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THE BREAKING COMSTOCK RING

The State of Nevada is represented in the United States Senate by JOHN P. JONES, the official head of the Comstock mill rings, which defraud the mine stockholders and debauch the officers of the mining companies.

It has been proved in court by their own testimony that the mill ring, through Senator JONES' millionaire associates, Messrs. HAYWARD and HOBART, paid their tool LEVY, the president of the Hale & Norcross Mining Company, a share in the plunder they secured from the stockholders of that company.

It has been shown in court that bullion which should belong to the mines is sold to the United States mint in Carson in the names of persons who had no right to it, the transfer of the bullion from the mine to the mint being through Senator JONES' mills; through the Bullion & Exchange Bank, managed by some of Senator JONES' employes of the mills; and through some of the officers of the bank, who by the influence of Senator JONES are officers of the Carson Mint.

The mill ring is being broken. The Hale & Norcross and the Savage have been obliged to change their management and have been obliged to give proper information to their stockholders. The whole Comstock may yet be redeemed from the clutches of the thieves and the disgrace and injury "Comstock management" has brought upon "mining" may yet be wiped out. That much-to-be-desired end would be greatly promoted by the public disgrace and punishment of the shameless members of the gang who have attained wealth and "honors" from the proceeds of the "loot of the Comstock."

Verily, Nevada is bringing shame and disgrace upon the United States Senate and the Comstock mill ring has dragged down the Mint into the mire; the United States Mint of whose administration every American has been justly proud. It is high time that the Carson mint be closed and even that the State of Nevada be consolidated with some larger and less corrupt constituency and that the United States Senate "turn the rascals out."

THE NEW MESABA IRON MINES OF MINNESOTA.

Some of the Minnesota papers have taken exception to the conservative opinions the ENGINEERING AND MINING JOURNAL has expressed of the possibilities of the Mesaba iron range. In other words, they have expressed surprise, not unmingled with indignation, that we have not been so enthusiastic as they. To boom local enterprises or local resources would seem to be the assumed duty of all newspapers, so thoroughly do they devote themselves to that object. Nor does this apply more forcibly to those on the Mesaba range than to those in other localities which have passed through the same fever.

A review of the 52 completed volumes of the ENGINEERING AND MINING JOURNAL will show that many such booms have existed, the majority of them without the good foundation of the Mesaba Range, and all of them have been extravagantly lauded.

What has been said in these columns has been the conservative opinion of engineers who recognize responsibility for their utterances and an who furthermore have the experience and knowledge requisite for authoritative opinion of value. Such views are always welcome, but the booming, hurrah statements of eager promoters should be shunned.

The facts, as at present shown on the Mesaba Range, are, that a very large amount (probably many million tons) of shipping ore has been proven. The grade of this ore as it will be shipped will probably run from 57 to 60 per cent. iron and a good deal of it will carry phosphorus within the Bessemer limit of .01 P. to each per cent. iron.

An experienced and careful mining expert who is himself largely interested on the range, gives us the following estimates of the ore: Hale mine, about 58 per cent. Fe, .080 P; Kanawha, Cincinnati & Canton, 60 Fe, .040 P; Biwabic, 58 to 59 Fe and .080 to .090 P; McKinley, 58 to 59 Fe, .045 P; Mesaba Mountain, one shaft in ore 61 Fe, .030 P; Mountain Iron Company, 58 Fe, and .040 P. All other mines are mere "prospects." The Biwabic, Canton and Cincinnati are large mines that could probably produce after the first year 250,000 to 500,000 tons a year. The Hale, Kanawha, McKinley and Mountain are smaller, with a prospective capacity of 75,000 to 100,000 tons a year. The others are very small.

These estimates of value are higher than some we have received, and may be taken as the views of a fair minded and experienced insider. They are conclusive as to the fact that the Mesaba range is henceforth to be counted upon as an important factor in the ore market.

The ore can be mined very cheaply, and it seems certain that when the railroad taps this new district these mines will exert a very important influence upon the ore market.

GOVERNMENT TIMBER TESTS.

Though we announced in these pages April 23d that we then closed this discussion, the receipt of the letters which we publish on another page has induced us to give a further hearing to the advocates of an appropriation for this work. Dr. R. W. RAYMOND, whose communications are always welcomed by our readers, assails with his usual and characteristic

eloquence the position taken by the ENGINEERING AND MINING JOURNAL in opposition to this appropriation. In reply to him, we would say that we stated quite clearly, as given in the bill, the objects for which the appropriation was asked, and we had no idea of saying or intimating that it was for any other purpose.

The "broad principle" that the functions of government should be restricted to doing what the citizens cannot well do for themselves, upon which we base our opposition to such work, we did not claim to be either original or brilliant; in fact, though it is not nearly so old, and, unfortunately, not yet so universally accepted, it is becoming, through the progress of civilization, almost as much of a "mere platitude" as are the "broad principles" laid down in the ten commandments, and yet the general practical acceptance of these principles requires the incessant work and preaching of an infinite number of churches throughout the world. We take it that it is as much the duty of an influential journal to contend for the principles which underlie free government, the inculcation of self-reliance in the citizen and the limitation of the functions of the central government to narrow bounds, as it is for a church to reiterate the "platitude" "Thou shalt not steal," and endeavor to educate the people up to its observance.

Our approval of a special statement in a correspondent's letter relating to Mr. EMMONS' Leadville report by no means involves either our approval or our disapproval of his other statements and in that respect Dr. RAYMOND'S letter calls for no reply from us, for the "test" he cites is not curs.

All that Dr. RAYMOND says or can say to stimulate public interest in the conservation of our national timber supply receives our warmest support; and we would suggest that one way in which the Government can properly promote this desirable end would be by a stricter enforcement of the existing laws against the plundering of the public lands, and the reckless or willful destruction of timber by conflagrations. The injurious effects of the destruction of the forest he mentions are and have long been thoroughly well known, and some State Governments and private associations are doing more or less (mostly less) to protect the forests. A united and continuous agitation of this subject by the various engineering and other "scientific" societies throughout the country would, we believe, be far more effective in awakening public interest in the subject than are the Government publications, however able they may be.

Dr. RAYMOND has evidently little faith in, and scarcely conceals his sneers at the advocacy of "self-reliance" in the citizen, and he almost seems to urge the appropriation and the work on the personal ground of the eminent fitness of Mr. FERNOW to conduct it. He even accuses us, without the slightest foundation, of having made a "victim" of that gentleman. To ask for an appropriation on such a ground could not possibly be defended, for no one whatever would contend that the Government is bound to enter upon work merely because it has found a man well qualified to perform it; nor, indeed, do we suppose that this is what Dr. RAYMOND intended. So far from our opposition to the appropriation being in any sense personal, it was coupled with a frank admission of the value of the work and of the eminent qualifications of Mr. FERNOW to carry it on. We certainly have not made him "a victim" in any sense.

Dr. RAYMOND says the object of the Forestry Division "is not to build a laboratory, or buy a machine, or establish a great scientific annex, but simply to select intelligently the samples of timber, send them to the private testing laboratory and publish the results." Mr. FERNOW, however, says in his circular No. 7, that "The work will be extended and its progress pushed in proportion to appropriations made by Congress." And in his letter published on another page of this journal he says that while he is "at variance with each and every one of the gentlemen who have written in behalf of or against the propriety of this work under government control," his opinion of the proper functions of government are "to do all those things which are best done by co-operative action." Under this definition there would, indeed, be no limit to the "extension" of this work except that imposed by the "appropriations made by Congress," and the modest programme mentioned by Dr. RAYMOND may be modest only because of the narrow limits imposed by the appropriation. The examples of some other departments of the government in "extending" to everything within reach and absorbing, or trying to absorb, various fields and investigations not dreamed of when the first appropriations were made is an object lesson that cannot be forgotten in discussing this work at its commencement.

We repeat that the work proposed under the title "timber tests" used in circular No. 7 is very desirable, and carried on under so efficient an officer as Mr. FERNOW would be of great value to the engineering profession, and especially to the railroads. This work should be done, and done thoroughly, and we believe that by the united efforts of our engineering societies and the technical press, the means to carry it on on a fitting scale, not limited to a paltry \$40,000, could be secured.

Discovery of Copper in Sumatra.—A Sumatran journal has recently announced the discovery of large deposits of copper, says the *Moniteur Industrielle*, between Solok and Siloengkang, near the Ombilien Railroad. As yet no trustworthy report of its value has been published.

BOOKS RECEIVED.

(In sending books for notice, will publishers, for their own sake and that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.)

Report of the Department of Mines, Nova Scotia, for the year 1891. Published by the Government, Halifax, N. S., 1892. Pages 50.

NEW PUBLICATIONS.

MANUAL OF ASSAYING GOLD, SILVER, COPPER AND LEAD ORES. By Walter Lee Brown, B. Sc. Fourth edition, 1892. Thoroughly revised and enlarged, 12mo., 533 pages, 132 illustrations, 1 scorifier color plate; flexible covers. Price, \$2.50. E. H. Sargent & Co., publishers, Chicago, Ill.

The worth and merit of this work are already testified to by the four editions through which it has passed. The methods described are practical and thoroughly American in their simplicity. It goes without saying that a work of this kind is a valuable aid to one already in the field or to the student. In dress and appearance it is all that can be desired.

THE IRON-FOUNDER. A Comprehensive Treatise on the Art of Moulding. By Simpson Bolland, Practical Moulder and Manager of Foundries. John Wiley & Sons, New York. 382 Pages, 308 Engravings. Price \$2.50

The author states that his principal object in writing this book is to help such of his fellow-craftsmen as by force of circumstances have been shut out from the wider experience which it has been his good fortune to enjoy. The book is the fruit of a praiseworthy attempt to write of the practical details of every-day work in the foundry in such a style as to be easily comprehended by the molder and foundry apprentice. It is a good sign of the advancement in intelligence of the journeyman mechanic when he begins to read books of this kind and to know that there is some good to be obtained from books as well as from experience. We trust the book will be widely read by the class for which it is written, as well as others who are interested in foundry practice, such as engineering students. The illustrations and descriptions of methods of work are admirable.

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.

Faulting in Veins.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of April 30th, Prof. John A. Church says: "In surface geology, faulting is proved by the discovery that a given member of the strata is displaced vertically along a certain line compared to its position on the other side of the line. When we turn to veins we are met by the remarkable fact that, as a rule, faults of this kind are not marked by the presence of veins. . . . If anyone . . . can point to evidences which establish, either conclusively or reasonably, the fact of motion of one vein wall upon another, he will confer a greater benefit upon geology," etc.

I read these remarks to mean that ore veins do not, as a rule, occupy fault-fissures, and that as yet no evidence exists to prove the motion of one vein wall relatively to the other.

If this interpretation of Professor Church's remarks be correct, I think he must have overlooked the evidence afforded in every mining district by "throws" and "horses." If vein A intersect and "throw" vein B, a clear proof exists of one wall of A having moved either upward or downward relatively to the other. And every mining engineer must have frequently noticed "horses" that have presumably been formed by the relative vertical displacement of the walls of a vein of irregular dip—in fact, by the very action to which Professor Church seems to allude when he says "It seems to be impossible for such interlocked walls to move on each other without shearing off the projecting bosses."

YOUNGWOOD, Pa., May 3, 1892.

STEPHEN H. EMMENS.

Government Timber Tests.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Since it is only fair that the defense should be allowed to close the argument, I hope you will permit me a last word regarding the much discussed government timber examination—the term "timber tests" is misleading, as it is apt to call up the idea of commercial testing, which is not intended. I wish more clearly to establish my position rather than to adduce further arguments, which do not, as a rule, convince the opponent who is set in his theory. I recognize two lines of argument in all affairs of state, namely, those of principle or theory and those of expediency and practical necessity. The former should prevail when any new departure is contemplated, the latter when the question is one of operating under established and accepted conditions. Having been placed in charge of an existing government institution, the object of which is, according to the organic act by which it was created, "to report upon forestry with a view of inducing more rational forest management," it is not for me to wrestle with theories as to the propriety of having such work undertaken, but only to decide what class of information will best serve the end in view and to devise the means of getting it. That in this decision I should be led to choose that kind of work which promises in its results the greatest practical and immediate benefit to the greatest number, and immediately leads to the object in view, namely, forest preservation by a more rational use of its product based on better knowledge, and, furthermore, that kind of work which private interest cannot perform or is not likely to perform, or which, if performed, would not be done in time to secure the general object and benefit to be expected from it, or would not be done well—this is simply the outcome of a postulate of rational judgment in an executive officer, to which Mr. Hewitt, statesmanlike, defers in such matters. That the timber examinations in the manner proposed, at the present time, when most essential to prevent further misuse are not likely to be done and in fact cannot be undertaken by private individuals for various reasons, and must be done by some co-operative agency, is clear to all who have any knowledge of what they involve. I have, of course, weighed the pros and cons of various classes of work which the Forestry

Division might perform, and finding concurrence of opinion among many competent judges that this proposed line is only most desirable and eminently practical, as well as eminently proper, to be done under government supervision. I do not hesitate to propose its continuance in a thorough measure, and to consider it as the most promising toward accomplishing the objects of the existence of this government agency, which is thereby "carried into such departments of industry as are not likely to be enlightened and determined by individual interests and efforts" (Mr. Hewitt's words).

As to general principle and theory of government function, I readily confess myself entirely at variance with each and every one of the gentlemen who have written in behalf of or against the propriety of this work under government control. Least of all do I admit any rational basis for the theories of the theorists, Messrs. Wells & Atkinson; the latter's amusing inconsistency in the matter of scientific state institutions is rather a sad reflection upon his advocated theory of self-reliance. The principle upon which these gentlemen base their government is the principle of the brute world, each for himself to struggle for existence as best he may, into which it is to be hoped mankind will not soon relapse. I know it is the school of Spencer and of the majority perhaps, as many now discarded theories have been those of the majority.

But I have an abiding faith in the ultimate victory of human intelligence over brute force, when it will be understood that government is not a thing outside the governed, to be checked and curtailed as something dangerous, tyrannical and incompetent, but rather a matter of co-operation to do all those things which are best done by co-operative action, when it will be recognized that the inhuman doctrine of competition is only useful in small part and entails to a large degree a waste of energy which should be directed to more useful work, when the educational and especially the providential functions of government, *i. e.*, the co-operative community, will be better understood.

Neither the extreme individualistic ideas of government, of which Herbert Spencer may be considered the father, nor the extreme and visionary one-sided paternal ideas, to which Bellamy gave expression, but a rational direction of all the various social forces and their co-operative employment promises the highest development and type of government, for which we should strive. Then true democracy will reign.

Respectfully,

B. E. FERNOW.

WASHINGTON D. C. April 28, 1892.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your article of April 23d on "Government Test of Timber" reiterates your opposition to the modest appropriation asked by the United States Forestry Division, but does not retract the injustice of your original intimation that this money is asked for a "government testing laboratory," which was not true. You note that only one of your correspondents has questioned the "broad principle" on which you take your stand. But this is not surprising. The principle is a mere platitude; it is the stand that deserves and permits question.

To my letter, published March 12th, in which I pointed out that the collection by the United States of information concerning the value of its own resources was quite as proper with regard to forest resources as with regard to mineral resources, you reply that you "do not approve all the work which the United States Geological Survey is doing;" and you quote with approval the distinction drawn by a correspondent between Mr. Emmons' contribution to the literature of economic geology, in his monograph on the Leadville district, and Mr. Guyard's contribution to metallurgical literature, forming a chapter of that report—the former being legitimate government work, and the latter illegitimate, as your correspondent says, because the former "had immediate and practical value upon the ore deposits of Leadville," and because, "by demonstrating the value of the mineral resources of that district, it led to their exploration, and, eventually, to the sale of the Government's mineral lands there."

Considering that the Leadville district was reported by Mr. Emmons to have produced already some \$96,000,000; that every ore deposit he described was already owned by private individuals; that as many prospectors as the country could hold were exploring it, as they had been doing for years; and, finally, that the Government gives occupation of its mineral lands for an indefinite period free, or grants absolute title at a price which does not pay for administration, I must consider this particular argument in favor of the Leadville survey very thin. But so far as it goes, it covers Mr. Guyard's work as well. What is the "value" of the ore deposits which may be properly "demonstrated" by Government monographs? Their gross contents, in this or that metal? Is it not rather their *net* value, after they have been reduced to useful forms? Does not an intending purchaser want to know how much the property will pay? Does he not inquire how and at what cost it can be made to pay anything? May not the agent of the vendor, besides giving estimates of gross value, properly add a description of the present methods of working, and even a suggestion or two as to scientific theories and possible improvements and economies? Mr. Emmons, with the aid of surveyors, draughtsmen, geologists, palaeontologists, lithologists, microscopists, chemists, and assayers, prepared an admirable treatise, dealing with the history of the Rocky Mountains, the continental uplift, the distribution of volcanic and sedimentary rocks of all ages (whether they contained ore deposits or not), views of scenery, records of past mining operations, and interesting theories of the genesis of the ore deposits, as well as underground plans and sections, compiled from the maps of private proprietors. It was important work, well done; and, once undertaken, it was right to do it so well. But Mr. Guyard's few pages are properly a part of it; and to the practical "value" of the ore deposits, or the promotion of land sales, they are more directly pertinent than the geological and chemical theories, the "demonstrations" of value past and gone, or the maps of private property, which constitute the greater part of the report. Your test is a bad one; and your application of it is worse.

But the question of the continuance of Government aid for timber tests has other aspects. The apathy and ignorance of the public and of Congress regarding our national timber supply and its rational management have been notorious. Not only have the forests on the public domain been plundered for private gain, or still more widely and wickedly wasted by conflagrations due to recklessness or malice; not only have the wholesale operations of lumbermen exhausted vast areas in such a manner as to prevent, unnecessarily, their natural reforestation; not only

have these acts of "self-reliant" citizens brought the nation within measureable distance of an actual scarcity of timber for its own use; they have also altered the regimen of rivers, destroyed water powers, injured the productiveness of soils and subjected populous valleys and great cities to destructive floods. If the spectacle of a whole country, thus hastened by self-reliant sawmillers toward the fate of Persia and other treeless wastes, does not justify some action on the part of the Government, pray admit that it is the duty of the Government, particularly if it can do so by mere publications, to persuade the said citizens not to drown its public buildings and official records.

Within the last few years this great evil has been opposed by the excellent method of public spirited agitation. "Arbor-day" has been established, as a somewhat feeble sentimental protest, and an object lesson for school children. Here and there land owners have voluntarily determined, or public reservation laws have decreed, that on certain tracts the forests should be let alone—as if letting them alone, instead of making them continuously productive, were "forestry!" This vague and scattered, though wholesome and growing public movement, needed an instructor, organizer and leader. Such a man came to the front in Bernard E. Fernow, a scientific forester, trained in the best European school, yet entirely free from the desire to enforce European systems of administration in this country. With unwearied activity and admirable tact, he has shaped an inchoate public feeling into an intelligent, organized public movement. Accepting a subordinate place in the Government service, and hampered at every step by the lack of means to accomplish widely useful work, he has gradually won universal recognition, not only of his own ability but of the usefulness of his department, and not through lobbying or newspaper puffing, but through publications which have proved instructive and useful to the people. He is still trying (not now quite single-handed) to influence public and congressional feeling so far as to secure some small protection, at least, for public forests, and some general acceptance of more rational forest management by private owners. As means to this end, he has published in successive bulletins much valuable information concerning American timber and its uses; and has begun (with private aid) a series of really accurate and really comparative tests of timber. This series he desires to finish. Whereupon the ENGINEERING AND MINING JOURNAL jumps upon this struggling little enterprise for the public good, and says the citizens or the railroads or the engineers ought to do this thing. What citizens? The "self-reliant" ones, who are cutting down trees as fast as they can, and pocketing the proceeds? What railroads? What engineers? Does not the JOURNAL know that railroads and engineers and individual scientists have tried to do this thing repeatedly, and that the results have been practically worthless? But public-spirited citizens propose to try again, and need the aid of the Forestry Division, not to build a laboratory, or buy a machine, or establish a great scientific annex, but simply to select intelligently the samples of timber, send them to the private testing laboratory and publish the results. These results will, as you admit, be of unprecedented value to engineers and builders. They will also furnish to Congress useful information as to the value of the varied timber resources directly owned by the nation. It is even conceivable that Congress might be led, as the trustee in charge of this property to act as an individual trustee would act—namely, make distinctions between the more valuable and the less valuable, sell at different prices, protect with different degrees of pains. But whatever might be the result in administration, it is surely right that the knowledge which might determine that result should be acquired.

Beyond this consideration there remains the great fact—really equal, one might say, to a "broad principle"—that the profoundest peril threatening the United States to-day lies in the wanton waste of timber: that the greatest difficulty in the way of reform, next to the short-sighted greed of the "self-reliant" citizens, is the ignorance of the rest; that the only means of meeting this difficulty, under our system of government, is the spread of information; and that the only agency promising to achieve practically useful results within the period left for action is the United States Forestry Division, which is to-day the center of life for the whole forestry movement in the country. It is vitally important to convince our people that forestry is not a humbug; that the work of this bureau is useful to the Government and to the citizen. And it is simple justice to confess that Mr. Fernow's publications, instead of checking private enterprises, have notably and always inspired it. Individuals everywhere are doing more, not less, because of the stimulus and guidance he has given them. And he is a shining example of a public official who has never asked the Government to do what he could persuade private enterprise to undertake. The ENGINEERING AND MINING JOURNAL is not consistently or worthily employed in obstructing such a cause, and discouraging such a man, by opposing the continuance of a good work, already in progress, for which he has succeeded in securing the co-operation of private citizens. In short, you have chosen the wrong time and the wrong victim. "Broad" as your principle may be, it does not cover this case.

NEW YORK, April 27th, 1892.

R. W. RAYMOND.

Thomas Steel in Bridge Construction.—Thomas steel has achieved a most remarkable victory over the Martin-Siemens steel in bridge construction, says the *Revue Industrielle*. The directors of the Bromberg railway being about to build a very large bridge over the Vistula, near Fordon, initiated an extended series of experiments upon the two metals. The result of more than 1,700 experiments decided them to use the Thomas steel, furnished by the Rothe-Erde Works, of Aix la Chapelle. As this bridge will be the longest of any railroad bridge in Germany, the decision of the directors is of great importance.

Oil as Fuel on Russian Railways.—The use of naphtha and naphtha residues as fuel on the Russian railways has increased enormously in late years. Wood is still the chief combustible used, forming nearly 35% of the whole but its use decreases year by year as the use of naphtha and foreign bituminous coal increases. In 1881 there were used by the railways 1,446,470 cords of wood, 6,072 tons of charcoal, 991,203 tons soft coal, 2,805 tons coke, 60,885 tons turf-peat and 1,914 tons of naphtha. In 1890 there were used 1,563,353 cords of wood, 6,484 tons of charcoal, 1,244,737 tons soft coal, 5,923 tons coke, 51,678 tons turf-peat and 291,307 tons of naphtha and naphtha residues.

THE ASSAY OF ORES OF ANTIMONY.*

By Ad. Carnot.†

As antimony has recently met with novel applications, the working of its ores has become much more active than heretofore. It has been complained, not without cause, that the assay of its ores by the usual processes of the dry way gave results very inaccurate and fluctuating in the hands of different operators. I have ascertained that the losses, always exceeding 8% rise frequently up to 20 and even beyond 30% of the true quantity, especially in poor ores.

After having made some attempts to diminish the losses by the dry process, which are always considerable on account of the volatility of antimony, I have studied a different method, the results of which have been much more satisfactory, and which on this account it seemed useful to make known.

The method consists, in principle, in dissolving the antimony in hydrochloric acid, in precipitating it with tin and weighing it in the metallic state. I indicate the precautions to be taken for sulphuretted ores, for oxides, and for those containing iron or lead.

1. *Sulphuretted Ores.*—We take from 2 to 5 grms. of the ore, according to its supposed percentage, so that we may operate upon about one grm. of metallic antimony. We attack it in a small flask with from 50 to 60 cc. of concentrated hydrochloric acid, heating in the sand-bath, but not up to ebullition, so as to avoid losses by projection.

When the action seems to make no further progress we decant the clear liquid through a filter, adding in its stead a new quantity of acid, and resume the heating in the same manner until the sulphide is entirely dissolved. The acid is renewed once again, adding 1 or 2 drops of nitric acid to complete the attack, heating to 100° and then washing the insoluble gangue with acid diluted with water.

The liquids decanted through the same filter are mixed with an equal volume of water; a blade of tin is introduced and heated to 80° or 90°. The precipitation begins at once, and for 1 grm. of antimony it is completed at the end of about 90 minutes.

The precipitate is washed by decantation, replacing the liquid by dilute hydrochloric acid to remove salts of tin and others derived from the attack and the precipitation. The metal is brought upon a weighed filter, washed for some moments with hot water, and lastly with a little alcohol. The metallic antimony is then dried at 100° and weighed upon the same filter. If the operation is thus conducted there is neither loss nor appreciable oxidation.

The percentage of antimony is thus determined accurately in a short time. In several experiments made with stibine mixed with quartz I found that the variations were ordinarily quite minimal, and at the most did not exceed 1 cm.—that is, 1-100th of the true percentage of the ores operated upon.

2. *Oxidized Ores.*—The oxides of antimony, often mixed with sulphides not as yet perfectly transformed by atmospheric agents, are sometimes attacked with great difficulty by concentrated hydrochloric acid. We are then exposed either to notable losses by volatilization or to an incomplete solution of the antimony.

I thought that we might easily convert the oxides into attackable sulphides by heating them very gently in an atmosphere of hydrogen sulphide, according to the method which I formerly proposed for the production of metallic sulphides (*Comptes Rendus*, 1879, July 21).

The ore, in very fine powder, is put into a small flat-bottomed flask, in which the quantity of from 2 to 5 grams. forms a light layer permeable to gases. We cause an elbowed tube to descend almost down to the level of the ore, securing it in its place by means of a cork resting in the neck of the flask. Through this tube there is passed a current of dry sulphuretted hydrogen. The flask is placed upon wire gauze at the height of 4 or 5 cm. above the flame of a Bunsen burner with its rose so that the temperature may not exceed 300°, not producing any volatilization of the antimony sulphide. The ore remains pulverulent, and is pervaded with hydrogen sulphide, which acts at once as a reducing agent and as a sulphurizer. The surface is renewed from time to time by shaking the flask. There is produced a little vapor of water and sulphur, which condense on the upper part of the sides. The conversion is complete in an hour. When cold the sulphide is attacked with concentrated hydrochloric acid in the same flask. The precipitation and weighing are then effected as in the former case. Experience shows that the quantity of antimony remaining undissolved is quite insignificant.

3. *Ores Containing Iron or Lead.*—It often happens that antimony ores contain iron, not only in the state of oxide or of pyrites, but also as ferrous sulphide combined with antimony sulphide, and soluble together in hydrochloric acid. Its presence, even in important quantity, does not interfere with or complicate the process. The presence of zinc, which is very rare in these ores, occasions no difficulty.

Lead, as sulphide or as oxide, is found in some varieties of antimony ores. It dissolves in hot concentrated hydrochloric acid; its chloride may partly crystallize out during the cooling of the liquid, but another portion is deposited on the sheet of tin and renders the weight of the antimony excessive.

We may easily detect the presence of lead in the precipitate, and even determine its quantity by converting it into sulphide by means of a solution of yellow sodium sulphide (prepared by boiling the monosulphide with flowers of sulphur). If we heat the metallic powder to 50° or 60° in the solution of polysulphide, the antimony is rapidly dissolved, and the residue of lead sulphide is washed, dried, and weighed. Eight-tenths of the weight of this sulphide represents the corresponding weight of the metallic lead, but as the lead generally undergoes oxidation during drying the quantity may be estimated practically at nine-tenths the weight of the lead sulphide. This is then the correction to be made.

The New Geological Map of Spain and Portugal.—The geological map of the Peninsula, to the large scale of 1 = 400,000, to make which a geological survey was established some years ago, is at last so near being completed, says *Industries*, that out of the 16 sheets of which it will consist there are now 13 already on sale, while the three remaining will be ready before the end of the spring.

*From *Comptes Rendus* cxiv., p. 587 through *Chemical News*. †Director of the Ecole des Mines in Paris.

QUANTITY OF REFUSE IN ANTHRACITE COAL BEDS.

Written for the Engineering and Mining Journal by William Griffith, M. E.

Having found it necessary during some recent investigations to ascertain the approximate amount of refuse contained in the coal seams of the Northern anthracite field, I find that the data I have collected contain interesting information which may be valuable to others and worth publishing. It is presented in tabulated form below.

NORTHERN COAL BASIN.—SCRANTON DISTRICT.

Names of Coal Beds.	No. of Bed Sections.	Aggregate Thickness of beds in feet.	Aggregate Thickness of refuse in feet.	Percentage of refuse.
Diamond Bed.....	6	42'25	7'2	16'1%
Rock Bed.....	5	36'70	5'2	14'2%
Big or G Bed.....	7	110'0	19'0	18'2%
New County Bed.....	6	57'0	13'1	23'0%
Clark Bed.....	9	76'77	13'0	17'0%
Total.....	33	322'72	57'5	17'8%

PITTSSTON DISTRICT.

Checker or 7-ft. Bed.....	1	7'0	0'75	11'4%
Pittston or 14-ft. Bed.....	5	47'9	6'2	13'1%
Marcy Bed.....	6	44'3	10'7	24'5%
Four Foot or Fourth Bed.....	4	31'9	5'4	17'3%
Red Ash Bed.....	12	107'4	20'0	18'6%
Total.....	28	236'5	43'05	18'4%

WILKES-BARRE DISTRICT.

Kidney and Abbott Beds.....	6	34'9	4'0	12'0%
Hillman Bed.....	7	56'8	4'6	8'0%
Baltimore Bed { Cooper.....	12	101'7	17'3	17'0%
Bennet.....	14	105'2	18'9	18'0%
Ross Bed.....	11	105'5	21'2	20'0%
Red Ash Bed.....	11	189'9	49'9	26'0%
Total.....	61	593'8	115'9	19'4%
General average for the three districts	122	1,153'02	216'45	18'7%

PANTHER CREEK BASIN, BETWEEN MAUCH CHUNK AND TAMAQUA.

Mammoth Bed.....	17	758'5	134'1	16'4%
Red Ash Bed.....	11	126'9	28'5	20'8%
Total.....	28	885'4	162'6	18'3%
Grand average for the two coal basins	150	2,038'42	379'05	15'6%

The beds are arranged above in the relative positions they occupy in the measures, lowest beds at bottom of the column and the highest ones at the top.

To facilitate the comparison of these columns of percentages we will place them side by side, arranging them according to their probable relative positions with the measures.

Scranton.		Pittston.		Wilkes-Barre.		Mauch Chunk Tamaqua.	
Beds.	P. c. refuse.	Beds.	P. c. refuse.	Beds.	P. c. refuse.	Beds.	P. c. refuse.
"Diamond".....	16'1	"Checker".....	12'0	"Kidney & Abbott".....	12'0	"Mammoth".....	16'4
"Rock".....	14'2	"Pittston".....	13'1	"Hillman".....	8'0	"Red Ash".....	20'8
"Big".....	18'2	"Baltimore".....	17'3	"Cooper" 17'3	17'3		
"New County".....	23'0	"Marcy".....	24'5	"Bennet" 18'9	18'9		
"Clark".....	17'9	"Four-Foot".....	17'3	"Ross".....	20'0		
"Dunmore".....	17'8	"Red Ash".....	18'6	"Red Ash".....	26'0		
Average.....	17'8		18'4		19'4		18'3

Now while the beds in these different districts of the Wyoming and Lackawanna coal fields have not been connected by mining operations, there is not much doubt as to the identity of the beds throughout the region; for example, the names "Big," "Pittston" and "Baltimore" are generally supposed to be locally applied to the same coal bed in the same way the bed known as New County at Scranton is generally supposed to be the same bed as the Marcy seam at Pittston and the Ross at Wilkes-Barre.

By inspecting the results in the above list of percentages, we at once notice that the New County, Marcy and Ross beds show in each district very large percentages of refuse, thus tending strongly to prove their supposed identity. It is also noticeable, so far as the above data are concerned, that the lowest beds in the column contain the most refuse, while those which are higher in the measures have the least; in other words, the oldest or first formed beds contain the most refuse. This at once suggests the idea of a general law to this effect, in which event the bituminous coal beds, which are supposed to be of later origin than the anthracite, should also carry a smaller percentage of refuse. The opinion of the writer, after much experience in this line, is that the bituminous beds examined by him have as a rule contained less refuse than anthracite beds of the same thickness.

The above would seem to open a field for future investigation, and similar data to the above with reference to bituminous coal, as well as to anthracite, would be valuable.

Production of Mercury in 1891.—A circular of MM. Sargant & Son, gives the following information regarding the world's production of mercury in 1891: Austria produced nearly 150,000 flasks, against 14,000 in 1890. Italy, 10,440 flasks, against 12,470 in 1890, and 10,498 in 1889; Spain, 47,993 flasks, against 50,202 in 1890, and 49,778 in 1889. The figures given for the Austrian mines are from January 1st to December 31st, but those for Italy and Spain from November to November. Russia, in 1889 produced 4,822 flasks, in 1890, 8,000 flasks. The figures for 1891 are not yet obtainable. Our Statistical Number gave the production of the United States as 21,022 flasks in 1891, against 22,926 flasks in 1890. Mexico, Borneo and Chili also produced a little mercury.

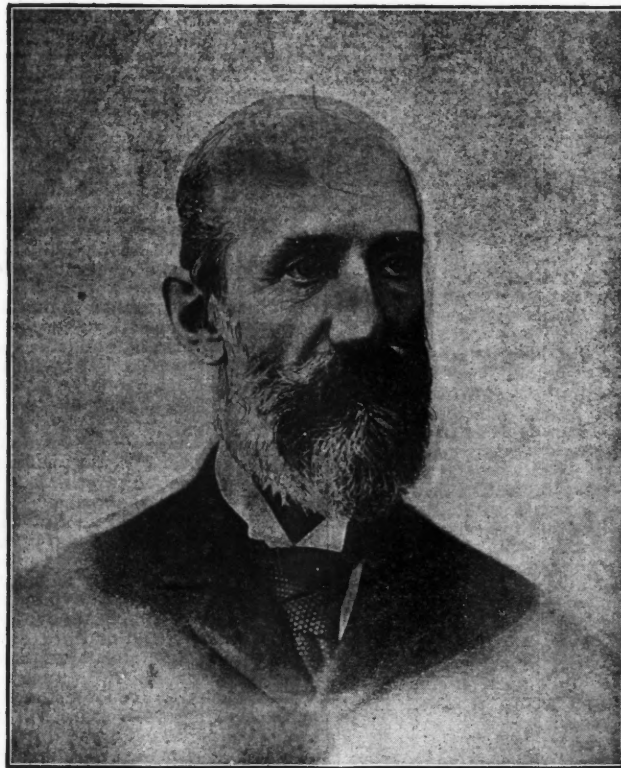
WILLIAM POWELL SHINN.

A telegram received from Pittsburg announces the death of William P. Shinn, ex-president both of the American Institute of Mining Engineers and of the American Society of Civil Engineers, and one of the most widely known and highly esteemed members of either society.

For the following brief outline of Mr. Shinn's professional career and for the accompanying portrait we are indebted to the courtesy of the *Engineering News*.

William Powell Shinn was born in Burlington, N. J., May 14th, 1834. He was the past president of the American Society of Civil Engineers and of the American Institute of Mining Engineers. He began his professional life as a civil engineer in 1849, and was at first engaged in making surveys for county maps in Massachusetts and Rhode Island. In May, 1850, he entered the service of the Ohio & Pennsylvania Railroad as a rodman. He rapidly passed through the intermediate grades and in August, 1852, was appointed an assistant engineer in charge of a division of the road, and in April, 1853, he became principal assistant engineer in charge of the location and construction of 83 miles of the Ft. Wayne & Chicago Railroad. "In February, 1855, he practically abandoned the active practice of railway location and construction, and began to occupy himself with the details of traffic and general management of railways. On the date last mentioned he took charge of the freight department of the Ohio & Pennsylvania Railroad Company, and from October, 1856, to September, 1861, he held various responsible positions in the accounting department of the

1881, ix. 293); "The Distribution of Steam in Cities" (1884, xii., 632); and "The Genesis of the Edgar Thomson Blast Furnaces" (1890, xix. 674). But these published papers by no means represent the amount of his unselfish labors for the benefit of this society or of the professions which it represented. His peculiar ability, developed in wide and various experience as a railroad engineer and manager, as director of the Edgar Thomson steel works, and in the difficult and novel business of the New York Steam Company (to mention no others), was in organization and control of complicated undertakings. He was a distinguished representative of the men, developed in modern civilization, who have been felicitously called "Captains of Industry"; the men who are both rare and indispensable for the conduct of the vast aggregated enterprises toward which commerce and industry are irresistibly tending. In 1890, the Institute of Mining Engineers and the societies and trades co-operating with it in the reception of the Iron and Steel Institute and other foreign guests, needed just such a man; and Mr. Shinn, in response to their call, leaving the positions of less laborious, but more conspicuous service to be filled by others, accepted the chairmanship of the Sub-Committee on Transportation of the General American Reception Committee. The arduous, vexatious, exhausting and unremitting labors of that position cannot be adequately described. Their results in the unprecedented excursions of more than 500 guests, over thousands of miles, extending from Lake Superior to Southern Alabama, and keeping several Pullman trains in continual use for weeks, and securing not only the collective safety, but also the individual comfort of the travelers, have been the topic of general wonder



THE LATE WILLIAM P. SHINN.

Pittsburg, Fort Wayne & Chicago Railroad Company. In September, 1861, he took charge of the passenger department; in September, 1863, he was made superintendent of the passenger department, and in October, 1865, he was made the head of the freight department.

"When the Pennsylvania Company was organized, Mr. Shinn was appointed as an expert to examine the affairs and conditions of the various companies interested in the lease to the Pennsylvania Company. From May, 1871, to May, 1873, he had charge of the construction of the Ashtabula, Youngstown & Pittsburg Railway Company, and in 1873 he became president of that road. In 1874 he was vice-president of the Allegheny Valley Railway Company.

"From January, 1873, to October 1, 1879, Mr. Shinn became the managing partner of Carnegie, McCandless & Co., and had charge of the building and operating of the Edgar Thomson Steel Works. In 1879-80 he reorganized the Vulcan Steel Company, of St. Louis, and rebuilt and started these works. From 1881 to 1887 he was vice-president of the New York Steam Company, for the distribution of heat by steam through the streets of New York. From December, 1886, to December, 1889, he was vice-president in responsible charge of the New York & New England Railroad Company, and in 1888-89 he was president of the Norwich & New York (steamboat) Transportation Company.

"Mr. Shinn was elected a member of the American Society of Civil Engineers on September 15, 1869, and on January 15, 1890, he was made its president. In 1875 he was elected a member of the Institute of Mining Engineers, his leading proposer being Alexander L. Holley. In 1876 and 1877 he was one of its vice-presidents and in 1880 he was elected president."

His contributions to the *Transactions* comprise, besides remarks in discussion, the following papers: "Pittsburg, Its Resources and Surroundings" (1879, viii., 11); "The Advance in Mining and Metallurgical Art, Science and Industry since 1875" (Presidential Address, February,

and praise. To those who knew that in the midst of the preparations for those intensely busy weeks, Mr. Shinn was overwhelmed by the greatest sorrow that could befall him, in the death of his tenderly beloved wife, from whose grave he turned to resume the work from which, at that late stage, he could not be spared without disaster, the spectacle of his unwearied zeal and efficiency was all the more impressive. I remember feeling more than once, as I watched him during that period, that there was something unnatural about his vigilance and industry—the wakefulness, as it were, of a man who could not sleep; the activity of a man who did not dare to cease from work, because rest was something worse; the patience of a man to whom all earthly disputes and disappointments had become infinitely trivial; the grim determination of a man resolved to carry through, for the sake of others, the work he had in hand, and hoping then, please God, to be permitted to die.

He did carry it through to the grateful admiration of all. It is pleasant to remember that our friends from abroad recognized by appropriate testimonials the marvelous executive ability which had done so much for their convenience and comfort, and that Mr. Shinn's American colleagues were not backward in confessing their debt to him for the one feature which made the international meetings of 1890 unique.

Nor did he, this work having been done with desperate energy, lie down and die. He stood yet, in manly fashion, like the warrior king of old, in the battle chariot; but the arrow had pierced his heart, and now he has fallen in his harness, a valiant soldier to the last! Had he been spared to us yet longer, he would have done good work still, for it was never in him to be idle—least of all in these last days, when labor was the best consolation of his loneliness. But I cannot doubt that after his life of duty well done it was no misfortune for him to be called to the higher sphere where death can no more strike at love, and labor and rest are one.

R. W. R.

THE PATIO PROCESS MODIFIED.

Written for the Engineering and Mining Journal by Ernest duB. Lukis, A. Soc. M. Inst. C. E.

The patio process used in the amalgamation of silver ores has been very little changed since the days of the priest Alonso Barba, who wrote his experiences and published them in the year 1640. Speaking of the mines of the "imperial city of Potosi" (Peru) he says, "the glut of riches hath been the reason why they have not applied the care that was requisite to prevent loss and waste in the refining of ore, which, speaking with moderation, hath been the loss of many millions;" and so it is with us at the present day, but with all that Barba taught his co-temporaries we have yet to find out how the "loss of millions" can be avoided. We look at financial results as the end to be attained and correctly so, but this is often done at the loss of quantities of silver and mercury amounting annually to millions and in countries where all commodities and stores are scarce and costly, we can only get a profit out of rich ores, leaving silver in the tailings and sacrificing much mercury in the reduction.

There are a number of mineral deposits so situated that the transport of heavy machinery to the mines is almost an impossibility, and in many such places, provided that the climate permits it, the patio process of amalgamation is the most convenient. It is, however, a costly and slow process; so much so that in the majority of cases it does not pay to treat ores of \$30 assay value. These difficulties have led to the research of a modification in the process, and with what success will be here described. The modifications, to be better understood, must be compared with the process used in some parts of Mexico, which will be first explained.

The ore is first reduced to a fine powder by stamps or other crushing mill and passed through a 60-mesh screen (dry). It is then transferred to the patio (hence the name of the process), which means a court yard paved with stone or laid with 2½-in. planks, in a *torta* or cake about 6 in. in thickness, and from 50 to 75 tons in a cake. It is then wetted (without previous roasting) and horses tread the pulp into a soft paste. Salt is then added, 2½% to 7%, according to the richness of the ore. This is an important item in the cost of the process when, as in some parts of Mexico salt costs \$100 per ton. The following day sulphate of copper (blue stone) is added, but the quantity is small, and it is not expensive, though it is a very important ingredient, as upon the quantity added depends the successful amalgamation of the silver contained in the ore. The third day the quicksilver is added in the proportion of 4 oz. per ounce of silver in the cake, according to assay.

The process of amalgamation proceeds slowly for from 20 to 60 days turning over, spading, and treading with animals (horses or mules) the cake every two or three days, adding requisite quantities of sulphate of copper from time to time, also a further two ounces of mercury per ounce of silver after the first four ounces have become amalgamated. Eight men and 16 horses or mules are required for this work that may be employed one day for one *torta* and another for another *torta* in the same mill. This is expensive and slow work, leaving a quantity of capital idle for a length of time and giving unsatisfactory results, the average yield of the process being not more than 75% of the assay value. The loss of quicksilver is equal to one and a half times the weight of silver bullion obtained and due to two causes: one, the *consumido*, or unavoidably consumed quantity equal to the weight of silver extracted; the other, the "mechanical loss" or unexplained loss amounting to half as much again. The above short description of the patio process will be sufficient to introduce and explain the modifications made and described in this article.

The ores experimented upon gave the best result when of the rebellious class, that is to say, antimonial and arsenical sulphides of silver, together with ordinary sulphides and some chlorides of silver. In the first place the ore is to be roasted instead of going direct to the patio after crushing, but this is not an ordinary roasting that would entail an extra expense. Only 10, 12 or 20 minutes were necessary according to the class of ore under treatment. Silver ores will not bear much roasting in presence of salt without losing a notable quantity of silver by volatilization in the form of chlorides of silver, but with this quick roast there is not over 1½% to 2½% loss. Roasting with salt for ordinary chlorination will cause a loss of 4% to 7% silver. The object of roasting is to merely give a quick start to the ordinary patio process and comparative trials have proved the benefit to be derived therefrom. It is not desirable to roast "sweet," but only to break up the molecular affinity of the particles of mineral by heat, so that in the after chemical process the progress is hastened, labor, time and money being saved.

Now, it is not sufficient to do this (roasting) only, and the most important part of the modification was called for at this point. If roasted ore is treated by the ordinary patio process it will not "work;" the quicksilver gets "hot" at once and nothing can be done with it, but by a careful use of hyposulphite of soda there is no difficulty and this is the latest innovation. Further, it is now possible to arrive at the quantity of sulphate of copper that will be required to beneficiate the cake from the start, which saves much time and reduces the treatment by patio very nearly to a certainty. To avoid the usual loss of quicksilver it has been found that the extraction of the silver by amalgamation can be advantageously stopped before the difficulties of the patio process commence, and this is explained as follows: It is impossible to concentrate silver ores in the way that galena, blende or copper pyrites may be concentrated. In the case of silver, so much goes away in the fine slimes that there is great loss, but that very portion, the finest particles, the native chlorides, etc., that are not adapted to concentration forms that portion which is most easily amalgamated and, on the other hand, the heavy concentrates are the most difficult to convert into silver amalgam by contact with mercury. It was thought that two-thirds, or about 66%, of the assay value might be first quickly extracted by the patio process leaving the stock of quicksilver exposed to loss in the "cake" for less time, then wash out the amalgam in the usual way and immediately concentrate the rest to collect as much as possible of the remaining 30%. The results were very satisfactory; in one instance 92% of the assay value was saved, but 85% would be considered satisfactory on a large scale in most mills.

The experiments have been conducted in the following manner: The ores taken were of a mixed class. One-third of the silver being in the state of antimonial or ruby silver, the remainder mostly as silver glance, but with pyritiferous silver ore and some chlorides. The assay value was \$50 per ton. The heavy minerals amounted to about 10% or 15% of the

whole. It is impossible to get out more than half the silver by concentration, as most of the silver lost goes away in the slimes. The ores were stamped dry to pass a 60 mesh screen and roasted in an ordinary reverberatory furnace, with a hearth 3 ft. x 6 ft. The temperature was raised to a good red heat. Charges of 400 lbs. were mixed with 2½% of salt, spread over the hearth, and kept gently stirred with a rabble. Eight minutes after charging a sample was taken out, and washed in the *tentadura* bowl or assay horn to show the color of the concentrates, and it is by the color that the calciner knows when to stop the roasting. When sufficiently roasted, which does not in any case take more than 20 minutes, the charge is quickly withdrawn, and another let down into the furnace. The roasting would be more uniformly done in a revolving furnace of special construction. The hot ore is allowed to remain in a pile until the next day, and then taken out to the patio, moistened with water and trodden by mules or horses into a soft pulp, together with an addition of ½% of salt. This being done in the morning, sulphate of copper can be added three or four hours later. The required quantity varies with the ores of almost every district, and can only be ascertained by experiment, but in the present case 17 grammes per 25 lbs. were found to be the right quantity. This being trodden into the pulp the "cake" is left until the next day.

Early next morning a "guide" is taken from the "cake" by a peon who walks across the cake in two diagonal lines taking small portions of the pulp here and there, accumulating 100 lbs. (dry weight) as nearly as can be guessed. This is placed in a corner of the patio and divided into four portions of 25 lbs. each, to each of which different quantities of sulphate of copper are added, say 1, 2, 3 and 4 grammes respectively. Assays of each are taken in turn commencing with the pulp of the cake itself and mixed up with a globule of mercury, in the *tentadura* bowl or assay horn, and finally washed, when the action of the sulphate upon the mercury will be seen by the color of the mercury which should remain bright and quick. In this way sulphate can be added in small quantities to the "guide" until the mercury shows a trace of "heat," i. e., becomes discolored and leaden in tone, which indicates that a gramme too much per 25 lbs. has been added, so that the amalgamator now knows that he may add a quantity equal to one, three or five grammes per 25 lbs. of the "cake," as the case may be. Done with care and patience, this should be a sure guide as to the total quantity of sulphate that the "cake" can stand, according to the class of ores received at the mill, but variable in each mill and district.

If the process were now continued as with raw ores the mercury would become very "hot" by the next day, and soon not work at all, that is to say, become dirty in appearance and cease to form silver amalgam. To avoid this trouble hyposulphite of soda has been employed and found to act perfectly well. It also helps to hasten the process owing to its powerful action upon silver compounds. It must, however, be used with great care, the quantity being found by trial for determined mixtures of ore, and upon this depends the success of this modification of the patio process; roughly speaking, half an ounce per 100 lbs. of pulp will be sufficient; a large quantity would destroy the mercury.

Having decided upon the additional quantity of sulphate of copper (blue stone) that can be added on this, the second day, and having trodden it into the pulp thoroughly, the hyposulphite of soda may be added and trodden in in the same way, and immediately after it the mercury should be sprinkled over the cake and trodden in, in such proportion as to take up by amalgamation two-thirds of the assay value, or 4 oz. of mercury per ounce of silver in the "cake."

The next day, or second after incorporating the mercury, treading with horses, spading over and taking assays will be all that is required, unless it is found that a "guide" of 25 lbs. can stand an addition of sulphate of copper. This should not be necessary if the quantity be properly determined before adding the hyposulphite. More than half the mercury will be converted into amalgam by the evening.

The following day, or third day after incorporating, the same work is required, paying more attention to the assays, adding sulphate of copper, if necessary, and by the evening more than three-quarters of the mercury will be taken up. The fourth day the treading, etc., again go on, and by the evening the mercury will be all converted into silver amalgam, and should be bright and dry and free from a straw color that indicates loss of mercury. The next morning the *bano*, or bath, is added; that is, about 1½ ozs. of mercury per ounce of silver in the cake, which acts to collect the fine amalgam. This has to be quickly done, and the washing of the pulp follows immediately. The amalgam is collected, pressed, retorted and bullion melted down in due course as generally done in the ordinary patio process. This takes out that portion of the silver that cannot be concentrated, and it is found easy to concentrate the remainder by ordinary machines (frue vanners, etc.), obtaining two grades, if necessary, the first assaying 1,500 ozs. and over per ton and the second grade 40 ozs. to 60 ozs. of silver per ton. The waste is then too poor to be treated again. These trials were made with an average temperature of 70° F. in the shade.

The loss of mercury, including mechanical loss and the *consumido*, is equal to about 18 ozs. for every 16 ozs. (1 lb.) of silver, as compared with 22 ozs. to 24 ozs. lost in the ordinary patio process. Ores containing gold do not lose it by volatilization during the short time that the calcination is carried on, and it is collected partly during the course of the process on the patio and partly in the first grade of concentrates obtained afterward. The cost of working a ton of ore of the assay value of \$50 is estimated at \$6.20, extracting 85% of the silver. The proportion of gold extracted has not been estimated.

Use of Primitive Crushers.—The crude crushers used in Corea as described by Williard Ide Pierce in the Transactions of the A. I. M. E., are in use in portions of Central America, particularly in Honduras.

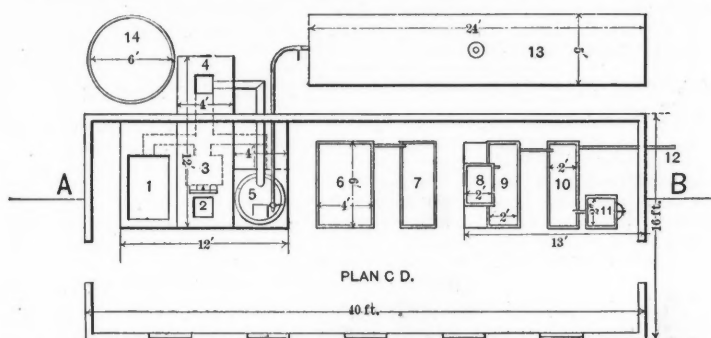
Occurrence of Bismuth with Silver.—The silver ores of the Canda mefia mine, of Chihuahua, Mexico, according to *El Economista Mexicano*, carry a considerable amount of bismuth, the percentage of which varies with the richness in silver. In the richer ores, known as refining metals, which at times contain as much as 20% Ag., the bismuth has been known to reach 15%. One of the peculiarities of this ore is that no mineral of bismuth is visible in it. The silver itself is carried in tetrahedrite, only slightly cupriferous, however. The ores are worked at present by chloridizing roasting in a reverberatory furnace, 2 oz. of salt being added to the ounce of silver in the charge.

PARTING BULLION.

Written for the Engineering and Mining Journal by F. Gutzkow.

In the ENGINEERING AND MINING JOURNAL of February 28th, 1891, I gave a description of my improved process for parting bullion. Since then the process has been introduced into practice and it will perhaps interest the metallurgical readers of the ENGINEERING AND MINING JOURNAL to read a more detailed account of the apparatus and the manipulations. The principal works which have adopted my method are those of the Consolidated Kansas City Smelting and Refining Company, at Argentine, Kan. The general manager of that prosperous and progressive concern wrote me under date of April 5th, 1892: "Your process works regularly and with best success, the refining costs being 0.35 cents per ounce." Considering that at Argentine the wages of the men employed at the plant are \$3 and \$4 per day and the cost of sulphuric acid 1½ cents per pound I have no doubt that elsewhere refining may be done at 0.25 cents per ounce; parting charges average 1 cent per ounce in the Eastern half of the United States and 2 cents per ounce in San Francisco, so the pecuniary advantage is apparent. Owing to the low price of silver it has become desirable for many small smelting works in this country and in Mexico, and probably elsewhere, to economize in the cost of marketing their silver. I have repeatedly been called upon to prepare plans for parting plants treating not more than a few thousand ounces of silver per day. In the following I propose to describe the plant and the operations of one of those small establishments having a maximum capacity of parting, say, 6,000 ounces of doré in the day-shift. Fraser & Chalmers in Chicago construct such works after my plans and specifications and undertake to put them in operation to the satisfaction of their customers. Fig. 1 shows the plant in top-view and Fig. 2 in section.

1. *Parting.*—I shall assume that the bullion is of the common high grade character, containing 90% or more of silver. It may be placed into the kettle in the shape in which it leaves the mill or smelting works; that is, as retorted amalgam or in large and irregular bars as they are ladled from the cupelling furnace, or in slabs of more uniform size and thickness if the bullion is remelted in order to charge it to the parting works by weight and assay. The charge may vary according to local convenience, the maximum being about 400 lbs. of doré. The commercial sulphuric acid is admitted into the kettle by gravitation from the wrought iron drum

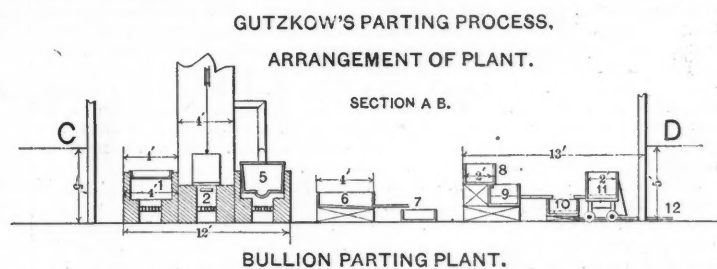


The proximity of 6 to 5 has the advantage that only a short siphon is required.

2. *The Gold.*—The residue in the kettle contains, besides silver solution, the gold and the insoluble sulphates of iron, lead, antimony, mercury, etc., together with sulphate of copper, if the bullion contained more than a certain amount of this, and sulphate of silver, if the heat has not been well regulated. It is ladled into a portable copper kettle (the solution settling therein is poured back into 5), which is carried to the lead-lined tank 8. Here it is emptied and the contents ore boiled with water until the sulphates soluble in water, viz., those of iron, copper and silver, have dissolved. The fairly settled solution runs on the "gold filter," which is a piece of cotton cloth spread over a false bottom in the tank 9. The filtered solution finds yet a chance to settle underneath the false bottom and overflows into the "silver filter" 10. The gold is brushed and washed through a pipe toward which the bottom of 8 pitches from all sides into a large earthen dish resting on the cloth of 9. In this dish it is stirred with hot water and decanted over the cloth until the insoluble sulphates have been washed off and the gold is left bright and clean. It is then scraped into a smaller dish and delivered to the superintendent to be melted in the assay office when sufficient weight has been accumulated for a commercial bar.

Of course, it will be just as well or better to deliver the copper kettle with its acid contents to the care of the superintendent and to make one job of the washing of the several batches of gold when there has been enough collected. The cloth on 9 is scraped and sponged into an earthen jar, and, after settling, is decanted back on 9. The stuff collected is occasionally dried and melted with the fluxes from melting the gold and silver into a button. The appearance of the latter decides whether it can go at once into the parting kettle or is to be cupelled with addition of some lead in a bone-ash cupel stamped into a worn-out crucible and heated in the melting furnace.

3. *The Silver.*—The great bulk of the silver is stored in the hot solution which stands in 6, about 6 in. high, when the plant works to its maximum. Steam is now blown in and the solution is tested for sufficiency of dilution in the manner fully described in my previous article. The diluted acid, which is caught in the leaden condenser-pipe leading from 5 to the chimney, may occasionally be mixed in for utilization when the steam has raised the temperature high enough to allow such addition without caus-



GUTZKOW'S PARTING PROCESS.
ARRANGEMENT OF PLANT.
SECTION A. B.
BULLION PARTING PLANT.
1. Drying pan; 2. Melting furnace; 3. Dust chamber; 4. Chimney; 5. Parting kettle; 6. Crystallizing pan; 7. Reservoir for mother acid; 8. Lead-lined tank for boiling gold; 9. do. for "gold filter"; 10. do. for "silver filter"; 11. do. for draining crystals; 12. Outlet of all liquids; 13. Reservoir for commercial acid; 14. Hot water tank.

which serves as a reservoir, and ought to be large enough to hold the 50,000 to 60,000 lbs. of acid shipped in a "tank car." One or more old steam boilers may be arranged for this purpose, and the acid may be raised into them by exhausting the air therefrom by a steam jet. The consumption of sulphuric acid of 66°B need not, and after some practice will not, exceed materially the stoichiometrical proportion, which is 1 lb. of acid for one of silver, as all surplus acid evaporated or required for dissolving the silver sulphate is regained and utilized in the course of the process.

For a beginner it is advisable to employ between the kettle and acid reservoir a small cast iron tank as an intermediate reservoir in which the acid required for the charge of bullion under treatment may be measured off.

It will be noticed in the figure that I discard the usual half-globe shape of the parting kettle, but employ a flat bottom with a pocket or well in the center in the shape of a spherical segment. To gain more capacity for equal height is one reason for this construction, but the most important one is that the bottom can be reached everywhere by a straight-edged stirrer or paddle, and, practically speaking, that every particle of gold can be scraped into the pocket and be taken therefrom with a ladle. This is not possible in a round-bottom kettle in the position in which the refiner has to work.

The dissolving of the stated maximum charge takes from four to six hours, according to the energy with which the heat is regulated. When the larger half of the bullion appears to be dissolved "mother-acid" is added from 7, a pitcher or two at a time, until the charge is completely dissolved.

The fire is now moderated and the kettle is gradually filled with mother-acid within an inch or two from the top. These gradual additions are regulated by the temperature of the solution in the kettle, which ought to be so that only faint fumes are discernible. If the fuming stops entirely it signifies that the temperature has become too low and that silver sulphate may separate. The gold ought to keep its bright color during this operation, which presents no difficulty. At larger works, for instance at Argentine, the mother-acid is lifted by steam power, but lifting by hand is sufficiently convenient for the small plant under description. The well stirred contents are now ready for settling, and the fire is still further moderated. Ten minutes is all the time required and given for settling, that is, for obtaining a perfectly clear solution of silver sulphate, which may be safely siphoned off the insoluble residue without carrying any gold along. This rapid settling is due to the change of the iron sulphate formed during dissolving from a yellowish slowly subsiding salt into a greenish flocculent compound, which carries all suspended matter readily to the bottom. The solution is now siphoned into the open cast iron pan 6. A ¼-in. gas pipe, which is suitably bent and ends in a "return elbow" resting on the bottom of the kettle, is used as a siphon.

ing a precipitation of silver sulphate. The solution is now allowed to cool over night.

At Argentine water cooling is used, but it is hardly necessary in our case in San Francisco. In the morning the mother-acid is allowed to run off into the cast iron reservoir, 7. Through an iron pipe toward which the bottom of No. 6 slopes, the crystals are detached by an iron shovel, and are thrown on the false bottom of the draining box 11, which runs on wheels and has been moved to 6. They are sprinkled with water, and the first drainage, down to a certain specific gravity, is run back into 6. The box 11 is then moved into the position shown in the figure. Here cold water is allowed to percolate through the crystals until the free acids and the sulphates of iron and copper are removed. The liquid runs on the silver filter 10, where all silver which it holds in solution is retained and it escapes finally through the pipe 12. The silver filter is a lead lined box, provided with a false bottom. It is filled to about six inches above the false bottom with precipitated copper. The silver separates on the top of the copper as a spongy sheet, a corresponding amount of copper being dissolved. Once or twice the sheet is loosened and turned in order to expose what copper may cling to it to the first action of the silver liquid entering. When the sweetening of the crystals have been finished and the crystals have been removed from 11 for further treatment, the silver separated in 10 is thrown on the false bottom of 11, a shovel of crystals is added, and 11 is filled with hot water and left at rest. By the time that 11 is again required to receive another batch of crystals from 6 all copper which the silver sponge may have still retained has been dissolved, the liquid is run on 10, and the silver is left in 11 to be mixed with the new charge of crystals. In practice the total amount of silver thus rendered metallic does not exceed 3% of the whole, as the crystals of silver sulphate are only slightly dissolved by cold water.

The sweetened crystals from 400 lbs. of bullion, which measure about 3 cu. ft., are now thrown on the drying-pan, 1. When dry, they are mixed with 5% more or less, of charcoal, the weight of the charcoal which is necessary being ascertained approximately from the known weight of the bullion which has furnished the batch of crystals under treatment. The mixing is done on the pan 1 itself, and the mixture is at once fed into the hot crucible in the melting furnace 2. The silver sulphate is reduced at a very low temperature—that is, at just red heat—into metallic silver, carbonate and sulphurous gases being evolved, and escaping without causing any trouble whatever; every trace of these gases having been removed by the time the temperature of melting silver is reached. The surplus of charcoal is finally lifted off the molten silver and reserved for mixing with the next charge of crystals. The silver is cleared by borax and toughened with niter until the so called "boiling" indicates that spitting needs to be apprehended no further. After cooling to the proper temperature it is ladled into molds, a little assay bar being cast from the

first and last ladle, and the crucible is again charged with the mixture of crystals and charcoal.

Those who are familiar with my old San Francisco process from its description in "Percy's Metallurgy" will notice that the treatment of the silver as here described contains three essential novelties, namely: First, the dilution of the original silver solution by steam, which forms the claim of my patent, and enables me to work with only one-third of the volume of "mother-acid" previously employed. In addition, it dispenses with certain cumbersome apparatus. Second, the desilverization of weak silver solutions over a bed of precipitated copper, which replaces their storing in capacious lead-lined tanks for re-utilization or for treatment with copper or iron or salt. Anybody who knows of the difficulty of getting a plumber who understands lead burning with the hydrogen flame to an out-of-the-way place, or has heard of the lead-burners' union, will appreciate the reduction of size and number of lead-lined tanks. The few small tanks used are shipped ready-made from Chicago. Third, the direct reduction in the crucible of the silver sulphate with charcoal; my former practice has been to reduce the crystals to the metallic state by percolating them in the draining box 11 with a hot solution of ferrous sulphate. The ferric solution which was thus formed was made again ferrous by metallic iron and used over. The silver was sweetened with hot water, then dried and melted. The advantages of the new method need hardly be discussed.

4. *The Copper.*—The liquid which flows from 12 removes all the copper which the bullion did contain, and all that which has been dissolved in the silver filter 11. In parting works, which treat only high grade bullion, the weight of the copper thus escaping is so small that it hardly pays for its recovery. The liquid from 12, may run to waste, and the copper in the silver filter be replenished by preparing, occasionally, a quantity of it at the works by dissolving bluestone in 8, and precipitating the solution by iron in 9, or by buying some in the market. When, however, the bullion contains a larger percentage of copper than can be economically neglected, the liquid issuing from 12 is carried in the usual manner through roughs or other vessels containing old iron.

This process is common enough, but it requires some judgment, which is less common than the process. I know even of a manufacturer or two who ought to appreciate to have it pointed out that precipitated copper ought never to be exposed to the atmosphere before sweetening, because certain basic salts of iron are formed which are insoluble even in boiling diluted acid, and that in an acid ferrous sulphate solution, even in the absence of iron, a continual consumption of acid takes place because the ferric sulphate formed by the atmosphere absorbs more acid than the ferrous sulphate from which it was generated contained, and, lastly, that no copper precipitated from cold or merely warm solution is fit for sweetening by filtration, on the large scale at least, before it has been violently boiled in acid water and thus has been made dense. For parting very low grade bullion with thirty or more per cent. of copper, I modify the process of dissolving in the kettle 5 in a certain plain but novel manner which I may publish at some future occasion.

5. *The Lead.*—It has been said already that the lead sulphate is washed from the gold by decanting. The amount of lead in the residue taken from the parting kettle is, however, very small, much less than is generally assumed, and almost *nil* when, as ought to be done in larger establishments, the gold is subjected to a second boiling with sulphuric acid. The sulphuric acid process in this surpasses the electrical method of parting. By the latter a number of substances, among which are quite unusual ones as for instances, tellurium, separate with the gold and have to be removed by special treatment. The vaunted simplicity of the electrical process may well be questioned when it is known that it includes a boiling of the gold with nitric acid with all the appliances and operations of a miniature parting plant working by that old fashioned process. In the sulphuric acid process, at least by my method, all the gold in the bullion which is placed into the parting kettle in the morning is delivered in the evening as a fine and tough bar, except what traces cannot be scraped from the kettle, and what the sponging of the gold filter may have removed. The principal part of the lead in the bullion, provided the latter contains of it only a few per cent, is dissolved in the hot silver solution.

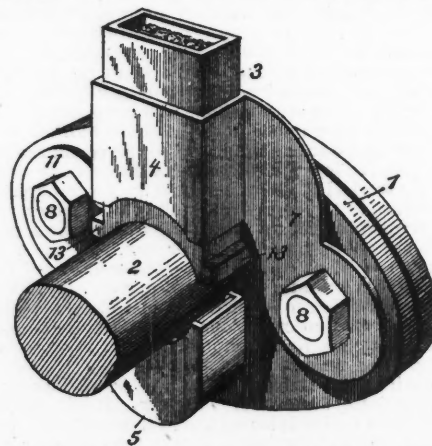
In the old style of parting, this solution is poured into a tank containing water and copper, and every trace of lead sulphate consequently intermingles with the silver to be removed therefrom by fluxing and toughening. By my own modification the lead sulphate separates on diluting the solution by steam and has subsided by the time the formation of crystals commences. It coats, therefore, the crystals where they have touched the crystallizing pan. I employ the following method for removing the lead sulphate whenever the character of the bullion makes it necessary to do so: The crystals of silver sulphate are not directly shoveled from 6 into the draining box 11 as described above, but are thrown into a small lead-lined tank filled with water, are stirred therein and finally taken out with a wooden shovel and thrown into 11. The powdery sulphates of lead, antimony, etc., are very readily washed off the heavy, hard and large-sized crystals. What is left behind in the wash-tank is heated by steam, the solution is run over the silver filter while the residue of lead sulphate, etc., is made metallic by adding some iron and finally washed, melted and cupelled.

The Durability of Aluminum.—Herr C. Winkler published results a number of years ago showing that with continuous use the losses in three spoons of different composition were per cent. per year as follows: Silver spoon, 0.403; aluminum spoon, 0.630; German silver spoon, 1.006. The silver and aluminum spoons have been in daily use now for sixteen years; the third spoon, however, has not been used with the same regularity. The loss during the sixteen years has amounted, in the case of the silver spoon, to 8.78 per cent., a result rendered too high by continual polishing; the aluminum spoon has lost 5.85 per cent., a result which may be taken as correct, since this spoon has been rubbed merely with a soapy flannel, as attempts at polishing were useless; lastly, the loss in the case of the third spoon has amounted to 5.62 per cent., a result decidedly low, seeing that this spoon has not been regularly used. It thus seems evident that, as regards durability, there is not very much to choose between silver and aluminum, whilst German silver wears away more easily than either. Hence Lübbert and Roscher's statement is assumed to be without foundation.

* *Zeits. f. angew. Chem.* 1892, 69 thro. *Journ. Soc. Chem. Ind.* of March 31, 1892.

THE SMITH VALVE ROD LUBRICATOR.

Smith & Simpson, of Birmingham, Ala., are the patentees of this device, designed for attachment to a gland or stuffing box around a valve rod or piston. The lubricator is constructed with three distinct parts; a box for holding waste or other capillary material retaining the oil; a cup on lower side of the valve stem filled with waste to catch and retain the otherwise wasted oil, and the arms which fasten the whole to the stud-bolt of the gland. The arm which holds the box is fitted with a sleeve in which the oil box fits loosely. The arm which holds the drip cup is fitted with a semi-



circular opening, in which the drip cup rests, held closely to the rod by a small adjusting spring. The lubrication of the rod being outside the stuffing-box and direct from the waste in the box to the rod, a perfect supply is maintained, it is claimed. The lubrication of the under side of the rod is by capillary attraction from the excess of oil supplied from the box on the upper side. The oil-box is supplied with a projecting shoulder on the lower end and is thus retained in position. The particular advantages claimed for this device are: self-adjustment, uniform lubrication, saving in lubricating material and simplicity.

COMPARATIVE VALUE OF HEATING SURFACE IN FIREBOX AND IN TUBES.

In a paper published by E. Sauvage in the *Bulletin de la Commission Internationale du Congrès des Chemins de fers*, a brief account is given of tests made by Almgren in Sweden, to determine the relative value of heating surface in firebox and in tubes. The boilers used were of the ordinary deep type, one being tested as usually built and the other having the sides and back covered with firebrick, the tubes being lengthened to give approximately the same total area of heating surface. The principal dimensions of the two boilers were as follows:

	Ordinary Boiler.	Boiler with Lined Firebox.
Number of tubes.....	150	150
Length of tubes.....	10 ft. 1.4 in.	11 ft. 3.8 in.
Diameter of tubes inside.....	1.8 in.	1.8 in.
Heating surface, firebox.....	717 sq. ft.	20.4 sq. ft.
Tubes.....	718.5 "	804.8 "
Total.....	790.2 "	825.2 "
Area of grate.....	13.7 "	13.7 "
Depth of firebox to grate.....	46.6 in.	46.6 in.

The results obtained were as follows:

Vacuum in the smoke-box. Inches of water.	Pounds of water evaporated per hour.		Pounds of coal burnt per hour.		Pounds of water evaporated per pound of coal.		Temperature in the smokebox. Deg. Fahr.	
	Plain firebox.	Lined firebox.	A	B	A	B	A	B
8.1	3,080	3,368	411.3	457.3	7.31	7.35	590	590
13.4	3,874	4,224	545.6	585.7	7.10	7.22	662	608
18.8	5,324	5,368	752.4	741.4	7.08	7.24	788	662
26.8	6,380	6,534	897.5	899.4	7.11	7.26	878	806

EARLE'S LACE HOLE CUTTER.

An important feature of belting is the lacing. The illustration shown herewith represents a cutter, which is operated by means of a handle connected to a threaded shaft. The shaft receives a cutter made of tool steel, similar to an ordinary punch. At its lower end, revolving the handle drives the cutter downward, and, with a circular motion, the hole is cut in the belt. The cuttings move upward through the cutter and shaft,

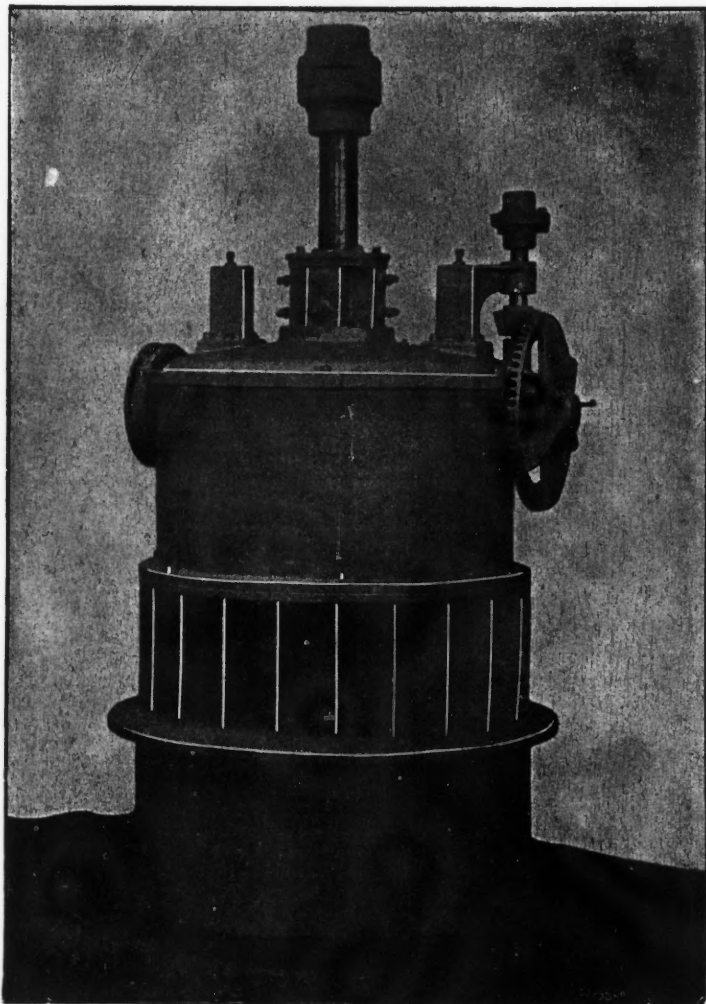


each being hollow, and come out at the hole shown in the top of the cutter shaft. The distance the hole is cut from edge of belt is regulated by an adjustable gauge. Accuracy in cutting; convenience, it being operated by one person, and range of work, four cutters of different sizes being packed with each tool, are claimed as advantages of this implement. It is sold by C. H. Tucker, Jr. & Bro., of New York.

THE VICTOR TURBINES.

The wheel manufactured by the Stillwell Bierce Manufacturing Company, of Dayton, Ohio, is coming into very general use. Successful at the start the manufacturers have been enabled by the observation of its behavior under many and varying conditions to make a number of important improvements. The cylinder is now made longer and heavier; the bridgetree that supports the wheel has been strengthened; the wood step is held in a detachable sleeve placed in the hub of the bridgetree so that a new step can be put in without disturbing the wheel and facilities are provided for setting up the step to compensate for the wear upon it; the form of the step and also the step-shoe have been changed so as to secure more perfect lubrication and keep the step-shoe cool, thus preventing the burning out of the step; the form of the couplings has also been changed, affording longer jaws and greater strength, and the diameter and length of the shafts which are made of the best hammered iron have been increased.

Various sizes of the wheel have been subjected to a series of tests in the testing flume at Holyoke, Mass. With the result that the small 15-in. wheel at 368 revolutions under 18'06 ft. of head and 990'19 cu. ft. of water, developed 30'17 H. P., an efficiency of .8932, a most remarkable re-



sult. The larger sizes also showed a high percentage of efficiency, the 48-in. wheel under 15'51 ft. head and 74'56 cu. ft. of water at 102 revolutions developed an efficiency of .8202.

In the Pillsbury Mills at Minneapolis, Minn., the machinery is being driven by two 50-in. Victors under 50 ft. head, each developing nearly 1,300 H. P. The performance of the wheel under high falls is stated to be unprecedentedly good.

The Spectrum of Samarium.—At a recent meeting of the Paris Academy of Sciences, a paper on researches on samarium was read by M. Lecoq de Boisbaudran. By passing an electric spark from a large induction coil, without condensers, through solutions rich in samarium, and viewing the spark spectroscopically, lines were obtained at the wave-lengths 466.2, 463.7 and 459.3, and a wide band having a well-defined edge at λ 611.2, and fading away to about λ 622. The samarium bands undergo very marked variations when the position of the spark with respect to the meniscus of liquid is altered. This fact is thought to be of interest from the point of view of the supposed complexity of samarium. It is not impossible that there is a relation between the band 611-622 and the narrow line which Professor Crookes observed when using mixtures of samarium and yttrium *in vacuo*, and which he attributed to the presence of a new element. M. Boisbaudran has observed this line, or one very near it, with different substances, and finds that its position varies sensibly with the nature of the solution employed. The narrow line is accompanied with a less refrangible and weaker one. With lanthanum sulphate mixed with a compound of samarium, the wave-length of the stronger line was determined as 61.27 and of the weaker 619.6. Professor Crookes obtained the wave-length 609.

LEAD-MINING IN THE KATHA DISTRICT, BURMA.

The only lead-mines of any value in the Katha District are those on the hills in the Mawku Circle, near the village of Mawka, and those near Mawkwun; there are other mines in the Mawhaing Circle near Taungpila village (now deserted).

The Mawka mines are situated at the foot of a range of hills, a continuation of the Kalagataung, says *Indian Engineering*; the mines consist of a large cave dug into the side of the hill, from which the ore is extracted by means of crowbars; the ore is then pounded up into fairly small particles and is then smelted in a roughly-made furnace. The furnace is a cone-shaped construction of mud, much like a wigwam, open at the top and with a small trench dug into the ground at the bottom, leading from a small opening much like the door of the wigwam; at the back of the cone and on the opposite side to the door the nose of a pair of bellows, made from large bamboo, is inserted; charcoal is used in the furnace.

This is put into the crater at the top of the cave and the lead ore is put on the top of this in small quantities at a time. The blast is then worked and in a short time the ore burns away into dust and the molten lead runs out from the opening at the bottom into the trough, the powdered refuse being blown out of the same opening by the action of the blast. After all the ore has been smelted the molten lead is scraped out of the trench by earthen ladles and poured into bamboos split in two and used as molds. One who has personally worked the Mawka lead mine as an experiment, found in four viss (the viss is equal to 3½ lbs.) of ore extracted over 50% of pure lead. The ore was taken in the ordinary way and not selected. The outturn from all the mines is said to be about the same; the quality of the lead is good, that from the Mawkwun mine being a little softer than the Mawka lead.

The mines were worked during the dry season from about October to June. The Mawkwun mines were worked up till about five years ago, when the Sawbwa claimed the refusal of the lead worked out at the rate of 4½ viss and then 5 viss the rupee. Owing to the depth into the hillside to which the workings had been carried, some about 100 cubits, this rate did not pay, and as the workers got no profit, they gave up working. The market price to traders at the Mawkwun mine was 2½ viss the rupee.

The Mawka mine was worked up to the time of the British occupation of Wuntho territory, and a number of the villagers, especially those of Kedwin and Napadaung, earned their living by working the lead. Their selling price was 4 viss the rupee, the rate being less than the Mawkwun price, owing to the slightly inferior quality of lead and the easier working.

The working of these mines ceased after British rule, owing to the idea that working lead was against the law, but the working was also discontinued owing to the fear that the lead might get into the hands of dacoits and rebels.

It is suggested that if the lead workings are continued, they should be carried out on a lease, which should be granted only to a trustworthy person, who would be held responsible for the proper supervision of the workers and the disposal of the lead under proper rules.

THE PRESENT FORMATION OF PHOSPHATIC CONCRETIONS IN DEEP-SEA DEPOSITS.

Written for the Engineering and Mining Journal by Walter B. M. Davidson, F. G. S. A. R. S. M.

By far the most important contribution to our knowledge of the vexed question of the geological origin of phosphatic deposits, has recently appeared in a monograph entitled "Deep-Sea Deposits," which forms the last published volume of the Report on the Scientific Results of the Voyage of the "Challenger." It is chiefly the work of John Murray, LL. D., Ph. D., etc., who was one of the naturalists of the expedition.

The phosphatic concretions which are described and commented on, were dredged from depths of 98 fathoms, 150 fathoms, and 1,900 fathoms, the two first situated on the outer edge of the Agulhas Bank south of the Cape of Good Hope, the last in the deep water nearly 100 miles southeast of the Bank. The concretions vary from 1 cm. to 3 cm. (exceptionally they may attain in greatest diameter from 4 to 6 cm.). They are surmounted by protuberances, penetrated by more or less profused perforations, and have on the whole a capricious form, being sometimes mammillated with rounded contours, and at other times angular. Their surface has generally a glazed appearance and is usually covered by a thin, dirty, brown coating, a discoloration due to the oxides of iron and manganese. This coating, which covers all parts of the concretions, usually veils the mineralogical nature and aggregate structure. The samples for 150 fathoms gave $P_2 O_5$, 19.96%, and that from 1,900 fathoms $P_2 O_5$, 23.54%.

The specimens from the deep water vary considerably from those dredged from 100 and 150 fathoms, the former there being an abundance of calcareous or organic remains, especially rhizopods, a diminution of mineral particles and a greater preponderance of phosphatic matter. The phosphate penetrates the shells in every part, and a pseudomorphic substitution of the carbonate of lime is also often observed.

When the filling up of a foraminifer, for example, and the pseudomorphism of its shell are complete, the phosphates attracted round this little center continues to be added at the surface, and thus a phosphatic granule is formed whose external appearance no longer recalls that of the organism around which the phosphate has grouped itself; sometimes the structure of the shell is more or less well preserved, but frequently it is quite effaced.

The phosphatic nodules are apparently more abundant in the deposits along the coasts where there are great and rapid changes of temperature arising from the meeting of cold and warm currents, as, for instance, off the Cape of Good Hope and off the eastern coast of North America. It seems probable under these circumstances, and also where there is a mixture of waters of different salinities, for instance, where polar and equatorial currents mingle, or where large quantities of fresh water are thrown into the ocean from floods in great rivers, that large numbers of pelagic organisms are frequently killed by these changes of temperature or salinity, and may in some instances form a considerable layer of decomposing matter on the bottom of the ocean. It is believed that the origin the thin bands of phosphatic nodules so frequent in geological formations may be thus accounted for, and the interpretation of the origin of the phosphatic concretions of existing seas should be equally applicable to those of the

Cretaceous and Tertiary formations. As these phosphate concretions enclose the remains of organisms and mineral particles identical with those constituting the actual sediments in which the concretions are founded, they must be regarded as having been formed *in situ*.

In view of the keen interest taken in the antagonistic theories of the origin of phosphates I consider the following from such an authority as Mr. Murray of the greatest importance: "If we ask whence the phosphate of lime found in these nodules is immediately derived, we may set aside in the first place the hypothesis of a direct derivation from the interior of the globe, for although it is evident that in certain cases a small percentage of phosphate of lime in deep sea muds might be attributed to apatite coming from volcanic rocks, still even at the highest estimate the amount of phosphate of lime coming from this source must be very subordinate relative to that derived, for instance, from organic remains. Nor is there any reason in the conditions under which they have been formed for supposing that the phosphate of lime could have been derived from submarine springs. Again, we find nothing in the surroundings to induce us to regard the phosphate of lime of these nodules as being a direct deposit from the waters of the ocean without the previous intervention of organisms; the small quantities of this substance found in analyses of sea water prevents us in the actual state of our knowledge from having recourse to this interpretation."

Mr. Murray then describes the mode of the formation of the nodules. They usually have an organic center as a nucleus, which acts in its turn as a center of attraction, and groups around itself, just as the solvents furnish material, all the molecules of the same nature which are found within its radius of attraction. In some cases, however, a mineral particle is the center of concretion, but whatever may be the nature of the substances serving as a first center for these concretions, we are led to believe that the phosphate of which they are constituted has passed through living matter.

These conclusions are based upon microscopical sections of the nodules (which are marvelously reproduced in colors in the work referred to), and on chemical analysis of the different parts. All this evidence goes to show that we do not need cataclysmic or catastrophic agencies to account for the deposits of phosphate of lime, and that now at the bottom of the oceans this valuable substance is being stored away possibly for the use of men in future eons.

DECISIONS OF THE COURTS AFFECTING THE MINING INDUSTRY.

Department of the Interior.

HOMESTEAD ENTRY.—MINERAL LAND REVIEW.

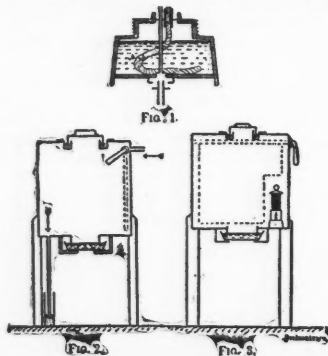
1. The discovery of coal upon land that is embraced within a homestead entry precludes the completion of such entry.

2. A motion for review on the ground that the decision is against the weight of evidence will not be granted where the testimony is of such a character that fair minds might differ as to the conclusion to be drawn therefrom. *Dickinson v. Capen*, on motion of Capen for "review and recall" of departmental decision of November 2d, 1891, involving homestead entry by him at Evanston, Wyo. [Decided April 22d, 1892.]

THE TESTING OF INFLAMMABLE GAS.

Professor Clowes, of Nottingham, in a recent communication to the Royal Society, gives the results of his further experiments on the use of safety lamps for the detection and measurement of firedamp in mines. He had previously showed (see *ENGINEERING AND MINING JOURNAL*, August 22, 1891) that a lamp with a small blue benzolene flame, such as that produced by drawing down the wick of an Ashworth's modified benzolene safety lamp, gives a distinct "flame cap" in air containing 5% of methane. He now finds that alcohol and hydrogen flames give even better results, and thus confirms the advantages claimed for the Pieler lamp, in which alcohol is used. The Pieler lamp has not found much favor, owing to the fact that its flame is non-luminous, and necessitated the workman carrying a second luminous lamp. Professor Clowes has devised a lamp which burns oil or benzolene, but contains a small supply of compressed hydrogen, which is kindled when the wick of the oil lamp is drawn down, and thus gives the miner an opportunity of testing from time to time the quality of the air of the mine.

The accompanying illustration, for which we are indebted to *Industries*, shows such a combination lamp, the hydrogen being supplied to a copper tube of fine bore, which passes through the oil reservoir and terminates



APPARATUS FOR TESTING INFLAMMABLE GAS.

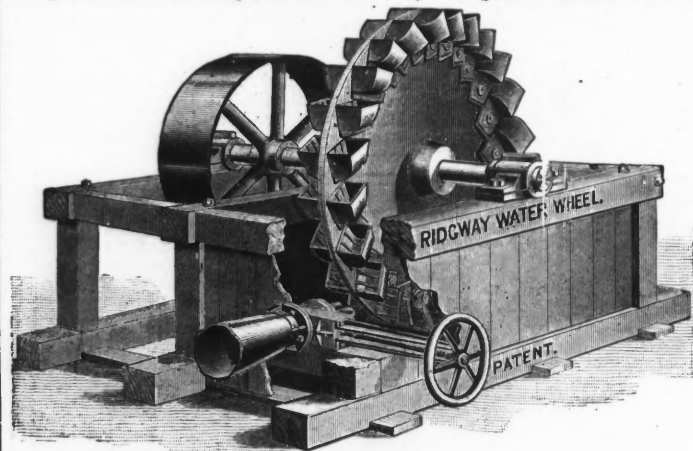
close by the top of the wick. Variations in the size of the hydrogen flame alter the sensitiveness of the lamp and the height of the flame "caps." Professor Clowes has further demonstrated that such a hydrogen safety lamp will indicate the presence of benzolene and petroleum spirit in air, and strongly advocates the use of such a gas testing lamp in the neighborhood of the oil tanks in petroleum-carrying steamers, in petroleum stores and in other places where vapor of benzolene is likely to be present

in the air. As a flame cap appears in a mixture of benzolized air to air of 1:23, and mixtures containing 1:9 are non-inflammable, this ingenious device of Professor Clowes should provide a very effective way of testing, as it would certainly be on the safe side.

THE RIDGWAY JET WATER WHEEL.

This Ridgway jet water wheel is shown in the accompanying illustrations, which show the wheel so clearly that but little explanation is necessary.

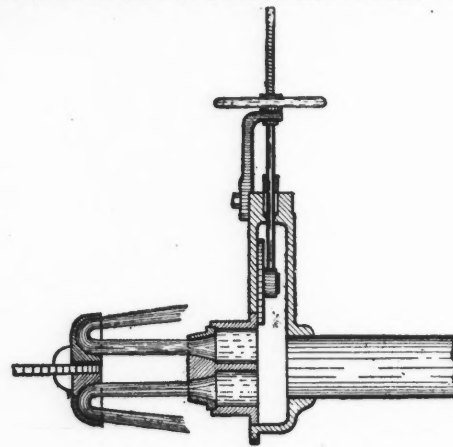
It will be noted that the Ridgway wheel is made double. The water is brought to the wheel in a pipe in the usual way. The gate has attached to it a



nozzle in two parts carrying a duplex tip. This gate is so arranged as to deliver the water to the runner through one or both tips at will. The sectional view through gate, nozzle and tips and one set of buckets shows the manner of the application of the water to the runner.

This runner is a plain flat disk, without arms to fan the air and consume power uselessly, having recesses on its two sides near its periphery. Into these recesses the buckets are set and secured in place by a single bolt to each pair of buckets. By this arrangement all the stress of the water is taken by the recesses and the bolts relieved of all strain from this source. In wheels designed to work under very high heads the disks are made from soft boiler steel having holes to take lugs upon the back of steel or bronze buckets, thereby making a wheel of extreme lightness but of great strength.

The wheel can be mounted in a solid, massive frame. The rectangular



SECTION OF VALVE.

lar gate box carries on the back, next the wheel, two sets of double nozzles, and the gate is ported in such a way that the handwheel can put the water on the wheel from any or all the jets. This style of wheel gives double the power of that shown in the cut, and is a great favorite on account of its low price. One of these wheels under 350 ft. head, gives about 100 H.P., and only costs about \$150, making it the cheapest motor of any sort ever known.

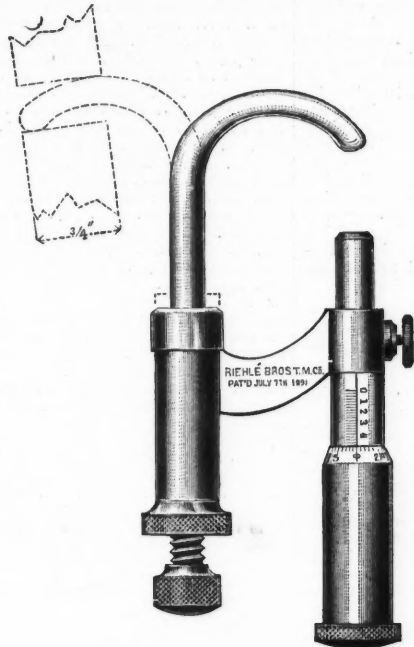
One of these solid frame wheels was recently furnished Lord Audelawn, of Great Britain, better known as Sir Arthur Guinness, the great brewer, for lighting his great estate by electricity, under a head of 100 ft. It was sold on condition it should yield 90 per cent. efficiency. On being set up, it was tested by English engineers employed for the purpose, and by no means partial to the innovation of foreign machinery, especially American, and on their report it was accepted as fulfilling the guarantee.

Copper in the French Congo.—The French Congo possesses mines of copper of apparently great richness, according to *Iron*. They are situated in the region contiguous to the sources of the Ludima-Niodi, to the south of Stephanieville. The ore, which is malachite, is exploited by a population of some 350 negroes. The methods employed are very simple. The bed of malachite is reached by excavating the soil with wooden tools. Pits a yard in diameter are made. The ore brought to the surface is broken and pulverized, mixed with coal and smelted. Combustion is animated by blowing. When the fusion is complete, the liquid copper is run into sand-blocs. The whole of the district named is stated to be rich in copper, and blocks of malachite are frequently met with in the bed of the Ludima.

THE RIEHLE-SLOANE MICROMETER CALIPER.

A new micrometer caliper, manufactured by the Riehle Brothers Testing Machine Company, of Philadelphia, is represented by the accompanying illustration. It has one leg movable to enable it to be inserted in small holes in plates, boilers, etc., and is designed to measure the thickness of material up to one inch at any place selected. While originally designed for steam boiler inspection service, it has been found useful in many unlooked for directions, as it can be used as an ordinary micrometer caliper as well as in work where the movable leg is available. The measuring leg is graduated to thousandths of an inch, as in the ordinary micrometer caliper, but is also provided with a lock (shown by the knurled set screw in the cut) for fixing the measurement.

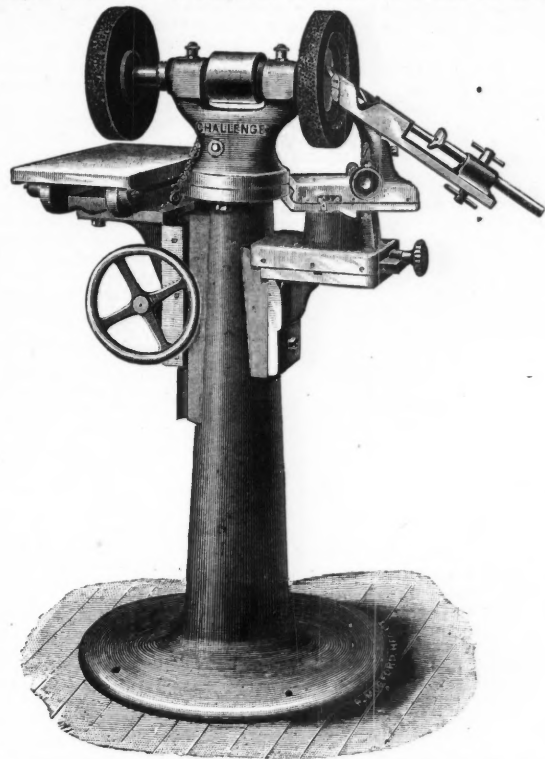
In operating through small apertures—a 1/4-in. gas tap hole is large enough—set screw is released two turns; then the movable leg is pressed downward until a pin fitting into a socket on it is disengaged, and thereby allows it to be turned around on its axis. The movable leg is then hooked through the hole and turned until the feather slips into the slot, which



brings the two caliper points into line, and is thrown up against its shoulder by a spring, after which the set screw is turned up tight again. The graduated leg is then adjusted and locked, the movable leg pressed down and turned as before and the caliper removed. When calipering in dark places, the measurement being fixed, the caliper can be taken out into the light and read, instead of being obliged to read it before removing. The small hole necessary for inserting the caliper in boiler shells is closed by driving a copper rivet instead of tap and plug.

ARTIFICIAL TWIST DRILL AND SURFACE GRINDER.

The subject of twist drill grinding is one that interests every machinist, manufacturer or metal worker. No more difficult work can be found in general machine shop practice than that of properly sharpening drills. Indeed, it is doubtful whether it can be done by hand with any degree of success, from an economical point of view, even by the most skillful. It requires the accuracy of a machine. The subject of the accompanying engraving is an emery grinder made for this purpose, in which the designers have sought to cover a wide range (from the smallest size up to 2 ins. diameter) in a single machine, so constructed that nothing is left to chance in grinding to standard; the operation being simply that of turning two hand wheels indexed for any given size drill. A 1/4-drill, for example, is first placed in a V-shaped holder or rest, the point slightly beyond it and the end held by the adjustable stop; then the two hand wheels on the slide below it (only one of which is shown in the cut) are



turned until the fingers point to 1/4; next, the hand wheel on the slide below is turned until the point of the drill touches the wheel, when, by grasping the holder near each end and rotating it, one-half the point is ground; then by turning it over it is finished in the same manner, each lip being identically alike.

The method employed for giving the proper shape and clearance to the drill; and embracing so wide a range of sizes, deserves special mention. A circular stem 2 1/4 x 3 in. underneath the base of the upper slide fits into a socket on the slide below, which is provided with a stop to limit the rotation of the holder. It is thus seen that as the upper slide is moved a different radius is described by the drill when the holder is rotated, and this bears a constant relation to each size drill and governs the distance ground from the point; next, that as the purpose of the second hand-wheel on the upper slide (not in view) is to "cant" the holder from the central line, the necessary "rounding" or helicoidal form is given to the point of the drill.

A surface grinder is attached to the column and is referred to by the makers as also useful for general grinding, thus embracing the three forms of grinding most essential to metal workers. They are furnished separately or both on one column as shown. The surface grinder is designed for grinding dies, punches, gibs, etc., etc. It is also useful for special work for which a suitable rig can be made and clamped to the table.

The table has a drop of 10 ins., is counterbalanced and operated by the large hand-wheel, rack and pinion, and is retained by binding screw. A supplemental adjustment is also attached, making the table very sensitive. The machine is manufactured by the Appleton Manufacturing Company, Philadelphia, Pa. It weighs about 500 lbs. complete.

DIVIDENDS PAID BY MINING COMPANIES DURING APRIL AND FROM JANUARY 1ST, 1892.

NAME OF COMPANY.	Paid in April.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in April.	Paid since Jan. 1st.
Adams, Colo.....		\$7,500	Hecla Con., Mont.....	\$15,000	\$60,000
Alaska, Treadwell, Alaska.....	\$75,000	150,000	Helena & Frisco, Mont.....		20,000
American Coal, Md.....	45,000	30,000	Homestake, S. Dak.....	12,500	50,000
American-Nettie, Colo.....	30,000	20,000	Horn Silver, Utah.....		50,000
Argyle, Colo.....	20,000	20,000	Idaho, Cal.....	3,100	9,300
Aspen, Colo.....	20,000	20,000	Iron Mountain, Mont.....		15,000
Bald Butte, Mont.....	20,000	6,000	Kennedy, Cal.....		15,000
Bannister, Mont.....	6,000	5,000	Lake Superior, Mich.....	252,000	252,000
Belden Mica, N. H.....	5,000	40,000	Lexington, Colo.....	3,000	12,000
Best Friend, Colo.....	10,000	40,000	Maid of Erin, Colo.....	139,725	139,725
Brotherton, Mich.....	20,000	40,000	Maryland Coal, Md.....		42,000
Bull-Domingo, Colo.....		4,000	Maxfield, Utah.....	3,000	18,000
Bulwer Con., Cal.....	10,000	10,000	Minnesota Iron, Minn.....	210,000	420,000
Buxton, S. Dak.....		20,000	Mollie Gibson, Colo.....	150,000	500,000
Calumet & Hecla, Mich.....	500,000	20,000	Morning Star D., Cal.....	7,200	25,200
Centennial-Eureka, Utah.....	15,000	500,000	Napa, Cal.....	20,000	30,000
Champion, Cal.....	10,200	60,000	New Guston, Colo.....	82,500	82,500
Colorado Central, Colo.....	13,750	27,500	Omaha, Cal.....	3,600	7,200
Consolidation Coal, Md.....	205,000	67,120	Ontario, Utah.....	75,000	300,000
Colorado Fuel.....	67,120	100,000	Pacific Coast Borax.....	15,000	60,000
Cook's Peak, Colo.....	100,000	95,000	Pandora, Mont.....		3,000
Cortez, Nev.....	37,500	150,000	Parrott, Mont.....	18,000	72,000
Daly, Utah.....	10,000	72,000	Plumas, Eureka, Cal.....	25,313	25,313
Deadwood Terra, S. Dak.....		40,000	Poorman, Ltd., Colo.....	18,225	36,450
De Lamar, Idaho.....		72,000	Quincy, Mich.....		200,000
Diamond, Kyuno & Castle, Utah.....		7,500	Rescue, S. N., Mex.....		12,000
Elkhorn, Mont.....		87,500	Rialto, Colo.....	4,500	18,000
Enterprise, Colo.....	50,000	50,000	R'ky Fork Coal, Mont.....		100,000
Eureka Con., Nev.....	12,500	5,000	Running Lodge, Colo.....		5,000
Farncomb Hill, Colo.....	5,000	80,000	Sierre Butte, Cal.....	14,700	14,700
Franklin, Mich.....		20,000	Standard, Cal.....	10,000	20,000
Golden Reward, S. Dak.....	5,000	280,000	Tamarack, Mich.....		200,000
Granite Mountain, Mont.....		20,000	United Verde, Ariz.....		30,000
Great Western Quick-silver, Cal.....	12,500	37,500	W. Y. O. D., Cal.....	3,000	12,000
			Yosemite No. 2, Utah.....		5,000
			Total.....	1,490,313	5,306,108

The Mineral Resources of Costa Rica.—The great mineral wealth of Costa Rica has been known since the very days of its discovery. Columbus and his companions suspected it when they saw the ornaments of pure gold which the natives wore, and soon afterward found that rich mines of the much coveted metal existed in the country. Early explorations made at Talamanca and Chiriqui, in the proximity of the Isthmus of Panama, rendered those regions famous; and when the Spanish governor, Don Juan Vazquez de Coronada, in 1564, ordered an examination to be made of the sands brought by the various rivers of the Dux Valley, one of which was the celebrated Rio de la Estralla, as Vazquez de Coronada himself christened it, substantial evidence was secured of the great wealth of the country. According to the *Anuario Estadistico* of 1890, says *Iron*, most of the Costa Rican rivers which empty into the Pacific Ocean bring, like those of the Atlantic, auriferous sands. The gold mines of Costa Rica, which have so far attained the greatest celebrity, namely, the mines of the Aguacate Mountains, are nevertheless the most modern. They were not discovered until 1815. It may be said, however, that this great wealth, which consists not only in gold, but also in silver, copper and lead, is not yet developed.

PERSONALS.

Mr. James Douglas, Jr., has returned from an inspection of the Globe, Ariz., copper mines, and is now in this city.

Mr. Jesse R. Grant, son of the late General U. S. Grant, now largely interested in mining in the West and in Mexico, is at present in this city.

Mr. W. A. Wilson, for many years metallurgist of the Daly Mining Company at Park City, Utah, has resigned his position with that company, as his private mining interests necessitate much of his time.

Dr. Mansfield Merriman, professor of civil engineering at the Lehigh University, South Bethlehem, Pa., has been offered the chair of mathematics in the Chicago University at a salary of \$7,000 a year. He has taken no action regarding the offer.

Mr. A. B. Wood, mining engineer, of Detroit, has been appointed general manager of the Sapphire & Ruby Company, Limited. This is the company which has recently purchased the sapphire-bearing and auriferous gravel banks on the Missouri River, near Helena, Mont.

Mr. John Hays Hammond, mining engineer, of San Francisco, has been appointed one of a commission to examine the mineral resources of the Carizo Mountains in the Navajo Indian reservation, heretofore inaccessible owing to the hostility of the Indians. In company with Gen. A. McD. McCook, commanding the Department of Arizona, and Mr. John Barstow, of Shelburne, Vt., he will report at Fort Wingate on the 10th inst.

OBITUARY.

J. Stewart Jackson, of Valparaiso, Chili, largely interested in the copper industry—in fact, one of the pioneers of that business, in Chili, died recently in Valparaiso.

Edwin H. Cowles, the eminent electrician and metallurgist, of Cleveland, O., died of consumption in El Paso, Tex., on the 21st ult. Mr. Cowles' biography and portrait will be published in the next issue of the Engineering and Mining Journal.

Dr. Theodor Schuchardt, founder of a chemical factory, well known in scientific circles throughout the world, died in Gorlitz on the 22d ult. He was a constant attendant at the scientific assemblies and possessed a personal acquaintance with the most celebrated representatives of chemistry, botany and mineralogy.

SOCIETIES.

The American Society of Irrigation Engineers.—At the close of the irrigation congress in Salt Lake City on Sept. 18th, 1891, a few engineers who were delegates were called together by Prof. L. G. Carpenter, of Colorado, who suggested the organization of a Society of Irrigation Engineers. A meeting was held during the evening at the rooms of the Polytechnic Society of Utah. Little time or opportunity was afforded for details of organization. Officers were, however, elected, and the board of directors was instructed to draft a constitution and by-laws and send it to the members for suggestions and additions. A few hours of rather informal discussion brought out the ideas of those present as to the aims and work of such a society.

It seemed evident to all that an organization of men interested in the physical problems of the arid regions would be of benefit to its members, and also that an organized body of skilled engineers with experience in the peculiar work of arid land reclamation was almost a necessity, not for the increase of their own knowledge only, but far more for the security of those investing their time and money in reclamation or irrigation works.

After adjournment the party dispersed, returning to their home or work in every State or Territory in the arid country, with little in the shape of a society except the hope that something useful would grow out of the meeting. The members of the board of directors reside in California, Colorado, Utah and Idaho, and, being engineers, have many duties and little time for traveling, so that it was February before a meeting was arranged. In the meantime the secretary had received many letters and much encouragement from the irrigation engineers, and when the board met it was found that 200 members were assured for the society, including several from Europe, India, Egypt, Mexico and South America. Success seemed no longer in doubt, not only for an American society, but one that would extend all over the world. The board of directors spent several days in drawing up a constitution and by-laws adapted to a society, the members of which will necessarily be widely scattered. The members of the society will be able to judge of the result of their labors as soon as the secretary can send them the printed copies.

The constitution of the society admits of members those who are professional irrigation engineers; associates, those who, by their knowledge and experience, can co-operate with engineers in the work of irrigation; juniors, young men who intend to become irrigation engineers. There will be one annual meeting of the society, and it is hoped that there can also be one meeting each year in San Francisco,

Denver, Salt Lake, and possibly in other cities north or south. At these meetings papers will be read and discussed in the usual manner. It is the intention to have every one in the society, at least once a year, give in writing something of his experience or something of his knowledge which will be of benefit. These will be published annually in book form, and this gathered experience and knowledge of irrigation engineers and of men building and managing irrigation works should be of great value and interest not only to members of the society, but also to that vast public who are interested in the great problems of irrigation, forestry and cognate subjects.

EXPORT NOTES.

The South African International Exposition will open at Kimberley in September, 1892. Prizes are offered, which will be awarded by competition, for various classes of mining machinery. The exhibit will include rock drills, air compressors, boilers, engines, hoists, rock breakers, crushers, concentrating machinery, machinery for gold extraction, agricultural implements, and prime motors other than steam. Diamond winning machinery will also be exhibited and tests will be made with various explosives; prizes are offered for the most efficient dynamo and motor and for a system of electric transmission not to exceed three miles. The De Beers Consolidated Mines, Limited, have offered a special prize of £100 for the best and most effective method of crushing hard blue ground. The ground must be reduced to a half inch mesh. In addition to the prize offered by this company in this competition, the exposition will award a medal to the successful exhibitor.

Two or three months ago one of the largest firms of colliery proprietors in Belgium conceived the idea of establishing coal depots at Constantinople, Salonica, Alexandria and Athens. Fifty thousand tons of the mineral were shipped to the ports named, where hitherto Belgian coal had never been seen. England's misfortune is Belgium's opportunity. Precisely at the moment of the miners' strikes in England, and of the arrival of the Russian fleet at Athens, the ordinary stocks of Newcastle coal in the Hellenic capital became exhausted, with the consequence that the Russian officers decided to give a trial to the Belgian product. The result is stated to have exceeded all expectations, and the engineers of the fleet are said to have declared that the burning of the Belgian coal assured them an economy of 30 per cent. over the English combustible. Proprietors of coal mines in Belgium are now looking forward with confidence to a good demand for their mineral in the Turkish and Grecian ports of the Mediterranean.

The Berlin Mercantile Society pays British manufacturers a compliment for the manner in which they "draw up their export catalogues. It states that "reports from various consulates again draw attention to the fact that the price-lists sent out by German firms, although compiled with great care, do not meet all the requirements of the foreign consumer. As a rule, too little attention is paid to the situation and circumstances of the buyer, who does not only desire information regarding the goods themselves and their prices; he requires, in addition, to be fully informed with respect to all extra charges and expenses, so that he can at once form an estimate as to the eventual cheapness or dearness of an article. The catalogues and prices of British manufacturers, the reports generally concur, are much better adapted than those emanating from Germany to secure custom." "Some of them," the memorandum of the society continues, "contain directions as to the telegraphic service, codes, etc., give lists of the banks at which payments may be made, set forth briefly and clearly the conditions on which business is transacted, and present illustrations with detailed descriptions of the articles manufactured. To these are added particulars of the prices, weights, packing, and other material points."

The figures which have been published relating to the German export trade to the United States reveal several facts to us, says "Kuhlow's," but more especially this, that the decrease is considerable and appears to be lasting. The returns from the different consular districts have been collected and it is said that the decrease for the past year amounts to about 8,000,000 marks. (The mark is equivalent to 23.8 cts.) Up till the present the decrease in the export from Hamburg has reached the value of \$1,286,101, or of more than 5,000,000 marks; according to the figures not one single pound of sugar has been exported. An explanation of this state of affairs does not seem to be forthcoming. It is thought that the commercial treaties between the Union and the South American republics are already beginning to work an effect upon trade. The city of Berlin shares on the deficit up to 1,000,000 marks. Of this amount 200,000 marks are put down to the score of gloves, and just the same amount for dress stuffs, the rest is for cheap ornamentation, which is shipped to the Southern States of the Union, where there is a good trade done among the negro population. But the last mentioned have now no longer the power to buy on account of the great cotton crop. The returns for Chemnitz are still wanting, but there can be little doubt that a considerable fall off has also occurred there. This is, however, to be as much ascribed to the fall in prices as to the McKin-

ley bill. From Crefeld, too, the report is bad. Compared with the great deficit it could not make much difference if Hanover has an addition to record of \$20,900, and if Plauen has exported additional \$69,200 worth of goods and Dresden \$139,970. If all these are taken together they make no difference when compared with the colossal figures registered in Hamburg, Berlin, etc.

The United States commercial agent at Limoges reports that the Department of Agriculture in France holds every year "Concours Regionaux," or fairs in the different agricultural regions. Prizes are given, medals awarded, and different tests made to develop the best interests of the land cultivators. At one of these concours held at Perigueux, the capital of the Dordogne, it was surprising to note the very poor display of machinery, though the best houses in France were represented. There were several foreign manufacturers represented, but the only prize awarded was given to the Planet Horseshoe and Cultivator Company, of Philadelphia, in a trial against 14 competitors. The following American agricultural machines and implements, if properly introduced, would find a most excellent market in France: First, there is a good demand for good mowers, reapers and binders. All the mowers on the ground but two were American, the exceptions being French and English, made after the pattern of patents that have expired in the United States. They were one-third heavier, their construction was more crude, the workmanship was poorer, and their difference in price from those of American make but £1 0s. 10d. Next in importance are hay tedders. Here the weather is so uncertain, and the soil so moist during the hay season, that it is absolutely necessary to keep the hay moving by turning and spreading, so as to have it dry enough to stack or house. The only tedder exhibited was heavy, poorly constructed and impracticable in many fields. A good tedder would be a boon to French hay-makers and find a ready market. Horse rakes are being used with considerable success. There are one or two manufacturers in France and several in England, but rakes coming from the United States are preferred, being cheaper and more easily worked by man and horse. There is a decided call for hand tools of American make over others, because they are better made, lighter in weight, and better wood is used in the handles. In many rough, rocky and uneven places, where a machine cannot be worked, it is necessary to use a scythe. The style generally used here has a very short, heavy blade, much like what is used in the United States for cutting brush; but it would probably be easy to demonstrate the advantages of a scythe and snath, as used in America, especially in cutting the heavy grass of the lowlands. Hay presses are almost entirely unknown, though hay is bound in bundles, much like threshed-out or wheat straw, and sold that way. Hay presses worked by hand and horse power can be marketed in France, but it will take some time and require care in the introduction. Threshers and cleaners are in good demand. Grain is usually threshed now by small companies, who unite in purchasing a movable steam engine with threshing and cleaning attachments, who go around from farm to farm. The prices of the steam machines are from £311 to £622. Horse machines are rare, but would sell quite readily to smaller proprietors, who cannot afford steam power, although the manufacture of steam machines is extensive. Drills of an inferior kind, with limited and imperfect facilities for sowing all kinds of grain, are introduced into France from England. Machines which, in addition to sowing any kind of grain, have attachments for distributing chemical manures and grass seeds possess an advantage over heavier machines which do not sow regularly and are liable to get out of order. Plows and harrows are made in France in great variety, but all, as a rule, are modifications of the same pattern. Subsoilers and plows of that description are not well known here. Harrows are mostly manufactured in England, and there is only a call here for the cheaper qualities. Other models might be introduced. Cultivators and horseshoes are very much needed. The styles in ordinary use have been antiquated in the United States for a long time. Garden tools are needed, especially spades and shovels, the long-handled ones being generally preferred. Those with rounded edges are mostly in favor. There is a great demand for wooden pails. Wooden measures of all sizes, after the metric system, are greatly in demand. Barbed and ribbon wire fencing has of late been in great demand. The supply comes mostly from England. There is a demand for all kinds of small tools, such as hoes, potato diggers, garden rakes, spades, etc. It is not recognized by manufacturers in the United States how necessary it is to have the right parties to introduce machinery of American make.

WORLD'S FAIR NOTES.

The Mining Building at the Fair is rapidly nearing completion. The entire framework is erected and the exterior finish is being put on. The south front is finished and the scaffolding has been removed.

The committees on mines and mining of both the National Commission and the Directory will make a tour in May of the principal mining States with a view of stimulating interest in the mining department. The members will defray their own expenses.

Of the 75,560,000 ft. of lumber required for the

Exposition buildings, docks and electric subways, 54,875,800 have been placed. Of iron and steel 39,490,900 lbs., or nearly 20,000 tons, are required. Of this nearly half is in place, and the remainder will be in position before the first of June.

The upper Michigan peninsula has applied for 20,000 sq. ft. of space, and will fill it with mineral and timber products. It is proposed to show several cords of natural copper as it comes out of the mine, and also the various sorts of iron. A complete working model of a mine with reduction works is also promised. In the State Building will probably be a mantel of rough beaten native copper, and also a pillar of the same material, and the copper ore will be so chosen as to show the native silver that is often found with the copper.

The Salt Manufacturers' Association of Michigan has agreed to make the salt exhibit for the State, and will get up a display which, doubtless, will attract a great deal of attention. A Bay City man has made a life study of salt manufacturing, and has learned the methods practiced in all ages for making salt. It is the intention to have him make models of all salt manufacturing apparatus used from the earliest days down to the present time, from the most primitive to the modern salt blocks, and in connection with the models show all the processes now practiced in producing salt. The association will, of course, show a full line of salt.

INDUSTRIAL NOTES.

The Pulsometer Steam Pump Company, of New York, has recently received an order for one of its No. 10 pumps, with a capacity of 3,120,000 gallons in 24 hours, to be used in the Department of Public Works in the city of St. Louis, Mo.

A combination of the Westinghouse Electric Manufacturing Company's interests with the big foreign firm of Siemens & Halske is reported from Chicago, Ill., as having been formed to oppose the Thomson-Houston aggregation. George Westinghouse denies the truth of the report.

Copeland & Bacon, of New York and Chicago, have recently issued a new catalogue in which several of the new devices manufactured by them are shown, notable among them being their double cylinder portable hoisting engine, a double drum winding engine with link motion and brakes for use in double slope work; an endless sorting and picking table for use in ore sorting, and their endless cable drums for gravity inclines.

The Berlin Iron Bridge Company have received the contract for the new rolling mill which the Waterbury Brass Company, of Waterbury, Conn., will build to replace the one lately destroyed by fire. It is said that this will be the finest rolling mill in the Naugatuck Valley, being 150 ft. in width by 350 ft. in length, with brick side walls and iron roof trusses covered with the Berlin Bridge Company's patent anti-condensation corrugated iron roof covering. This building will be absolutely fire-proof, it is claimed.

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 addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

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

GOODS WANTED AT HOME.

2,665. A clay dryer to furnish clay for a dry press brick machine. Louisiana.

2,666. A combined lath, picket and stave machine. Louisiana.

2,667. A 20-arc light dynamo with all fixtures complete. Pennsylvania.

2,668. Prices for complete line equipment on an overhead electric line, 6 miles long, single track, standard gauge, 3 motor cars of 15 H. P., generator of 60 to 80 H. P., engine 100 to 125 H. P., and boiler for same. Virginia.

2,669. Complete steam electric plant, including one alternating dynamo, transformers for 300 lamps, 300 lamps and sockets, station equipments complete, 70 or 80 H. P. boiler and engine, 2½ miles arc line, 2 miles incandescent line, 18 double carbon lamps, suitable building and foundations for dynamos, boilers and engines. Bids will be received in whole or in part. West Virginia.

2,670. A 30-H. P. boiler dismantled and a 25 H. P. engine. Virginia.

2,671. A 7-in. four-side molding machine, a 16-in wood turning lathe, a scroll sawing machine, and 3 wood split pulleys, 12×30, 8×24, 6×16. Georgia.

2,672. Lathes, planers and machinists' tools. Texas.

2,673. A machine to manufacture conveyor flights. Pennsylvania.

2,674. A second-hand steam feed for an 8-in. saw mill. Virginia.

2,675. An engine, a boiler and a drier for drying soft phosphate. Florida.

2,676. Prices of machinery for manufacturing sash, doors, spokes, buckets, etc. Mississippi.

2,677. A general outfit for distilling, including boiler, pumps, pipes, etc. Arkansas.

2,678. Four hundred and fifty yards 12 to 16-lb. T rails for tramway; also two clay cars to take clay from bank to mill. Florida.

GENERAL MINING NEWS.

A bill introduced in the United States Senate on the 2d inst. by Senator Sanders, entitled "A bill for the protection of the silver mining industry," provides that the Secretary of the Treasury, in the purchase of silver under the provisions of the act of 1890, shall advertise for and receive bids for and purchase such silver bullion only as is produced from mines within the United States, or from ores smelted within the United States.

ALASKA.

(From our Special Correspondent.)

Alaska Coal Company, Cook's Inlet.—For eight months the mines at this point have been worked, and this week a staff of 35 additional miners and mechanics left this city for the purpose of building wharves, bunkers, tram-railway, etc. Inside of 90 days the first shipment of coal, it is expected, will be placed on the San Francisco market.

Alaska-Treadwell Gold Mining Company, Douglas Island.—A quarterly dividend of 37½ cts. per share, aggregating \$75,000, was paid on the 28th ult. **

ARIZONA.

Hon. W. O. Murphy, Secretary of State of Arizona, recently said the following concerning the mining industry of the Territory: "The Harqua Halas are wonderful producers and are attracting more attention than any other gold section in the country. Not long ago an \$81,000 bar of bullion was turned out from a forty days' run. The owners are residents of California. One of them is George Bowers, of San Francisco, and the other is A. G. Hubbard, who has large property interests in Los Angeles. There are other prosperous mines, and the production for the coming season will probably be the largest ever known in the Territory. The copper mines at Bisbee, Globe, United Verde and Clifton show unusual activity."

Maricopa County.

Dos Cabezas, Phoenix.—It is reported that this gold mine has been sold to an Eastern syndicate composed of New York, St. Louis and Chicago capitalists. The district, it is said, will now be developed to its fullest capacity.

Pima County.

Rich Hill Placer Mining Company.—This company, it is understood, will construct a big dam in the creek below Genung's spring, near Stanton, to catch water with which to sluice the rich gravel beds below. The spring itself furnishes four miner inches of water all the year round, and a very large body can be held by means of a dam below; this is fed by the live stream running into it continually, and will furnish water sufficient to do a large amount of sluicing every year. The placer grounds are claimed to be rich. The pipe for the new hydraulic system is now being shipped to the ground.

CALIFORNIA.

Amador County.

Bay State Mining Company, Plymouth.—Operations at this mine, which is located three and a half miles north of Plymouth, were begun by the present owners in last June. It is on the Mother lode, in close proximity to the Plymouth Consolidated mine. The mine was developed to a small extent about 25 years ago. The ore milled at that time about \$3.50 a ton, excluding the sulphurets. Three shafts were sunk. In the north one a depth of 80 ft. was reached. The middle shaft is 80 ft. deep, also, the two being connected by a tunnel. By a cross-cut run from the middle shaft a vein of quartz about 95 ft. in width was encountered. Four hundred feet north of the middle shaft a third shaft has been sunk to a depth of 60 ft., disclosing a ledge 18 ft. in width, proving that an abundant supply exists within the boundaries of the 80 acres of land owned by the company. The present owners concluded that by sinking deeper on the ledge a better paying quality of rock would be reached. Experience with the ledges in that neighborhood justifies Mr. Jones in this expectation. The shaft now being sunk is to a depth of 296 ft.; after a depth of 300 ft. is attained—which will not include a sump of 25 ft.—a cross-cut of about 40 ft. will be run, at which distance it is expected to tap the ledge.

Live Oak Mining Company.—The mine has been closed down for nearly two months owing to the scarcity of fuel, but work will be resumed a couple

of weeks hence. The present owners have made pay what previously was a losing proposition. It was discovered that about 50 per cent. of the gold passed off in the milling, so when the present owners got possession they erected an arrastra, run by a 12-H.P. engine. The experiment was successful, and operations will be extended when work is resumed.

Inyo County.

A discovery of tin at Deep Spring is reported. Samples were sent to the State Mining Bureau, which reported the presence of metallic tin.

Mono County.

(From our Special Correspondent.)

Mono Mining Company, Bodie.—The ore being taken out from north and south from above No. 1 winze, below 700 level, is very rich, but no particulars are to hand as to its extent. The average battery samples for the week were \$38.10; tailings, \$7.91. **

Nevada County.

Cassidy Consolidated Mining Company.—A patent has been secured for this mine, a piece of property adjoining the Empire on the west and the W. Y. O. D. and Pennsylvania on the east. Ore taken from this claim by George H. Stackhouse and crushed at the Orleans mill yielded a handsome profit. The ledge has been worked down to water level for a distance of 1,500 ft. along the lode line, the ore yielding from \$15 to \$80 per load.

(From our Special Correspondent.)

Yellow Diamond Claim, Nevada City.—This property, which has been well prospected and is known to be a good ledge, having ore ranging from \$37 to \$266 a ton, and when last worked having a ledge 6 ins. thick, has recently changed ownership. S. B. Ladd, A. F. Dunnington, G. B. Chittenden and others of Washington, D. C., are the purchasers, and they are about to form a stock company at Washington, organizing with 100,000 shares at a par value of \$10 each, with a working fund of 50,000 shares. In order that active work might be at once commenced, 25,000 trustee's certificates are being disposed of at 50 cts. each, said certificates to be redeemed for stock when the company is organized. The company has 4,200 linear feet on the lode. **

Placer County.

(From our Special Correspondent.)

Harlon Drift Mine, Loomis.—The mill is kept running just now, the average crushing being 45 tons per day. The clean-ups average \$2,400 per week, of which over 50 per cent. is clear profit. The gravel is taken altogether from drifts and laterals, no breasting being done.

Mayflower Gravel Mine, Forest Hill.—A shipment of bullion, valued at \$3,700, has been received from the mine, making the total for the month \$11,000. **

COLORADO.

Mineral surveys approved by the United States Surveyor General of Colorado during the week ending April 30th, 1892: Survey No. 7,398, land district, Central City, name of claim, Little Comstock Lode, 7,387, Pueblo, Grace Greenwood Lode; 7,137, Durango, Stafford Lode; 7,401, Central City, Santa Fe Lode; 7,363, Garfield, Amazon Lode; 7,378, Central City, Fifty-niner Lode; 7,388, Leadville, Old Ironsides, Ben Harrison, Countess, Aggie and Maggie Lodes. Amended surveys: 5,822, Leadville Lime Deposit Placer; 4,939, Central City, Franklin and Steamboat Lodes; 930 A and B, Central City, Iris Lode and mill site.

A press dispatch in the Denver "Times" from Casper gives the following information concerning the recent discovery of asbestos in Casper Mountain: The dikes run east and west and are about three miles. There are five of them, and they each are composed of from four to six veins of asbestos that range from 1 to 6 ft. in width, making the field about two by three miles in extent. There have been about 40 claims located, which are in the hands of men unable to work them properly, but who have done more or less on all of these claims. The walls of the different veins differ to some extent, but the walls of the main dikes are granite on the south and quartzite on the north. The dip of the veins is about 20 degrees to the southwest.

Chaffee County.

(From our Special Correspondent.)

Bath, Buena Vista.—These properties are attracting much attention. The ore found is a lead carbonate carrying silver. ***

Dolores County.

Enterprise Mining Company, Rico.—The extraction of ore continues with unvarying regularity at the Enterprise and Jumbo mines. The ore veins are being opened up and are looking better as work is advanced. On the completion of the ore house at the mouth of the Group tunnel all the ore will be taken out that way.

Rico-Aspen Consolidated Mining Company, Rico.—Two levels have been started at a depth of 522 ft. in the Aspen shaft, says the Rico "News." The levels are pointed north and south from the shaft, and are intended to cut the formation at right angles, the course of the vertical veins on Newman Hill having a nearly east and west course. Work has also been commenced in the contact vein of the Aspen shaft about 400 ft. from the surface. The vein at present does not contain much marketable

ore. At a depth of 510 ft. in the Vestal shaft two drifts have also been started pointing in a similar direction to those in the Aspen to prospect the ground. Work has also been commenced on the contact in this shaft, which occurs at the same depth as in the Aspen shaft. The company is also operating the Montezuma, adjoining the Enterprise on the south. In its lower levels are exposed reserves of ore, which are increasing as development progresses. The ore shipments average more than a carload per day, of high grade ore, all of which is shipped to Denver. The Syndicate group is also being worked by this company, and a large amount of good ore is being mined and shipped. A 10-in. streak of silver glance was recently struck in the east drift of the Vestal claim. Mr. A. B. Roden, treasurer of the company, will leave for New York shortly to confer with the Eastern stockholders in regard to some contemplated deals. The company already owns 35 claims.

El Paso County.

(From an Occasional Correspondence.)

Buena Vista.—In this mine the shaft is down 62 ft., with 150 of levels. From this nearly \$7,000 in gold have been shipped at a cost of less than \$5,000. The vein at the bottom of the shaft is 4 ft. wide and runs without sorting between \$60 and \$70 gold with a fraction of an oz. silver. The Buena Vista is only one of half a dozen most promising properties, the Anaconda and Gold King showing large bodies of high grade gold ore. The former has been conservatively estimated from measurements and assays to contain \$6,000,000 in sight.

Gunnison County.

Blaine, Pitkin.—This mine is reported as improving. There is a small body of medium grade ore at the property. The shaft at the Silver Plume, adjoining the Tycoon, is in about 85 ft., and that at the Stars mine about the same depth.

Cleopatra, Pitkin.—This mine is shipping good ore. The body found a short time ago proves good. The owners are now 40 ft. in ore, and the vein is from 8 ins. to 4 ft. wide.

Chronicle, Pitkin.—The gold strike in the north drift, third level, of this mine still holds good. The south drift, same level, is in the ore 22 ft. The vein is about 4 ft. wide and runs 60 oz. silver and \$4 gold.

Swiss Belle, Pitkin.—At this mine the owners are still working on the upraise and have 35 tons of ore on the dump, running 100 to 1,000 oz.

Tycoon, Pitkin.—This mine has shipped a car of ore which sampled 156 oz. silver.

Lake County.

Blind Tom, Leadville.—The ore struck at this mine, reference to which was made in our last week's issue, is reported to run 60 per cent. lead and 100 oz. silver to the ton.

Iron Silver Mining Company, Leadville.—At the annual meeting of the stockholders of this company, held in this city on the 3d inst., the following were elected directors for the coming year: Ashley Pond, W. H. Stevens, Freeman H. Newberry, Wm. A. Moore, of Detroit, Mich.; L. H. Peirce, of Chicago, Ill.; Homer A. Hoyt, Parker D. Hardy, R. W. Swan, L. B. Crocker, Henry A. Taylor and R. W. Raymond, of New York. At a subsequent meeting of the directors of the company the following gentlemen were elected officers to serve for the ensuing year: Ashley Pond, president; Parker D. Hardy, vice-president; Jno. M. Nicol, treasurer; Homer A. Hoyt, secretary and transfer agent; Fremont Woodruff, assistant secretary.

(From our Special Correspondent.)

The water proposition in Leadville is being rapidly solved, the three shafts—i. e., the Penrose, Star of Hope and the Sixth Street—having already lowered the water more than 100 ft. in each respective shaft. Pumps, in stations that have been submerged, are being continually met with, put in order and started, these at once adding their quota to the general output.

Doris, Leadville.—The discovery that another fine ore chute lies just west of the main chute, separated by a lime wall, has been made in this mine by cross-cutting through what was supposed to be the wall. The second chute, however, contains ore of much higher grade than the first, and the gold value is much greater. About 25 tons a day are now being shipped, with a promising prospect of opening out both bodies to such an extent that the output will soon be doubled.

Dunkin Mining Company, Leadville.—This company is shipping on an average about 50 tons of ore a day, the greater percentage of which is argentiferous iron, though the quantity of lead carbonate ore mined is considerably in excess of that of the previous month.

Kansas City Mining Company, Leadville.—This company has about completed arrangements to resume work upon its properties, about four miles from the city, but within this district. Here the indications are that a further sinking of the shaft, which has already attained a depth of about 400 ft., will result in finding ore upon the quartzite, which outcrops a short distance to the west of the main workings. The property has not been worked for a year, and is principally owned in Kansas City and adjacent cities.

Twin Lakes Placer Syndicate, Granite.—The work on this placer has not begun as yet, though the man-

ager has just returned from a reporting visit to the directory in London. A consolidation is to be effected between this company and the owner company of the adjoining ground, as the hydraulic plant on the former is amply adequate to the joint work the development will proceed during the coming season. There are three pipe lines, furnishing six Hoskins' giants with all the water necessary. The ground intended for washing this season gives returns warranting the belief that the property can be worked to a large profit. Curvatures and grades have been reduced, and some 80,000 ft. of lumber was used last season in getting the different flumes into shape. ***

Ouray County.

A dispatch from Ouray says that the Yankee Girl mine is again in good ore, and that on all the large mines of Red Mountain ore is being piled up awaiting shipment and an advance in silver. Development goes steadily on, new properties are being opened, and there is decided improvement in the mining outlook. The Silver Belle mine, near Ironton, has encountered a good body of ore. On the Cora Belle 25 men will be at work shortly. The main shaft is now down 375 ft.; three drifts are running.

Bobtail, Ouray.—A strike is reported at this mine located above Ironton, and owned by the Standard Oil Company. The ore body is quartz, carrying free gold, silver, zinc and lead.

New Guston Company, Limited.—The following is the superintendent's latest report: No. 3 level, south drift: Drift extended 15 ft., total distance driven from north end of No. 3 stope 232 ft. Ore in forebreast scattered. Average value 40 oz. silver, 1/4 oz. gold per ton. The drift has now been driven through ore from 1 ft. to 8 ft. wide for a length of 58 ft. In places the ore is slightly mixed with decomposed porphyry, but I anticipate being able here to open out a fine stope during the coming shipping season. No. 6 level, south drift, winze: The winze under the new or boundary stope has been sunk 21 ft., total depth 41 ft. Ore in bottom of winze scattered. Average value: 40 oz. silver per ton. For 20 ft. in depth a fine body of ore was met with in sinking. We purpose pushing this winze down with all speed and effect communication from No. 7 south drift. North or pioneer level, upraise: About 90 ft. north of winze an upraise has been made for the purpose of communicating with the north end of the north stope. The ore in the stope-over having lengthened out north for 100 ft. from the winze, it was necessary to put this raise up in order to carry on operations, when resumed, in the stope more advantageously; at the same time proving the ground from the back of No. 6 level to the stope. Height raised 24 ft. Total height of upraise 47 ft. There is about 15 ft. more to raise to communicate with stope. Cross drift: 26 ft. back from forebreast of drift, a cross-drift has been driven west 14 ft. Here we have the ore break well defined, but no ore of value has thus far been met with. No. 7 level, No. 7 ore body stope: We have been engaged repairing the timbers in the stope and getting this point in the best possible shape for spring shipments. South drift: The work of retimbering the south drift has been completed. Length of drift retimbered 162 ft. Drifting has been resumed. South drift, winze: Immediately under the middle stope, or 90 ft. south from the cross-cut at No. 7, ore body stope preparations are being made for sinking a winze on the ore passed through when drifting. North drift: Drift extended 15 ft., total length driven from cross-cut 42 ft. No. 8 level, south drift: Drift extended 20 ft. Total distance driven from the cross-cut on the ore break 43 ft. No ore of value has yet been met with, but the ground looks exceedingly favorable for mineral. North drift: Drift extended 21 ft. There is nothing of value to report. Shaft sunk 31 ft.; total depth below the base of No. 8 station, 97 ft. Machinery: The machinery at surface and underground is working satisfactorily. Ore at surface awaiting shipment about 500 tons.

Pitkin County.

Homestake.—A strike, according to report, has been made in this property, consisting of a large body of fair grade ore, which has not been sufficiently examined to tell its exact value, but from present indications there is an unlimited quantity of it.

Smuggler Mining Company, Aspen.—U. S. Commissioner Hinsdale, at Denver on the 27th ult., took testimony in the suit in equity brought by this company of West Virginia against the Standard Mining Company, the Fulton Mining Company, the Silver Brick Mining Company, Leon Pollard and Benjamin Phillips, defendants. The action is brought by the Smuggler Company to obtain possession of about seven-eighths of an acre of mining property near Aspen.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending April 23d were: From Sheridan Co., 24 cars; from Smuggler-Union, 41 cars; from Hector Mining Co. (Cimarron), 1 car; total, 66 cars; total shipped since Jan. 1st, 1,073 cars.

IDAHO.

Boise County.

Mountain Queen Mining Company.—The 20-stamp mill at this mine, near Pioneerville, has commenced crushing. The ledge is porphyry, 30 ft. wide, and goes from \$5 to \$10 per ton in free gold, while \$2 per ton is said to pay expenses.

Owyhee County.

Blaine Tunnel.—Work has been stopped on the tunnel to put in air pipe. The tunnel is in 968 ft., and in the present face and for the last 70 ft. the drift has been in a fine shoot of ore. The ledge between walls is 6 ft. wide with 2 ft. of fine ore, assaying from \$168 to \$500. The character is a soft, white sugar quartz, easily crushed and milled. The company will now have plenty of work for its mill. This shoot of ore is 1,600 ft. south of the famous shoot in tunnels 2 and 3 of the Trade Dollar.

Poorman Mines, Limited.—The second general meeting was held in London on the 14th inst. The chairman, Mr. J. Hamilton Brotherton, made the following statement: "The report and balance-sheet before you extend over a period of 15 months—that is, the expenses do. The revenue account extends over an actual period of 14 weeks, to an apparent period of 16 weeks, the difference being caused by the fact that we make our clean-up at the mill at the middle of each month; consequently the clean-up between Dec. 15th and 31st does not appear in this balance-sheet, but appears in the Jan. 15th clean-up of this year, so that the state of affairs as presented in this balance-sheet is not absolutely as good as it is in fact. You will find by turning to the revenue account that we have from 910 tons of ore obtained £11,761 19s. 2d. The cost of obtaining that, for wages, hauling, milling, superintendent's salary, labor, on roads, cablegrams and taxes, amounts to £4,854 9s. 5d. The whole of the London expenses extend over 15 months, exclusive of directors' fees, and amount to £649 7s. 8d. We have distributed in dividends, up to Dec. 31st, or rather to the end of November, £2,264 19s. 8d., being at the rate of 13 1/2 per cent. for the quarter. We have charged to revenue account an item of £2,098 2s. 1d., which has been spent on account of capital. We carried forward on Dec. 31st £1,776 3s. 11d., which is equivalent to another dividend at the rate of about 10 per cent. per annum. Bringing matters up to the present date, as these accounts only deal with the period to Dec. 31st, we have crushed 681 tons of ore, which have produced something like \$42,800; we have declared an interim dividend at the rate of 20 per cent. per annum for the quarter ending Feb. 29th, whilst carrying forward a handsome sum, a portion of which is still being appropriated to the development of the large body of ore our manager reports he has struck. It is a vein 8 ft. wide, and his last report states that in cross-cutting on this lode has gone east 35 ft., and yet has not reached the eastern wall of the lode. It was only 8 ft. wide when he started, and now he finds it is 35 ft. wide. An important feature of this strike is the fact that the whole of the values in this lode are gold. Our mine is a gold and silver mine. Hitherto silver has predominated, but we are pleased to find that this large vein which the manager is now developing has most of its value in gold—the quartz being soft and very mealy. The value of our bullion has averaged from \$1.82 to \$2 per oz. We expect, with this lode, the value of our bullion will be increased to something like \$6 per oz. This is an important item to us considering the low price of silver at the present time. In a report, dated Feb. 14th, the manager says: 'I cabled you to-day that the ore-body to the west has improved. The average assay of the last week have been \$21.25.' This is the 8-ft. lode which when first cut only averaged something like \$12 a ton. The highest sample average we have obtained from it is \$46 a ton. This has extended over a period of seven days. On Monday he had an average of \$14.30; Tuesday, \$13.40; Wednesday it dropped to \$6.70; on Thursday it rose to \$23.35; on Friday it was \$24, and on Saturday \$46.05 to the ton." It was stated that the capacity of the custom mill where the ore is crushed would shortly be increased, allowing increased production.

Trade Dollar.—Stopping is being done in tunnel No. 1 on a fine ledge of milling ore mixed with some shipping ore. Winze C is just as rich, if not richer, than when we last mentioned it, two weeks ago. Where the company stopped drifting north at the bottom of winze C, the ledge is 2 ft. wide of \$1,500-ore. Tunnel No. 3 has not cut the ledge yet and is south of C winze about 100 ft.

Shoshone County.

Helena & Frisco Mining Company.—It is reported that negotiations are under way for the purchase of this property, the consideration being named as \$1,500,000. The parties named as the possible purchasers are the syndicate which owns the Jay Hawk and Lone Pine properties.

ILLINOIS.

Madison County.

Consolidated Coal Company.—The coal miners' strike at Collinsville is still on. The members of the committee appointed to speak in behalf of the miners have not had an opportunity to consult with the Attorney General, nor have they been afforded a chance to return to work. The miners insist upon the weekly payment of wages, according to the law recently passed, and a general strike throughout the State is threatened in case satisfactory terms cannot be made. A meeting was held on the 29th ult. by the miners, at which the Consolidated Coal Company was asked to reinstate the discharged men. A refusal on the part of the Consolidated Company will insure, it is said, a general strike among thousands of Southern Illinois miners. The Consolidated Coal Company's miners at Staunton, Macoupin County, thus far have paid no attention to the Collinsville strike.

KANSAS.

Cherokee County.

During the week ending April 30th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,452,880; rough ore, pounds sold, 2,226,040; zinc ore, pounds sold, 1,172,920; lead ore, pounds sold, 139,600. Sales aggregated a total value of \$16,550.

B. C. Kingsbury, President of the Coeur d'Alene Silver-Lead Company, returned recently from a visit to the Coeur d'Alenes and Spokane Falls. When asked by a reporter as to the prospects for the resumption of work in the Coeur d'Alene mines, Mr. Kingsbury said:

"The properties there have all closed down for an indefinite period, and with silver at such a low figure it is just as well that it should be so. There is no telling when a resumption will be ordered, as the mine owners are determined not to accede to the demand of the car shovers and shovelers for \$3.50 per day. It requires no skill to do this work. With miners it is different, their vocation requiring them to have a practical knowledge of the work, the same as that possessed by the blacksmith, the carpenter, or in fact any other tradesman. Further, the mines of that district might as well remain in a state of suspension any way, as the miners a short time ago gave notice to the mine owners that on June 1st a demand for \$4 per day of eight hours would be made by them, and that of itself would mean a strike. Lead, too, is in a dilapidated condition just now. When the mines were in operation this metal was quoted at 4¼ cents, but now it is hovering about the 3.60 cent notch. With affairs in the condition they are now it is better to have the ore in the mines. As to help for the miners of the Coeur d'Alenes they can get all the financial assistance they desire."

MAINE.

Penobscot County.

It is alleged that a discovery of coal has been made under the town of Greenfield. It is stated that experts have pronounced the samples to be bituminous coal of good quality.

MICHIGAN.

Copper.

Adventure Mining Company.—This mine is being opened up by a force of miners.

Allouez Mining Company.—While work is suspended at this mine, it is said that the Calumet lode will be explored on it.

Centennial Mining Company.—Thirty-five men are at work sinking No. 3 shaft. The hoisting capacity has been increased.

Iron—Marquette Range.

Volunteer.—The management of this company has discharged 225 employees. The men laid off were miners and surface men, and only 100 men are retained. This step was taken by the owners of the mine because of the large amount of ore now in stock at the mine and unsold. The stockpiles are estimated to contain 115,000 tons.

MINNESOTA.

Iron—Mesaba Range.

During the past week the force of men employed at the Cincinnati, Kanawha and Hale mines has been greatly increased with a view to opening up the properties and getting them in shape for shipping ore. For an area of several acres on each property the trees are being cleared off and the underbrush is being burned, and as soon as the frost is thoroughly out of the ground the work of removing the surface will be commenced. It consequently will not be long before an immense underground stock pile will be exposed to view at these three properties, and it will then be an easy matter for a visitor to the range to fully realize the extent of the deposits.

The Duluth & Iron Range Railway Company. have let contract to build a branch to the Canton mine in Sections 3—58—16. It is very hard to guess what ore will be shipped from the Mesaba this year, as they are into the hands of speculators and not mining men. The Pewabic Company have just released their property to Kimberley & Jones, of the Hamilton mine, Iron Mountain, Mich. They have to pay 50 cts. per ton, and it is presumed they will do some work this year.

(From an Occasional Correspondent.)

Hamilton Ore Company.—This company has secured control of the Biwabik, paying a royalty of 50 cts. per ton. When Mr. Kimberley and his superintendent, Mr. John T. Jones, looked the property over about a month ago they arrived at the conclusion that it would prove to be a non-Bessemer. They now state, I understand, that they expect to make it a producer of Bessemer ore. A new find of 66 to 67 per cent. Bessemer ore has been made at this mine. While at the Kanawha I noticed that a shaft was being sunk in some ore exactly similar to that at the new find of the Biwabik. This ore had not been discovered when Mr. Hollis visited the mine. Messrs. Kimberley and Jones took a large number of samples from the Cincinnati, and have concluded that this mine is a Bessemer. The Lake Superior also has a Bessemer ore, exactly similar to that at the Norrie.

Iron—Menominee Range.

Hamilton Ore Company.—Three tests of the new

bailing apparatus have been made for the purpose of ascertaining which was the most economical way of freeing the mine of water and keeping the same free—pumping or the system just tested. This bailing apparatus consists of two immense iron bailers 38 ft. in length and 42 ins. in diameter, holding 1,460 gallons of water, and when filled weigh 10 tons each. They are operated by a compound Corliss type engine manufactured by Webster, Camp & Lane, of Akron, O. The cylinders are 32x72 ins., and the capacity is 1,400 H.P., with a steam pressure of 120 lbs. The reels are 6-ft. centers with a capacity for 2,500 ft. of 8-in. flat rope. In the first test made the machinery was in operation exactly 45 minutes. In that short time the water was lowered 34 ft. 6 ins. In the following 18 hours 10½ ft. of water flowed into the shaft. On Sunday last another test was made, and the engines were operated some 8¼ hours. In that short time the water was lowered 428 ft., and at times the speed of one boiler a minute was attained. It is estimated that 752,760 gallons of water were raised, 306 bailers full being discharged. In the succeeding 36 hours, during which time the bailers were not in operation, 14 ft. of water flowed into the shaft. On Wednesday last another 9¼-hour test was made and the water was lowered 425 ft., making a grand total of 899 ft., or less the inflow of 853 ft. At this rate it would only take three days to free the shaft, which is 1,436 ft. in depth, of water.

Mastodon.—At this mine the force is very small, but 14 men all told being employed. Six of these are uncovering the southeast stope back of the old skiproad, a "raise" having been put up during the past winter to enable them to run down the sand and rock and thus make an opportunity to work this stope underhand, the sand and other refuse going down to fill a large room at the 350 ft. level. It is estimated that 12,000 tons will have to be removed from this old cave over the skiproad. Superintendent E. S. Roberts says that little work will be done unless there is a material change in the market, as the Mastodon Company has not sold a pound of ore, nor has any purchaser been found even at low figures. As most of this year's product will have to be from the open pit a rest of a month or two to allow the frost to leave the ground will render future work much more safe.

MONTANA.

Coal.

Prof. O. C. Morton has prepared a report of the coal output and the condition of the industry in Montana for the year 1891 for the Department of Statistics at Washington. "From the best available sources, I estimate the coal production of Montana for 1891 to be about 582,000 short tons. The past three years shows an average ratio of increase of between 13 and 14 per cent., as follows:

1889.....	363,301 tons.
1890 (an increase of 49,683 tons).....	512,984 "
1891 (estimated—an increase of 69,016 tons).....	582,000 "

The above amounts are exclusive of the coke product, which industry may be said to be in its infancy as yet. The building of the Montana, Wyoming & Eastern Railroad (a branch of the C. B. & Q. system) this coming season will undoubtedly stimulate the coal production of central Montana, where vast areas await exploitation. The Pacific Extension of the Great Northern Railway will also without doubt bring the coal fields of Choteau and Missoula Counties into prominence, as the extent of the Choteau fields is utterly unknown and those of Missoula are very large and abnormally thick. Park County has the largest product, with Cascade second. The eastern part of Montana may be said to be one vast lignite deposit, and if I could procure the returns from all the small banks which are scattered over that section it might possibly increase the product 750 tons. This data, however, it would be an impossibility for me to obtain without an organized method requiring time and money. From the present trade outlook and amount of development being done, a larger output may be expected during 1892 than any time heretofore."

Jefferson County.

The Elkhorn Mining Company, Limited.—The following cable information comes from the mine: Bullion produced for week ending April 23d, \$9,545.

Meagher County.

Hartley.—This property is being worked under bond by a syndicate consisting of E. G. Maclay and others. They let a contract to E. L. Murphy, Geo. Gunn and Frank MacGregor to run a crosscut tunnel to cut two leads which appear in the upper workings. This contract was finished on Tuesday evening, as the tunnel 365 ft. long cut the second lead. The upper workings consist of two shafts, each 35 or 40 ft. deep, on different leads, each 3 or 4 ft. wide. The crosscut below has cut these leads and they have at the depth obtained sufficient ore of a high grade to set stopers to work. Upraises will be made to the surface from the tunnel below.

Montana Gold, Silver, Platinum and Tellurium Mining Company, Neihart.—Mr. John C. E. Barker reports concerning this mine as follows: Two men working in the face of the drift in the lower level are taking out \$1,000 worth of ore per day. The mine at this point shows 8 ins. of ore that will sample \$2,000 per ton. In fact, there were streaks of ore 2 ins. in thickness in which the ruby seemed to predominate. These specimens will average from \$15,000 to \$20,000 per ton. The largest specimen,

nearly the size of a man's hat, showed the thickness of the streak and the position of the different classes. The tellurium ore, now not in a regular streak, showed up in splendid quantities and would average fully \$30,000 per ton. There were also streaks of gold ore in the vein that were very rich indeed. In addition to these fine chunks Mr. Barker exhibited two saucers full of pure metal in wire form. The cluster of wire silver was simply wonderful, one mass weighing 7 oz., while the saucer of wire matte would have weighed four or five times that much. The saucer of gold wire was not quite so large or pure as the silver exhibit, but it was the richest ever dug from a quartz mine in the Northwest, being worth almost as much as gold bullion.

Silver Bow County.

Butte & Boston Mining Company.—It is now a settled fact, says the Butte "Miner," that the Butte & Boston Company will early in May take under its protecting wing a group of copper-silver claims lying east of the Mountain View mine. This group comprises the Rarus, Snohomish, Never Despair and Tramway, each of which is known to contain large bodies of rich mineral. About six months ago the claims were bonded by Robert C. Burton, who shortly afterward placed the papers in the hands of Ferdinand Van Zandt, the originator of the Butte Copper Company, which was to be operated in conjunction with the Blue Bird. This was about the time the trouble arose between the Butte & Boston people and the Butte Copper Company over the Ground Squirrel Claim, and Burton, realizing that the latter intended to persecute the former company by reason of the fact that a portion of the Butte & Boston works were on a few feet of the Never Despair ground, took sides with the Butte & Boston, watched his opportunity, took the bonds out of Van Zandt's hands and turned them over to the Butte & Boston people. A breach of the contract between Van Zandt and Burton regarding the development work to be performed made it possible for Burton to take the bonds from Van Zandt, and it was done at the first opportunity, on the 16th of January. Since that date the Butte & Boston Company has been sinking a shaft on the Snohomish. This shaft has now reached a depth of 250 ft., and although the bottom is about 75 ft. from the vein, rich stringers of copper ore are being encountered at every stroke of the pick.

Olive Branch Mining Company.—A rich strike is reported in the Olive Branch, east lode, lying in the suburbs of Butte. The shaft, 5x9 ft., has reached a depth of about 96 ft., the last 35 ft. of which has been driven through a solid body of ore that assays from 47 oz. to 276 oz. of silver, and that carries from \$4.60 to \$19 in gold. There is neither hanging nor footwall exposed and no idea can be formed of the width of the vein, although it is known to exceed 12 ft. Sinking is still in progress and the shaft is still full of ore. At a depth of less than 20 ft. a 2-ft. vein of 70-oz. ore was encountered. About 14 years ago about \$75,000 were taken out of one edge of this property, after which it was abandoned on account of inadequate facilities for keeping out water and pushing the development. Last December G. W. B. Smith, of Helena, and Daniel Jaeger, of Butte, interested themselves in the matter, and J. G. Ramsey, S. W. Merrill, J. T. Sperry and A. B. Keith, of Helena, united with these gentlemen in taking a bond on the property for \$45,000. The Olive Branch Mining Company was incorporated, with A. B. Keith as president.

NEVADA.

Elko County.

Nevada Queen Mining Company.—Of Nos. 1, 2 and 3 raises, all show continuous ore, average width 4 ft., assaying from \$106 to \$760. Third level—East drift from No. 3 raise in 16 ft., has exposed 18 ins. of good ore; looks well in the face. Stopes above this level show but little variation. Hoisted during the week 15 tons first-class, average assay \$306 per ton, and 100 cars of second-class, average \$52.21 per ton.

(From our Special Correspondent.)

Captis Mining Company, Tuscarora.—The De Frees mill will start up on the accumulated ore of this company early in May. The following are returns from ore worked in this city: Second-class ore, \$166.50; third-class ore, \$74.18. **

Lincoln County.

In a recent interview in the Salt Lake "Tribune" Mr. S. T. Godbe, who had recently returned from the new Ferguson or Monkey-Wrench district, made the following statement: "About the best claim in the district is the April Pool. It is a fissure cutting the bed of the country at right angles to the dip just like the fissures in Pioche. They are nearly all fissures breaking from one porphyry dyke to another porphyry dyke, although the dykes are in quartzite. In the April Pool they have run a cut about 12 or 15 ft. below the outcrop, which has proved the vein at that point to be 55 ins. wide, carrying \$1,100 in gold besides the silver; and it is safe to say that a fair average of the vein will go pretty high in silver, because there is 4 ins. included in the 55 ins. that assays 10,000 oz. silver per ton. Besides the vein proper, they have 3 or 4 ins. on the hanging wall that samples \$24,000 in gold. Of course this gold in the quartzite walls has worked in from the fissure. The walls are more or less impregnated with gold for 15 or 25 ft., but it would not be proper (as some do) to include all that in the width of the vein, because the ledge is comparatively a narrow fissure

with its dips, spurs and angles going off into the walls quite a distance. When its owners get fixed for handling low grade ore there may be 20 ft. of the wall that will pay to handle. The walls are rich in gold, and for a little way in they run up into the thousands of dollars per ton, but then some distance out it would be low. The ore chute, as indicated by the open fissure, is shown to run 300 ft.; beyond that the fissure is closed and there are no signs of mineral. The Magnolia is also on a porphyry contact. There is at this time a shaft 25 ft. deep on the ledge, and the vein has improved as it has gone down. In the bottom of the shaft is about 4½ ft. of ore, and the walls are diverging at that point. Like the April Fool, to some extent, the walls of the Magnolia are considerably impregnated with gold and some silver. The ore in this vein will perhaps average as high as that of the April Fool. The vein has been stripped about 300 ft. on the surface and ore found all the way, proving the chute 300 ft. long. About 300 ft. north and down the hill another shaft has been started on this vein that shows the ore channel to be about the same as it is on top of the hill in the discovery shaft. The Magnolia fissure will, without a doubt, run for miles. I have found porphyry and quartz contact three miles and a half directly south of and in a line with the Magnolia, but you cannot trace it all the way because it is covered with soil and boulders. There is a claim called the Ferosa, owned by Messrs. Chon and Wilson, that promises to turn out big. It is a huge ledge, 50 ft. wide, and they say it goes about \$50 per ton in gold. But it is impossible to tell what a big ledge like this will prove to be in the short period of a week or two. The Ferosa is in a line with and perhaps is on the same fissure as the Magnolia. There is a claim that I think looks well belonging to Mr. T. E. Edwards. They get ore in which you can easily see free gold. This claim is about half a mile south of the Magnolia and parallel with the April Fool. J. B. Clinton is said to have a rich claim, though I have not seen it. He gets good gold pinnings from his ore, and I understood that a man named Mr. Howell from Salt Lake offered him \$6,000 for it inside of 30 days and \$100 down, but the offer was refused. About half a mile north from the Magnolia, too, is a claim in limestone, belonging to John Vietti and others, that was supposed to be a silver mine, as it has been assaying about 60 oz. silver, until the other day a sample of 4 ft. in the face of a cut was taken that went \$1,400 in gold. Still farther north there are other claims owned by Roeder and the Ferguson boys that have had considerable work done on them. They all run high in silver and carry some gold. These are the first claims found in the district. Ferguson cannot help but develop into a prosperous mining country, and it will not take long to do it either. I never saw or even heard of a vein showing such a splendid ore chute as the April Fool does for such a new prospect. There has been little actual prospecting in the district as yet, and it would take a thousand men a year or two to prospect that district, for it is a big mineral belt, and so much of it is covered with boulders and soil that prospecting will necessarily be slow and tedious. The veins are all on a contact with porphyry and quartzite like the Yuba and Ontario mines, and if they don't go down then there is no use in relying on the generally accepted principles concerning the permanency of veins."

Storey County—Comstock Lode.

Belcher Mining Company.—The winze from the north lateral drift on the 300 level is now down 43 ft. The bottom shows a width of 6 ft. of quartz mixed with porphyry, pitching west. Have stopped the raise from this level and started a winze from the 200 level to meet it. The west cross-cut from the end of the seventh floor north drift, 1,300 level, has a total length of 48 ft. It has passed through quartz assaying from \$7 to \$10 per ton, and has reached the footwall.

Bullion Mining Company.—In this mine, on the 1,300 level, a width of 50 ft. of mineralized quartz giving assays ranging from \$4 to \$12 has thus far been cut by the east cross-cut 350 ft. south of the north line. Some very active and important work will be done in this large quartz body during the next six months.

Justice Mining Company.—The west drift, 490 level, is now out 818 ft.; face in hard rock. The south winze from No. 2 cross-cut, 622 level, is now down 15 ft. There is a streak of ore in the bottom 18 ins. wide assaying from \$15 to \$20 per ton.

Kentuck Mining Company.—From the south drift, 160 level, have extended a cross-cut west 20 ft., where a streak of ore of good grade was cut, varying in width from 8 to 12 ins. Are following this streak north and saving the ore as we advance.

Overman Mining Company.—Extracted from the 1,000, 1,100 and 1,200-ft. levels during the past week 117 tons and 500 lbs. of ore. Car samples average \$27.77 per ton. The Vivian mill started to crush ore on the 19th inst. Battery assays, \$28 per ton. On the 1,200 level the northwest and southeast drifts are both showing ore of a fair grade. The incline upraise above the 1,100 level is up 52 ft. and has in the top a seam of ore 20 ins. wide of good quality.

Savage Mining Company.—During the week we have hoisted 532 cars of ore from the 500, 950, 1,100 and 1,400 levels; shipped to the Nevada mill 525 tons; milled 525 tons, average battery assay, \$20.37. Bullion yield for the week, \$7,486.50. The

east prospecting drift from the 12th floor, 750 level, is advanced 75 ft.; face in clay and porphyry. The east cross-cut from the 5th floor, 950 level, is advanced 56 ft.; face in porphyry. On the 1,450 intermediate level we have started a northwest drift on top of the upraise from the 1,500 level, and advanced some 20 ft.; face in low grade quartz. On the Suro tunnel level the joint north drift with the Gould & Curry Company has a total length of 370 ft.; face in porphyry.

(From our Special Correspondent.)

The efforts of the Mining Stock Association to compel the Comstock companies owning bullion producing properties to comply with the law has so far only met with very measurable success. It will be noted, however, from the following weekly statement of ore hoisted and milled, etc., that several of the companies are showing some inclination to furnish some, if not all, of the particulars required under the law:

Mine.	Tons extracted.	Car sample assayed.	Average milled, assay.	Bullion shipped.
Con. Cal & Va	1,260	1,405	\$19.21	(1)\$34,748.17
Hale & Nor's.	(2)544	\$18.69	428	14.88
Ophir.....	21	18.00	...	.....
Overman.....	117	27.77	...	28.00
Potosi.....	363	...	370	23.20
Savage.....	(4)532	...	525	20.37
Yellow Jacket	196	...	...	.....

(1) First shipment, to Carson Mint, on April account. (2) Cars. (3) To Carson Mint. (4) Cars. (5) Bullion product for the week.

It will be noted that the above companies differ in opinion as to what information shall be given to the stockholders, but nevertheless an advance is being made in the right direction. The Yellow Jacket stands alone in retaining a defiant attitude and absolutely refusing all information. This and other of the south end mines controlled by the Sharon estate and the Jones combination, like the Hale & Norcross recently, will bear investigation, or, to speak more properly, would not bear an examination of similar kind without the fact being disclosed that their administration is just as rotten as the one until lately under control of Levy and the other Comstock thieves.

Consolidated California & Virginia Mining Company.—There are rumors current that an improvement has been shown on the 1,800 level, and that another mill is to be set at work crushing ore, and the bullion output largely increased. At the Eureka mill six pans are being run on tailings.

Crown Point Mining Company.—A small streak of ore in the raise from the 160 level is being followed and may develop into a valuable deposit. In the bottom of the south winze, from cross-cut No. 2, 622 level of the Justice, a streak of ore has been found assaying from \$20 to \$30 per ton.

Hale & Norcross Silver Mining Company.—The ore hoisted is being shipped to the Brunswick mill. The concentrates from ore worked for a test at the Occidental mill have been shipped to Selby's Smelting Works. There was shipped from the Occidental mill to the Carson mill bullion of the assay value of \$487.18, and from the Brunswick Mill bullion of the assay value of \$7,959.04.

Occidental Consolidated Mining Company.—A drift has been started from the west cross-cut, 550 level, in ore assaying \$20 per ton. The north drift from bottom of the winze from 450 level is in low grade ore.

NEW HAMPSHIRE.

Grafton County.

Messrs. Chipman and Russel are working 10 tons per day at their mines at Lyman. They have a crusher, Golden Gate concentrator and Wiswell mill in operation. They claim an ore body of unlimited size, running \$5 per ton in free gold. The gold is carried in arsenical pyrites, the pure iron pyrites being barren. The pyrites concentrates are said to run \$100 to the ton.

NEW MEXICO.

Gen. A. McD. McCook, commanding the Department of Arizona; John H. Hammond, mining engineer of San Francisco, and John L. Barstowe, of Shelburne, Vt., who have been appointed a commission to investigate the Carrizo Mountain country by the Secretary of the Interior and report as to its mineral character, will meet at Fort Wingate May 10th and proceed to the Carrizo Mountains on the Navajo Indian reservation. If the reports that a rich mineral district lies in these mountains prove true the land will be purchased of the Indians and will be thrown open to the public. For more than 25 years miners have looked upon the Carrizo Mountains as the richest mineral section in New Mexico, and dozens of adventurous miners have lost their lives in attempting to prospect the country, which has always been jealously guarded by the Indians. In 1889 a party of five succeeded in reaching the mountains, and they reported having found fabulously rich ore, but one of their number was killed by the Indians and the others did not deem it prudent to return after they were safely out of the reservation. Two years ago a large, well-armed party went into the mountains, where they remained several weeks and located a large number of claims, but on the complaint of the Indians they were driven out by United States troops. Some very fine specimens of ore were brought back by the party which went into the mountains two years ago, and there are hundreds of miners in the Territory who are waiting for the opportunity to go into the district to locate mines.

Santa Fe County.

Santa Fe Copper Company.—Several hundred feet of the main tunnel have been caved, burying the drills and machinery and closing more or less of the drifts. Happily the company has been opening up the Copper Bell mine separate from the old works, and has been prospecting with a view to operate in other parts of the mine. Capt. John Daniell, of the Tamarrack mine, lately inspected the Santa Fe property and declared the situation encouraging.

Sierra County.

Kangaroo.—A rich strike is reported in this mine in the Kingston district. Ore is being taken out which runs from 1,500 to 2,000 oz. in silver per ton. The ore has been found to extend over 40 ft., and it is believed to be a more important strike than the one made in the Comstock mine of this locality in 1885, which started the Kingston boom. The mine lies between the Lady Franklin, from which hundreds of thousands of dollars have been taken, and the Comstock. It is reported also that Chicago parties have secured a bond on the property.

OHIO.

Stark County.

A promising feeder to the Cleveland & Canton Road is being built, not by the company, but by individuals connected with the company. This road leaves the main line at Navarre, and will run six miles into a new coal district called the Massillon, and will have some four miles of branches to the different mines. This coal district is about 12 miles south of Canton, and is estimated to embrace 8,000,000 tons of the best grade of domestic bituminous coal in Ohio, a coal much and chiefly used at Duluth. The road will be finished in July, and will probably be operated by the Cleveland & Canton Road under lease. Three mines are already opened, and it is expected that the output will be 150,000 tons of coal the last six months of 1892. To meet the prospective needs of the company, the directors have ordered 1,000 25-ton coal cars, which are also suited to other freight. These cars are bought of the Messrs. Pennock Bros., whose works are at Minerva, on the line of the Cleveland & Canton Road. Delivery of the cars has begun and will be completed in July.

PENNSYLVANIA.

Coal.

The railroad miners of the Pittsburg district, irrespective of the Miners' Union, met in conference with the operators on the 30th ult. and agreed upon the old rate of mining. The schedule adopted is as follows: The price of mining 1½-in. screen coal from May 1, 1892, shall be 79 cts. per ton of 2,000 lbs. and ¾-in. screen coal, 65 cts. per ton of 2,000 lbs. Run of the mine shall be paid for on a basis of the average weight for wagons screened over a 1½-in. screen. Clay veins over 6 ins. and less than 12 ins. shall be paid \$2 per cutting; anything over 12 ins. shall be paid at the rate of \$2 per ft. Where clay veins run at an angle across the room or entry, 50 cts. a yard shall be paid while it continues. Anything 6 ins. or less shall be considered a spar, for which \$1 shall be paid, and 25 cts. additional shall be added where the spar runs in an angle; 50 cts. shall be paid for room turning, not to exceed 7 yards. Entry work to be paid \$7 per yard for two men; \$1.25 for two additional men, and \$1.50 per yard when entry is worked with three shifts. For 12 ft. places the former price shall be paid, "break throughs" to be paid 50 cts. per yard. The question of ripping roof, digging drain and thick slate to be left to miners and to mine bosses. Pick sharpening to be 1¼ per cent. Drivers' wages are to be as follows: Minimum price, \$2; maximum, \$2.25, excepting in such cases where, owing to exceptional difficulties, a higher price is now paid.

Boyd, Stickney & Co., of Harrisburg, will operate Pennsylvania, Hickory Swamp and Hickory Ridge collieries in the Shamokin district, formerly worked by William L. Scott. They have a combined annual output of 750,000 tons.

Pennsylvania Railroad.—The Philadelphia "Record" of late issue says: "Following the chartering of the Tomhicken, Milnesville & Eastern Railroad, an eight-mile road, which the Pennsylvania Railroad will build in the Lehigh region to reach Stout colliery, whose output it has bought, comes an authoritative announcement that the company has also purchased the output of the William Penn colliery, near Shenandoah, one of the largest operators in the Schuylkill region. Its annual output of about 300,000 tons now passes over the Reading Railroad, but by building a short branch of about a mile and a half from the Schuylkill Valley Railroad, the Pennsylvania can reach the colliery. By these new acquisitions the Pennsylvania has increased its annual anthracite tonnage to easily 5,000,000 tons, an amount which, on a total production of 40,000,000 tons, is equal to 12½ per cent.

Vista Coal Company, Lucyville.—This company, composed of members of the Jones & Laughlins Iron and Steel Company, of Pittsburg, was organized about two years ago, and purchased a large tract of coal property in the Fourth Pool of the Monongahela River, including the old American mine, which is now operating to its full capacity. The company organized with Mr. A. H. Laughlin president, James Laughlin vice-president, and W. E. Bosworth secretary and treasurer. Mr. R. B. Drum, formerly of Shireoaks, is superintendent. At present about 100 men are employed. Superintendent Drum has a large force opening up the new

mine at Allenport, two miles from the old works. The narrow work is being pushed as rapidly as possible. The entire structural work of this new plant will be of iron, and a fine tippie will be erected. The Millholland Machine Company, of Pittsburg, will place a fine rope haulage plant in these new works, by which the coal from both the old and new mine will be brought forward. A large 25-ft. fan is nearing completion at the old mine by which both works will be well ventilated. The products of these two mines will be largely used by the company at their mills in the city and furnace and coke oven plants on the opposite side of the river from the mills. At the new iron tippie a large iron crusher will be operated for crushing the coal, which will be loaded in barges and taken to the coke oven plants at the furnaces in the city. It will be arranged so that when the river is too low for use the crushed coal can be loaded on cars and run down by rail.

Westmoreland Coal Company.—William White has sold 1,500 acres of gas coal land in the Irwin basin to this company, the consideration being \$250,000. A newcomer in the field is the Elkins Gas Coal Company, which has secured between 400 and 500 acres of land in that district. The incorporators are all Philadelphians.

York Farm, Pottsville.—Fire broke out in this colliery on the 3d inst. in the timber of one of the stairways leading to the fan house. Late advices report that it was extinguished before it did much damage.

Oil.

Work has commenced on the Crescent Pipe Line, which is to be extended from Western Pennsylvania to Philadelphia. The pipe is being delivered at Mansfield, Greggs, Hay, Leysdale and other stations along the Pan Handle Railroad. A large consignment of pipe is ready to be shipped to the eastern end of the State. A big force of workmen will soon be put on the line. It is expected that it will be completed and ready to pipe oil by Oct. 1st next. A pump station is to be built at Greggs and five others at various points.

SOUTH CAROLINA.

A deposit of phosphate rock, thought to be of considerable value, has been found on the banks of the Edisto, about 80 miles from Charleston, on land owned by Capt. A. P. Miller. An analysis, it is said, shows it to be equal to, if not above, the average of the Carolina rock. The same quality of rock has been discovered in two other localities along the river bank, the farthest place of discovery being about one-half mile from the bluff and an equal distance from the river.

SOUTH DAKOTA.

Custer County.

Spokane Mining Company, Hermosa.—A seven-eighths interest in this silver mine has been sold to an Eastern syndicate, it is said, for \$180,000. The average assay value of the ore is \$75 per ton.

Lawrence County.

Big Missouri Mining Company.—While the shaft was being sunk at a depth of 185 ft. the miners found that the bottom had disappeared and that they were in the workings of another mine. They notified their superintendent that they had broken through into the underground workings of the Homestake mine and discovered that the Homestake was getting their ore by means of a tunnel they had driven from their workings a distance of 200 ft. into the ore bodies of the Big Missouri.

Pennington County.

It is reported from Rapid City that platinum has been discovered at a point about 25 miles west of that city.

TENNESSEE.

Polk County.

Ducktown Sulphur, Copper and Iron Company.—This company has recently put in two new engines at the Mary mines. Preparations are being made to hoist the ore to the surface instead of the level, and it will be run down through a chute to the tram road. The old stamp buildings are being torn down and will be remodeled. A large quantity of ore is being roasted and will soon be ready for smelting.

UTAH.

Juab County.

Mammoth Mining Company.—A rich strike was made on the 1,000-ft. level of the Mammoth recently, according to the Tintic "Miner." It is a gold strike running 80 oz., besides some silver and lead. This rich find of ore is a continuation of the one found on the 900, as a drift was run in that direction and the same ore found. It proves that the reappearance of gold in the Mammoth in large quantities is permanent. It is stated that the vein is 25 ft. in width and how much larger is undemonstrated, but that no walls have as yet been encountered. Superintendent Nesbit informed us that the entire vein would average about \$35 to the ton, besides a high percentage in copper and 100 oz. in silver.

VERMONT.

Galedonia County.

Platinum was discovered in nickel ore found at Lower Waterford. A sample of the nickel reduced

from the ore gave $\frac{1}{4}$ per cent. of platinum. The ore body is 20 ft. wide, inclosed in talcose slate. A solid body of pyrrhotite 5 ft. wide has been exposed.

WEST VIRGINIA.

McDowell County.

Gilliam Coal and Coke Company.—This company has erected a coal tippie 51 ft. high at its mines and transfers coal over a tram road 2,400 ft. long. It also has 100 coke ovens now under construction.

Monongalia County.

An important decision has been rendered by the Supreme Court of Appeals of West Virginia, by which Mr. J. M. Guffey gains settled control over a valuable piece of oil property. The case has reference to the Wise farm in West Virginia, which was leased some years ago by Guffey & Co. They had made all preparations to drill upon the territory, when E. M. Hukill, by means of a forfeited title, got possession of the land, and before any power of legal constraint could be exercised, had drilled two wells and was reaping the profits of a good flow of oil. The Common Pleas Court of Monongalia County, West Virginia, upon hearing the evidence, decided that Guffey & Co. were entitled to the benefits of the farm. The case was appealed to the Supreme Court, and the lower court's decision was sustained. Mr. Hukill was then granted the privilege of a rehearing, and the case was for the second time decided against him by the Common Pleas Court. This occurred more than one year ago. The case was again brought before the Supreme Court, and its decision has for some time been anxiously awaited. The final decision is a reaffirmation of the first decision, giving Guffey & Co. complete control of the property. The entire amount involved was \$125,000. Guffey & Co. will bring suit against the Standard Oil Company to recover \$60,000, which is the value of oil alleged to have been received by that company acting as trustee for E. M. Hukill.

WYOMING.

Laramie County.

A dispatch from Cheyenne states that a smelter is to be erected there to cost \$375,000. A contract was signed on the 29th ult. by President Baird of the Board of Trade and Banker Kent with Mr. Blanchard, the promoter, for the erection of the plant.

Natrona County.

(From Our Special Correspondent.)

On Casper Mountain, at an elevation of 7,500 ft., large quantities of asbestos are found. Surface asbestos, much weathered, leading to prospecting proved that a fine quality of commercial asbestos could be produced; the quantity available is unknown. Some capital has been enlisted and work will be prosecuted vigorously. Some 40 claims have been located. The mineral occurs in the serpentine rock which covers an area of 6 sq. miles. The district is 12 miles from the railroad by a good wagon road. At present work in the Salt Creek and Powder River oil basins is at a standstill. The Pennsylvania Company has three wells varying in depth from 600 to 800 ft. One is a flowing well, but all of these wells are closed to the public and are guarded, and any information is unattainable. Other parties have closed down on account of financial troubles. A New York company is operating an extensive carbonate of soda deposit 50 miles from Casper, the nearest railroad station, but when the road is extended in the immediate future it will pass within a few yards of this lake. This is the largest known lake in the State. Fifty thousand dollars have been raised for experiment. All operatives, buildings and fuel and machinery are on the ground, also all other material needed for development. Over 100 tons will be hauled to the railroad about May 15th to be shipped to Eastern cities to determine the actual value of the product, after which, if satisfactory, operations will be conducted on a large scale.

FOREIGN MINING NEWS.

BELGIUM.

Societe Anonyme des Mines et Usines a Zinc de la Vieille-Montagne.—The general meeting of the stockholders of this company was held on the 18th ult. in the general office at Angleur. Mr. Saint-Paul de Sincay, general manager, read the report for the year 1891, of which the following is an abstract: "We have taken up the question of wages again and are now studying it with the greatest possible care. Each of the various classes of our miners receives a salary which pays amply for the services rendered. The assessment of 3 francs destined to aid the Miners' Help Fund was suppressed on April last. By this action wages underwent a corresponding increase. The step has been most favorably received by all our workmen, who have sent us from our various establishments situated in Belgium, France, Germany, Sweden, Italy, etc., testimonials of their gratitude. In order to crown the work of the Workingmen's Institute of the Vieille-Montagne by creating an asylum for old and invalid workmen, the members of our administrative council have placed at the disposal of the directors of the institute the sum of 100,000 francs and with the College of Commissaires the sum of 10,000 francs in order that the work of the institute might be carried out. Ground has been bought upon which a

house is building which will serve as a retreat for old and invalid workmen. Thus the laboring classes of Vieille-Montagne will be supplied with those privileges which are needed so much among working communities. We feel confident that our workmen will maintain the same discipline and attention to their work as hitherto. The gross profits during 1891 were 7,379,289.20 francs, against 6,918,044 francs in 1890. Deducting the general expenses, which amounted to 592,340.51 francs, the net profit was 6,785,948.69 francs. Against this must be charged 540,000 francs for the ore in order to set off the value of stocks at the prices which ruled during the commencement of the year, and 993,333.44 francs on account of installations and also 50,000 francs spent upon a permit for the exploration of mines in France. The balance is therefore 5,201,615.25 francs, which allows for the payment of a dividend of 32.50 francs (against one of 30 francs in 1890), and to carry over 950,523.05 francs in the statutory reserve. The account "real estate" has been increased by 907,891.19 francs. This sum represents the expenses of the completion of the property at Rue Richer in Paris and expenses of installations and enlargement of foundries. Under the heading of 'bonds' there stands only the sum of 616,500 francs, representing the last annuity of the loan of 1870, payable in 1892." The stockholders unanimously re-elected Baron William Del Marmol. Baron Schiervel was elected commissaire, vice Mr. Laveissiere, whose term expired this year.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, May 6.

Heavy Chemicals.—The trade in heavy chemicals has been very quiet during the week, and the market on the whole does not show any change of importance. Caustic soda has been very dull; there is very little of it unsold on the market, but trade generally has been quiet. There have been a good many inquiries for carbonated soda ash, but actual business has been rather limited owing to the fact that the foreign article is held above buyers' views at present. The same thing may be reported of alkali, owing to the light stocks available for prompt delivery. We hear that prices have been named for bleaching powder somewhat below the figures made by the agents. Prices remain unchanged in other chemicals as follows: Caustic soda, 70 per cent., 2.95@3.10c.; 74%, 2.97½@3.12½c.; 76%, 3.12½@3.25c.; 77%, 3.12½@3.25c. Carbonated soda ash, 48%, 1.62½@1.75c.; 58%, 1.50@1.55c. Alkali, 48%, 1.60@1.65c.; 58%, 1.47½@1.57½c. Sal soda, English, 1.10@1.15c. Bleaching powder, 2.15@2.20c. on the spot, according to quantity.

Acids.—Manufacturers continue to report a good business in almost all acids. We have heard sundry prophecies that higher prices will be obtained before long, but we must confess our inability to perceive why this should be so. Some of the most prominent and largest manufacturers of acids in this vicinity agree with us in this. We quote per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@\$.2, according to quality; alum, lump or ground, \$1.55@\$.1.80; muriatic, 18°, \$1.20; 20°, \$1.12½@\$.1.25; 22°, \$1.25; nitric, 40°, \$4; 42°, \$4.50@4.75; sulphuric, 90c. @\$.1.10; mixed acids, according to mixture; oxalic, \$7.25@7.75. Blue vitriol is quoted all the way from \$3.25@3.50. Glycerine for dynamite, 11½@12½c., according to quality and quantity.

Brimstone.—Again has there been a change in the price of Sicilian brimstone. May shipments are held at \$22 for best unmixed seconds and \$21.25 for best unmixed thirds. For goods on the spot \$24 is asked for seconds. The market during the week has been very dull, and but little business was done.

Fertilizers.—Now that the season practically is over, this market cannot be expected to show much activity. During the past week there was a fair demand for ammoniates; otherwise the market was entirely featureless. Taking it all in all, the season has been good. The North has bought liberally and dealers in manufactured fertilizers have done fairly well. The South, of course, owing to the disastrous effect of the cotton crop, has had no money to buy fertilizers. Prices do not show much change from last week. We quote: Sulphate of ammonia, \$2.90 for home goods and \$2.90@2.95 for gas liquor. Dried blood, \$1.95@\$.2 per unit for high grade and \$1.85@\$.1.90 for low grade. Acidulated fish scrap, \$11@\$.12, factory. Dried scrap, \$23.50@\$.24. Azotine, \$1.90@\$.1.95. Tankage, \$17.50@\$.21, according to grade. Bone meal, \$22.50@\$.23.50.

Double Manure Salts.—Quotations are as follows for lots of from 10 to 50 tons ex-vessel New York: 48-53 per cent., \$1.13½@\$.1.23½; 90-95 per cent., \$2.13@\$.2.23½.

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

Muriate of Potash.—Arrivals at various ports during the week aggregate 500 tons. The season being almost over, there is but little inquiry for muriate. It is yet scarce, although not quite so much as last week. There are large stocks on the way which will lead the market.

Nitrate of Soda.—The market for nitrate has been

very quiet during the week. Quotations for goods on the spot are about \$1.70. Dealers still refuse to quote future shipments until the negotiations in London come to a head. Every one here fears to sell short lest the price should advance, making it impossible to cover contracts at a profit.

Messrs. Mortimer & Wisner, the well known nitrate brokers of this city, send us the following interesting monthly statement for April:

	1892.	1891.	1890.	1889.
	Bags.	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1892, to date...	236,658	263,013	262,234	134,492
Imported into Atlantic ports from Europe.....		7,100		
Stock in store and afloat May 1, 1892, in New York.....	52,838	45,435	57,263	51,729
in Boston.....				
in Philadelphia.....	4,800	8,000	1,500	500
in Baltimore.....				
To arrive, actually sailed.....	232,000	114,600		
Visible supply to Sept. 1, 1892.....	289,638	168,035		
Additional charters....	170,000	220,000	507,100	289,900
Total supply, when shipped.....	459,638	388,035	565,863	342,129
Stock on hand, Jan. 1, 1892.....	53,585	36,454	22,009	87,043
Deliveries past month.....	89,888	126,284	48,043	59,264
Deliveries since Jan. 1 to date.....	232,605	253,132	224,880	169,306
Total yearly deliveries.....		634,207	673,679	546,589
Prices current May 1, 1892.....	1.70@ 1.72½	2.15@ 2.20c.	1.70@ 1.72½	2.05c.

Liverpool. April 27.

(Special Correspondence of Joseph P. Brunner & Co.) There is no activity in the demand for heavy chemicals, and the market generally is very dull.

The coal strike in the Durham district is not yet over, but the Tyne chemical manufacturers are getting their supplies of fuel from other districts, and the stringency is now over. In consequence of the increased production on the Tyne, the price for soda crystals has been reduced 5s. per ton, to £3 per ton net cash f. o. h. Tyne.

Soda Ash.—There are a fair number of inquiries in the market, but the "Union" declines to quote for earlier delivery than July, and on this account prices are nominal, and for the commoner qualities may be quoted as follows: Caustic ash, 48 per cent., £5 6s. 3d. per ton; 57-58 per cent. £6 7s. 6d. per ton. Carb. ash, 48 per cent., £5 9s. 9d. per ton; 58 per cent., £6 12s. 9d. per ton. Ammonia ash, 58 per cent., £6 7s. 6d. per ton, all net cash. Prime makes are held for premium on above figures.

Soda crystals are less firm at £3 7s. 6d. per ton to £3 10s., less 5 per cent. On the Tyne the price has been reduced to \$3 per ton net cash, being a drop of 5s. per ton.

Caustic soda is quite neglected, and in spite of the restricted output stocks are being accumulated at the works. Although the demand is so unsatisfactory, no change has been made in quotations, which remain as follows: 60 per cent., £9 7s. 6d. per ton; 70 per cent., £10 10s. per ton; 74 per cent., £11 10s. per ton; 76 per cent., £12 7s. 6d. to £12 15s. per ton, all net cash. For parcels under 10 tons, 5s. per ton extra is charged. Nothing to be had on this market for export to the States.

Bleaching powder in light request at £7 15s. to £8 per ton net cash for hardwood, for all quarters except the States and Canada.

Chlorate of potash has improved, there being a better inquiry for Japan, and resale parcels at 6¼d. have been picked up. Some can still be had from second hands at the same price, but it is offered less freely. The syndicate hold for 7d. per lb. for May-June and 6¼d. for July-December. For the last six months, however, buyers hold aloof expecting lower prices.

Bicarb. soda in demand at £6 15s. to £7 per ton for one cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia keeps dull, and is nominally quoted at £10 6s. 3d. to £10 7s. 6d. per ton for good gray 24 per cent., and £10 10s. to £10 12s. 6d. per ton for 25 per cent., both in double bags less 2½ per cent. f. o. b. here, while in some cases a shade under minimum quotations has been accepted.

MINING STOCKS.

NEW YORK, Friday, May 6.

The dullness of the mining market continues unrelieved. The business has dwindled down to small routine sales, and the trading is entirely devoid of anything bearing the faintest resemblance to excitement.

The Comstocks have been very quiet and unchanged as to price. There were sales of Comstock Tunnel bonds, \$10,000 at 17. Of the stock, 6,000 shares were sold at 12@15c. Consolidated California

& Virginia was very quiet, only 200 shares being sold at \$2.14. There was a solitary sale of 100 shares of Crown Point at 51c., and an equal number of Sierra Nevada at \$1.40. Yellow Jacket was very quiet at \$1. Mexican shows a sale of 100 shares at \$1.65. Union Consolidated another at \$1.20.

Of the California stocks Bodie Consolidated was dealt in to the extent of 400 shares at 40@41c. Belmont shows sales of 1,900 shares at 33@35c., and Brunswick of 3,500 shares at 12@15c. The output of the Standard Consolidated Mining Company for the month of April amounted to \$21,600. The expenses for the same time were \$14,850, leaving a profit of \$6,750.

Colorado stocks were in better demand this week. Breece shows a sale of 200 shares at 37c., and Chrysolite an equal number of shares at 20c. Sales for Little Chief aggregated 1,100 shares at 25c. Ward consolidated, which has not been dealt in for a long time, shows a sale of 100 shares at 25c. Leadville Consolidated appeared in considerable request during the week. Owing to the dividend of 3c. per share declared by this company the stock opened at 23c. but declined, and at the close sold at 17c. Total transactions aggregate 18,025 shares. The old rumors about a deal in this stock have been revived at the Consolidated Stock and Petroleum Exchange. Thus, it is said, that the directors have seen fit to declare dividend at this particular time in order to "unload" stock. At the office of the company this is denied, and it is stated there that some of the officers have bought stock lately.

Of the Black Hills stock only Father De Smet was dealt in; 400 shares of it were sold at 31@34c. Of Alice 400 shares were sold at 75@80c.

Horn Silver continues quiet and low. During the week 267 shares were sold at \$3@3.10.

Phenix of Arizona shows sales of 500 shares at 45c.

Boston. May 5.

(From our Special Correspondent.)

The market for copper stocks during the past week shows a slight improvement in prices, but the volume of business continues to be small and without any special speculative feature. The Montana group of stocks are the most active—indeed, without them there would be very little to encourage operators—but they furnish the groundwork of dealings, while the Lake Superior stocks suffice to fill up.

Boston & Montana advanced to \$42½ at one time during the week, being an advance of \$1 over last week's closing, but the rise did not hold, and the price receded to \$41½, at which it was barely steady.

Butte sold up to \$12½, declining to \$11¼ in later dealings.

Of the Lake stocks, Centennial has shown the most strength, advancing from \$9¾ to \$12 on sales of about 1,500 shares. We hear it stated that the present management intend to push operations in the way of development, and feel confident of reaching the Calumet lode before many months. It is the opinion of good judges that there is a fortune in this mine for persistent holders of the stock.

Oscuela sold up to \$33, an advance of three points. The directors have declared a dividend of \$1 per share, and it is said that if copper continues to hold at 12c., \$3 will be earned the present year.

Calumet & Hecla advanced to \$275 and is in good demand. A dividend of \$5 is expected within a very short time.

Tamarack holds steady at about \$164@165, with limited transactions.

Kearsarge sold at \$13, and a small lot of Franklin at \$14½.

We also note small sales of Atlantic at \$11½; Alouez at 75c., Bonanza at 40c.

Santa Fe declined 25c. on the report of the disaster at the mine.

Silver stocks continue dull and inclined to weakness. Sales of Dunkin reported at 30c. and Crescent at 10c.

3 P. M.—Franklin sold at \$15 this afternoon, Oscuela declined to \$32½ and Butte to \$11¼. Quincy was quoted on the street during the week at \$117 bid, \$118 asked.

San Francisco. April 30.

(From our Special Correspondent.)

During the past week mining shares have sold at steadier prices and the market generally has had a healthier appearance. Values have tended upward though rather curiously. Consolidated California and Virginia sold to-day at a lower figure than a week ago.

Discussion of the decision of the Supreme Court ament buying stocks on margin, referred to last week, still continues, and truth to tell, many of the brokers do not like the outlook. They got fair warning, however, of what was coming in June last year when, on appeal, the Supreme Court of the State held in the suit of Root vs. Cashman, that the clause of the State constitution wherein it says that "all contracts for the sale of shares of the capital stock of any corporation or association on margin, or to be delivered at a future date shall be void, and any moneys paid on such contracts may be recovered," was inserted in the State Constitution for the express purpose of stopping such practices. In this a full court concurred and the idea of carrying the more recent case before the Supreme Court, sitting in banc, an hardly be expected to result in the court of last resort nullifying

itself. Of course the old cry has been taken up by certain papers in this city and echoed on Pine street, to the effect that the damning clause inserted in the State Constitution refers to stock sales for delivery, seller 5 to 30 days, and not to the purchase of stock upon which brokers advanced 50% margin.

The fact of the matter is that the "street" wants to gamble and brokers have a decided objection to any legislative handicapping of a business that is in a sufficiently demoralized condition.

The north end Comstocks, with the exception of the leader, have been selling at slightly enhanced prices. To-day Consolidated Virginia sold down to \$3.85, and this in spite of the report than an improvement had been made in the mine. Ophir sold for \$2.20, much the same as last week, and Andes at 55 cents, Mexican at \$1.50; Sierra Nevada at \$1.35, and Union at \$1.30, showed trifling gains.

Of the middle Comstocks Hale & Norcross has shown a gain on the week's trading of 40 cents, selling to-day for \$1.35. The remainder, save Savage, which has declined, have remained at the ruling figures of a week ago. Best & Belcher was quoted to-day at \$2.30; Chollar at 85 cents; Potosi at \$1.10; and Savage at \$1.50.

The South end and Gold Hill stocks have not been in great demand, but there has been little change in values. Belcher has ruled at \$1.20; Caledonia at 25 cents; Challenge Consolidated at 50 cents; Crown Point at 15 cents; Confidence at \$1.25; Exchequer at 35 cents; Occidental at 15 cents; and Overman at 65 cents.

Scattering sales of outside stocks have been made at the following figures: Commonwealth at 15 cents; Nevada Queen at \$1; Mono at 75 cents, and Weldon at 5 cents.

SAN FRANCISCO, May 6th.—(By Telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$2.30; Bodie, 30c.; Belle Isle, 15c.; Bulwer, 40c.; Chollar, 85c.; Consolidated California & Virginia, \$4.00; Eureka Consolidated, \$1.50; Gould & Curry, \$1.30; Hale & Norcross, \$1.25; Mexican, \$1.50; Mono, 80c.; North Belle Isle, 20c.; Ophir, \$2.30; Savage, \$1.25; Sierra Nevada, \$1.30; Yellow Jacket, 85c.

St. Louis. May 4.

(From our Special Correspondent.)

Mining stocks were decidedly more active this week. Greater interest was held in them, and sales were better and larger than last week. Prices, however, were lower if anything, and now are quoted lower than a week ago. As formerly, only a few stocks showed any prominence in the different transactions, noticeably so were Central Silver and Elizabeth. Central Silver opened at 1c. on a sale of 700 shares; sold on Saturday at the same figure—1,500 shares selling, and closes at that figure.

Elizabeth opened at 42½c., sold later at 46¼c., 100 shares changing hands, and closed at 45c.

American and Nettie opened on a sale of 500 shares at 52½c., and after dropping to 51¼c., sold on Monday at 52½c., 300 shares selling, and closed at that figure.

Leo was on the market this week, and sold 1,000 shares at 7@6½c. The market appeared strong and rose to 7½c., closing, however, at 7c. on a sale of 700 shares.

Montrose sold at 10c., 1,000 shares being dealt in. Present quotation 10c.

One thousand shares of Pat Murphy brought 2¼c. Granite Mountain was sold several times, though the market declined. Opening at \$14, on Friday 20 shares sold at \$14.25; the market then fell to \$13.75. On Tuesday 20 shares more sold at \$14.50, the market closing firm at \$13.50 bid and \$14.50 asked.

Other stocks were quiet and report no sales. Adams is still at \$1, Eureka & Excelsior at 5c., Silver Bell at 12½c., although opening at 10c.

DIVIDENDS.

Cook's Peak Mining Company, dividend No. 4, of 50 cents per share, \$100,000, payable May 10, at the office of the company, in Colorado Springs, Colo. Transfer books close May 6 and reopen May 11.

Oscuela Consolidated Mining Company, dividend 33, of \$1 per share, \$50,000, payable May 20, at the office of the company in Boston, Mass. Transfer books close May 7 and reopen May 16.

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'ng't in office.	Day of sale.	Am't. per share.
Brunswick Con. G., Cal.....	3	Apr. 15	May 18	June 3	.02
Bullion, Nev.....	3	Mar. 17	Apr. 21	May 11	.25
Confidence, Nev.....	20	Mar. 30	May 3	May 25	.75
Crown Pt., Nev.....	57	Mar. 15	Apr. 19	May 10	.50
Gold Flat, Cal.....	1	Mar. 28	Apr. 30	May 18	.05
Gold Mountain, Cal.....	2	Mar. 29	May 3	May 23	2.00
Hale & Norcross, Nev.....	101	Mar. 24	Apr. 28	May 20	.50
Head Center & Transquility, Ariz.....	4	Mar. 14	Apr. 19	May 12	.03
Kentuck Cons., Nev.....	3	Mar. 22	Apr. 26	May 19	.10
Lone Star, Cal.....	4	Apr. 2	May 14	June 4	.10 1/4
Norway, Utah.....	...	Dec. 24	Feb. 1	July 21	.02
Occidental, Nev.....	10	Apr. 6	May 9	May 31	.25
Seg. Belcher & Mides, Nev.....	10	Apr. 8	May 11	May 31	.25
Silver Hill, Nev.....	30	Mar. 31	May 5	May 25	.10

PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales
Apr. 30.....	567 1/2	567 1/2	567 1/2	567 1/2	175,000
May 2.....	58 1/2	58 1/2	57 1/2	58 1/2	10,000
3.....	58 1/2	58 1/2	57 1/2	57 1/2	25,000
4.....	57 1/2	57 1/2	57 1/2	57 1/2	5,000
5.....	57 1/2	57 1/2	57 1/2	57 1/2	5,000
6.....	57 1/2	57 1/2	57 1/2	57 1/2	13,000
Total sales in barrels					233,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 6th.
Statement of shipments of anthracite coal (approximated), for week ending April 30th, 1892, compared with the corresponding period last year:

Regions.	April 30, 1892.	May 2, 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region.....	446,422	402,438	Inc. 43,984
Lehigh Region.....	124,464	145,904	Dec. 21,440
Schuylkill Region.....	213,094	231,759	Dec. 18,665
Total.....	783,980	780,101	Inc. 3,879
Total for year to date.....	12,044,410	11,081,667	Inc. 962,743

PRODUCTION OF BITUMINOUS COAL for week ending April 30th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.....	999	30,852	41,887
Cumberland, Md.....	59,907	1,141,278	1,353,823
Barclay, Pa.....	4,127	67,605	58,993
Broad Top, Pa.....	12,281	200,935	196,481
Clearfield, Pa.....	85,261	1,249,187	1,497,557
Allegheny, Pa.....	24,361	390,532	484,097
Beach Creek, Pa.....	42,071	894,942	773,245
Poconantas Flat Top.....	48,883	816,016	816,510
Kanawha, W. Va.....	64,656	808,312	766,006
Total.....	342,546	5,559,659	5,990,599

WESTERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Pittsburg, Pa.....	28,241	438,302	314,331
Westmoreland, Pa.....	38,951	511,379	675,219
Monongahela, Pa.....	16,194	169,944	194,817
Total.....	83,386	1,119,625	1,184,367
Grand total.....	425,932	6,719,284	7,174,966

PRODUCTION OF COKE on line of Pennsylvania R. R. for the year ending April 30th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 95,368 tons; year, 1,965,379 tons; to corresponding date in 1891, 971,567 tons.

Anthracite.

The anthracite market during the past week has been very quiet, as is usually the case after an advance; but for all this there is a tone of firmness and whatever new business has been done has been at the new prices. Now that confidence prevails in the trade these prices will be adhered to strictly; consumers were anxious to stock up, and now the reaction has set in and everything is quiet. Most of the collieries controlled by the combination will close down to-day and to-morrow and thus the output will be restricted.

The Philadelphia & Reading Coal and Iron Company has issued the following circular of prices at New York:

	Broken.	Egg.	Stove.	Chestnut
Hard white ash.....	\$3.85	\$4.00	\$4.15	\$3.90
Free white ash.....	3.75	3.90	4.15	3.90
N. Franklin white ash.....	4.15	4.15	4.15	3.90
Shamokin.....	4.10	4.35	4.00	4.00
Schuylkill red ash.....	4.15	4.50	4.15	4.15
Lorberry.....	4.15	4.50	4.15	4.15
Lykens Valley.....	4.75	5.15	5.65	4.75

Following this comes the announcement that the same company has canceled all unfilled orders for coal at the old prices, and all new contracts will be booked for the month of May only at the new circular figures.

It is interesting to know that the Philadelphia & Reading Railroad Company and other corporations involved in the bill in equity filed by Attorney-General Hensel, of Pennsylvania, have filed answers at Harrisburg. The Reading company sets forth in detail all the railroads and branches owned or controlled by it in Pennsylvania, and also those owned or controlled by the Lehigh Valley company, and denies emphatically that these two systems are parallel and competing within the meaning of the constitution. The leasing of the Lehigh Valley lines by the Reading is admitted, but the answer claims that the agreement was distinctly authorized by the charters of the two companies, and that it is not in any way in conflict with the constitution and laws of Pennsylvania. The answer admits that the Port Reading Railroad Company, of New Jersey, has leased the Central Railroad of New Jersey, but denies that the Reading owns a majority of the capital stock of the Port Reading, but, on the contrary, avers that the entire stock of that company is held by a construction company. The answer is very complete as to all the allegations contained in the Attorney-General's bill, but the company demurs to sundry of said allegations, particularly as to the relations of the Philadelphia & Reading Coal and Iron Company, the Lehigh Valley Coal Company, and the Le-

high & Wilkesbarre Coal Company, contending that, if all the Attorney-General's allegations are true, they nevertheless do not constitute any violation of law or public policy. The Lehigh Valley Company denies that its lines in Pennsylvania compete with the Reading, and, on the part of the other corporations defendant, it is maintained that no legal wrong has been done.

Several interviews with President Roberts, of the Pennsylvania Railroad, in which that gentleman expressed his views concerning the Reading combination and vaguely hinting that "trouble" might ensue if the Reading did anything to injure the interests of shippers, have been published during the week. In this the Pennsylvania is consistent, for that railroad has always regarded itself more as a carrier than as a miner and seller of coal. President Roberts' statement would indicate devotion to the interests of the public and they are highly credible to him as an individual. But we think until actual competition and warfare begins we shall take Mr. Roberts' utterances *cum grano salis*. At the Western meeting he is said to have acquiesced to an increase in freight, owing to the advance in the price of coal in Chicago.

Bituminous.

Last month, which promised to be one of large tonnage, disappointed the trade and owing to the blockade the lack of vessel and several other causes tonnage fell considerably below expectations. This month will be a fair one provided transportation facilities improve. The blockade on the Pennsylvania Railroad continues, but the officials have given assurance that it will be relieved very soon, and things will look brighter before many days have passed. The Baltimore & Ohio Railroad has withdrawn the bonus of 6 cents per ton, which it formerly paid to vessels as an inducement to go to Baltimore. It is alleged that the motive for this is the desire on the part of the railroad to compel shipments to Georgetown over the Chesapeake & Ohio Canal, which is controlled by the railroad.

Freights this week are a little stiffer, as follows: Norfolk, Baltimore and Newport News to Boston, Salem and Portland, 85c.; to Sound Ports, 80c.; Philadelphia freights are 5c. lower. The local market is dull and new business has been scarce. It is only now and then that a tardy contract is closed.

Baltimore.

Prices for anthracite coal at Baltimore, as reported by E. Stabler, Jr., & Co., to the trade, in cars on track, for local consumption, are as follows:

	Hard white ash.	Free-burn- ing.	Lykens Valley Shamokin red ash.
Lump and Steamboat broken.	\$4.25	\$4.25	\$4.60
Egg.....	4.35	4.35	4.70
Stove.....	4.50	4.50	4.95
Chestnut.....	4.25	4.25	4.60
Pea.....	2.70	2.70	3.25

Afloat alongside, by cargo, 15 cents less than price in cars.

Boston.

As the dealers in this market anticipated, an advance which took place this week in Lykens Valley coal. The advance is the same as that in white ash coals, that is: 25 cents per ton on stove and chestnut; 15 cents on egg and 10 cents on broken. The advance in the prices of anthracite has naturally checked buying to a great extent; in fact, dealers are buying very little at present and trade is quieter than it has been for months. Dealers as a rule are on the safe side and have very fair stocks.

We quote: f. o. b. prices net at New York; stove \$4.15; egg, \$3.90; free burning broken, \$3.75; chestnut, \$3.90; Lykens Valley broken, \$4.50; egg, \$4.90; stove, \$5.40; chestnut, \$4.50. These prices on Lykens Valley coal are net at Philadelphia.

The soft coal market is held very firm. Now, as the contract season is over and there is next to no transient trade, dealers are doing nothing except deliver on contracts. Clearfield coal can be had here for \$3.15 on cars, while George's Creek coal costs from \$3.60 to \$3.65. These are prices on cargo lots; on parts of cargoes they would be 10 cents per ton higher.

There is no necessity of quick shipments by vessel; consequently, freight rates are easier and in some cases lower.

We quote: From New York to Boston, 60c.; from Philadelphia to Boston, 85c.; from Philadelphia to Portland, 85c.; to Bath, 90c.; to Providence, 75c.; from Baltimore to Boston, 90c.; Newport News to Boston, 70c.; Sound points, 70c.

Boston retail coal dealers have made an advance of 50 cents on all grades of coal except broken, and that has been advanced 25 cents per ton. Such advances seem large after the advances made by the anthracite companies. At the meeting there were a number of dealers who were much opposed to such extensive marking up of prices, but they finally swung in with the majority and accepted them, making the action a unanimous one. Among the arguments why such an advance should be made were that the coal combination would before long make another general advance in prices, and dealers had better make one advance than two, as it would be less objectionable to their customers. Then again it is claimed that present prices give but a fair profit, as the old prices were too low to enable them to make money. These arguments, however, do not seem to justify the advances that have been made in retail coal. The margin will be so great that considerable cutting may be expected. Though

the meeting to advance prices was held early this week, the new prices will not go into effect until Monday of next week. We quote: Stove, \$6.00; nut, \$6, egg, \$5.75; furnace, \$5.75; Franklin, \$7.25; Lehigh egg, \$6; Lehigh furnace, \$6. Wharf prices are 50 cents less than the foregoing.

The receipts of coal at the port of Boston for the week ending April 30th were 46,651 tons of anthracite and 19,820 tons of bituminous, against 44,740 tons of anthracite and 20,885 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 58,023 tons of anthracite and 208,226 tons of bituminous, against 474,567 tons of anthracite and 337,573 tons of bituminous for the same time last year.

Buffalo.

(From our Special Correspondent.)

Changes were made in the anthracite coal quotations on May 2; they are now as follows. Grate, egg, stove and chestnut f o b vessels at Buffalo, \$4.80 per gross ton; grate, egg, stove and chestnut on cars at Buffalo or Suspension Bridge, \$4.50 per gross ton. At retail: Grate, egg, stove and chestnut, \$5 per net ton delivered, and Pea and Blossburgh, \$4 per net ton delivered.

The anthracite coal trade very quiet, and without any noteworthy incidents to report. Bituminous coal is fairly active and the quotations, though nominally unchanged, are undoubtedly cut to save demurrage, etc., as the supply is greater than the demand. Slack ranging up to screened lump \$1.50 @ \$2.60 per net ton to consumers on track.

The shipments of anthracite coal by lake westward for the month of April aggregated from 105,000 to 115,000 net tons at the following rates for freight: 40c. to Chicago, Milwaukee, Sheboygan, Racine and Gladstone; 30c. @ 20c. to Duluth; 25c. to West Superior, Toledo and Detroit; 45c. to Racine; 40c. to Gladstone; 50c. to Portage.

Between 15 and 20 miles of pipe will be laid in a new district of Buffalo to supply the residents of the houses therein with natural gas for fuel purposes. The sources of the gas will be the new Canadian wells at Point Albino, Lake Erie. Another big flowing well was struck last week.

The ice blockade at Duluth was ended on the 27th ult. Vessels have had no difficulty since in making or leaving that port.

The Silver Creek & Morris Coal Company has sold its business, it is stated, what coal there is on hand and its wharf property and entire plant in Chicago at West Superior, on Lake Superior and at St. Paul, to the Philadelphia & Reading Coal and Iron Company.

By its absorption of the Lehigh and Lackawanna lines the Reading comes into possession of a fleet of the finest boats on the lakes—seven steel, one iron and nine wooden propellers, with a total registered tonnage of 35,400 tons and a total valuation of \$2,615,000. All but two of them rate A 1. It is learned that the Reading is also organizing a line of steamers to ply between Buffalo and Lake Superior ports.

No other individual owner or organization of owners can approach this.

It is said that the Buffalo, Rochester & Pittsburg Railroad will soon come into the possession of the Philadelphia & Reading Company. Time will confirm or dispel the rumor.

The contract for coal for the Consumers' Gas Company, of Toronto, Can., has been awarded as follows: 15,000 tons to Mr. Mark Hanna, of Cleveland, and 15,000 tons to the Youghiogheny Coal Company, but price not made public.

Chicago.

(From our Special Correspondent.)

Retail coal is active for the season at \$6.50 per net ton delivered or \$6 at yard, and so far as we can learn \$5.50 to dealers from yard or dock is being strictly maintained; as for wholesale trade there is not much doing. The public appear to accept the situation philosophically, though with the customary amount of grumbling at the advance of one of the necessities of life, and seem to realize after all that the difference in cost to each one individually will be but a mere bagatelle in the annual expense account. An earnest and honest adherence to the programme outlined and proposed will insure the best market for anthracite coal that Chicago has seen for many years. The prompt, decisive discipline of any one found breaking or infringing on the prices on intentions of the consolidation will also tend to give additional strength and prevent any future demoralization. We look to a good trade for the larger retailers all through May and June. The inflammatory articles in the Chicago daily papers in regard to the combine have thoroughly frightened the average good pay customers, and those having sufficient storage capacity are providing against the dangers of waiting until fall to put in their supplies of coal. This will tend to relieve the docks and rail yards of their stocks, and readily enable them to handle more coal and stock up again for the fall and winter business. We reiterate that the outlook to-day is more encouraging than for years past. There is no great amount of vessel coal coming forward. Car coal to dealers who have railroad facilities for handling is \$5.35. Manufacturers, hotels, restaurants, institutions and apartment houses using not less than 200 tons annually, where service is furnished by the proprietor, will pay \$5.75 per ton at yard or \$6.25 delivered. Yearly contracts for grate only can be taken at those figures.

Bituminous coal is in good condition and large contracts have been taken from railroads and other

big consumers of steam sizes of coal. The usual annual lay-off of the Illinois miners is tending to reduce the accumulations on track, and prices are very well maintained. A serious wash-out of a bridge at Cayuga has delayed shipments of Indiana coal, and has enabled shippers to get rid of much of their surplus on railroad tracks here. With possibly one or two exceptions, and those of minor importance, there are no strikes in Illinois or adjoining states.

Coke is in moderate demand only, as many of the structural foundries are not working up to full capacity, and the expected strike of the machinery molders May 16th, if at all prolonged, will materially reduce the consumption in this vicinity. Prices remain steady.

Quotations are: \$4.65 furnace, \$5.05 foundry crushed, \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$2.10 foundry; New River foundry, \$4.90; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are unchanged at the following rates: Lehigh lump, \$6.35; large egg, \$5.35; small egg, range and chestnut, \$5.35. Retail prices per ton are: Large egg, \$6.50; small egg, range and chestnut, \$6.50.

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

Pittsburg. May 5.
(From our Special Correspondent.)

Coal.—The market was steady, with a moderate amount of activity. The mild weather caused a falling off in the local demand. The Southern markets have an abundant supply. Coal shipments for April, 8,536,000 bushels; April, 1891, 6,576,000 bushels; increase, present year, 1,960,000 bushels.

The May shipments so far reach 3,410,000 bushels. The Yellow Run Coal Company of Greensburg was chartered at Harrisburg May 2d, with a capital of \$75,000. The directors are John S. Wilhelm, Thomas Donahoe, W. H. Huff, J. P. Wilson and Daniel W. Lake.

Ten thousand miners resumed work on Monday at 79 cents a ton, the wages they refused last fall. It was a peaceful gathering, not a hostile word being spoken. Striking is not so popular as it was.

The big meeting at Monongahela City was a very successful affair, 17 mines being represented. It was resolved to unite in a call for a joint convention of the Ohio, Monongahela Valley and Hocking Valley districts at an early date.

Connellsville Coke.—Shipments of coke from the Connellsville district continues to show a material falling off. At the same time the operators throughout the regions are unwilling to cut prices to increase their production, and although fully 30% of the ovens have been blown out, they intend to blow out 20% more in order to maintain prices and present indications are that nine will be blown out in the near future. Last week there were 11,630 ovens in blast and 5,494 idle. Estimated production, 105,400 tons, being a drop in production of nearly 8,000 tons compared with preceding week.

Advices received from many points where coke is used show that consumers are indifferent and do not care to make contracts for any stated time or for large amounts at present prices. Week's shipments were 115,362 tons, distributed as follows: To Pittsburg, 1,950 cars; east of Pittsburg, 1,355; west of Pittsburg, 3,104; total, 6,409 cars.

Following are the prices quoted: Furnace coke, \$1.90; foundry, \$2.30; crushed, \$2.65 per ton of 2,000 lbs. f. o. b. at ovens.

METAL MARKET.

NEW YORK, Friday Evening, May 6, 1892.
Prices of Silver Per Ounce Troy.

Month	Sterling Exchange.	London.	N. Y. Pence.	Value of sil. in \$1.	May.	Sterling Exchange.	London.	N. Y. Pence.	Value of sil. in \$1.
April	4.88	39 3/4	86 1/2	.669	4	4.88	39 3/4	87 1/2	.673
May	"	"	86 1/2	.671	5	"	39 1/2	86 1/2	.669
June	"	39 3/4	87 1/2	.673	6	"	39 1/2	"	.669

Silver has remained fairly steady the past week with good buying orders on London account. On Tuesday considerable silver was placed in London at 40d., filling orders for the moment and resulting in a fall to 39 1/2, at which price market closes strong on renewed buying orders.

Some 600,000 oz. have been shipped London this week. Practically nothing is done nowadays in silver certificates, the present outlook not inviting speculative buyers.

The United States Assay Office at New York reports the total receipts of silver for the week to be 81,000 ounces.

Government Silver Purchases.

WASHINGTON, D. C., May 6—(By Telegraph).—Treasury Department purchased to-day 281,000 oz. of silver at prices ranging from '871 to '871 1/2 per oz. fine.

Coinage at the Mints of the United States.
The following statement shows the coinage ex-

cut at the mints of the United States during April, 1892.

Denomination.	Pieces.	Value.
Double eagles.....	88,625	\$1,772,500
Eagles.....	43,120	431,200
Half-eagles.....	211,560	1,057,800
Total gold.....	343,305	\$3,261,500
Standard dollars.....	520,000	520,000
Half-dollars.....	182,000	91,000
Quarter-dollars.....	1,112,000	278,000
Dimes.....	1,870,000	187,000
Total silver.....	3,684,000	\$1,076,000
Five cents.....	1,812,000	90,600
Total minor.....	1,812,000	\$90,600
Total coinage.....	5,839,305	\$4,428,100

Silver Bullion Certificates.

	Price.		Sales.
	H.	L.	
April 30.....	.....	.....	.....
May 2.....	.....	.....	.....
May 3.....	87 3/4	87 1/2	60,000
May 4.....	.....	.....	.....
May 5.....	.....	.....	.....
May 6.....	.....	.....	.....
Total sales.....			60,000

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars.....	\$.70	\$.75
Mexican dollars.....	.68 1/4	.69 3/4
Peruvian soles and Chilean pesos.....	.65	.68
English silver.....	4.83	.....
Five francs.....	.33	.35
Victoria sovereigns.....	4.86	4.90
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.76
Spanish doubloons.....	15.69	15.70
Spanish 25 pesetas.....	4.81	4.83
Mexican doubloons.....	15.50	15.70
Mexican 20 pesos.....	19.50	19.60
Ten guilders.....	3.96	4.00
Fine silver bars.....	.87	.87 1/2

Copper.—The market has been quiet but firm; there is a great demand for cakes and wire bars and for spot delivery 12 1/2 c. can be realized, but nothing is to be had. The first deliveries by rail and lake are now almost due and will greatly relieve the situation. For May and June shipment 12c. has been paid and in some instances a little more for cakes and wire bars, but ingots were freely dealt in at from 11 1/2 to 12c. At these prices nothing can be exported and the entire production has to be taken care of by the home trade. Casting copper has been neglected and we must quote 11 1/2 @ 1/4, according to brand and quantity. No business is reported in Arizona pig copper. The consumption is reported to be rather large.

In Europe the market has been quiet but firm. Hardly any business has there been done in American copper as prices here are too high for export. Heavy shipments of Montana matte have gone forward during the past few weeks to Europe. The G. M. B. market does not show much alteration, closing at \$45 1/2 for spot and at \$46 1/2 for future and for manufacture. We quote: English Toub, £43 10s. @ £49; Best Selected, £49 10s. @ £50; Strong Sheets, £58 @ £58 10s.; India Sheets, £54 10s. @ £55; Yellow Metal Sheets, 5 1/4 d.

Statistics for the second half of May have decreased 500 tons. Another meeting of the principal producers of the world was held last week, but again was no definite result reached.

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

To Bristol—Copper Matte.	Lbs.	
S. S. Mohican.....	67 sacks.	\$1,500
To Liverpool—Copper Matte.	Lbs.	
S. S. Cufic.....	4,054	443,955
S. S. Victoria.....	3,725	390,630
To Hamburg—Copper.	Lbs.	
S. S. Dania.....	20 bbls.	25,000
S. S. Gothia.....	20 bbls.	22,688

Tin.—Values have given way slightly, but very little tin is coming on the market, and stocks are held very firmly. Shipments from the East Indies have been rather small, and statistics for the second half of April show a decrease of 1,600 tons in the visible supplies, which shows the excellency of the position, to which we have repeatedly drawn attention. Consumption is very good, and appears to be somewhat larger than the average, which is taken to be about 1,400 tons a month. A firmer tone has prevailed during the last few days, and 19 1/2 has been bid for wholesale lots, but refused. The retail price is 19 7/8 @ 80c. The London market declined in the beginning of the week, but afterward a firmer tendency was noticeable, and the closing figures are £93 10s. for spot and £93 7s. 6d. for three months.

Lead.—The higher prices established last week brought out more sellers, and the market has been somewhat irregular, declining at one time to 4 20c., but afterward again coming up to 4 25c. Western producers are offering very sparingly, but there are, nevertheless, plenty of supplies in the East. We quote 4 25 @ 4 27 1/2 c.

In London a rather firmer tendency has been noticeable, and prices for Spanish have gone up to £10 10s., and for English lead to £10 12s. 6d.

Chicago Lead Market.—The Post, Boynton Strong Company telegraphs us as follows: "The market has ruled very quiet through the week and whatever demand there has been was for car lots. Prices have been steady in spite of the limited de-

mand and at the close the market is quiet but dull at 4 12 1/2 to 4 15 asked."

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead continues practically stationary; 4.07 1/2 c. is the market for both present and future delivery. Buyers are not inclined to anticipate their wants, and only buy such quantities as their immediate requirements compel them to.

Spelter.—A large business has been done as the result of the consumers wanting to cover their wants, partly for spot and partly for near delivery, they evidently fearing they would have to pay still higher prices. At the close there is, however, a little more disposition on the part of the smelters to make sales and the market is somewhat irregular. Nevertheless, we have to quote 4 85 @ 4 90c. delivered New York. The foreign market is below the parity of that here, and the prices quoted in London are £22 10s. for ordinaries and £22 12s. 6d. for specials.

Antimony is in rather better demand, but the somewhat higher prices asked have checked business somewhat. We quote Cookson's 15 1/4 L. X. 12 1/2 c., and Hallett's 11 1/2 @ 1/4.

Quicksilver.—There has been a fair business in this metal during the week. Quotations are £6 15s. for Rothschild's, London. New York prices are about \$40 per flask.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 6, 1892.

The first week of May has brought no relief to this market, the old features—low prices, slow and small sales, and a disinclination on the part of consumers to buy ahead—all these remain unchanged. Doubtless the past week has been as dull as any during this year. Some dealers report more inquiry, but it may safely be said that only in very few instances has this resulted in actual sales. Whilst the majority of the trade agrees that a change for the better must occur in the iron market sooner or later, it is not believed that there is any immediate prospect of improvement. It is scarcely probable, all predictions to the contrary notwithstanding, that lower prices will be reached this year, but consumers are convinced that present values will hold through the summer and they purchase supplies accordingly. One of the best known pig iron brokers in this city read the sizes of the sales which he had made during April. Almost all were in quantities of 50 tons and 100 tons. This from foundrymen, who in former times would have taken three or four times these amounts. It must not be supposed that the foundrymen are themselves pleased with the present condition of the market. Said one: "No market is more carefully watched by the people than the iron market. Whenever pig iron declines say \$1 per ton, our customers expect us to make a reduction of about 1/2 c. per pound in the price of castings, never stopping to think that this would be equivalent to a drop of \$5 per ton in the price of pig iron." Prices have been maintained; we do not hear of any sales made at lower figures than have ruled for the past few weeks. We quote: Northern No. 1 X, \$16; No. 2 X, \$15; Southern No. 1 X, \$15.50 @ \$16; No. 2 X, \$14.50 @ \$15.

Spiegeleisen and Ferro-Manganese.—We do not hear of any new business in either spiegeleisen or ferro-manganese. The market continues as dull as ever. Quotations remain as follows: 20% spiegeleisen, \$26 @ \$27, and 80% ferro-manganese, \$61.50 @ \$62.

Steel Rails.—It is the old story of dullness in this market. Old prices, \$30 f. o. b. mill and \$30.75 tide water, are maintained; and the railroads, which have long ere this convinced themselves that no break is imminent; seeing no inducement to purchase large supplies, buy only as their needs may dictate. The "Association" is apparently a success, and the "gentlemen's agreement" seems in no danger of being broken. As stated in this column some time ago, billets are selling below \$23. This is more than \$7 lower than the price of steel rails—an astounding fact, for no reason is apparent save that the mills will not sell if they cannot get their prices. In this respect the rail market is in better condition than any other branch of the iron and steel market.

Rail Fastenings.—Nothing is doing in this market. There were some reports of a sale of several thousand kegs of spikes to a new England road, but from a conversation with an officer of one of the most prominent railway supply houses here, who has just returned from that section, we learn that the road referred to has bought only for necessary but unimportant repairs. Quotations remain unchanged as follows: Fish and angle plates, 1 65 @ 1 70c.; spikes, 1 95 @ 2c.; bolts and square nuts, 2 70 @ 2 80c.; hexagonal nuts, 2 80c.

Merchant Steel.—There is no change in the report in this market. Business continues rather light and prices are unchanged. We quote: Mushet's special, 48c.; English tool, 15c. net; American tool steel, 7 @ 8c.; special grades, 13 @ 18c.; crucible machinery steel, 4 75c.; crucible spring, 3 75c.; open hearth machinery, 2 25c.; open hearth spring, 2 50c.; tire steel, 2 25c.; toe calks, 2 25 @ 2 50c.; first quality sheet, 10c.; second quality sheet, 8c.

Tubes and Pipe.—The customary business is doing in this market. Prices remain unchanged. We quote ruling discounts as follows: Butt, black, 5 1/2 % butt, galvanized, 4 7/8 %; lap, black, 6 7/8 %; lap,

galvanized, 55%; boiler tubes, under 3 in. and over 6 in., 55%; 3 in. to 6 in., 60%.

Structural Material.—The season for structural iron and steel is about to open, and unless all indications prove false dealers will experience considerable activity before many weeks. Thus far the business has been only fair. We quote this week: Beams, 2-30@2-50c.; angles, 2@2-10c.; sheared plates, 1-90@2c.; tees, 2-40@2-60c.; channels, 2-40@2-50c. Universal plates, 2@2-10c.; bridge plates, 2@2-10c. on dock. In some cases lower prices have been obtained, but on the whole the above quotations are fair.

Old Material.—We do not hear of any business in this market.

Buffalo. May 4.
(Special report by Rogers, Brown & Co.)

The volume of business transacted and the general tone of the market continues on the same plane which seemed to be established a week or two back, viz., a little larger business with more life than for some time preceding. Prices still continue at their lowest ebb, and the consumption of iron locally below the average. We quote on the cash basis f. o. b. cars Buffalo: No. 1X Foundry Strong Coke Iron Lake Superior ore, \$15.75; No. 2X Foundry Strong Coke Iron Lake Superior ore, \$14.75; Ohio Strong Softener No. 1, \$15.75; Ohio Strong Softener No. 2, \$14.75; Jackson County Silvery No. 1, \$16; Jackson County Silvery No. 2, \$17; Lake Superior Charcoal, \$16.50 to \$17; Tennessee Charcoal, \$17.50; Southern Soft No. 1, \$14.63; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

Chicago. May 5.

Consumers of crude iron are still anticipating a further decline, but one thing is noticeable, that local furnaces and well-established Southern companies are found here and there with a well defined limit as to price, below which they persistently refuse business. This is probably the most encouraging feature in the pig iron market, though most buyers refuse to admit it. Rather more activity is noted in inquiry for coke and charcoal iron and deliveries to consumers are large. The boiler makers strike is now in full force, and the expected strike of the machinery molders, May 16th, will cripple many of our manufactories, as in several of the larger plants these two classes of mechanics are employed in big gangs. The trouble with the former has already had a serious effect on warehouse business for plates. Structural material of all kinds is in good inquiry, and the threatened trouble with bridge builders is happily averted. Steel slets and black sheet iron are in better demand, orders for round lots of car iron are in the market, and the outlook improving for further demand for freight cars. Steel rails are more active and for an increased tonnage. Old material and scrap are exceedingly dull and prices lower.

Pig Iron.—Local coke iron continues in fair demand in moderate sized lots—100 to 500 tons. Implement makers are inquiring for season's requirements of coke, and as these are always desirable orders, competition is sharp. Several contracts have been placed at satisfactory prices to furnaces, considering the low range of values now ruling. Some consumers of Southern iron offer a little less on every occasion they have to buy, be it for a car load or 100 tons or more, and makers are endeavoring to hold their own until the Tennessee DeBardeleben consolidation show their hand in regard to prices and deliveries. Some of the larger individual furnaces, Woodward, Sloss and other strong companies are endeavoring to effect a combination to be in a better position to resist any arbitrary action of the big consolidation. Some large inquiries are in the market for the Lake Superior charcoal iron from malleable iron makers and car wheel concerns, who expect to get low offers, but they find that our inside figures are rarely shaded, as the position of this grade of pig iron is stronger than they had supposed. Actual sales are still confined to small quantities.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@17; Lake Superior coke, No. 1, \$14.50@15; No. 2, \$14@14.25; No. 3, \$13.75@14; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@16; American Scotch, \$17@17.50; Southern coke, foundry No. 1, \$14.75; No. 2, \$14.25; No. 3, \$13.75; Southern coke, soft, No. 1, \$14; No. 2, \$13.25; Ohio silveries, No. 1, \$17.50; No. 2, \$17; Ohio strong softeners, No. 1, \$17.50; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17.50; No. 2, \$17; Southern standard car wheel, \$20@21.

Structural Iron and Steel.—None of the structural iron foundries are running full, as mild steels are steadily displacing cast material. There is plenty of business in sight here, but outside work is light, and contract prices are becoming worse. Regular quotations, car lots f. o. b. Chicago, are as follows: Angles, 2@2-10c.; tees, \$2.20@2.30; universal plates, \$2.05@2.10; sheared plates, \$2.05@2.10; beams and channels, \$2.15@2.25.

Plates.—Locally, warehouse business is much depressed on account of the boiler-makers' strike. Demand from the outside is fair, and tubes are in a little better shape. Steel sheets, 10 to 14, \$2.40@2.50; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$3@3.25; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.25; boiler rivets, \$4.10@4.25; boiler tubes, 2 1/2 in. and smaller, 55%; 7 in. and upward, 65%.

Merchant Steel.—Actual business is confined to small lots, but inquiry is increasing from the imple-

ment trade, and the outlook for a heavier tonnage than last season is excellent, dependent largely on the crops. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.25@2.30; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.90; 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 good, but is jeopardized by the expected strike of sheet metal workers. Discounts are lower at 70 and 10% on mill lots and 67 1/2 and 5% off on Juniata and 67 1/2 and 10% off on charcoal from warehouse. An extra 2 1/2 to 5% is given on large orders.

Black Sheet Iron.—Some good far Western orders have been placed for heavy sheets, for hydraulic purposes. In the higher gauges we note a sale of 100 tons for roofing purposes; inquiry continues fair. No. 27 is quoted at 28 1/2c. for common; dealers get 3@3 1/2c. from stock.

Bar Iron.—The increased inquiry in the market from car builders has not improved the price, though the tonnage required is large. A large quantity is for high specification iron on which 1 65@1 67 1/2c. is quoted. Common iron is 1 55@1 57 1/2c. with half extras, but of store orders are filled at 1 70@1 80c., according to quantity, etc.

Nails.—Wire nails are in better demand from mill, orders are larger and prices are fairly steady at \$1.75 Chicago, and \$1.85 in small lots from stock. Steel cut nails from factory are quoted at \$4.60 regular average and \$1.70 from stock and demand good.

Steel Rails.—The steel company here report an increased demand for heavy sections. Some of the larger railroads with terminals here have also placed supplemental orders, and the outlook for round lots for extensions, coincidental with the crop prospects, is very favorable. Quotations remain steady at \$31@32.50, mill, according to quality. Demand for other track supplies are on a parity with orders for rails. Regular prices for splice bars are \$1.70 for steel and iron; spikes at \$2.05@2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65@2.70; square, \$2.55.

Scrap.—Demand for any grade is almost at a standstill, and prices nominal only. No. 1 railroad, \$17; No. 1 forge, \$16; No. 1 mill, \$10.50; fish plates, \$18; axles, \$21; horseshoes, \$17; pipes and flues, \$8; cast borings, \$6.50; wrought turnings, \$9.50; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.50; coil steel, \$14; leaf steel, \$15; tires, \$15.50.

Old Material.—Values are on the down grade, demand being at a minimum, and price of iron rails \$18.50, but doubtful if consumers would pay that. Old steel rails are flat at \$12.50@13.50 as to length, etc. Old car wheels are quiet at \$15.50 gross ton.

Philadelphia. May 5.
(From our Special Correspondent.)

Pig Iron.—It was hoped a week ago that an improvement would set in in crude iron, but the events of the past few days have shown that buyers are not yet prepared to depart from their slothful policy. Prices continue very low. Several inducements have been offered for inferior No. 1 Foundry, both Northern and Southern, or at least irons not very well known. No. 1 Schuylkill has been selling at \$15.50, and even this figure, it is said, has been sharply shaded. Offers are now on the market for very good makes of iron at this figure. Parties making the offers are reticent, and decline to say the lowest figures at which they have recently made sales. No. 2 has sold at \$14.50, and some is held as high as \$15.50. Standard Forge is sold at \$14, and some as low as \$13.50, although not the best quality. American Scotch, No. 1, is offered at \$17, and hot blast charcoal, good make, at \$20. It is impossible to gather any encouraging news to-day.

Muck Bars.—Sellers of muck bars looked forward to a good demand this week, but confess to disappointment. Prices range from \$24.50 to \$25, according to size.

Steel Billets.—Quotations range all the way from \$25 to \$26, according to quality. Billets are hard to quote to-day. Makers have very few inquiries, they say, but mills are making quite good time.

Merchant Iron.—There is nothing whatever to report this week. Plenty of iron is being offered at \$1.65, and of good make. Even at this low figure mills are scrambling for business.

Nails.—Nails continue very low, but as an offset there is a liberal distribution going on.

Sheet Iron.—There is a fair demand for sheet and galvanized in progress, and best refined is selling at from 2-70 to 3 1/2, according to gauge. Several lots of common were sold within a day or so.

Plate and Tank Iron.—The demand is not up to the expectations of two or three weeks ago. Special quotations are being made for first-class boiler plate; ordinary quotations for tank are 1-75 to 1-85 flange, 2-75 for iron.

Structural Material.—Notwithstanding the reiterated statements of a very dull demand, the mills continue to maintain their average output, but certainly new orders are very disappointing.

Steel Rails.—There is very little new business for the steel rail mills. Quotations \$30 at mill.

Old Rails.—Old iron rails are quoted at \$20, and steel \$16.

Scrap.—No. 1 is quoted at \$19, although sales have been made at \$1 less.

Pittsburg. May 5.
(From our Special Correspondent.)

Business continues to move along in a very unsatisfactory way. The demand has been irregular and competition lively. At the present time there are two classes of buyers, the first consumers who purchase merely sufficient to keep their works running, and the second those who know a good thing when they see it—those who have money and consider iron and steel a good investment at present prices. These enter the market and purchase blocks of 5,000 and 10,000 tons of pig iron, steel, or in fact any leading article that can be obtained at prices that meet their views. For instance, Bessemer pig—we heard of a sale of 6,000 tons of standard description at \$14.25, May, June and July delivery. The party that made that purchase certainly made no mistake; the price is the lowest we ever reported. May 4, 1891, we reported sales of 10,000 tons Bessemer, \$16.75@17, cash; Grey Forge at the same date sold at \$14.75@15. The present rate for Grey Forge is \$12.85@13; the latter figures can only be obtained for the best description.

On the first of the year iron and steel manufacturers confidently expected that with the approach of spring trade would become more active; but the second month of the second quarter has been reached with business still in a depressed condition and with a want of confidence in the future on the part of the majority of buyers. There are many indications that the spring trade will be unsatisfactory in many lines of production.

The demand for pig iron continues to be for small amounts for mixtures for immediate delivery, consumers refusing to purchase in excess of what they actually require even at the low prices prevailing. The leading producers, with a regular line of customers, manage to dispose of the principal part of their current output at full quoted rates, and are, therefore, not showing any anxiety to take orders for the future below ruling rates.

Close competition continues among the furnaces that, from one cause or another, are compelled to realize, and the concessions which are made to secure contracts are a factor in keeping the market in its present condition. With the future outlook so unsatisfactory, it is expected that there will be a more general action taken toward reducing production by the blowing out of a larger number of furnaces. The Southern producers continue to turn out large quantities of pig iron, a considerable amount of which is marketed in the eastern part of the State.

A leading dealer has this to say: "In certain lines there is more business offering, and, although the figures in some instances are a little below the market, it may be inferred that confidence is gradually returning. Prices are certainly low enough to be perfectly safe, but the objection is not so much in regard to prices as it is to getting tied up with more stock than is necessary, considering that current quotations are the lowest on record, and that the financial position is easy. It is surprising that there is so little disposition to make speculative purchases, but all the same it is a fact."

Standard Bessemer Ore.

30,000 Tons Standard Bessemer Ore at Cleveland	\$4 00 cash.
<i>Coke Smelted Lake and Native Ores.</i>	
3,000 Tons Bessemer, May, June, July	\$14.35 cash.
2,000 Tons Grey Forge, City Furnace	13.00 cash.
2,000 Tons Grey Forge, June, July	12.85 cash.
2,000 Bessemer, May, June, July	14.25 cash.
2,000 Bessemer, May, June, July	14.25 cash.
1,000 Tons Grey Forge, June, July	12.85 cash.
750 Tons Grey Forge, May, June	12.90 cash.
500 Tons Grey Forge, City Furnace	13.00 cash.
250 Tons Grey Forge, City Furnace	13.00 cash.
200 Tons No. 2 Foundry	14.25 cash.
100 Tons No. 1 Foundry	15.75 cash.
100 Tons Silvery No. 1	16.75 cash.
50 Tons Silvery No. 2	15.50 cash.
50 Tons No. 3 Foundry	13.50 cash.
50 Tons White Southern	12.50 cash.
<i>Charcoal.</i>	
100 Tons Cold Blast	26.75 cash.
75 Tons Cold Blast	26.75 cash.
50 Tons Cold Blast	26.50 cash.
50 Tons No. 2 Foundry	20.00 cash.
<i>Steel Slabs and Billets.</i>	
2,000 Tons Steel Billets and Slabs, July, Oct.	22.75 cash.
1,000 Tons Steel Slabs, May, June	23.40 cash.
1,000 Tons Steel Slabs, May, June	22.40 cash.
1,000 Tons Steel Billets, June, July, Aug.	22.50 cash.
<i>Muck Bar.</i>	
600 Tons Neutral, May, June	25.60 cash.
500 Tons Neutral, May, June	25.10 cash.
500 Tons Neutral, May, June	25.00 cash.
<i>Skelp Iron.</i>	
460 Tons Sheared Iron	1.80 4m.
400 Tons Wide Grooved	1.67 1/2 4m.
350 Tons Narrow Grooved	1.55 4m.
<i>Steel Skelp.</i>	
850 Tons Wide Grooved	1.40 4m.
<i>Ferro-Manganese.</i>	
125 Tons 80% imported delivery	62.00 cash.
85 Tons 80% imported delivery	62.20 cash.
<i>Mill Cinder.</i>	
1,500 Tons Mill Cinder	2.60 cash.
<i>Steel Wire Rods.</i>	
550 Tons American Fives, at mill	32.00 cash.
<i>Bloomers and Rail Ends.</i>	
1,000 Tons Bloom and Rails Ends	16.50 cash.
<i>Old Iron and Steel Rails.</i>	
1,000 Tons Old Iron Rails	21.00 cash.
500 Tons Old Iron Steel Rails	20.50 cash.
400 Tons Mixed Steel Rails	16.00 cash.
<i>Scrap Material.</i>	
400 Tons Cut Pipe, gross	14.75 cash.
300 Tons No. 1 W. R. R. Scrap, net	17.80 cash.
300 Tons Cast Borings, gross	9.50 cash.
200 Tons Cast Scrap, gross	14.50 cash.
100 Tons Soft Steel, net	20.00 cash.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, April 30, May 2, May 3, May 4, May 5, May 6, SALES. Lists various mining companies like Adams, Alice, Amador, etc.

Table with columns: NAME AND LOCATION OF COMPANY, April 30, May 2, May 3, May 4, May 5, May 6, SALES. Lists various mining companies like Alpha, Alfa, American Flag, etc.

*Ex-dividend. †Dealt at in the New York Stock Ex. ‡Unlisted securities. † Assessment paid. ‡ Assessment unpaid. Dividend shares sold, 22,592. Non-dividend shares sold, 12,167. Total shares sold, 34,759.

BOSTON MINING STOCK QUOTATIONS.

Table with columns: NAME OF COMPANY, Apr. 29, Apr. 30, May 2, May 3, May 4, May 5, SALES. Lists companies like Atlantic, Bodie, Bonanza, etc.

Table with columns: NAME OF COMPANY, Apr. 29, Apr. 30, May 2, May 3, May 4, May 5, SALES. Lists companies like Allouez, Aruold, Astec, etc.

Dividend shares sold, 3,985. Non-dividend shares sold, 8,020. Total shares sold, 12,005.

COAL STOCKS.

Table with columns: NAME OF COMPANY, Apr. 30, May 2, May 3, May 4, May 5, May 6, Sales. Lists coal companies like Cambria Iron, Cameron Coal, etc.

San Francisco Mining Stock Quotations.

Table with columns: NAMES OF STOCKS, Apr. 29, Apr. 30, May 2, May 3, May 4, May 6. Lists companies like Alpha, Alfa, Belle Isle, etc.

† Ex-dividend. Total share 1d, 585,102.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date & amount of last), and NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and am't of last).

G. Gold, S. Silver, L. Lead, C. Copper. * 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 Con. Virginia 0,000,000. ** 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 \$100,000 before reorganization in 1890. ††† This company acquired the property of the Raymond & Ely Company which had paid \$3,075,000 in dividends.

STOCK MARKET QUOTATIONS.

Aspen. May 2. The closing quotations were as follows:

Table of stock market quotations for Aspen, listing various companies and their prices.

Baltimore, Md. May 5. Bid. Asked.

Table of stock market quotations for Baltimore, Md., listing companies like Atlantic Coal and Big Vein Coal.

Pittsburg, Pa. Prices highest and lowest for the week ending May 5:

Table of stock market quotations for Pittsburg, Pa., listing companies like Allegheny Gas Co and Bridgewater Gas Co.

St. Louis. May 4. Closing prices.

Table of stock market quotations for St. Louis, listing companies like Adams, Colo and American & Nettie, Colo.

Deadwood. April 30. Bid. Asked.

Table of stock market quotations for Deadwood, listing companies like Billion and Caledonia.

Helena, Mont.

(Special report by SAMUEL K. DAVIS.) Prices highest and lowest for week ending April 30, 1892:

Table of stock market quotations for Helena, Mont., listing companies like Bald Butte (Mont.) and Benton Group.

Trust Stocks.

Special report by C. I. Hudson & Co., members New York Stock Exchange

The following are the closing quotations May 6:

Table of trust stock quotations, listing companies like Am. Cotton Oil Co and Am. Sugar Refineries Co.

Foreign Quotations.

London. April 27. Highest. Lowest.

Table of foreign quotations for London, listing companies like Alaska Treadwell and Amador, Cal.

Paris. April 21. Francs.

Table of foreign quotations for Paris, listing companies like East Oregon Ore and Forest Hill Divide, Cal.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Table of current prices for various commodities, including acids, alcohols, ammonias, and other chemicals.

Powdered, # lb.

Marble Dust - # hbl. \$1.29

Table of powdered and other materials, listing items like Metallic Paint, Mineral Wool, and various oils.

THE RARER METALS.

Table of rarer metals, listing items like Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Osmium, Palladium, Platinium, Potassium, Rhodium, Ruthenium, Rubidium, Selenium, Sodium, Strontium, Tantalum, Tellurium, Thallium, Thorium, Tungsten, Uranium, Vanadium, Vanadium, and Zirconium.