 cars; increase in tonnage, 12,060 tons. The Western shipments increased 437 cars; Eastern, 83 cars; Pittsburg, 50 cars; total increase, 570 cars.

Prices remain nominal, being governed by circumstances.

**METAL MARKET.**

NEW YORK, Friday Evening, Sept. 16, 1892.

**Prices of Silver Per Ounce Troy.**

Sept.	Sterling Exch'ge.	London, Pence.	N. Y. Cents.	Value of sil. in \$.	Sept.	Sterling Exch'ge.	London, Pence.	N. Y. Cents.	Value of sil. in \$.
10	4'88	38 3/4	83 3/4	645	14	4'87 1/2	38 1/4	83 3/4	645
12	4'87 3/4	38 3/4	83 3/4	646	15	4'87 3/4	38 1/4	83 3/4	645
13	4'87 3/4	38 3/4	83 3/4	647	16	4'87 1/4	38 3/4	83 3/4	643

Silver has remained very steady and in the absence of all speculation has simply flowed into the natural channels of trade and into the vaults of our government. London continues a buyer at the equivalent of Eastern exchange and as buyers are neither very keen, nor sellers very anxious, no great change for the immediate future is in sight.

The United States Assay office at New York reports the total receipts of silver for the week to be 78,000 oz.

There were sold during the week ending Friday, September 16th, 36,000 ounces in silver bullion certificates, at from 84 to 83 1/2 cents per ounce.

**Government Silver Purchases.**

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

- September 12th, 200,000 oz. at 83.33c. to 83.78c.
- September 14th, 527,500 oz. at 83.62c. to 83.73c.
- September 16th, 356,000 oz. at 83.35c. to 83.65c.
- Total for month, 1,508,500 oz.

**Gold and Silver Exports and Imports at New York for Week Ending September 10th, 1892, and for Years from January 1st, 1892, 1891.**

	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
Week....	\$43,000	\$29,494	\$551,194	\$100,387	\$464,213
1892.....	57,998,363	6,477,821	15,651,602	1,508,411	65,663,733
1891.....	75,218,910	3,063,350	11,567,632	1,437,696	82,285,496

During the week ending September 17th the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$720,760; silver, \$341,521. Imports, gold, \$43,297; silver, \$238,848.

Six hundred thousand dollars in gold went to Bremen, the rest to the West Indies and South America; the silver exported went to London.

The imports all came from the West Indies and South and Central America.

**NOTES OF THE WEEK.**

That ill bring blessings as well as pains has been illustrated anew since the cholera has threatened New York.

Among its benefits we may mention the improved cleanliness of the city, the increased care given to our water supply, and, what here concerns us most, the decreased volume of gold exports. A considerable amount of gold was to have been sent by the Columbia, but owing to her hurried departure no shipment was made.

There has been considerable interest in the profit made by shippers of the yellow metal. It is stated that gold brokers now receive 70s. 6 1/2 d. per ounce, 900 fine, and that the highest price paid this year was 70s. 6 1/2 d. per ounce, which would give a profit of \$150 to \$200 per \$500,000 sold.

It is more than probable, however, that shippers receive a much larger sum than this in bonuses and premiums.

In regard to the International Monetary Conference, it is stated that both Mr. Gladstone and Sir Wm. Harcourt are averse to the conference discussing anything affecting the currency of the British Empire. Mr. Gladstone thinks that if anything is done to relieve the financial distress in India that it ought to be effected without consulting the conference. These reports are probably true, but if the conference is to accomplish anything, it must discuss the monetary condition of India; in fact the distress there is one of our strongest arguments in favor of international agreement on the status of silver.

In reference to the matter of the suspension of silver coinage in India, it is learned that the pressure of the Indian Government in favor of suspension is so urgent that a special cabinet meeting will shortly be convened in order to decide the question, which is considered to be much more critical and important than the monetary conference. Mr. Gladstone does not like the idea of a suspension of India's silver coinage, but finding that the India Office insisted upon an early settlement of the question, he has consented to submit it to the cabinet.

A late cable from Rome states that the French and Italian delegates to the conference have arranged to meet representatives of the other states in

the Latin Union in order to determine upon a course of action.

The total amount of Austria's purchases of gold since the adoption of the new currency reform law is 14,000,000 florins, equal to \$7,000,000.

**Domestic and Foreign Coin.**

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

	Bid.	Asked.
Mexican dollars.....	.69	.67
Peruvian soles and Chilean pesos.....	.61	.63
Victoria sovereigns.....	4.85	4.90
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.79	4.81

**Copper.**—The market has been very flat during the week, and prices have given way not inconsiderably. Early in the week a few lots of lake ingot sold at 11'25; later on 11'20 was accepted, and at the close there are free sellers at 11. A great deal of this copper came from second hands, but first hands also sold, and it is reported that one of the large companies made a large sale. Consumption has not been what it might or ought to have been recently, and manufacturers can well look on for a little while without going into the market to any greater extent. Taking into consideration that hardly any exports took place (as the European market is still below the parity of ours) it stands to reason that stocks must accumulate. The Calumet & Hecla Company have not been in the market lately, but it is considered very improbable that they would be able to make a larger sale unless they drop the price. Electrolytic copper continues scarce. Casting copper is somewhat low, and we have to quote 10 1/2 to 10 3/4. The foreign market is dull and barely steady; G. M. B.'s touched in the middle of the week £44, but afterward recovered somewhat, and closed at £44 2s. 6d @ £44 5s. for spot, and 10s. higher for three months.

Several others have lately been placed for India, which appears to be very bare of copper, but the prices are said to have been very low. We quote: Tough copper, £46 10s @ £47; Best Selected, £47 10s. @ £48; Strong Sheets, £55 @ £56; India Sheets, £51 @ £52; Yellow Metal Sheets, 4 1/2 pence.

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

To Liverpool.....	Copper Matte.	Lbs.	\$4,000
S. S. Naronic.....	784 bags	80,460	
To London.....	Copper Matte.	Lbs.	12,000
S. S. America.....	2,098 bags	242,330	
To Rotterdam.....	Copper.	Lbs.	\$23,981
S. S. Werkendam.....	613 bars	112,576	
S. S. Fundam.....	54 cakes	194,613	
	1,111 pigs	291,379	\$30,000

**Tin** has further declined, and sales took place at 20 1/2, for September delivery. Future deliveries are held very much higher, and we hear of sales for next year at 20 1/2. Stocks in warehouses here appear to be rather reduced, but arrivals have been fairly heavy lately. The London market continued to decline, and we quote £92 2s. 6d. to £92 5s. for spot, and £92 5s. to 92 7s. 6d. for three months.

**Lead** is dull, and also somewhat cheaper, and we have to quote 4.10. The amount of business has been rather small. In Europe prices continue to rule very low, and we quote Spanish lead, £10 1s. 3d. to £10 2s. 6d.; English lead, £10 2s. 6d. to £10 5s.

**Chicago Lead Market.**—The Post, Boynton Strong Company, telegraph us as follows: "The market is inactive with prices entirely nominal 3'95c. and 4c. Sales were 300 tons October delivery at 3'95c. with more offered for near by delivery but no takers."

**St. Louis Lead Market.**—The John Wahl Commission Company telegraphs us as follows: "Pig lead in the past few days has been steadily declining. Friday it is freely offered at 3'95c. but consumers are holding off looking for lower prices."

**Spelter** has been rather pressed for sale lately, and shows a disposition to accept lower prices. We quote, nominally, 4'60 @ 4'62 1/2. The English market shows a heavy decline, and prices which last week stood at about £20 10s. have collapsed to £18, and the market is cabled as being rather flat and irregular. This heavy decline is due to the fact that the combination, which existed among the producers abroad to hold prices on a certain level, has come to an abrupt termination.

Buyers operated with great caution and stocks accumulated in rather a serious way, and it will take some time to sell off. Present prices in Europe will not allow any American spelter to be exported, and considering that our production this year will probably amount close to 90,000 tons prices will entirely depend upon home consumption.

**Antimony** is dull and continues to be sold below the parity of English prices. We quote: Hallett's Antimony, 10 1/2 @ 10 1/2 c.; L.X., 11c.; Cookson's, 12c.

**Exchange.**—On the 10th, 4'87 1/2 @ 4'88c.; 12th, 4'87 1/2 @ 4'87 3/4 c.; 13th, 4'87 1/2 @ 4'87 3/4 c.; 14th, 4'87 1/2 @ 4'87 3/4 c.; 15th, 4'87 1/2 @ 4'87 3/4 c.; 16th, 4'87c.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Sept. 16, 1892.

**Pig Iron Production.**—The following table gives the number of furnaces in blast and the estimated production of pig iron in the United States during the week ending Saturday, September 12th, 1891, and for the corresponding week ending September 10th, 1892. Also the total estimated production from January 1st of last year to these dates. This table has been corrected by the official returns of the Ameri-

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

Fuel used.	Week ending—				From Jan., '91.	From Jan., '92.
	Sept. 12, '91.	Sept. 10, '92.	Tons.	Tons.		
Anthracite.....	83	67	28,000	1,306,703	1,213,365	
Coke.....	159	130	115,000	3,604,015	4,842,975	
Charcoal.....	58	42	9,300	377,427	376,581	
Total.....	300	239	152,300	5,288,145	6,432,921	

As will be seen by the new figures in the above table, the output of pig iron is still decreasing, but this month the decrease is not so great as during former months. This decrease in the output began in March last, when the weekly output was 192,100 tons, until now it is only 152,300. The difference in the weekly output between the present and a month ago is only 3,000 tons, so that we may hope that the decrease will soon be checked.

The rate of output has decreased in anthracite and coke, but has increased in charcoal. There are considerable decreases noticeable in the Pittsburg district and in Southern States, but in Illinois and Michigan the output has increased. The stocks at all points have decreased considerably during the month, throughout the country the reduction being 63,000 tons and in New York and New Jersey about 2,000 tons. The demand, as usual at this time of year, is better than in the other seasons; but the amounts sold are not encouraging, and dealers all have an unsatisfactory tale to tell.

The reduction of stocks in New York, New Jersey and elsewhere is not great, seeing that there has been a curtailment in the production, and is not so great as it would be if the fall increase in trade had been up to the average. Buyers refuse to take large lots, and will not go further than a month's supply at a time. All consumers are very low in stocks, so that all of them have been forced to buy rather more just now on account of their fall increase in trade. The prices as a rule remain the same, viz., No. 1, \$15; No. 2, \$14, and gray forge, \$13 @ \$13.50 at tidewater. There are a few cases where a rebate has been made, but just at present there is no indication of a general reduction.

The cholera scare is unsettling the trade a little for with the actual presence of the epidemic in the city consumers are unable to tell how long their works will be able to run to their full capacity. The vacancies on the board of directors of the Thomas Iron Company, caused by the deaths of Messrs. Clarke and Sturges, have been filled by the appointment of Messrs. Hulick and Hardenbergh.

**Spiegeleisen and Ferromanganese.**—There is nothing to report in spiegeleisen. In ferromanganese there is a very fair demand and the recent low quotations have been withdrawn. Dealers in foreign ferro state that they have very little to offer on account of the scarcity of bars in the foreign makers' hands.

**Steel Rails.**—The state of the steel rail industry remains very dull and hardly anything except the usual renewal orders is reported. There are no new roads in prospect. The only new order received during the week was a comparatively insignificant one for a southern road. On the 14th inst. there was a meeting of rail manufacturers at New York and it was unanimously agreed to retain the present price of \$30 per ton.

**Rail Fastenings.**—No new transactions of any magnitude is reported in rail fastenings and all the work is on permanent orders. Prices rule as follows: Fish and angle plates, 1'55 @ 1'65c. at mill; spikes, 1'90 @ 2c.; bolts and square nuts, 2'50 @ 2'70c.; hexagonal nuts, 2'70 @ 2'80c., delivered.

**Merchant Iron and Steel.**—The sales for all kinds of merchant iron and steel continue slow and in small quantities at a time. There is no variation in prices, which stand as follows: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6 1/2 @ 7 1/2 c.; special grades, 13 @ 18c.; crucible machinery steel, 4'75c.; crucible spring, 3'75c.; open hearth machinery, 2'2c.; open hearth spring, 2'50c.; tire steel, 2'25c.; toe calks, 2'25 @ 2'50c.; first quality sheet, 10c.; second quality sheet, 8c.

**Structural Iron and Steel.**—The amount of new orders received during the past week at Eastern mills is comparatively small; but all the mills have sufficient orders on hand to keep them employed at full pressure for a month or more. Some of the Carnegie structural material has put in appearance in this market again, and no new orders received in this district can be traced to former customers of the Pittsburg mills. Prices continue about the same as last week, but plates show a weakness. Prices are as follows: Beams, 2'3 @ 2'5c., except for 20-inch beams, which are 2'8c.; angles, 2'15c.; sheared plates, 2 @ 2'10c.; tees, 2'40 @ 2'60c.; channels, 2'35 @ 2'50c.; universal plates, 2 @ 2'10c.; bridge plates, 2 @ 2'10c., all on dock.

**Buffalo.** Sept. 15.

(Special Report by Rogers, Brown & Co.) Considerable activity is apparent among stove, radiator, heater and agricultural implement makers. In a small way there has been quite a little spurt in favorite brands of Lake Superior charcoal iron but, as a rule, buying during the week has been light, while shipments are very heavy. Indications are that buying must soon be resumed. We quote for cash f.o.b. cars Buffalo. No. 1 X Foundry Strong Coke Iron Lake Superior Ore, \$15.25; No. 2 X Foundry Strong Coke Iron Lake Superior Ore, \$14.25; Ohio Strong Softener No. 1, \$15.25; Ohio Strong Softener No. 2, \$14.25; Jackson County Silvery No. 1, \$17.30; Jackson

County Silvery No. 2, \$16.80; Lake Superior Charcoal, \$16.25; Tennessee Charcoal, \$17.00; Southern Soft No. 1, \$13.90; Alabama Car Wheel, \$19.00; Hanging Rock Charcoal, \$20.50.

**Chicago.** Sept. 15. A new company has been formed and definite arrangements will be completed this week to put into operation the rolling mill at East Chicago, Md. This plant was formerly the property of the National Forge and Iron Company, which failed a year ago. New machinery is being introduced and the works will probably be started next week. It will give employment to upward of 500 men. The threatened strike of the trainmen on the Reading system is causing some stir in railroad circles here.

In nearly all lines of industrial pursuits, and particularly those devoted to the manufacture of iron and steel, there is a steady and growing improvement. There is, however, some falling off in demand for quick shipments of finished material, and most of the new business coming into the market is for forward delivery, on which prices are less firm than for prompt shipment. Values on pig iron are now about as low as they can go, but with the increased consumption and decreased production, the conditions are more encouraging than they have been for months. Some dealers are sanguine enough to predict not only hardening of prices but an advance on some grades inside of sixty days.

**Pig Iron.**—Demand is still mainly confined to small quantities. Fifty to several hundred tons of coke iron and orders for such are frequent. Early this week a good inquiry has sprung up, and the outlook for increased business in local iron is better. Two round lots of 1,000 and 2,000 tons and one for 500 tons were placed with a local furnace last week, on bids which were flatly refused by other makers here. Foundries are taking in more work, and demand from this source is also becoming more active. Carload trade is quite a feature, and enlarges each week. Southern coke is in moderate demand, and runs mostly to Nos. 1 and 2 soft, on which prices are much firmer. Bids for 500 to 2,000 tons of these grades have been refused by several furnaces at current rates for future delivery. In some directions there is a better inquiry for Lake Superior charcoal iron, and several transactions involving a fair sized tonnage will be closed this week.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.55@17.00; Lake Superior coke, No. 1, \$14.25@14.75; No. 2, \$13.50@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15@15.50; American Scotch, \$16.50@17.00; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.25; No. 3, \$12.50; Southern coke, soft, No. 1, \$13.25; No. 2, \$12.75; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

**Steel Billets and Rods.**—Consumers are in the market for billets at \$24.50. Rods are quiet at \$34.50.

**Structural Iron and Steel.**—A fair inquiry is noted for building shapes. Bridge material is also more active and miscellaneous demand is good. Shipments of beams and columns from mill are comparatively slow on the two latter, and price is a little irregular. Regular quotations, car lots f. o. b. Chicago are as follows: Angles, \$2@2.10; tees, \$2.30@2.40; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.25@2.50.

**Plates.**—Demand from warehouse is rather more than fair and prices firm. Mill business is improving, but shipments are still slow. Tubes are stronger. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, 2 1/2 in. and smaller, 60%; 7 in. and upward, 70%.

**Merchant Steel.**—An improved and growing demand is reported for soft steel bars, and some good business was entered last week, but large manufacturing concerns have a much greater tonnage booked for future delivery than ever before. Tool steel for mining purposes are in active demand. We quote tool steel, \$6.50@6.75 and upward; tire steel, \$2.10@2.20; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.80; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

**Galvanized Sheet Iron.**—Demand is greater than supply and best brands of standard makes and sizes are scarce. Discounts are firmer at 70 and 10% off on mill lots, and 70% on Juniata, and 70 and 5% off on charcoal from warehouses.

**Black Sheet Iron.**—Inquiry is active and few mills in a position to give earlier delivery than October. Prices are steady at 2'90@2'95c. for No. 27 common, f. o. b. Chicago steel sheets are 10c. higher. Dealers quote 3'10@3'20c. from stock, same gauge.

**Nails.**—Orders for wire nails are plentiful and mills behind with deliveries. Mill quantities are quoted at 1'70 f. o. b. Chicago and 1'80@1'85c. from stock. Steel cut nails are in good demand from local mills at \$1.60@1.62 (30c. average) and \$1.75 from jobbers.

**Bar Iron.**—Demand for shipment 20 to 60 days hence is active; quick delivery orders are less urgent, and quotation is steady at \$1.50@1.52 1/2 mill, half extras, equal to 1.62 1/2@1.65 Chicago. Warehouse demand is well maintained at 1'80@1'90c. rates.

**Steel Rails.**—There is some inquiry, and the usual amount of small orders from 200 to 500 tons for light and heavy weight. The latter are steady at \$31@32 as to quantity. Track repair material is in moderate demand only 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.**—Demand is exceedingly light and stocks are large. Dealers look for no improvement until next month. Prices 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, \$5.50; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.60; coil steel, \$14; leaf steel, \$15; tires, \$14.50.

**Old Material.**—Some inquiry is quoted for iron rails and small quantities of several hundred tons have changed hands at \$18; holders want 25@35c. more for large quantities. Steel rails are quoted at \$12.50@14 according to length. Old carwheels are dull at \$14.75@15, with a few sales at our inside figures.

**Louisville.** Sept. 10.

(Special Report by Hall Brothers & Co.)

There is nothing new to be said about the iron market. Buying has been very light during the past week and orders have been mostly in carload lots. Buyers do not seem disposed to contract for their future requirements so long as prices are so uncertain, nor are they desirous of carrying part of the stocks as long as they can get furnaces to carry them, and can buy from week to week at lower prices.

**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.** Sept. 15.

(From our Special Correspondent.)

**Pig Iron.**—Buyers remain very conservative considering that production has fallen off, and that makers are not pushing stocks upon the market. Only a moderate volume of business has been done since Monday. Inquiries have been made for Southern Foundry irons, and brokers handling Southern brands think some business will be done with them. The possibility of an advance in price is spoken of by manufacturers, but buyers do not think danger exists in that direction. The mills are running full time, and forge iron is selling briskly, but only to meet current wants. Quotations for No. 1 range as usual from \$14.25@15.50; No. 2, \$13.25@14.50; forge \$12.50@13.25. For Bessemer the market is a little better.

**Muck Bars.**—Buyers are more anxious to place orders for 30 to 60 days delivery, but no large sales have yet been consummated. Quotations range from \$25.50 to \$26.

**Steel Billets.**—Quotations are \$26 for early and \$25.50 to \$25 for late delivery. Large contracts may be made very soon. There are negotiations in progress, but neither side will speak.

**Merchant Iron.**—There is not quite as much anxiety to hurry in orders for merchant bars as usual. This does not indicate that there is weakness. A large amount of business will undoubtedly be done during the rest of the year. Quotations 1'70 to 1'80, and 1'65 for common.

**Sheet Iron.**—Prices rule quite firm, ranging from 2'75@3'50 for best refined, soft steel sheets 3@4c. Discounts on galvanized, 70 to 72 1/2%. Plenty of business is being offered. Manufacturers all feel that there will be a steady run of orders up to the close of the year.

**Wrought Iron Pipe.**—Small orders are being booked, but not sufficient to run the mills to full capacity.

**Plate and Tank Iron.**—A heavy run of orders is reported. Some manufacturers who are unable to make deliveries in the times called for are making their possible customers feel uncomfortable by quoting higher figures than they reasonably expect to get. The average price for plates is 1'90, though that figure is not paid on a very large order. Shell, 2'20; flange, 2'50 for steel.

**Structural Material.**—There are indications of a very heavy demand for structural material, growing out of the possibility of the erection of an elevated railroad, and the prosecution of work upon railroad terminal facilities. Quotations for beams, tees and channels, 2'30; sheared plates, 2'10. Mills are all crowded with work.

**Steel Rails.**—The amount of business done in steel rails is rather insignificant; quotations \$30.

**Old Rails.**—Old iron are being offered at \$19; steel, \$16.

**Scrap.**—The average quotation for No. 1 Scrap, which is quite plenty, is \$17.

**Pittsburg.** Sept. 16.

(From our Special Correspondent.)

**Raw Iron and Steel.**—The demand for certain descriptions of iron and steel still shows visible signs of improvement so far as the volume of busi-

ness is concerned. The improvement in values, so far, has failed to reach expectations. Iron men, generally, have undoubtedly experienced more obstacles and drawbacks during the present year than at any time during the past ten. The present year has exceeded all previous ones in strikes and the end is not yet reached. And now the cholera scare is about to be added to the rest of our troubles. At many points steel plants are taking the place of puddling furnaces, whose days are certainly numbered. The reason is very plain; steel, for many purposes, is not only better but cheaper. Take, for instance, skelp, of which hundreds of thousands of tons are used annually, we note sales of wide grooved iron, \$1.62 1/2 per cwt.; wide grooved steel, \$1.50. The difference is a handsome profit; the same remarks are equally applicable to numerous other articles.

It is only a question of time when puddling will be a thing of the past. The middle of September has, to a certain extent, sustained the anticipations of the iron trade as to a slight revival of fall business. While there has been only a limited number of heavy transactions made public since our last, quotations show no material change. There is an undercurrent of feeling as to the immediate outlook that is encouraging to producers. Most of the options of iron and steel which were given some weeks since have been taken up, and there is not the same facility in securing concessions; so that these facts, taken in connection with the action of the leading producers in refusing business which would have been accepted a short time since, has had the effect of imparting strength to the market for crude material. The position of the market is as satisfactory as could be expected, but consumers recognizing that there will be a fairly active business during the balance of the year, contend that the capacity of the furnaces is so great that competition for orders will have the effect of preventing any sudden increase in prices.

Consumption of all grades of pig iron is now heavy and the output movement nearly approximates the demands from the various consuming industries. On the whole, the present situation is one in which manufacturers find much that is encouraging, although consumers, while closely watching the condition of the market, are generally purchasing on short deliveries, except in instances where odd lots can be picked up at prices that are regarded as satisfactory.

A well-informed Eastern dealer has this to say: "The inquiry for iron and steel has fallen off somewhat since the general resumption of operations at Western mills and to some extent also of the uncertainty that has afflicted every business because of the cholera scare. For the present, however, the Eastern concerns have plenty of work and, therefore, the situation is a satisfactory one. Pig metal is firmly held and no concessions are made, but the orders are principally for small lots."

**Coke Smelted Lake and Native Ores.**

4,000 Tons Bessemer, del. Oct., Nov., Dec ...	\$13.85 cash.
2,500 Tons Bessemer, Sept., Oct. ....	13.90 cash.
2,000 Tons Grey Forge, .....	12.50 cash.
1,500 Tons Grey Forge, .....	12.50 cash.
2,000 Tons Bessemer, Oct., Nov. ....	13.35 cash.
1,000 Tons Grey Forge, Sept., Oct. ....	12.50 cash.
1,000 Tons Grey Forge, .....	12.55 cash.
1,000 Tons Bessemer, .....	13.90 cash.
1,000 Tons Bessemer, .....	13.85 cash.
1,000 Tons Bessemer, .....	13.90 cash.
500 Tons Grey Forge, .....	12.50 cash.
300 Tons White Iron, .....	11.75 cash.
200 Tons Mill Iron, .....	12.50 cash.
200 Tons No. 1 Foundry, .....	14.50 cash.
200 Tons Foundry No. 1, all ore, .....	15.00 cash.
100 Tons No. 1 Silvery No. 1, .....	16.50 cash.

**Charcoal.**

200 Tons Cold Blast, .....	25.50 cash.
100 Tons Cold Blast, .....	26.50 cash.
100 Tons No. 1 Foundry, .....	10.50 cash.
100 Tons No. 2 Foundry, .....	19.50 cash.
75 Tons No. 2 Foundry, .....	19.00 cash.
50 Cold Blast, .....	26.50 cash.

**Steel Slabs and Billets.**

2,500 Tons Billets and Slabs, Sept. ....	24.50 cash.
2,000 Tons Billets, Sept. ....	24.50 cash.
1,500 Tons Billets, Sept., delivered, .....	25.00 cash.
1,000 Tons Billets, at mill, .....	24.25 cash.
1,000 Tons Billets, Oct. ....	24.00 cash.
1,000 Tons Billets at works, .....	23.50 cash.
500 Tons Billets, at works, .....	23.75 cash.

**Muck Bar.**

2,000 Tons Neutral, next four months, .....	25.00 cash.
1,500 Tons Neutral, Sept., Oct., Nov. ....	25.00 cash.
1,500 Tons Neutral, Oct., Nov., Dec. ....	24.85 cash.
1,000 Tons Neutral, .....	24.75 cash.

**Steel Skelp.**

300 Tons Wide Grooved, .....	1.50 4 m.
300 Tons Wide Grooved, .....	1.65 4 m.
500 Tons Narrow Grooved, .....	1.62 1/2 4 m.
400 Tons Sheared Iron, .....	1.85 4 m.

**Sheet Bars.**

500 Tons Sheet Bars, October, .....	30.50 cash.
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**Steel Wire Rods.**

800 Tons No. 5 Gauge American, .....	32.25 cash.
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**Ferro-Manganese.**

200 Tons 80 per cent. Domestic, .....	61.00 cash.
75 Tons 80 per cent. Foreign Seaboard, .....	56.50 cash.

**Spelter.**

100 Tons Spelter, .....	4.55 cash.
75 Tons Spelter, .....	4.60 cash.

**Blooms, Beams, Rail and C. Ends.**

500 Tons Bloom and Billet Ends, .....	16.50 cash.
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**Old Iron and Steel Rails.**

500 Tons old Steel Rail, Melting Stock, .....	15.65 cash.
500 Tons American Ts, .....	19.60 cash.
200 Tons Old Steel Rails, .....	15.50 cash.

**Scrap Material.**

1500 Tons No. 1 W. R. R. Scrap, net, .....	15.75 cash.
1000 Tons No. 1 Western Rail Road Scrap net, .....	15.80 cash.
1000 Tons No. 1 Western Rail Road Scrap net, .....	15.25 cash.

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

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from Sept. 10 to Sept. 16, and Sales. Dividend-paying mines are on the left, non-dividend-paying on the right.

\*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. ¶Dividend shares sold, 5,671. Non-dividend shares sold 23,909. Total shares sold, 29,580.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names, dates from Sept. 9 to Sept. 15, and sales figures.

Dividend shares sold, 5,244. Non-dividend shares sold, 1,967. Total shares sold, 7,211.

COAL STOCKS.

Table of Coal Stocks, listing company names, dates from Sept. 10 to Sept. 16, and sales figures.

Total shares sold, 482,518.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing company names and closing quotations from Sept. 9 to Sept. 15.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS, DIVIDENDS, NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS. Lists various mining companies and their financial details.

G. Gold, S. Silver, L. Lead, C. Copper, B. Borax. \* Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42,900,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Fly 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 \$125,000 in assessments.

