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RICHARD P. ROTHWELL, C.E., M.E., Editor.

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Forty gold, silver, copper, and quicksilver mining companies which make public statements of their earnings paid dividends to the amount of \$1,315,460 during April. Since the first of January sixty-two companies have paid dividends amounting to \$4,846,270.

The article entitled "Notes on the British Alkali Trade; the Manufacture of Sulphuric Acid," which appeared in the numbers of the ENGINEERING AND MINING JOURNAL of the 11th and 18th ult., has attracted much attention, as indeed it deserved. It was written especially for the ENGINEERING AND MINING JOURNAL, by a practical alkali maker of high standing and wide reputation, whose modesty alone has kept him from making his name known in connection with this series of articles.

In our issue of January 3d we gave the production of spelter in the United States as 68,000 tons of 2,000 pounds, and on March 29th we published the statistics of spelter production of Messrs. Henry R. Merton & Co., and we made the remark at the time that they had omitted one producer. We have since learned that we were in error in this. It is true we had returns from this producer at the close of 1890 stating that he

had produced so many tons of "zinc," but we are informed that he had intended to say "zinc ore"—that, in fact, his figures represented "concentrates," and not zinc or spelter. We have therefore to modify not only our criticism, but our statistics, and we give herewith the corrected figures of spelter production for 1890 and 1889 in tons of 2,000 pounds. We have in this table credited each state with the amount of spelter produced in the state, instead of apportioning the product to the states where the ore originated. In this way the figures will correspond with those for the pig-iron production which are given according to the states where the iron is smelted. In lead and copper the effort has been to apportion the product to the states where the ore was produced.

PRODUCTION OF SPELTER IN THE UNITED STATES.

States	1889.	1890.
	Tons of 2,000 pounds.	Tons of 2,000 pounds.
Illinois.....	23,620	26,197
Kansas.....	13,627	15,787
Missouri.....	11,753	13,529
Eastern and southern.....	9,797	10,145
<b>Total.....</b>	<b>58,797</b>	<b>65,658</b>

## COLORADO AS A COPPER PRODUCER.

There was no other section of the United States, producing copper, in which so large a proportionate increase was made in 1889 and in 1890, as in Colorado. The copper output of this state in 1888 was 1,621,100 pounds: in 1889, it was nearly double that amount, 3,103,000 pounds; and in 1890, 6,700,000 pounds. In 1888, Colorado stood sixth on the list of copper-producing states, being led by Montana, Michigan, Arizona, Utah, and New Mexico; in the following year it rose to the fifth place, passing Utah; and in 1890, ranked fourth. This increase has been so marked as to call for attention.

Colorado has been for many years producing a small amount of copper, and, although the amount prior to 1888 had never exceeded 2,100,000 pounds, the prospects of a supply of copper ore from this source were at one time considered sufficiently promising to justify the Pueblo Smelting and Refining Company in adding a copper plant to its works. Small copper-smelting works were also erected near Westcliffe in Custer county. Several copper mines were being opened in the Greenhorn range at that time, and some ore was shipped from them, but for some reason or other operations were suspended, and the copper smelters at Pueblo and Westcliffe have done little work since 1888.

In later years, the only mine in the state, worked for copper alone, has been the Sedalia, located near Salida. Since 1838, this property has made a considerable output, the ore having been shipped east for treatment. This mine is still being worked and seems likely to become quite an important producer.

The increase of recent years in the copper output of Colorado, has been in great measure due to the increasing amount of copper in the ore of certain Leadville mines, where up to two years ago, it was found in important quantities in one mine only, the Mike and Starr, located on the extension of the Stone ore chute. The sulphide ore, which, in mines further to the southwest, consists of galena, blende, and pyrite, changes hue to pyrite and chalcopyrite, carrying several per cent. of copper. This ore, although of low grade, has furnished material of desirable character for the Boston & Colorado Smelting Company. In the Henriett & Maid mine, famous as being the largest lead producer of the United States, there was found in 1889, underlying the lead carbonate ore, a large body of pyritous ore, carrying copper, to the extent of about five per cent.; quite a large output of this ore was made in 1890, accounting in a great measure for the increase in Colorado's product, and it is likely that even a greater quantity will be produced this year.

There are three mines in Colorado at the present time, which may be classed as copper producers. The list is likely to be increased by one other, and an important one, during the present year. This is the American Belle Mines, Limited, of the Red Mountain district, in two of whose mines, the Hudson and National Belle, a large amount of argentiferous copper sulphide ore has been exposed. A smelter of capacity of 300 tons per day is to be erected by the company at Durango, Colo., for the reduction of this ore during the coming summer.

Other copper deposits will undoubtedly be found in other parts of Colorado also. The extreme northwestern portion of the state is practically undeveloped and almost unprospected. All accounts agree, however, that large veins of copper ore have been found there; and as the region is opened and becomes better known attention will certainly be given to their exploration.

## MINING EXCITEMENTS; THE PAST AND THE PRESENT.

The West is again aroused by the discovery of rich silver ore in a new district and there is talk of another mining excitement such as was last seen at Leadville in 1878 and 1879. Many prospectors and speculators are already rushing to the scene of the reputed new bonanzas located in what is known as the Deep Creek region of Utah, but whether these discoveries will prove as valuable as those of Leadville or will result in disappointment like the many mining "booms" which there have been from

time to time in the past, can only be determined by the development of the district.

It is not at all unlikely, however, that profitable mines may be discovered in the new region. The name, Deep Creek, is used to cover quite an extensive area, in which gold, silver and lead ore has been for many years known to exist at various points, separated by quite considerable distances. Hitherto, however, all ore found has been of low grade, and the district, occupying a comparatively isolated position, has been of late years almost neglected by prospectors, until now attention is suddenly called to it again by the discovery of rich ore.

Notwithstanding the remarkable manner in which the resources of the western states have been developed since the first bands of gold hunters crossed the Rockies, there are still many portions of the Rocky Mountain region which, like Deep Creek, remain imperfectly or not at all explored, and it is quite within reason to expect that new and valuable mineral discoveries, which may have important effect upon the mining industry of the United States, may, from time to time, be made. It is altogether improbable, however, that even if ore deposits of great richness should be found in the future at Deep Creek, or elsewhere, we shall ever see a repetition of the mining excitements which followed the discovery of gold in California in 1849, the Comstock bonanzas in the decade subsequent to 1859, or the uncovering of the immense lead carbonate ore deposits of Leadville in 1878 and 1879.

Another "boom" has long been the dream of the prospectors and mining speculators who lived through the exciting times of Virginia City and Leadville, but they are probably doomed to disappointment. While they have been waiting, the condition of affairs in the West has been changing, and in the last ten years changing with great rapidity, so that it is no longer the country which they knew.

When, in 1849, the reports of the discovery of gold in California began to straggle to the East, they were received with incredulity; but when they finally became so definite that they won credence, there was so little knowledge of the vast country lying beyond the Rocky Mountains, that the men of the eastern states imagined it a veritable El Dorado, whither they had only to go in order to find gold, and there commenced the first and most remarkable excitement recorded in the annals of the mining industry of this country.

The miners who gathered in California at that time, although generally men of intelligence as compared with the laborers in other countries, had vague ideas of the geological distribution of gold, and the marvelous amounts won by them from the rich placers excited their fancy so much that they would scarcely have been able to form a sound judgment in any case. No story was too extravagant to find believers, and men who had been earning but a dollar a day in the East became dissatisfied if they were not clearing twenty, and were always ready to start off on some expedition in search of distant diggings reputed to be rich.

After a while the miners became better informed; but the discovery of gold and silver in Colorado and the wonderful bonanzas of the Comstock added flames to the fire, and for a quarter of a century after MARSHALL'S discovery the history of gold and silver mining in the Rocky Mountains is the record of a series of "rushes" and "booms." Even so late as 1878 the West was comparatively but little known, and it needed only reports of the richness of the Leadville ore deposits, the ease with which they were opened and their great extent to arouse a new excitement from one ocean to the other.

Since then, however, railways have been built in all directions, great cities have grown up and the population of some states has more than doubled. With the influx of people from the East the character of the people has changed. The Argonauts who went to California in 1849 are fast passing away, and those who were on the Comstock in the early days are now old men. Where there was one district in which profitable mines were being worked 10 years ago, there are now probably twice the number, and so much capital being absorbed in all of these enterprises, as well as the numerous other industries which are springing up all over the West, there is not the amount ready to seek a speculative investment in new mining undertakings that there was once. Mining for the precious metals, moreover, is no longer a new branch of industry in this country, but is one in which the conditions necessary for success are well understood, and one which is being conducted on as sound business principles as are practiced in other industrial undertakings. The people who are now engaged in building up the West are too much engaged, and are too cautious to embark in the wild speculation which forms the foundation of a mining "boom."

There have been several important and valuable discoveries of ores bearing the precious metals in various parts of the West during the past ten years, but in no instance has there resulted an old-time "boom." The Deep Creek region may prove to be very productive and its mines as rich as it is expected, and in that case it will undoubtedly attract considerable attention in other parts of the West. All probabilities are, however, that its development will be as gradual as that of the San Juan district of Colorado has been; and, while new fortunes may be accumulated there, it is unlikely that they will be won in a day.

## 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.]

*Electric Transmission of Energy and its Transformation, Subdivision and Distribution.* A Practical Handbook by Gisbert Kapp, C. E., Associate Member of the Institution of Civil Engineers, Member of the Institution of Electrical Engineers. With 130 illustrations, 360 pages. Third Edition, revised. Published by D. Van Nostrand Company, New York, 1891.

*Memoir and Letters of Sidney Gilchrist Thomas, Inventor.* Edited by R. W. Burnie. 314 pages; illustrated. Published by John Murray, London, 1891.

*Surveying and Levelling Instruments.* Theoretically and practically described for construction, qualities, selection, preservation, adjustments and uses; with other apparatus and appliances used by civil engineers and surveyors. By William Ford Stanley, optician, manufacturer of surveying and drawing instruments, author of a treatise on "Drawing Instruments," "Properties and Motions of Fluids," etc. 545 pages; illustrated. Published by E. & F. N. Spon, London and New York, 1890. Price \$3.

## 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.

## Pyrometric Data.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: My attention has been called to the fact that in my article on pyrometric data in your issue of October 11th, 1890, I gave the melting point of gold and that of silver, on the authority of Violle, slightly differently from the points usually quoted on his authority; differently indeed from the points given in his original article in the *Comptes Rendus*. They are as follows:

	ENGINEERING AND MINING JOURNAL.	<i>Comptes Rendus.</i>
Gold.....	1,045 degrees C.	1,035 degrees C.
Silver.....	945 degrees C.	954 degrees C.

Professor Le Chatelier, on whose authority I gave these numbers, writes me that M. Violle has informed him directly that the number which I gave, 1,045°, is right, a correction having been overlooked in arriving at the number which Violle himself gave, 1,035°. Professor Le Chatelier further thinks that the number which I gave for the melting point of silver, 945°, is nearer the truth than 954°, if we take 1,045° as the melting point of gold.

I hope to send you soon an account of the Le Chatelier pyrometer based on my own use of it, which has now run over several months. I will now merely say that its simplicity and convenience leave little to be desired. The evidence so far leads me to believe that with reasonable care, its indications are extremely accurate, and, better still, extremely constant, exposure even to a brilliant white heat thus far seeming to produce no important change in the readings.

H. M. HOWE. †  
BOSTON, MASS., APRIL 21, 1891.

## Darby's Recarburizing Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As far as Mr. Howe's communication in your issue of the 18th inst. and under the above heading applies to the remarks I made in your issue of March 7th, I have to say that Mr. Howe has thoroughly misunderstood the intent of those remarks. I merely referred to the graphite experiment in order to put in a "disclaimer," as it were, and for the purpose of fortifying my position against the ever changing aspect of the experiments which Mr. Howe offers in defense of the theory that carbon can unite directly with iron or steel, inasmuch as the absence of a sufficiently detailed description of these experiments and their results prevents constructive argument.

At first it was "gas carbon and a filtering process;" by gas carbon I suppose is meant either carbon derived from the decomposition of ethylene gas, etc., or the plain coke from the gas-works; but it did not matter which of them was meant, for neither the one nor the other can combine with molten iron or steel that contains no oxygen, excepting to the extent to which the gases which the carbon or coke contains can effect an indirect combination of carbon and metal.

Then the graphite experiment, which was not a filtering process, but merely a "stirring in" of graphite into a crucible filled with molten metal, and under conditions which, as Mr. Howe stated, were favorable to the direct combination of the graphite with the metal. As I know absolutely nothing about the conditions under which that experiment was made, excepting that the metal contained a good deal of manganese, it would have been absurd to try to explain away the results which Mr. Howe communicated. As to the constitution of the graphite that had been used, I was equally in the dark. Hence, I alluded to blast furnace graphite (FeC<sub>3</sub> = Fe: 61%, C: 39%). As to ordinary or "natural" graphite, containing in the average, say, below 2% of iron, I do not even care to insist that said iron is chemically combined with the carbon, though I incline to the belief that it is.

In the case under discussion this question is, however, immaterial, for 2% of graphite, if containing 2% of iron actually combined with the carbon, in the proportion of FeC<sub>3</sub>, could only yield to the metal 0.01% of soluble graphite-carbon; hence the combination of the balance of the carbon that was taken up by the contents of the crucible—by the stirring in of graphite or of any other kind of carbon—would have to be accounted for in some other way. I have not the slightest doubt that this can be done, when the conditions of the experiment are made fully known, without falling back on the theory of direct combination. For that matter it would even be possible to change a crucible charge, consisting entirely of wrought-iron scrap, to pig iron containing 3/4 or more per cent. of carbon without stirring anything into the molten metal, always provided that the following conditions could be secured:

1. Some parts of the crucible should be exposed to a strong oxidizing flame.
2. Other parts should remain covered by red-hot coal.

3. The respective parts should be in such area proportions to each other that the oxygen which would pass into the charge through the exposed parts of the crucible, would again be driven out, after having combined with the metal, by the carbonic oxide gas (CO) that would enter through those parts that are covered with glowing coal.

4. The surface of the molten metal should be covered by a liquid slag, so that no oxygen could enter from above.

Coming now to the latest development of the process, viz., to the use of Connellsville coke in paper bags, I feel highly gratified that Mr. Howes has procured and published the results obtained therewith at the American works, the more so as the twenty-four tabulated results, arrived at in recarburizing open-hearth steel to a moderate degree, fully corroborate what I predicted for the process in your issue of July 12th, 1890. As to the high-carbon steel obtained by recarburizing Bessemer metal (of which there are only four tests), those results can probably also be easily explained in harmony with the theory of "indirect" combination, provided it has been determined how much oxygen the steel still contained after having been dosed with ferro-manganese. In other words, how much oxygen did the steel contain when it analyzed 0.10% of carbon? I know that it is customary to suppose that the manganese reaction eliminates the oxygen entirely, but that is not always the case, and especially not when it is intended to economize in the use of costly reducing agents. Another important clue to the true inwardness of the recarburizing reaction would be to ascertain how the same metal pans out in carbon and oxygen after cooling (*i. e.*, cut from the ingot), when it has not been recarburized by filtering.

As far as the removal of oxygen is concerned, I do not think that the filtering process will ever prove as efficient as a thorough manganese reaction.

In filtering, more or less of atmospheric oxygen is absorbed by the metal, alongside with monoxide and dioxide of carbon, hence the after-reactions must be quite energetic. But as the reaction  $CO_2 + Fe = FeO + CO$  develops heat, whereas the reaction  $FeO + CO = Fe + CO_2$  absorbs heat, it is to be supposed that the internal oxidizing changes must keep on longer than the internal reducing changes, and that oxidized iron will have to remain in the metal because the element which could carry it off as slag (Si) is no longer present, at least not to an appreciable extent.

HOBOKEN, April 21, 1891.

A. D. ELBERS.

The Lixiviation of Silver Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have just read with great pleasure the communication from Mr. C. H. Aaron in your issue of April 18th, on lixiviation. If we had more men in the profession like Aaron and Stetefeldt, who are constantly giving to the public the fruit of their brains, not only our technical literature, but metallurgy in its practical application, as well, would be in a far more advanced state.

I would like to call attention to certain statements made in Mr. Aaron's article, not with any intention to criticise, but rather to obtain more information in regard to these points.

The statement is made that "silver leachers, outside of the Russell process, agree that only in exceptional cases, or as the result of bad management or accident, is it necessary to reinforce their hyposulphite solution; in the ordinary course the waste is compensated by the hyposulphite which the precipitant always contains." I do not see why it should be more necessary to reinforce the hyposulphite solution in the Russell than in the ordinary hyposulphite process. It is true that when the extra solution is made by the addition of copper sulphate, very frequently more hyposulphite is added to increase the percentage. But, aside from this, I do not see how it is possible to avoid the necessity of continually reinforcing the ordinary hyposulphite solution. The loss of hyposulphite occurring in any leaching works is very small—*theoretically*, only that from the oxidation of the hyposulphite. But how is this in practice? In the writer's limited experience, he has always found that whenever a wash-water was displaced by hyposulphite or vice versa, the displacement was never perfect, that there was always more or less diffusion in the two liquids where they came into contact with each other, and, instead of having all the hyposulphite solution coming out of the ore at the same strength it went in, say 2%, it is more likely, at the last, to come out, varying gradually all the way from 2% down to practically nothing—or, in other words, from 2% hyposulphite solution down to wash-water. Now, taking into account this state of things, how is it possible to avoid reinforcing our solution if we desire to use a hyposulphite solution of uniform strength? If we stop saving the hyposulphite solution the moment it gets below 2% we will lose a lot of hyposulphite; if we endeavor to save it by running it into our hyposulphite tank, we dilute our 2% solution, and will be under the necessity of reinforcing it to some extent for our next charge. So far as the compensation of the waste by the precipitant is concerned, it is true, there is a compensation here; but if sodium sulphide is used as the precipitant, I do not see how the compensation can be even approximately equal to the waste occasioned by the hyposulphite being carried away by the wash-water, and the dilution occasioned by the admission into our standard hyposulphite solution of some wash-water containing, say, 1% of hyposulphite.

The diffusion is probably aided to some extent by the mechanical mixing of the two solutions, owing to the fact that a charge of ore is never quite uniform throughout in density, thus allowing part of the solution to leach through the ore and be replaced faster than the rest. If Mr. Aaron can suggest any practical way of overcoming this difficulty he will, at the same time, practically overcome the necessity of reinforcing the hyposulphite solution; otherwise I do not see how he can avoid it.

The statement is also made that "so long as any silver or copper remains dissolved the white zinc sulphide immediately redissolves, silver or copper sulphide taking its place." In regard to this statement I will relate an experience I had, which I have never been able to explain satisfactorily to myself. During the last year, Mr. E. R. Holden leased the works of the Colorado Gold and Silver Extraction Company for the purpose of conducting a series of experiments to discover the value of the Russell process as compared with the ordinary process, both on the large and small scale. By a large scale, I mean charges of from 2,000 to 2,500 pounds of ore.

Some of the ores treated contained considerable zinc, all of which was not washed out by the first wash-water. The experiments were under the

supervision of Mr. E. B. Kirby, M. E., and the charges were treated day and night without interruption until finished, Mr. Kirby having charge of the day shift and I of the night shift. Frequently one of us would precipitate a tank solution and let it stand for the other to filter. We found out, as has been stated, that the silver and copper would precipitate before all of the zinc. Therefore, whenever we had a large percentage of zinc in our solution, we would not throw down all of the zinc, but simply add enough sodium sulphide to precipitate all of our silver and copper, always testing 500 c. c. of the solution by filtering and adding excess of sodium sulphide and assaying the precipitate. Several times when I had precipitated a tank of solution and left it for Mr. Kirby to filter, he would complain to me of imperfect precipitation of the silver, when I was positive that the precipitation had been perfect when made. I then determined to test some of his precipitations and found them also imperfect, finally we investigated this and found that whenever we had large quantities of zinc in our solution and precipitated the silver and copper perfectly, but not the zinc, on standing, some silver would invariably go into solution. I do not remember about the copper. If the zinc had first been removed as carbonate, no silver ever went into solution after once being precipitated. What the action was, I do not know, but whatever it was, it was due to the presence of zinc in the solution.

L. D. GODSHALL.

ASPEN, Colo., April 25th, 1891.

Discussions in the Institute of Mining Engineers.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I learn that during my absence from the country the subjects of the nature of the Transactions of the Institute of Mining Engineers and the desirability of securing a larger amount of discussion of papers, have been agitated more or less, in your columns and elsewhere. I have seen, however, but a single article, which appeared before my departure. I trust that later writers have shown more intelligent acquaintance with the facts of the case; but whether they have or not, I am glad to have the matter discussed, because I am led to hope that a more effective co-operation on the part of members of the Institute may be secured than has heretofore been the case. In view of such encouragement, I can well afford to smile at the assumptions that things are worse in this respect than they used to be, and that there is some "system" in the way which needs to be reformed before the good old times can be restored. Possibly a brief statement of facts may be useful. It is just as well to start fair.

Dividing the history of the Institute, for convenience, into two periods, the first comprising thirty-five meetings reported in eleven volumes, and the second twenty-one meetings reported in seven volumes, it appears that during the first period four important discussions were held, *the subject in every case being a paper presented at a previous meeting*, and the discussion being organized in advance by personal exertions, and including non-members as well as members. I think this practice might be continued with advantage, and the failure of several attempts has not caused me to cease from either desire or endeavor in that direction. The present affords an excellent opportunity for a fresh attempt. Several of the topics presented at the New York meetings of last year are of sufficient interest to warrant it, and if any member willing to take part in such a discussion will promptly furnish me with a list of suitable persons they will be invited at once.

So far as the ordinary discussion of papers outside of these special occasions is concerned, a considerable gain has been effected. The discussions of the first 35 meetings (including papers offered practically as discussion but printed for convenience under separate titles) fill 185 pages of the *Transactions*, or (one meeting at which no papers were read being deducted) 5 1/2 pages per meeting. The similar discussions of the next 21 meetings occupy 357 pages, or 17 pages per meeting. At the same time the editorial work of the secretary's office, not including indexes, index-volume, catalogues, circulars, etc., has covered in seven years 5,974 pages of professional matter, or 853 pages per annum, as against 5,662 pages, or 472 per annum, for the previous 12 years (Vol. I covering two years). It is of course obvious that an unlimited increase of oral discussions cannot be secured without an increase in the number of sessions. This has been done, the number of sessions now regularly provided for being larger than in the early period. It does not seem practicable to make a further increase, nor is it necessary in order to permit still more extended discussion.

While the improvement already accomplished is matter of congratulation, much more can be done with the earnest co-operation of members. The Secretary has no pet system of his own, and the council has adopted no rules, which would interfere with any practicable change of method. The only definite proposition suggested has been, so far as I am aware, the adoption of the plan pursued by some other societies, of printing and distributing papers long enough before a meeting to permit members to prepare for their discussion at that meeting. So far, this is the exact thing attempted by both Dr. Drown and myself, with conspicuous lack of success, for the past twenty years. The causes of failure may perhaps be detected in the following tabulated statement:

a. Average time between meetings.....	4 months.
b. Average time before each meeting at which it is practicable to fix place and issue circular.....	1 1/2 "
c. Average time required to edit MS. of authors, receive their corrected proofs, and print pamphlet edition.....	1 "
d. Average number of papers in various stages of publication at one time.....	60
e. Average number of papers for one meeting.....	30
f. Time required to make up and send out a package of pamphlets, after all have been printed.....	10 days.

It is clearly impossible to receive, print, and send to members the papers of a coming meeting, and at the same time go on with the revision, "make up," and final printing in volume sheets of the papers of the preceding meeting, unless the manuscripts of the new papers are in the secretary's hands two months, on the average, before the meeting.

On the above statement the following observations may be made:

a. It has been suggested that the number of meetings should be reduced. This would (as experience has shown) undoubtedly reduce the number of papers, and also the time available for discussion, since it is not found practicable, as a rule, to make the meetings longer than will permit members to attend them at the average cost of one week's absence from their business.

b. The attempt is always made to announce at each meeting the time and place for the next; but it generally fails, because local members are not sure, so long in advance, whether they can conveniently make the necessary arrangements at that particular time. The active co-operation of members in this respect, by procuring early suggestions or invitations, would be very valuable.

c. The average length of time required for the examination, acceptance, preparation of MS., proof-reading, and press-work is greater, the larger the number of papers offered and the larger the amount of type standing and waiting for final corrections from authors all over the world. At the present time, more than six months since the New York meeting, there are papers in hand not yet printed on that account, and blocking the way of other work. Moreover, it is impossible for all MS. received to be edited at once; and the undersigned takes the liberty of saying frankly to his fellow-members that very few of them furnish "copy" which could go to the printer without careful editing. The degree of accuracy presented by the published *Transactions* is the result of successive revisions, up to nine in number, the first of which is applied to the manuscript, while the last, almost without exception, still detects some points for correction. The only way in which this immense labor can be performed is to distribute it throughout the year. It cannot be crowded into a few weeks just preceding a meeting.

d. The foregoing remarks apply also to the average number of papers standing in type. They are kept standing until they can be made as nearly perfect as possible. Then they are printed for the volume, and not until then is the type distributed. The average time is five months.

e. The number of papers offered at each meeting is often more than 30. They are of course mainly presented by title; and those which are read at length or by abstract are in most cases withdrawn by the authors for further perfecting before publication. The reduction of the number of the papers, and consequently of the variety of contents, of the *Transactions* would be a disadvantage, to be avoided if practicable, or to be accepted only if counterbalanced by a greater advantage.

f. The sending out of a package of pamphlets is a matter involving considerable labor and expense. The printing of the wrappers, preparation of correct mailing list, sorting out and wrapping of over 2,000 packages, directing stamping and mailing, constitute a cumbersome operation. The Institute cannot afford to send out single pamphlets as fast as they are ready. (The postage account last year was over \$1,200.)

And to all this, I have heard but one suggested reply, namely, that everything might go on as now with the single change, that whatever papers had not been sent to members should not be presented. It is declared that in that case possibly one meeting might be a failure, but afterward things would go on again all right. I presume that by special effort, the failure of one meeting might be avoided. For instance, if the gentlemen who are now advocating in the papers the introduction of that system would kindly furnish to the Secretary *now*, papers enough for the next autumn meeting, that difficulty would disappear. The Secretary would only be too glad to receive papers on such conditions. But as a matter of practical experience he usually receives them coupled with exactly opposite conditions.

A few authors prepare and send manuscripts whenever they are ready. The great majority do so only after knowing where the next meeting is to be held, and, if invited to prepare now papers for "meeting after next," would decline.

In 1890, there being no May meeting, the undersigned made a special effort to secure papers in time. Numerous personal appeals were made, and August 1st was set as the date for receiving the manuscripts. On that day only one of the promised papers was in hand. Between that date and September 29th, by intense labor, day and night, of the Secretary and his assistants, 600 pages of matter were got into print, but not in time to be distributed, except at the meeting itself.

The theory that the Institute has only to lay down a rule in order to secure obedience to it rests on the assumption that authors are anxious to offer papers and secure their acceptance on any terms. This is true of a part only, and that not the most desirable part, of the contributors to the *Transactions*. Our best men are the busiest. Many of our most valuable papers have to be obtained by solicitation, by consulting the convenience of the writers, and in numerous cases by leading them along patiently from the initial promise to write (clinched by the "reading by title") to the final production of a rough MS., to be perfected during publication. We encounter the competition of the technical journals, which stand ready to pay for valuable contributions, and often endeavor to get even the papers of the Institute before they have been put into correct form. I confess that with my present light on the matter I feel almost sure that the attempt to enforce such a rule as is proposed would, in the Institute, result in the loss of our most valuable contributions altogether. That it does not have that result in other societies differently constituted and differently situated, may be, in my judgment, easily explained. At all events the question is one to be settled by the authors, not by outside observers; and it is quite easy to find out what authors want. My own experience with them is that they insist on having their papers presented at once, if only by title; that they want advance copies for technical journals, etc., at the earliest possible day, and that they are not ready until the last minute, whether they have two months' or six months' notice. But there is nothing to prevent an author from requesting that his paper be *not* presented until after it has been distributed to members. And what a relief it would be to the Secretary! I recommend this view to all who prefer that way of doing things, and I would be personally grateful to every one who acted upon my recommendation. Moreover, I am quite ready to be convinced that my fears are groundless as to the effect of proposed rigorous rules. But I must say that I know of nothing that would convince me so completely as the receipt of a few manuscripts coming from authors not in a hurry.

R. W. RAYMOND.

NEW YORK, April 23, 1891.

Some efficient composition to prevent the corrosion of the bottoms of steel ships has long been sought for by naval architects. Experiments with Japanese lacquer are now being made at the Brooklyn Navy Yard, and, it is thought, promise most favorably. One coat of lacquer is said to be sufficient for a three years' cruise, and will cost about \$5,800 for a vessel like the Boston.

#### INTERESTING OCCURRENCES OF GOLD.

Written for the Engineering and Mining Journal by A. Hausmann.

Two very singular occurrences of gold have come under my observation within the last four years which present some peculiar geological and mineralogical features, and are, to my knowledge, unique in many respects, for I have never read of anything similar and have never met any one who had seen anything like them. They are of an entirely different character, the one representing a typical fissure vein, the other an irregular deposit, which it would be difficult to classify.

About four miles from Breckenridge, in Summit county, Colo., between Swan and French creeks, lies Farncomb Hill, a spur of Mount Guyot, which, under various names, extends as far west as the Blue River. This portion of the long ridge consists of clay, slate, and porphyry, the latter occurring in form of dikes and sheets overlying the slate. In this latter formation one fossil has been found, *inoceramus*, indicating that it probably belongs to the Cretaceous period. The porphyry, of course, must be of a later date.

Running nearly north and south, almost at right angles with the longitudinal axis of the mountain, is a system of parallel veins cutting almost vertically through the planes of stratification of the slate. Although from less than one to four inches in width only, they possess all the characteristics of true fissure veins in a marked degree, viz. trend, dip, smooth walls, faults and specific mineral contents, entirely different from and foreign to the adjacent rock, and often separated from the walls by selvages. In places where the porphyry overlies the slate the veins continue from the former into the latter without the slightest change in their physical or mineralogical features. The occurrence of a dike has likewise no perceptible effect upon the veins, proving conclusively that they were formed after the last eruption of the igneous rock took place. Their principal contents are iron (oxides and sulphides), copper (oxides and sulphides), gold, silver, calcite, quartz, and, rarely, galena.

The gold is associated with all of these minerals, except the quartz, which is but seldom found in the richer portion of the vein and does not contain a trace of gold wherever it forms the bulk of the vein matter. Fine threads and wires of gold are frequently seen in the crystals of calc-spar. Concerning the shape, I doubt whether any other mines exist in the world producing such a variety and abundance of beautiful specimens. Nuggets weighing several ounces are literally covered with crystals; wires varying in thickness from the size of a coarse hair to that of a nail are scattered through the iron or copper matrices, or are densely matted into bunches closely resembling a tuft of moss. Examined through a magnifying glass all the wires show a more or less quadrangular shape, which can be plainly seen in the larger ores without the aid of a lens. Their sides are often deeply grooved, the edges sharp and projecting, frequently studded with minute crystals. I have observed only two forms of crystals, the regular pyramid of the octahedron, often with double edges, and a rhomboid. Of this latter form I have seen only one perfect crystal, which was about  $\frac{1}{2}$ -inch long, half as wide, as thin as card paper, showing double edges on both sides. But I have frequently seen flattened wires terminate in an imperfect crystal of this kind.

All the richer portions of these veins were found within little distance from the surface, while with increasing depth the characteristic contents disappear and are replaced by calc-spar and barren quartz. These veins have been the feeders of the rich placers in Georgia, Humboldt, and American gulch, which produced millions in the early days of Colorado's settlement by the gold hunters.

A little over 300 miles south of San Diego, some distance off the coast of Lower California, is situated Cerros Island, a mass of steep and rugged mountains, about twenty miles long from north to south, about ten miles across in its widest part, the highest point reaching nearly 4,000 feet above the sea. On the northern part of the island, about three miles from the coast, gold was discovered not very long ago on the slope of a mountain at an elevation of about 1,500 feet. The rock forming this mountain belongs to the basic igneous group, of which diorite, diabase, propylite, etc. are the best known types. In the lower part of the slope, extending over more than half its entire length, the rock is decayed or metamorphosed in a peculiar manner. This zone of decomposition, which can be readily traced along the surface by its lighter color, is of varying thickness, from a few feet at the outcrop or apex to several hundred feet at the base of the mountain. The line of decomposition is, however, not sharply defined, and all the intermediate stages of the process, from the dark, unaltered, crystalline, hard country rock to the soft, white, homogeneous talc or kaoline, can be easily demonstrated. Near the surface the colors are generally darker, of a vivid brown, red, purple, yellow; with depth they become lighter until attaining a pure white in the ultimate product of decomposition.

Through this much-altered and broken formation, gold is disseminated irregularly, but apparently within a certain belt. Occasionally streaks of quartz are met with, forming thin layers on the larger boulders of decayed rock, and showing free gold in the small cavities of their honey-combed surface. This gold may be considered as being in place, however, and seems to be the original source of all the gold found in the fine detritus filling the cracks and crevices between the rocks. Being set free through disintegration of the quartz, it forms merely an accidental admixture in the gold-bearing formation, similar to the gold found in the gravel of a river bed. There seems to be no doubt that the gold was originally precipitated from a hot alkaline solution, and the presence of alum and native sulphur point to volcanic agencies as the cause of the metamorphosis.

It is a singular coincidence with the veins on Farncomb Hill, Breckenridge, that all the richer pockets so far have been found near the surface, the amount of gold decreasing with depth. All the gold is fine. The largest piece I ever saw was less than the size of a pea and composed of delicate crystalline filaments.

I have read with interest Mr. C. H. Aaron's communication in the *ENGINEERING AND MINING JOURNAL* of March 14th, describing a coating of gold by carbonate of bismuth, having had a similar experience on Cedros Island. A white, heavy substance was frequently found when washing ore, which assayed well but did not show a color in the spoon.

Are similar occurrences of gold known in the United States or elsewhere?

## THE NEW QUEBEC MINING LAW.

By Our Special Contributor.

The mining law which goes into effect in the Province of Quebec on May 1st, unless suspended by the Provincial Government, or vetoed by that of the Dominion, or set aside as unconstitutional by the courts, is a curious piece of legislation. Its most important paragraph is No. 1,426, which is as follows:

"From the first day of May, 1891, a royalty shall be levied in favor of the Crown upon every mine which is now or may hereafter be sold, conceded, or otherwise alienated. Such royalty shall, unless otherwise determined by letters patent already granted, consist of a percentage of 3 per cent. of the merchantable value of the products of all mines and minerals, upon the following: Iron, including iron pyrites and chromic and titaniferous ores; copper, nickel and cobalt; manganese, antimony, lead, zinc, aluminum, molybdenum, baryta, silver, gold (including alluvial gold), mercury, tin, amianthus, phosphate of lime, graphite, mica, coal, petroleum, ochre, soapstone.

"On gold 2½ per cent. of the gross weight estimated at \$18 per ounce, and on silver 2¼ per cent. of the gross weight."

The law provides for permits to prospect on any lands, public or private, the term of the permit being three months, and the fee \$5 for every 50 acres if the land is private and \$10 for every 50 acres if the land belongs to the Crown. The prospector would be encouraged to prefer to explore private lands but for the further provision that if he should find anything of value the landowner would have the privilege of working it, and the pains of the discoverer would have been thrown away.

A large number of petty officials are created, with a corresponding list of offices, and appurtenant prices, half of which, after payment of costs of prosecution, goes to the complainant.

On Wednesday last an important meeting of the Quebec Mining Association was held to protest against this unwise and unjust law. I presume that the ENGINEERING AND MINING JOURNAL will publish next week some account of the proceedings. Meanwhile, by way of putting my own view on record, I give the text of a letter recently written by me to Mr. B. T. A. Bell, editor of the Canadian Mining Review, and presented by him at the meeting of the association.

MY DEAR SIR: I beg to acknowledge with thanks the copy of the new Quebec mining law which you have kindly forwarded to me. Having but just returned from an absence of several months, principally spent in Egypt or on the ocean, I was not acquainted with the provisions of this law, and could scarcely credit the reports concerning them which came in a fragmentary way to my attention.

I have examined, therefore, with curiosity the printed text of the law, and I confess that my surprise is now greater than ever. I did not deem it possible that the legislature of any civilized country could at this day be induced to enact a measure so barbaric in its injustice and unwisdom. Of the particulars which embody the injustice of the law, the following struck me as the most important, though not the only ones.

1. As I understand it, the law imposes a "royalty" of three per cent. of the gross value of the product upon mines already alienated from the Crown by actual sale, without any reservation of the right to levy such a royalty. The exact effect of the phrase "unless otherwise determined by letters patent already granted," in paragraph 1,426, I may perhaps fail to appreciate correctly. I do not know the precise form of such letters patent; and I am led to believe that the form has varied at different times and in different cases. But it seems clear that, under paragraph 1,435 of the Quebec law hitherto in force, the right to exact royalty is qualified by the phrase "unless such royalty be otherwise established by letters patent or other title from the Crown," the latter half of which is omitted in the new law. Moreover, that paragraph confines to gold, silver, and phosphate of lime the royalty therein specially referred to.

Paragraph 1,425 of the old law provides for the purchase of the mining rights expressly reserved by the government in letters patent granted before July 24, 1880; and the only requisite is a payment of certain additional sums, sufficient with former payments to make \$2 per acre for gold or silver, or \$1 per acre for other metals.

Paragraphs 1,423 and 1,426 to 1,434, inclusive, provide similarly for all cases arising under letters patent; and the last-named paragraph, together with paragraph 1,545, authorize the increase of price, from time to time, by the Lieutenant-Governor in Council, but cannot be construed as affecting the rights of those who had, before such increase, made the prescribed payment and, in the language of paragraph 1,425, purchased the mining rights. In other paragraphs the phrase is sometimes varied, and the right to "work" the mines is mentioned, but without any limitation as to time; and it is impossible to construe the payment per acre thus provided for as anything else than a purchase outright, or the tender and acceptance of a lump sum in lieu of all royalty forever.

The new law seems to levy a royalty even upon mines the rights to which have been legally alienated from the Crown already. I have no doubt that if this be held to be its force, it will stand self-condemned as unconstitutional. Such a levy is no longer royalty at all. It is illegal taxation, or, rather, confiscation. Probably words are wasted in discussing this possible aspect of the case. The courts of a free country may be relied upon to defeat any such formal violation of justice.

2. But in another aspect the legal remedy may not be so clear; and the view I venture to suggest is therefore offered with less confidence. Yet it seems clear to me that the landowners coming under the provisions of the old law above cited have certain vested rights, aside from those which they may have acquired by supplementary payments per acre or by absolute purchase in any other way of the mining rights of the Crown.

The law, taken as a whole, embodies the inducements held out by the Government to purchasers of land. One of them is that the purchaser of agricultural land may, if he find ores of iron, copper etc., buy for an additional sum per acre the right to such deposits. If he afterward find gold, silver, or phosphate a further payment per acre will buy the right to these also. He is warned by paragraph 1,434 that these prices per acre may be increased any time, and by paragraph 1,435 that, as to gold, silver, and phosphate, he will have to pay royalty unless he has obtained under preceding paragraphs the "other title from the Crown" therein provided. But he is not warned that the Government may at any time decline to accept any lump sum whatever per acre in lieu of royalty and enforce a ruinous royalty on mining of all kinds.

Now, the question is whether there is not an implied promise on the part of the Crown involved in these provisions, on the faith of which purchasers of lands have acted. Is it not an inducement to the pur-

chaser of agricultural land that if he should find it to contain valuable mines he can buy the mineral right for an additional sum per acre? Or, is it not an inducement to the purchaser of iron or copper-bearing lands that he may, if phosphate or gold or silver should be discovered in them, buy the right to these for an additional sum per acre? Granted that the Government has reserved the right to increase at any time this sum as to any lands upon which the purchasers' option has not been exercised; granted also that under the terms of the law the Crown remains in possession of the mineral right, yet, is it not true that, although that right has not been alienated, an option to buy it has been offered as a bonus to the purchaser of other rights?

It must be remembered that the substitution of a royalty, even of reasonable amount, is not a mere modification of the procedure of a sale; for the purchaser of mineral rights has thereafter the free choice to work the mines or let them lie idle, as he may deem most to his interest. But under the system of royalty contemplated by the new law as universal the previous purchaser of land is subject to the intrusion of licensed prospectors, and is forced, upon discovery of mineral alleged to be valuable, to work the mines or else let others work them.

I am not now inquiring whether this system would be wise as applied to the administration of Crown lands henceforward, but whether it does not involve a violation of good faith and obligation when applied to the purchasers of lands heretofore. In any such controversy between private parties the courts would inquire whether the purchaser had performed, in pursuance of the alleged agreement, any acts which he would not have performed in the absence of the inducements offered. The answer to that question in the present case is, I take it, perfectly clear; and the proofs will be speedily forthcoming if the new law goes into operation. Capitalists will certainly not wish to buy even agricultural lands to which they cannot somehow obtain a complete title, excluding all private trespass and official interference. Nor will they invest in mining rights held under royalty and subject to forfeiture. Mortgages upon such property will have no value as security. And what will be, is only what would have been, if the old law had been like the new one in these respects. But the old law held out inducements on the faith of which capital was invested or loaned. Hence, it seems to me, the new law violates an implied contract as to all purchasers of land under the old.

But whether this be legally the case or not, the essential injustice of the new law is plain enough. If it is not unconstitutional, it is unfair.

3. Aside from these features, the new law is unjust in that it singles out for taxation a particular industry—and the most laborious and precarious of all the productive industries. It does not mean to say that mining skillfully conducted may not be largely profitable; but it would be folly to deny that it presents peculiar risks, and that the profits of fortunate and well-managed enterprises are offset in the calculation of general results by the cost of much fruitless exploration and many deserved and undeserved failures. The stimulus to industry in this field is the hope of exceptional good fortune. This it is that keeps prospectors at work, and commands a perpetual supply of capital for experiments and developments. Consequently, mining, less than any other industry, can bear a burden laid equally upon the successful and the unsuccessful. Yet this law not only selects mining for special taxation, but practically discriminates against the unfortunate by taxing gross product instead of profits or dividends. I am not now saying that this is foolish and suicidal, but that it is unjust.

4. I might go on to characterize in a similar way the harassing restrictions thrown around mining operations under the law, the system of petty official espionage and tyranny ordained by it, etc., but these are part and parcel of the fundamental injustice which it contemplates.

5. I will add a few observations as to the unwisdom of the law, apart from its injustice. To make this special aspect clear, let us suppose the new system to be applied to Crown lands and their future occupants only. This was the case, for instance, with the federal mining laws of the United States of 1866 and 1872. They concerned exclusively the mineral lands of the public domain in certain States and Territories. It is much to be regretted that the Quebec law was not similarly limited. In that case, it would have furnished an interesting, instructive, and not disastrous object-lesson to the legislators of the Province; for they would have seen very quickly that no capital would submit to its vexatious conditions, and no revenue would result to the Government.

Who is going to pay for the privilege of exploring for minerals if the owner of the land has the preferential right to take the mine he may develop?

Who is going to make explorations, even on his own land, if every pit he digs must be fenced and kept fenced forever?

Who is going to put money into the development of a mine which he cannot allow to be idle if he finds that it is temporarily unprofitable, or if he gets involved in a lawsuit about way-leaves or damages or boundaries?

Who is going to bind himself to make monthly or quarterly returns of minute business details to a government bureau, or furnish complete maps and descriptions of all workings? It must be remembered here that the law provides for no use to be made of these data beneficial to the mining industry. It establishes no body of trained and skilful engineers, whose supervision or advice might be really of service. The reports thus exacted will be simply a mine of information for informers, blackmailers and opposing litigants. And the business of mining under such regulations ceases to be a private enterprise at all.

No doubt some enthusiastic reformers will say that the state ought to "work" the mines anyhow; we have such people on this side the line, and perhaps they exist in Quebec. But I need not discuss that proposition here. I will only observe that under the new Quebec law the state might as well prepare to work such mines as are not now in private hands, for I do not believe that private capital will undertake enterprises in which the public is to be a confidential, irresponsible, and meddling partner.

6. I see that the Premier of Quebec has declared the motive of the law to be the obtaining of increased revenue. It is quite possible that certain concerns now profitable may yield something for a while under this process of squeezing. But unprofitable enterprises will not go on; capital will not be forthcoming for new ones; the goose will lay but one golden egg and then die.

7. The folly of this scheme as a whole is carried into its minor details. A little acquaintance with mining should convince anybody that three per cent. on gross value would be a very unequal tax on the different substances enumerated. Levied as directed on the gross weight of gold, it would be on low-grade ores, 10 or 20 or 50 per cent. of the net profit of the miner; and it would strike a fatal blow at the mining and treatment on a large scale, at small net profit per ton, of the auriferous ores of that class. In fact, the law is so contrived as to rest least heavily upon the miners of rich, concentrated materials, who employ proportionally the least labor and benefit the country least; while it bears most heavily upon those who spend most money in wages, freights, and machinery, carry on the most expensive business, and are content with the smallest profits per ton of raw material.

A more ingenious contrivance for injuring a fundamental industry, and with it all the business of the Province, it would be difficult to invent.

8. Of the army of inspectors and informers, and the catalogue of petty offences and fines created by this law, I can hardly speak with patience. And perhaps it does not become me to say much on that subject. We are cursed in the United States with too many officials, and with the evils of too much "patronage" in the hands of our government. Until we get our own civil service, Federal, State, and municipal, into a more satisfactory condition, we should not indulge in too free a criticism of our neighbors. I am sorry, in a sympathetic way, to see the people of Quebec exposed to the same evils, and in a form apparently worse than we are called to suffer; but after all, that is their business, not mine. Such citizens of the United States as are not so unfortunate as to be already involved in mining enterprises in the province of Quebec, will have no cause to complain if this new law goes into effect. They have only to keep their money at home, or invest it in regions more justly and wisely ruled.

R. W. RAYMOND.

PRODUCTION OF THE PRECIOUS METALS IN 1890.

In our issue of February 28th, 1891, we published an abstract of the report of the Director of the Mint on the Production of Gold and Silver in the United States in 1890, in which the totals for the country only were given. The full report just published shows the division of the output among the several states and territories, and enables us to make comparison with the figures of 1889.

States and Territories.	1889.			1890.		
	Gold.	Silver.	Total.	Gold.	Silver.	Total.
Alaska.....	\$900,000	\$10,343	\$910,343	\$762,500	\$9,697	\$772,197
Arizona.....	900,000	1,333,333	2,233,333	1,000,000	1,232,929	2,232,929
California.....	13,000,000	1,034,343	14,034,343	12,500,000	1,163,636	13,663,636
Colorado.....	3,500,000	20,683,333	24,183,333	4,150,000	23,307,070	27,457,070
Dakota.....	2,900,000	64,616	2,964,616	3,200,000	129,292	3,329,292
Georgia.....	107,000	465	107,465	100,000	517	100,517
Idaho.....	2,000,000	4,393,959	6,393,959	1,850,000	4,783,838	6,633,838
Michigan.....	.....	.....	.....	90,000	71,111	161,111
Montana.....	3,500,000	13,333,333	22,833,333	3,300,000	20,363,636	23,663,636
Nevada.....	3,000,000	6,206,060	9,206,060	2,800,000	5,753,535	8,553,535
New Mexico.....	1,000,000	1,461,010	2,461,010	850,000	1,630,803	2,530,803
North Carolina.....	115,000	3,878	118,878	118,500	7,757	126,257
Oregon.....	1,200,000	38,787	1,238,787	1,100,000	96,969	1,196,969
South Carolina.....	45,000	232	45,232	100,000	517	100,517
Texas.....	.....	.....	.....	.....	387,878	387,878
Utah.....	500,000	9,050,505	9,550,505	680,000	10,343,434	11,023,434
Washington.....	175,000	105,434	278,434	204,000	30,505	234,505
Other.....	95,000	373,808	473,808	40,000	2,585	42,585
Total.....	32,967,000	61,768,730	97,735,730	32,845,000	70,485,714	103,330,714

The gold output of the United States in 1890 amounted, according to this report, to 1,588,877 ounces, or \$32,845,000, and silver, 54,516,300 ounces, or \$70,485,714. The production of gold in foreign countries, so far as reported, is given as follows: Australia, \$29,896,434; Russia, \$21,161,683; India, \$2,000,000; South Africa, \$9,887,000; Mexico, \$766,569; Venezuela, \$1,157,000; Colombia, \$3,300,000.

In the United States, the product of precious metals in Alaska was somewhat smaller than in 1889, and, as in preceding years, was mostly gold from the Alaska-Treadwell Gold Mining Company. In California there were no new discoveries of consequence, and about the same mines were producing as in 1889. Almost the entire silver output of this state came from the three counties, Mono, Inyo and San Bernardino.

In Colorado, the output of the Gilpin, and Clear Creek mines was about the same as in 1889. That of Leadville, Aspen, and Red Cliff, particularly the latter, showed a decided falling off, but this was more than counterbalanced by the increased product of the San Juan and Rico districts.

Mining in the Black Hills was somewhat stimulated by improved railway facilities and better means for the reduction of ores, and an increased output, in both gold and silver, was made.

The most important feature in the mining industry of Idaho was the increased output of the Coeur d'Alene mines, estimated to have been 50% greater than in 1889. The gold output of Montana decreased slightly, which is attributed to the lack of water for placer mining.

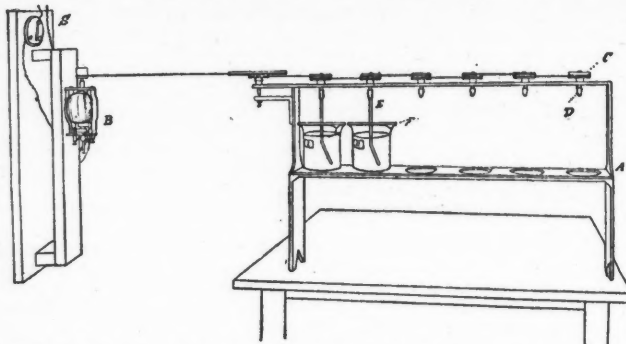
About 75% of the gold and silver output of Nevada mines came from the Comstock lode, and 90% of the entire output of New Mexico came from three counties in the extreme southeastern portion of the territory, Grant, Sierra and Socorro. In Utah there was a notable increase in the amount of silver produced, of which, in round numbers, 70% came from the mines of Tintic and Park City, those of the former district, in particular, making a great gain, and passing the mines of Park City as the leading producers of Utah.

**A Deep Drill Hole.**—Some time ago the Wheeling Development Company began drilling a well near Wheeling, W. Va., in search of petroleum or natural gas. The hole has now reached a depth of 4,100 feet. In this distance several veins of coal have been passed, and both oil and gas have been struck, but not in paying quantities. The hole is 8 inches in diameter. It is reported that Professor White, state geologist of West Virginia, has succeeded in interesting the officers of the United States Geological Survey in the exploration, and that the hole is to be continued to a depth of 1,000 feet more, or as far as is practicable, with the idea of making investigations of temperature and magnetic conditions.

A STIRRING MACHINE FOR USE IN DETERMINATIONS OF CARBON IN STEEL.

By A. A. Blair.

The most tedious part of the determination of carbon in steel is frequently that which has to do with the decomposition of the steel and the solution of the precipitated copper. This is particularly the case with low steels, as the samples are nearly always in lumps and the analyst does not like to separate these larger particles for fear that the fine stuff alone may not represent a true average. To shorten the time required for this part of the operation and at the same time to avoid the labor of stirring by hand, I had the machine shown in the cut constructed. It consists of a framework A of brass, cast in one piece for the sake of rigidity. It is fastened to the table by lugs and screws not shown in the cut. The shelf, on which the beakers stand, has on it a piece of asbestos board with holes to fit exactly the bottoms of the beakers, to prevent them from moving. To further increase the stability of the beakers (which



should be of very heavy glass) their bottoms are ground on a glass plate with fine emery until they have a good bearing surface all around.

The tops, which are covered when on the machine with a plate of glass F, ground on one side and perforated to allow the passage of the stirring rods E, are likewise ground, so that when slightly moistened the ground glass surfaces prevent almost entirely all movement of the cover on the beakers, when the machine is in motion.

The small wooden pulleys C are fitted with brass spindles which run through the upper cross piece and have on their lower ends pieces of rubber tubing D, which serve to hold the stirring rods. The stirring rods are bent as shown in the cut to give the proper motion to the liquid. A small motor B, adapted to the strength of the current, furnishes the requisite power. The motor, if properly wound, may be attached to an ordinary incandescent lighting current, as I now use it, but a sewing machine motor run by a dipping battery of three bichromate cells is sufficient to give the necessary number of revolutions. I used the latter arrangement for three years, and have had the machine in constant use for about four years, during which time it has been perfectly satisfactory in every respect.

**Gold Mining in Victoria.**—According to the official report of the Mines Department of Victoria, Australia, for the quarter ending December 31, 1890, the production of gold for the three months was 152,816 ounces, which was the lowest for any December quarter for the past decade, the gold output having fallen off from 225,071 ounces in 1881. The statistics show that 23,712 miners were employed in the gold-mining industry in Victoria during the past quarter. The deepest mine is Lansells 180, at Sandhurst, which has a shaft 2,640 feet deep. Nine other companies at Sandhurst have sunk over 2,110 feet.

**The Hudson River Tunnel.**—The Hudson River Tunnel is in nearly 3,400 feet of the 5,400 feet necessary for completion, and is progressing at the rate of 10 feet a day. Three shifts are at work. Twin hydraulic elevators have been put in, to provide for a more rapid removal of loaded cars. Negotiations are now being made for an electrical plant to be placed at the New Jersey entrance, with a view to the substitution of electricity for mule power in hauling the loaded cars from the shield to the end of the shaft. No work has been done on the New York side of the tunnel since the new management, Sir Benjamin Baker and Sir John Fowler, took charge of the operations. A new shield, however, is now ready for the work at this end. It can be put into place, and work may be resumed, at any time.

**Engineering Features of the Road Question.**—Mr. Thomas G. Janvier in an interesting paper on this important subject read before the Engineers' Club of Philadelphia on the 4th ult., said that in the location of a road the line should be as direct as possible, remembering that a slight deflection to the right or left, or an easy curve, might save considerable expense in the matter of excavation, embankment or bridging. The grades should be made as easy as possible, not exceeding seven feet per hundred, nor less than eight inches per hundred feet. Excessive excavations and embankments should be avoided. The full width of a road should not be less than 40 nor more than 60 feet, but the paved portions need only be from 18 to 24 feet. The roadbed, or sub-grade, should have the same shape as finished grade. Concerning the pavement, if the road is intended for heavy travel, the Telford system should be adopted, but if for ordinary travel, McAdam will answer. The difference in the cost of these two pavements is but slight, and the Telford, being much superior, should be given the preference. A Telford or McAdam road thoroughly constructed and properly maintained will never need reconstruction. The best system of maintenance is that of constant attention and daily repairs. All dirt roads intersecting a paved road should be paved several hundred feet from the intersection in order that as little mud and dirt as possible shall be carried on to the paved road. Important points to be observed for keeping a road in good condition are: All dirt and mud removed as frequently as possible, the entire drainage system carefully maintained, constant daily repairs and patches wherever ruts begin to show, careful sprinkling three or four times a day in dry weather, and the frequent use of a 2½-ton roller.

\* From Journal of Analytical and Applied Chemistry, April, 1891.

## PROMINENT MEN IN THE MINING INDUSTRY.

Johnson Vivian.

Descended from a race of miners and receiving his early training in the tin mines of Cornwall, where so many of our best miners have gained their first experience, Captain Johnson Vivian has achieved signal distinction in his profession, and is now one of the most prominent men in the copper mining industry of this country. He was born in Cornwall in 1829, being the son of John Vivian, a prominent mine agent, and from his early boyhood may be said to have breathed the air of mines. At the age of fourteen he began work in a stamp mill, treating tin ore; two years later he received his first employment underground, and finally in 1853, at the age of twenty-four, decided to try his luck in northern Michigan, and left old England for the Peninsula, which at that time was just commencing to make some substantial returns to pioneer investors from Boston and other parts of the country. Hon. Samuel W. Hill, who had formerly been connected with the geological survey of the Lake Superior region, and who was then engaged in opening up the Copper Falls and Hill mines on a much more extensive scale than anything previously attempted in that region, employed the young Cornishman as a miner. A year later, recognizing his ability, he appointed him an assistant mining captain, which position Captain Vivian held until 1856, when he was placed in charge of the Clark property, then being operated by the French Copper Mining Company, most celebrated for the amount of work it did in a determined effort to achieve a success that was unfortunately wanting.

In the meantime the management of the Copper Falls mine had been changing hands, Hon. Samuel W. Hill was succeeded by Wm. Petherick,

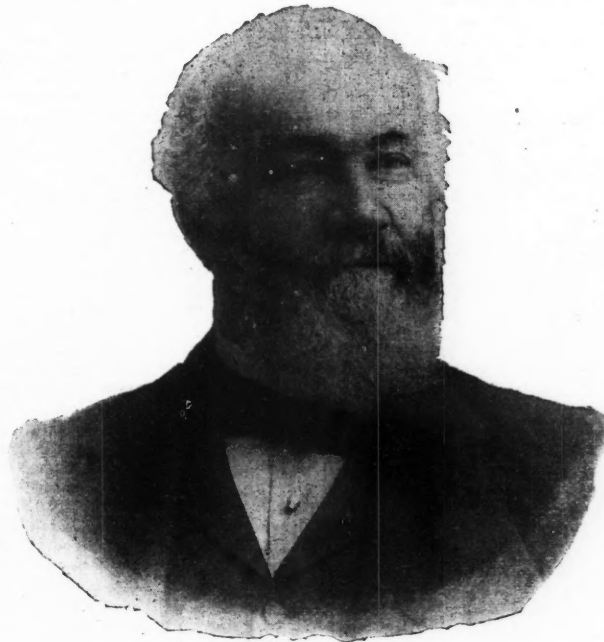
watched over the interests of his employers. For him to be superintending a property has come to be almost synonymous with a guarantee that if the rock is there, it will be found and worked at a minimum of cost.

In 1880, Captain Vivian was appointed superintendent of the Huron Copper Mining Company, in 1888 of the Centennial, a reorganization of the Schoolcraft, and in 1890 he accepted the management of the Tecumseh Copper Company and of the National Mine at Rockland, Ontonagon county.

## COMMON USES OF THE RARE ELEMENTS.

Written for the Engineering and Mining Journal by Elwyn Waller, Ph. D.

Almost any book on elementary chemistry published within the past few years contains a statement to the effect that sixty-five to seventy elements (not resolvable into simpler forms) are known to science, but how few of these are known in the affairs of every-day life, and yet how many contribute to our welfare or comfort without their existence being suspected by most of the world! For a partial answer let us consult the reports of the various markets and prices current. The quotations of the produce exchange, of the cotton and textile fabric market, of the oil market, etc., give the names of a variety of materials, the essential constituents of which are only four of the commonest elements—carbon, hydrogen, oxygen, and nitrogen. Those of the metal market include, usually, scarcely a dozen metals in their various forms, and frequently not over five or six. Among building materials, fertilizers, etc., we have combinations of four or five more elements added, such as lime, magnesia, silica. The painters use many of the elements already alluded to and some half a dozen more, while the drug trade uses the largest variety of



JOHNSON VIVIAN.

and as the returns from working the ash-bed and Owl Creek vein were decidedly larger, mining work on company account came gradually to be confined to them, and the Hill and Copper Falls mines were let on tribute. The former of these was leased by Captain Vivian in February, 1857, and worked with varying success until the fall of 1859, when he was appointed to the chief captaincy of the Phoenix mine, and later, in 1863, became its superintendent, a position which he held until 1867, when he resigned.

Captain Vivian was then appointed agent of the Hancock mine at Portage Lake, and in the following year accepted the position of manager of the Schoolcraft property adjoining the Calumet and Hecla lands on the north. After long-continued and unsuccessful attempts to produce a mine, the company was obliged to shut down. In July, 1874, the superintendency of the Franklin and Pewabic mines was offered to him, and it is in the management of these properties that he has had the opportunity to show the measure of his ability. For the four preceding years these mines had been operated under a tribute lease and on account of the poverty of the lode it had been thought advisable to discontinue work entirely. The Franklin Mining Company was organized in 1857, and, up to the close of 1874, with total receipts amounting to \$3,600,000, had disbursed dividends amounting only to \$280,000, and levied assessments aggregating \$320,000. The average rock does not contain more than  $\frac{1}{2}\%$  of copper, and it seemed probable that only under exceptional circumstances, when the price of the metal was very high, or when a more than usually rich pocket had been encountered, the mine could be worked with a profit. Captain Vivian's long experience in the conduct of difficult enterprises here stood him in good stead. He managed the business of the mine with exceptional skill, economy and good judgment. Starting with a depleted treasury, containing about \$16,500, but little ground opened for stoping, and the buildings and mining plant very much the worse for wear, operations have been continued without calling upon the stockholders for a dollar, and up to January, 1891, the profit won from the mine amounted to nearly \$1,000,000. This result has largely been due to Captain Vivian's intimate knowledge of all the details of mining, and the ceaseless activity with which he has always

any, if we except the comparatively small business of supplies for chemical laboratories. Altogether, an enumeration of the elements which, either as such, or as their compounds are recognized as useful in the markets of the world, would embrace only about half the list of the elements recognized in chemistry.

How is it with the other half? Are they of no use at all except as chemical curiosities? Ask any chemist about them, and ten to one he will tell you, "Those are the *rare* elements." The use of the word "rare" is, however, to some extent misleading in this connection. Press your friend, the chemist, a little further, and you will force him to admit that many of them are widely diffused over the earth's surface, and that many are found plentifully in various localities, although some are really of rare occurrence, so that in fine the "rarity" of a goodly number of these elements consists in the infrequency of their application to useful purposes. In that sense only, can half the elementary substances on the list be classed together as "rare" elements. In this utilitarian age, utility has dictated the standard.

But the line is not a sharp one; the usefulness of these elements passes by indefinite gradations from a few limited applications to no application at all, although almost any day, one or more of them may leap at once into a large field of usefulness. The phrase that one-half the world knows not how the other half lives, might in this connection be paraphrased into: One-half the world knows not what the other half provides for its use, amusement, advantage, or comfort.

Since no positive line can be drawn, we had best consider some of those elements imperfectly known to the world at large, as well as some only imperfectly known even among scientific men. Suppose we begin with the element barium. In the elemental form it is simply a chemical curiosity, as much as calcium, the basis of lime, but every price list of pigments has a quotation for barytes, the native mineral sulphate of barium, which is chiefly used in pigments, partly as an adulterant, and which has found various other applications, among which may be mentioned the surface finish of paper collars, in which relation it bears the commercial name of "blanc fixe." Other compounds of barium are used in fireworks, in sugar refining and in clarifying water for use in boilers.

In many respects its compounds resemble those of calcium, with which it is classified.

Closely allied to barium, and standing between it and calcium in the properties of its compounds, is strontium, the chief use of which is in the red-fire of our theatres, signal lights, and fireworks, where, in the form of a nitrate, it lends that brilliant ruddy glow, so familiar to us all. Strontium compounds are also better than the corresponding ones of barium, or calcium, in sugar refining. Their use for this purpose is, however, somewhat limited, since the deposits now known do not yield enough for a very extended application. However, in some statistics of the refining of sugar in Germany, it was noted a few years ago that three factories in that country, and two in Austro-Hungary were refining by the strontium process, producing about one-thirtieth of the entire output of sugar in Germany. Strontia is found in many places, but the chief sources are the craters of extinct volcanoes. It seems as though the sprites who presided over the volcanic fires desired the red flames to give a lurid zest to their gambols, as much as the average small boy on the Fourth of July.

A crimson flame still more beautiful than that of strontium is afforded by compounds of lithia, the oxide of an element allied in its chemical properties to potassium and sodium. Its flame, however, is not often seen outside of a chemical laboratory, as lithia has such an important use in medicine as to consume the greater part of the available supply, and that fact, combined with the expense of extracting it, renders it too costly for the purposes of aesthetics or amusement. The element is widely diffused, though not exceedingly plentiful. It is a remedy for gout, stone in the bladder, etc., and every owner of a lithia spring is better satisfied with his possession than he would be with a gold mine. The rivalry between those selling waters containing lithia is so sharp that accusations of "doctoring" the springs by adding lithia compounds are not infrequently made. Another use of lithia may be of interest. In order to trace a suspected connection between a cesspool and a water supply, experts sometimes put some lithia salts into the cesspool, and then examine the suspected water for lithia from time to time afterward. If the lithia is found the connection between the two is clearly proven. Of course a necessary condition is that the water in its natural state should contain no lithia, a condition not always realized. Incidentally it may be mentioned that lithium is the lightest metal known.

Every artist knows cadmium yellow, one of the most permanent and satisfactory colors on his palette, unchangeable in brilliancy by admixture with the oils or varnishes he may use, and unaltered by exposure to light or air. How many, however, know that cadmium yellow is the sulphide of a metal so nearly like zinc in its properties that it might be called its brother, and that some of its compounds are valuable in the medical treatment of the eyes, while some others are of use in photography; indeed, in the old days of wet-plate photography, being indispensable adjuncts in the dark room? Such is the case, and it may also be noted that in alloys for special purposes this metal, more silvery in appearance than zinc, has been used to lower the melting point without permitting a material decrease in toughness of the metals to which it has been added.

Another element of service in some of the processes of photography is uranium. Like cadmium, it is also used to obtain yellow colors, but in a different branch of art. Its compounds are of no use as pigments, but in the coloring of glass and enamels they impart that yellow color with a greenish reflex which almost every one has seen and admired without knowing what has produced it.

Here, also, may be mentioned titanium, an element which, when in metallic form, looks not unlike iron. It occurs in many of our iron ores combined with the iron, and indeed large deposits of iron ores are known to exist (for instance on the western shore of Lake Champlain) which, but for the titanium which they contain, would be very valuable. The titanium, however, renders them too refractory in the blast furnace. But the mineral oxide of titanium, rutile, is much used to give a peculiar ivory-like appearance to porcelain and has been very extensively used in giving a tint to artificial teeth. The old joke about "being in everybody's mouth," has here a peculiar application.

In the production of tints of a different kind in still another branch of art, that of dyeing, we encounter vanadium, an element in some respects resembling phosphorus. Used in conjunction with aniline, it serves to produce the finest blacks known to the dyer and calico printer. Though widely distributed, it is seldom found anywhere in large quantities, but fortunately a very little of it will do a great deal of work, and now-a-days no list of dyers' chemicals would be complete without ammonium vanadate. In passing, it may be interesting to observe that just as the dyer's, or bleacher's, whitest white is a blue white, his blackest black is usually an olive green black. The production of a thoroughly satisfactory black tries the skill of the most able dyer, and the vanadium black is the best that has yet been obtained. As might, perhaps, be surmised, vanadium is also used in the manufacture of inks.

Still another element has an important connection with articles of wearing apparel. Some twenty years ago, one or more frightful accidents occurred in England in consequence of the light dresses of ballet dancers catching fire from the footlights, and the poor girls were seriously injured, or even burned to death, before the eyes of the audiences. In consequence Queen Victoria offered a reward for the discovery of means for the prevention of such catastrophes. Experiments soon showed that the impregnation of light goods with various salts, such as alum, phosphate of soda, etc., would prevent them from flaming up when in contact with fire. They would char, but nothing further. But the goods so treated could not be ironed, and those who were to wear them preferred not to "look like dowdies," however safe they might be. The reward was finally given to Dr. Frederic Versmann, who discovered that sodium tungstate, when mixed with starch, imparted the desired immunity from fire, while at the same time it permitted the goods to be "done up" in a way to suit the most fastidious taste. Some ladies now always have their linnen "done up" with this so-called fire-proof starch, and its use for lace curtains is certainly most commendable.

In altogether another connection the metal tungsten, or wolfram, has proved valuable. Alloyed with iron, it affords an exceedingly tough and hard metal, and ferro-tungsten and tungsten steel are finding application in the manufacture of cutting tools and for other purposes, where their peculiar properties render important service.

Another of the "rare" elements is unobtrusively contributing to the welfare of thousands, we might almost say millions. Few people outside of chemical laboratories have even heard of the metal molybdenum, yet it is found in almost every country in the world, and often in very considerable quantities, as, for example, among the mountains of Virginia and in the Adirondack region of New York state. Indeed, if any more extended use were found for molybdenum, this could probably be produced as cheaply as, if not more cheaply than, tin. At present it has practically but a single application. Its trioxide, which combines with various other elements to form molybdates, is used in analytical laboratories chiefly for the isolation of phosphoric acid for the purpose of its very exact estimation. In this relation it is rendering most valuable service by informing our ironmasters of the quality of the material with which they work, by serving them as a guide in the management of their furnaces, determining vital questions in the metallurgy of iron and steel. An illustration of the exactness necessary in the estimation of phosphorus in iron is shown by a suit which was brought a few years ago involving several thousand dollars, where the issue turned on whether a certain lot of pig iron contained three hundredths or four hundredths of one per cent. of phosphorus. One could almost venture to say that without molybdenum the iron industry, and all that depends upon it, would be far behind its present state of advancement.

There was a touch of poetry in the minds of the old alchemists when they gave the name *aqua regia* (royal water) to the mixture of nitric and muriatic acids, the only solvent which they knew for the royal metal, gold. The poetry in that idea was further extended in more recent times, when the name of noble metals was given to gold, silver and platinum—metals which, even when combined with other elements, if tried by fire, royally cast aside their entangling associations and stand forth in their integrity as pure metal. What, however, shall we say of a metal which not only yields with difficulty to acids, assumes the metallic form when its compounds are heated, and melts only under intense heat, but is also comparable in hardness to the diamond? Such is iridium, one of the group of platinum metals whose noble character renders it well nigh intractable. The metal is indeed so aristocratic that it refuses to alloy with gold, though small amounts are sometimes found in the gold bars sent to our mints. The Russian government has had especial trouble with iridium, or iridosmine (an alloy of iridium with osmium), which occurs frequently in the gold from the Russian mines, the hard points of the metal ruining the rolls and dies used in coining the gold. The Russian government has, therefore, been obliged to offer a high price for iridium and iridosmine in order to make it profitable for the miners to separate it from the gold, and, on the other hand, it dares not sell any, for fear that an improper use might be made of it. Its high specific gravity and its resistance to acids would make it a dangerous adulterant of gold. It has, however, found some applications in the arts. In the construction of the standard meter bars for the French government an alloy of 10% of iridium with 90% of platinum was employed. It has also been used for wire draw-plates, cutting tools, points of pens, bearings for magnetic compasses, and in watches, both as bearings in place of jewels and in the wheels. Unlike steel, it has no temper to be drawn, and is non-magnetic, besides being absolutely incorrodible. Other applications, as vents for ordnance, and as imperishable electrodes in the electric arc lights, also deserve mention.

The cost of iridium is at present about the same as that of gold. The amount used is, however, exceedingly small. Its use in pen points is probably the most extensive of any, yet for that purpose it has been stated that but 30 ounces *per annum* are consumed. Probably less than 100 ounces a year would at present supply the world.

Palladium, rhodium and ruthenium also belong in this group, and have been used in watch wheels and other forms of mechanism where hard non-corrodible and non-magnetic materials are of special advantage. They are more manageable than iridium, which is best manipulated by melting with phosphorus. Osmium is also found associated with iridium, rivaling it in hardness, and to some extent in resistance to acids. When attempts are made to melt osmium by applying high heats, it mocks the experimenter by assuming the gaseous form, and, combining with oxygen, affords the ill-smelling and poisonous osmic acid. After the construction of the standard meter bars, a small bottle of osmic acid was exhibited in the French Academy, which it was said contained enough to poison every living being on the face of the earth. Osmic acid is at present used to a considerable extent in the examination, staining and preservation of microscopical anatomical specimens.

We are such devotees to business that we take a large proportion of our recreation literally, and to some extent metaphorically, by artificial light. One of the "rare" elements, zirconium, here is brought into service. Its oxide, like lime, glows brilliantly when heated, and a pencil of zirconia, used in the same way as the lime pencil in the calcium light, gives a very superior illumination. When used in this form, the alternate heating and cooling of the pencil, combined with exposure to the moisture and gases of the atmosphere when cool, tends to render it prone to brittleness or to disintegration. The records of the patent office would show many devices aiming at the utilization of zirconia in artificial lights. One company in this country is using it in the following manner. A cotton net is impregnated with a solution of zirconia mixed with smaller amounts of other oxides having similar properties. After drying, the cotton fibre is burned out, leaving a delicate lace work of these oxides, preserving the shape of the original cotton net or "mantle" as they term it. This mantle is then hung in a gas flame which is managed so as to burn with great heat, but with very little luminosity. The result is a very brilliant light. The addition of the other oxides is intended to counteract to some extent the disadvantages inherent in the zirconia, and to modify the quality of the light. The oxides used are all those of other "rare" elements, lanthanum, yttrium, neodymium, præsodymium, cerium, erbium, tantalum, and thorium. Just what oxides are used, and their proportions, is one of the trade secrets of the company.

Cerium has found a use in medicine, but thus far no additional application for the other elements just enumerated has been found in the arts. It may be interesting to recall that cerium was among the first of this group of "rare" elements to be discovered. Later on it was found to be associated with lanthanum, which was named after the Greek word signifying "to conceal." Still later what was supposed to be lanthanum was found to consist of two elements, for one of which the former name was retained,



while the other was called didymium, from the Greek word for "twin." Still more recently it has been found that the name had an unsuspected significance, for didymium consisted of two elements which have been named neodymium and præsodymium. The account reminds one of the well-known fairy story of the wonderful gifts of the white cat.

A complete sketch would require an extension into wearisome details, but the subject should not be dismissed without at least a casual mention of beryllium, or glucinum, a metal closely resembling aluminum, which exists as an essential constituent of the emerald, and of selenium, an element similar to sulphur, which has been used in the measurement of light, owing to a peculiar property it possesses of varying in its power of conducting electricity proportionally to the intensity of the light to which it is exposed.

If it should be asked, "How many elements are recognized as such?" the answer would not be an easy one to give.

Again and again the discovery of new elements is announced, and the announcement is accepted as possibly a fact by all chemists, most of whom lack the time or the material with which they may confirm or disprove the assertion. After a time a further investigation may prove the elementary character of the substance, or, on the other hand, it may show that the belief in a new and hitherto undescribed element was induced by the peculiarities manifested by a mixture of two or more known elements, or by some previously unknown character of some element already on the list. In such a case the pseudo-element is relegated to the limbo of "defunct elements," a name first applied by Dr. H. C. Bolton. The list of defunct elements is now quite as long as that of the genuine elements, and at the present time is increasing more rapidly. Between 1877 and 1887 upwards of fifty-eight new elements were announced, of which number

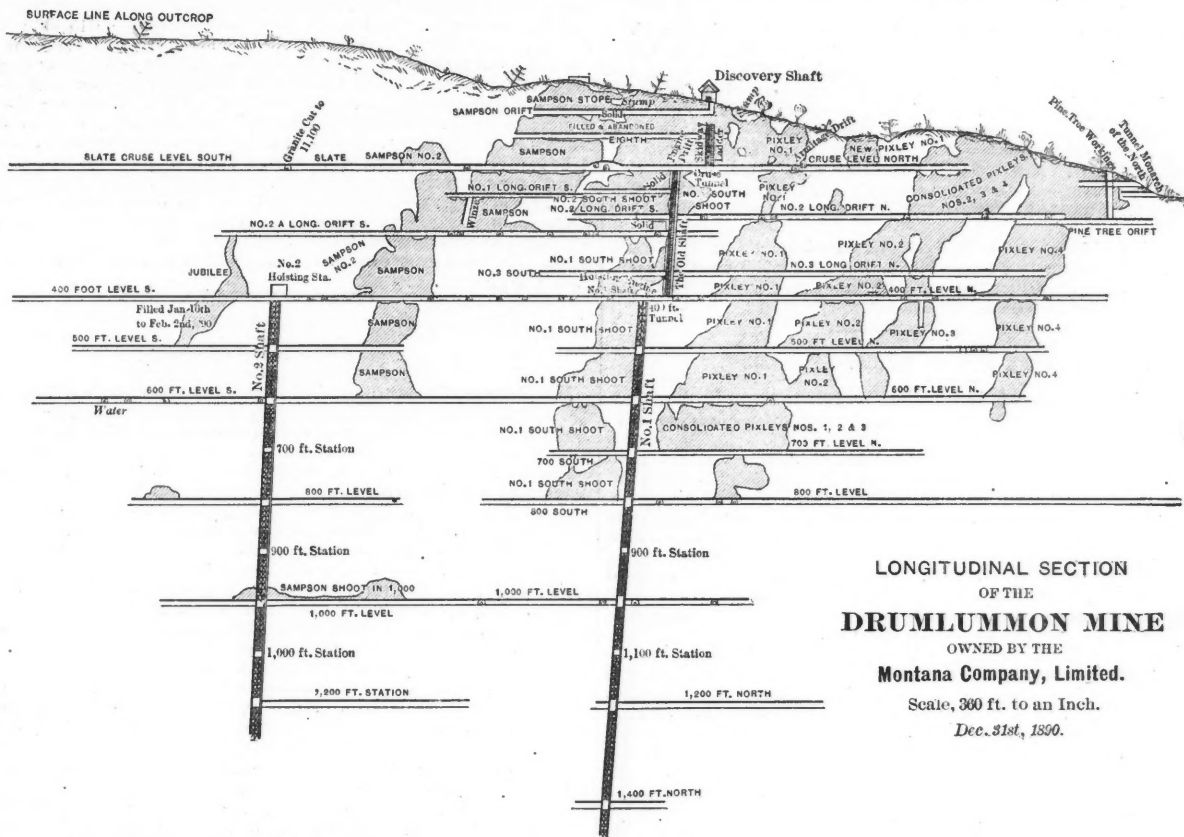
ore averaging \$7, against 44,449 tons of \$23.87 and 34,300 tons of \$6.89 average value in 1889. The cost of production during the two years, per ton of ore, was as follows:

Mining Expense.	1889.	1890.	Milling.	1889.	1890.
Prospecting.....	\$1.12	\$1.19	(High-grade ore.)		
Shafting.....	.63	.56	50-stamp mill.....	\$4.34	\$3.59
Mining.....	2.08	2.37	10-stamp mill.....	5.45	5.55
			Average.....	3.06	2.80
			Concentrating, assaying, } ...	0.18	0.15
Total.....	\$3.83	\$4.12	and smelting.....	1.23	1.23
Milling.			General charges.....	0.50	0.42
(Low-grade ore.)			Extraneous expenses.....	0.50	0.42
60-stamp mill.....	\$1.22	\$1.37	Total expense.....	8.80	8.72

The total development on the different lodes on December 31st, 1890, amounted to 44,364 feet, of which 27,323 were on the Drumlummon. Not including shafts sunk or diamond-drill holes, 9,045 feet of work were done in 1890. The average cost of development work, exclusive of main shafts, in 1890, was \$10.12 per foot. 1,558 feet of diamond-drill holes were bored at an expense of \$3.53 per foot.

Shaft No. 1 was sunk a depth of 276 feet at an expense of \$102.93 per foot; No. 2, 203 feet at \$86.18 per foot. These shafts are 13 ft. 8 in. x 5 ft. 6 in. in the clear, requiring an excavation about 19 ft. x 8 ft. The rock is very hard magnesian slate.

The workings of the Drumlummon mine are illustrated in the accompanying engraving. The portions of the map which are hatched show the stopes and of course indicate the general direction of the ore shoots. These shoots continue into the lower levels of the mine, and have been cut in the 800, 1,000, 1,200, and 1,400 foot levels in about their relative positions if continued on the lines shown in the section. The bottom of the pay ore in these shoots, with the exception of the Sampson, is at



scarcely half a dozen are to-day recognized as being elementary. Chemists are accordingly rather cautious in their admissions as to the exact number of elementary substances. Almost at any time there are three or four, if not more, elements regarding which chemists are waiting the progress of time and further investigation, to show whether they shall be installed in the place to which their godfathers assign them, or whether they shall merely increase the mortuary record. It is scarcely to be doubted that other elements remain yet undiscovered; indeed, the relations of elementary substances to each other are so remarkable that we may anticipate not only the discoveries, but many of the characteristics which these hypothetical elements must possess, and it is also certain that many new discoveries in the useful applications of the elements now known will reward the labors of future investigators in the realm of chemistry.

OFFICIAL REPORTS.

Montana Company, Limited.

The report of the directors of the Montana Company, Limited, for the six months ending December 31st, 1890, presented at the general meeting of the shareholders, March 31st, contains much information of interest.

The total output of the three mills for the year was \$876,163.69 in bullion, and \$221,181.86 in concentrates, a total of \$1,097,345.55, which fell short of that for 1889 by \$200,353. The total expenditures were \$751,057.39, of which \$718,172.04 were working expenses, and \$37,885.35 for permanent improvements. Dividends to the amount of £33,000 were declared, and a balance of £494 11s. 8d. carried forward.

There were milled during the year 47,335 tons (dry weight) of high-grade ore of average yield of \$18.10 per ton; and 34,400 tons of low-grade

ore between the 800 and 1,000 foot levels, the ore below being of too low grade to pay for milling under present conditions. In the case of the Sampson shoot, however, the low-grade ore has been passed and high-grade ore has been encountered in the 1,000-foot level, as indicated by the stope opened at that point.

The following table shows the production of the Montana Company, Limited, from its organization to December 31st, 1890:

Year.	Dry tons crushed.	Gold.	Silver.	Total production. (Assay value.)	Average yield per ton.	Dividends paid. £
		Assay value.	Assay value.			
1883.....	987	\$27,111	\$37,663	\$64,774	\$65.63	...
1884.....	19,133	147,314	139,247	276,561	14.45	9,534
1885.....	33,482	536,183	358,027	894,210	26.70	49,024
1886.....	41,728	916,521	796,359	1,712,910	41.05	146,250
1887.....	75,005	1,204,286	836,388	2,040,674	27.21	181,000
1888.....	83,745	722,223	372,370	1,094,598	13.07	57,756
1889.....	78,749	784,999	513,400	1,237,699	16.48	57,756
1890.....	81,735	737,302	360,044	1,097,346	13.43	33,000
Total.....		\$5,075,244	\$3,403,528	\$8,478,772	\$24.52	£528,808

The total production, \$8,478,772, is equal to £1,751,812. The total profit from this has been £673,687. The difference between this amount and the dividends paid having been written off for depreciation, purchase of adjoining locations and other accounts chargeable against capital. In addition there has been expended, out of revenue, on exploration work since 1884, the sum of £123,123.

## THE PRODUCTION OF IRON ORE IN THE UNITED STATES IN 1889 AND 1890.

The production of iron ore by all the leading iron ore districts of the country in the last two years, as stated in the recently issued statistical report of the American Iron and Steel Association, was as follows, in gross tons, the figures in nearly every instance denoting shipments from the mines, and not taking account of stock piles at the mines at the beginning or end of any year:

District.	1889.	1890.
Marquette Range, Mich.....	2,534,817	2,997,927
Menominee Range, Mich. and Wis.....	1,796,764	2,289,017
Gogebic Range, Mich. and Wis.....	2,016,391	2,845,171
Vermillion Lake, Minn.....	844,782	880,264
Missouri mines.....	233,784	186,633
Cornwall mines, Penn.....	769,020	686,302
New Jersey mines.....	482,169	477,289
Chateaugay mines, N. Y.....	122,923	130,398
Crown Point mines, N. Y.....	65,169	78,737
Port Henry mines, N. Y.....	409,000	417,810
Other Lake Champlain mines, N. Y.....	45,000	35,000
Hudson River Ore and Iron Co., N. Y.....	54,000	72,505
Tilly Foster mines, N. Y.....	70,889	76,949
Forest of Dean mines, N. Y.....	12,042	23,016
Salisbury region, Conn.....	32,000	26,058
Cranberry mines, N. C.....	12,974	22,873
Inman mines, Tenn. Coal, Iron & R. R. Co..	120,232	119,402
Alleghany county, Va.....	162,322	184,640
Calhoun, Etowah and Shelby counties, Ala.	165,084	212,540
Total.....	10,049,362	11,764,551

The total production in 1888 was 7,648,126 tons.

The Lake Superior mines which produced the largest quantities of iron ore in 1890 were the following: Norrie, Gogebic range, 906,754 tons; Chapin, Menominee range, 742,843 tons, and Ashland, Gogebic range, 435,472 tons.

The imports of iron ore during the past three years have been as follows: 1888, 587,470 gross tons, valued at \$1,313,589; 1889, 853,573 tons, \$1,852,392; 1890, 1,246,830 tons, \$2,854,118. During 1890 the Juragua Iron Company, Limited, imported from its Cuban mines 362,068 gross tons of ore, an increase of 105,790 tons over its imports in 1889. Two new companies, the Sigua Iron Company and the Spanish-American Iron Company, expect to be prepared to ship iron ore from Cuba before the close of the present year. All of the Cuban iron ores brought into this country have been of Bessemer quality; recently some manganiferous iron ores have also been imported. Shipments of ore from Cuba commenced in 1884.

The consumption of iron ore in 1890 is estimated at about 18,000,000 gross tons, as against 14,096,427 tons in 1889, and 12,062,530 tons in 1888. The shipments of Connellsville coke in 1890 amounted to 6,221,518 net tons; of Pocahontas Flat Top coke, 433,319 net tons.

## THE DEEP CREEK MINING REGION OF UTAH.

The Deep Creek mining region, which has become the center of attraction in Utah since the discoveries of rich ore recently made there, is situated in the extreme western portion of the territory, lying in Tooele and Juab counties, and extending into Nevada, a large range of country, in which are comprised a number of independent mining districts, being included under this general name. The Deep Creek region is about 100 miles southwest of Salt Lake City, and borders upon the southern limits of the Great Salt Lake Desert. The Deep Creek country itself is an arid and inhospitable region, and is reached only by a long journey over a dreary and desolate area of alkali land. Water is found only in isolated spots, and, although it has been obtained in several places by artesian wells, the lack of an ample supply is likely to prove a serious obstacle in the development of the ore deposits of the country.

The existence of ore in this section of Utah and Nevada has been known for more than twenty years, and in several places a considerable amount of development work has been done. Just west of Deep Creek proper, in Egan, or Gold Cañon, Nevada, the once famous Gilligan lode, which was discovered in 1864, was opened to a depth of many hundred feet; a mill of 5 stamps, the number afterward being increased to 20, was erected there and quite a large amount of bullion was produced. As the old overland stage route passed through this region, it naturally became fairly well known.

The ores found in Deep Creek hitherto, however, having been for the most part lead ores, assaying low in silver, which could not be worked at a profit under prevailing conditions, prospectors gradually abandoned the region, and of late years but little has been heard of it until within the past six months.

Last autumn prospecting was again stimulated in Deep Creek by the fact that a railway was projected to run through the region. Among others who went thither at that time was Samuel H. Gilson, an energetic prospector who is well known as the discoverer of the asphaltum deposits of Eastern Utah. He located several claims at Dugway, one of the easternmost of the Deep Creek mining camps, and in March last started a tunnel in the Buckhorn claim. Ore was struck almost at the surface, and, unlike all other ore found at Dugway up to that time, it was of very high grade in silver, and low grade in lead. The first lot of eight tons of ore shipped to Salt Lake City sold at nearly \$380 per ton, net. Since then, it is reported that ore far richer has been encountered in the Buckhorn mine. The extent of this ore body is, of course, yet unknown, but the richness of the strike was sufficient to start an army of prospectors to the new region. Besides that of the Buckhorn, several other important discoveries have now been made in neighboring properties at Dugway.

Concerning the geological character of these new ore deposits at Dugway, but little is definitely known at the present time. In general the country rock of the whole Deep Creek region is carboniferous limestone, quartzite, silicious and argillaceous shales, underlaid with granite or rhyolite, numerous dikes of porphyry traversing the formations. The mineral veins are found in the limestone and in the contacts between the limestone and quartzite, and the limestone and shale.

Besides Dugway there are several other camps in Deep Creek which now promise to be of importance, among which are Kinsley, Clifton, Furber, and Fish Springs. A line of stages starting from Stockton, the terminus of the railway from Salt Lake City, is now running to these places. It follows, very closely, the route over which the overland stages

traveled twenty-five years ago. The distance from Stockton to Dugway is about 65 miles.

## AN IMPROVED SKID FOR HEAVY VEHICLES.

In the accompanying illustration, for which we are indebted to *Industries*, is shown an ingenious skid for use with ore wagons and other heavy vehicles, invented by Mr. John Robertson, of Newton Stewart, Wigtownshire, Scotland. It is said to have been well tested in Scotland with satisfactory results.

The skid *A*, when not in use, is suspended by the chain *B* in front of the wheel, as shown by the dotted lines. When the wheel is to be skidded, the driver releases a chain wheel *C* by means of a split hand *D*, thereby paying out sufficient of the chain to allow the skid to reach the ground and the wheel to mount on the top of it. He then simply lets go the

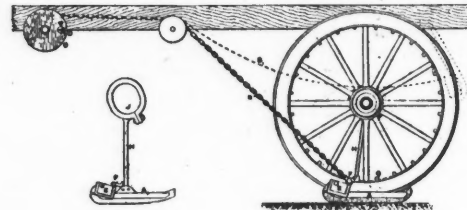


FIG. 1.

FIG. 2.

hand, and the chain wheel becomes again locked, and the skid is securely held by the chain. By means of a peculiarly constructed box *E* on the skid *A*, the driver is enabled to unskid the wheel without stopping the vehicle or dismounting. To do this he simply pays out a little more of the chain, and allows the wheel to ride off the skid, on which there is a claw *F* which engages with a pin *G* on the wheel, thereby carrying the skid up to its normal position, shown in dotted lines. While the latter operation is taking place, the driver again winds up the chain, so that, when *A* has reached its extreme height, it falls, by its own weight, through a slight angle and tightens the chain, thus releasing the claw *F* from the pins *G*. The arm *H*, which connects the skid with the nave of the wheel, has upon its upper end a collar *J* (Fig. 1) of an elliptical form for embracing the nave, so that sufficient play is allowed between the skid and the tire when the former is out of use, but which perfectly fits the wheel when upon the ground.

## RAIN-MAKING.

By Our Special Contributor.

Mr. Fernow, the accomplished and thorough expert at the head of the Forestry Division in the United States Department of Agriculture, is to be congratulated on having been relieved of the duty of expending the public money in absurd experiments for the artificial production of rain by concussion. Not because such experiments might not properly be made to determine certain questions of meteorology, but because their avowed purpose in this case was to facilitate the production of rain in arid regions—that is to say, where the atmosphere is not charged with moisture—the inquiry is one in which a self-respecting man of science can scarcely engage without a blush. For Nature has answered it beforehand, on the very line which man (that is to say, Congressional man) now proposes to follow. No matter what concussions her thunder-storms bring about, they never cause rain, except when the surplus moisture for rain is in the air, and as soon as that condition has ceased, the rain ceases. Our signal service predicts with high accuracy the route (though it cannot be so sure of the rate of progress, and hence its failures) of a storm, through hygrometric observations. An area of dry air is a barrier which storms cannot cross. Even tornadoes and cyclones turn aside from it.

I suspect that Mr. Fernow's enthusiasm in this inquiry must have been doubted, for it is now reported that the original \$2,000, with \$7,000 more available in July, are to be expended by Mr. Robert G. Dyrenforth, late Commissioner of Patents, and now a patent attorney in Washington. This gentleman is reported by a Washington correspondent as expressing some curious views and purposes. He thinks high explosives, like nitroglycerine, would not be suitable, because they would not affect a sufficient area of the atmosphere. He wants something more like thunder; and he proposes to send up in balloons, and fire by electricity or by a time, fuse, a mixture of two volumes of hydrogen to one of oxygen, which he calls "an immensely powerful explosive," and considers specially advantageous, because its explosion would form water, and thus furnish "a nucleus for the agglomeration of the water which floats in the air." As the total amount of the water which could be formed by the explosion of 1,000 cubic feet of his mixture (a volume which he says he almost hesitates to use all at once) would be about half of one cubic foot, the importance of the nucleus is not very great.

But the gem of the interview is the following:

Q. "Having succeeded in producing rain by concussion in parts of the country where the atmosphere is known to be charged with moisture, how are you going to apply your principle to an arid region?"

A. "Let me answer that question by asking another. Did you ever notice when thunder is to be looked for—whether after a period of drought or of wet weather? After a dry time, eh? Well, take an area of habitual drought, and supply artificially the conditions of a thunder clap; is it not reasonable to suppose that the rest of the customary results will follow? There is probably enough water in suspension in the atmosphere anywhere to make a rainfall if an exciting cause could be supplied."

The prospects of experiments supported by such theorizing as that are not very brilliant. The notion that thunder makes rain, and that if we can imitate thunder we can make rain, too, ignores much that is already well known of the relations of these phenomena.

The question whether some higher stratum of the atmosphere may not carry moisture when the air below is arid, so that rain might fall from the upper layer in spite of the adverse conditions near the ground, has but a limited possible importance. Currents of moist air do indeed exist, but they show their presence by raining when they come in contact with colder currents. If the rain does not prove their presence, they

are not likely to be found by any other test. No local sheet-thunder is half as effective as a lowering of temperature.

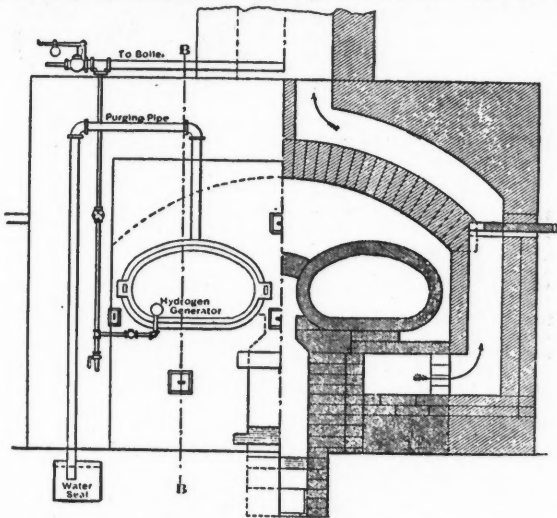
The well-known cold of the upper air is accompanied by an equally marked dryness. At 7,000 meters (the highest point ever reached by man) Gay-Lussac found a temperature of -10 C., or 40° lower than that on the earth's surface; and this cold air was so dry as to desiccate rapidly all hygroscopic substances in his balloon. The upper air is a poor place to look for rain.

R. W. RAYMOND.

THE GESNER RUST-PROOF PROCESS.

The accompanying engraving illustrates the furnace used in the rust-proof process invented by Mr. G. W. Gesner of New York, which was recently put into practical operation at South Brooklyn, N. Y. The furnace itself consists substantially of a bench of two ordinary gas retorts placed side by side, over a grate. The retorts having been heated to a temperature of 1,000° or 1,200° F., according to the character of the articles to be treated, the latter are put into the retorts, care being taken that they do not touch each other.

After closing the retorts, the heating continues for about 20 minutes,



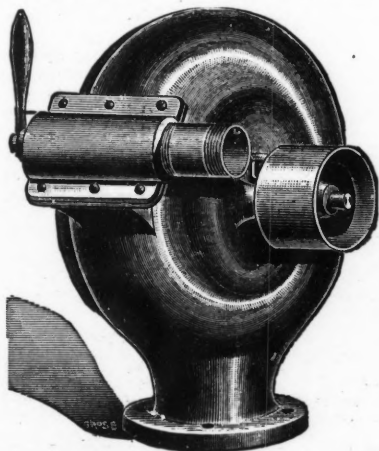
when steam is introduced through the pipe called the "hydrogen generator," shown in the drawing, this operation going on for about 35 minutes. At the end of this time, a small amount of naphtha is allowed to flow slowly into the retorts for about 10 minutes, and then the steam, which has been introduced throughout the operation, is continued for about 15 minutes longer. The whole time employed in the operation is, therefore, 1 hour and 20 minutes. Any excess of gas in the retorts finds an escape through the "purging pipe," the end of which is sealed by a basin of water.

In cases where articles treated are ornamental, such as many varieties of hardware, they are given a bath of cold whale oil or paraffine oil to render them more even in tone. In other articles no oil is used.

By the Gesner process it is claimed that the surface of the articles treated is converted, into a compound of iron, hydrogen, carbon and oxygen, which will not oxidize, and forms a thoroughly protective coating.

THE STILWELL WATER MOTOR.

In the accompanying cut is illustrated a new water motor invented by Mr. H. C. Stilwell, of Dayton, O., which is now being placed on the market. There is quite a demand for small water motors where small amounts of power are needed. In the Stilwell motor it has been aimed to make a machine attractive in appearance, simple in design, economi-



cal, and at the same time strongly and carefully built. It is claimed that, by a peculiar combination of two streams of water and an ingenious form of bucket, this motor has been designed so as to attain a high degree of efficiency. Both streams of water are regulated by one lever, which affords a simple means of varying the power without, it is said, affecting the efficiency of the motor. The bearings are made of bronze, and can be renewed at any time if they should become worn by neglect to oil.

**Power Drills in a Harz Mine.**—At the St. Andreasberg silver mines in the Harz, rock drills worked by compressed air have recently been introduced, says *Industries*. The air compressor is placed underground, and is driven by a Girard turbine. The special point of interest in connection with this installation is the regulator, which consists of an air reservoir hewn in the solid rock. By the employment of power drills, it is found that in driving levels there is a saving in cost of 58.2%, while 4-04 times as much work is done as that accomplished by manual labor. The cost of stopping by hand was \$4.00, as compared with \$2.12½ by machine, per cubic meter of ore won. In the case of shaft sinking, the cost with machine, inclusive of explosives, was \$19.50 per running meter, as compared with \$36.50 with manual labor.

**Coal and Iron Mining in Great Britain in 1890.**—A Government report shows that the total quantity of coal and iron ore wrought in the different districts of Great Britain in 1890 was 189,731,764 tons, of which 181,614,288 was coal and 8,117,476 ironstone. In addition there was produced 4,874,123 tons of other minerals, including fire-clay, oil-shale, etc. There was an increase of 4,697,564 tons of coal, but a decrease of 153,066 tons of ironstone. The number of fatal accidents was relatively a little less than in the preceding year. In 1889 the general average was 223,624 tons of mineral per fatal accident, and in 1890 226,023 tons. Under the first Coal Mines Act there was one death in every 233 persons employed; under the second Act one death in 258; under the third Act one death in 312; under the fourth Act one death in 466; while for the present year it is one in 528.

DIVIDENDS PAID BY MINING COMPANIES DURING APRIL AND FROM JANUARY 1ST, 1891.

NAME OF COMPANY.	Paid in April.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in April.	Paid since Jan. 1st.
Adams Colo.....	\$7,500	\$15,000	Jackson, Nev.....		\$5,000
Alaska-Treadwell, Alaska.....	75,000	150,000	Little Rule, Colo.....	\$10,000	40,000
Alto, Mont.....	25,000	25,000	Mammoth, Utah.....	40,000	160,000
American Belle, Colo.....	50,000	50,000	Maxfield, Utah.....		9,000
Aspen, Colo.....	20,000	80,000	May Mazonia, Colo.....	12,500	50,000
Atlantic, Mich.....	40,000	40,000	Mollie Gibson, Colo.....	100,000	106,000
Bald Butte, Mont.....	10,000	40,000	Montana Ltd., Mont.....	39,600	79,200
Bannister, Mont.....	6,000	24,000	Morning Star, Colo.....	25,000	50,000
Bates-Hunter, Colo.....	2,500	2,500	Morning Star D., Cal.....	3,600	3,600
Bimetallic, Mont.....	70,000	280,000	Mt. Diablo, Nev.....		10,000
Boston & Mont., Mont.....	125,000		Napa, Cal.....	10,000	20,000
Calliope, Colo.....	5,000	5,000	New Guston, Colo.....	110,000	110,000
Calumet & Hecla, Mich		500,000	Norih Banner Cons., Cal.....	5,000	10,000
Centennial - Eureka, Utah.....	15,000	60,000	North Star, Cal.....	50,000	50,000
Central, Mich.....	20,000	20,000	Ontario, Utah.....	75,000	300,000
Champion, Cal.....	10,000	40,000	Osceola, Mich.....	50,000	50,000
Clay County, Colo.....	4,000	16,000	Parrot, Mont.....	18,000	72,000
Coeur D'Alene, Idaho.....	20,000	20,000	Plumas Eureka.....	35,150	35,150
Cor. Nev.....		138,500	Quicksilver, Prof. Cal.....		64,360
Curlow, Mont.....		10,000	Quincy, Mich.....		200,000
Daly, Utah.....	37,500	150,000	Retriever, S. Dak.....		7,500
Derbec Blue Gravel.....		10,000	Rialto, Colo.....	3,000	3,000
Elkhorn, Mont.....	200,000	200,000	Richmond Cons., Nev.....		20,250
Glengarry, Mont.....	5,000	5,000	Running Lode, Colo.....	5,000	10,000
Granite Mountain, Mont	100,000	600,000	San Miguel Con, Colo.....	75,000	75,000
Hecla Con. Mont.....	15,000	60,000	Sierra Butte.....	15,310	15,310
Helena & Frisco, Mont.....	10,000	40,000	Silent Friend, Colo.....		30,000
Helena & Victor, Mont.....		25,000	Silver Mg. of L. V., N. Mex.....		50,000
Homestake.....	12,500	50,000	Tamarack, Mich.....		200,000
Horn Silver, Utah.....		50,000	W. Y. O. D., Cal.....	1,500	3,000
Idaho, Cal.....	9,300	27,900	Yankee Girl.....	130,000	130,000
Iron Mountain, Mont.....		25,000			
			Total.....	1,315,460	4,846,270

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

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

Tuesday, April 23, 1891.

- 451,081. Device for coiling wire rods. Joseph A. Tatro, Beaver Falls, Pa.
- 451,087. Suspension Bridge. Argyle W. Tucker, Midlothian, Tex., Assignor of one-half to Frank Hosford, same place.
- 451,088. Projectile. Cornelius Tunnichiff, Denver, Colo.
- 451,100. Apparatus for actuating and controlling the valves of hydraulic cylinders, etc. Louis S. Wright, Philadelphia, Pa.
- 451,120. Railroad Tie. Leonard L. Frost, Bara, Pa., Neb.
- 451,205. Die for Shaping Sheet Metal. William A. Turner, Worcester, Mass., Assignor to Edmund Converse, same place.
- 451,204. Sewer construction. George E. Waring, Jr., Newport, R. I.
- 451,209. Piston Packing. Albert C. Ellithorpe, Chicago, Ill.
- 451,220. Apparatus for Coating Wire. John Coffin, Johnstown, Pa.; Elizabeth F. Coffin (executrix of said John Coffin, deceased), Assignor to the Cambria Iron Company.
- 451,221. Apparatus for Annealing Wire. John Coffin, Johnstown, Pa.; Elizabeth F. Coffin (executrix of said John Coffin, deceased), Assignor to the Cambria Iron Company.
- 451,234. Stop Motion for the Feed Rolls of Garnett Machines. James Ingram, Lawrence, Mass.
- 451,241. Breach Loading Ordnance. Gregory Gerdon, West Troy, N. Y.
- 451,261. Process of and Apparatus for Tinning Sheet Metal. Samuel Y. Buckman, Philadelphia, Pa.
- 451,262. Apparatus for Coating Sheet Metal Plates. Samuel Y. Buckman, Philadelphia, Pa.
- 451,263. Apparatus for Cleaning Sheet Metal Plates. Samuel Y. Buckman, Philadelphia, Pa.
- 451,264. Apparatus for Coating Metal Plates. Samuel Y. Buckman, Philadelphia, Pa.
- 451,274. Tool for Straightening Artesian Wells. Samuel F. Karnes, and Philetus Nichols, Harvey's, Pa.
- 451,289. Ore Washer. Frederick C. Miller, Leadville, Colo.
- 451,292. Rock Drill Bit. Robert McKee, Meeker, Colo.
- 451,295. Railroad Tie. Bridges Smith, Macon, Ga.
- 451,323. Apparatus for Loading Coal into Vessels. Wilhelm Glunder, Glatz, Germany.
- 451,345. Method of Electric Welding. Elihu Thomson, Swampscott, Mass., Assignor to the Thomson Electric Welding Company, of Maine.
- 451,369, 451,370. Magnetic Ore Separator. John P. Conkling, Glens Falls, N. Y., Assignor to Gardon Conkling, same place.
- 451,404. Process of Manufacturing Alloys of Aluminum. John W. Langley, Edgewoodville, Assignor of one-half to Hunt & Clapp, Pittsburg, Pa.
- 451,425. Rotating Mechanism for Rock Drills. Harry Ball, Stamford, Assignor of one-half to Frederick Lenggenhager, Glenbrook, Conn.¶

## PERSONALS.

Mr. E. E. Olcott, mining and metallurgical engineer, has removed his office from 101 Pearl Street to 18 Broadway, New York.

Dr. P. A. H. Franklin, of Salt Lake City, Utah, President of the Niagara Mining and Smelting Company, is visiting New York, on business matters.

Dr. M. E. Wadsworth, Director of the Michigan Mining School, at Houghton, has been re-appointed director of the Michigan Geological Survey.

Dr. Geo. C. Munson, formerly assayer in charge of the Denver mint and more recent manager of the De Lamar mine, of De Lamar, Idaho, has returned to Denver, Colo., to reside.

Mr. W. W. Adams, formerly manager of the Hope Mining Company of Phillipsburg, Mont., has accepted the position of assistant manager of the Bluebird Mining Company, of Butte, Mont.

Mr. Nicholas Treweek, of Salt Lake, has been appointed general manager of the Niagara Mining and Smelting Company and the Live Pine Consolidated Mining Company, operating at Bingham, Utah.

A. Wairath, formerly superintendent of the Providence mine at Nevada City, Cal., has accepted the position of manager of the New Eureka mine in Nevada county, taking the place of W. H. Weldon, resigned.

Mr. C. M. Dobson, Mining Engineer, of St. Louis, Mo., is about to start for San Salvador, Central America, to examine the property of the San Sebastian Gold Mining Company for an English syndicate.

Mr. J. H. Ernest Waters, M. E., manager of the Sheridan Mining Company, of Telluride, Colo., is visiting Shanghai, China, where the head office of his company is located. He will return to the United States in about two months.

Mr. Benjamin Miller, who has been assistant superintendent of the May-Mazepa Mining and Milling Company, of White Pine, Colo., for several years, succeeds his brother, Mr. S. M. Miller, as superintendent of that company.

Mr. William H. Burr, recently general manager of the Phoenix Bridge Company, has severed his connection with that company, and has purchased a considerable interest in the business of Messrs. SooySmith & Co., contracting engineers, of New York City, and will, after June 1st, 1891, become vice-president.

Mr. S. M. Miller, who has been superintendent of the May-Mazepa Consolidated Mining and Milling Company, of Colorado, for the past two years, and has developed its property so successfully, has been promoted to the position of general manager of all the mining interests of Messrs. Taylor and Rathvon, of Denver, which include the May-Mazepa, Bates-Hunter, and several other properties.

## OBITUARY.

Thos. G. Cocker, of the firm of Cocker & Bastian, iron founders, of Frankford, Pa., died on the 25th ult., in Philadelphia.

Alfred J. Ware, of Breckenridge, Colo., manager of the Victoria Mining Company, and for many years a prominent mining man of Colorado, died at Denver on the 19th inst., of pneumonia, after a week's illness. Col. Ware was born in Stark County, O., in 1838, and while a young man studied law, and was admitted to practice. He became attorney for the Springfield & Northwestern Railroad, and was subsequently connected with other railway companies. In 1872 he removed to Colorado, and located in California gulch, which subsequently became the scene of the Leadville excitement, but was at that time but an almost exhausted placer diggings. Col. Ware was fairly successful, however, and after remaining in the gulch for some time, went to the San Juan country. In 1880 he removed to Breckenridge, becoming interested in placer mines there, and has since resided in that place.

Prof. John Le Conte, of the State University of California, died on the 29th ult. at Berkeley, Cal. He was the son of Lewis Le Conte, the naturalist, and was born in Liberty county, Ga., in December, 1818. He was graduated at Franklin College of the University of Georgia in 1838, and at the New York College of Physicians and Surgeons in 1841. In 1846 he was called to the chair of Natural Philosophy in Franklin College, which he occupied until 1855. The following year he lectured on chemistry at the New York College of Physicians and Surgeons, and in 1856 he was appointed Professor of Natural and Mechanical Philosophy in South Carolina College, at Columbia, S. C. In 1869 he was appointed Professor of Physics and Industrial Mechanics in the University of California, and discharged the duties of that position until 1881. From 1876 to 1881 he held the office of president of the University in connection with the professorship. At the expiration of that period he retired to the chair of physics, which he occupied until his death. The whole of his active life, more than half a century, was devoted to scientific investigation, first in the

line of medicine, but afterward almost exclusively in the domain of physics. The result of his labors was disclosed in a great variety of communications to scientific journals in this country and Europe and in the "Proceedings of the American Association for the Advancement of Science," of which organization he was general secretary in 1857. In that year he delivered a course of lectures on the "Physics of Meteorology" before the Smithsonian Institution at Washington, and in 1867 he read a paper on "The Stellar Universe" before the Peabody Institute in Baltimore. He received the degree of LL. D. from the University of Georgia in 1879, and since 1878 had been a member of the National Academy of Science. A treatise on "General Physics," which he had almost completed, was destroyed in the burning of Columbia, S. C., in 1865. He was a brother of Prof. Joseph Le Conte, the eminent geologist and physiologist.

Dr. Jos. Leidy, the physician and naturalist, who has been lying at the point of death at his residence in Philadelphia since April 24th, died on the 30th ult. His brother, Dr. Philip Leidy, died on the previous day. Joseph Leidy was born in Philadelphia on September 9th, 1823. He early acquired a knowledge of mineralogy and botany by his own efforts, studied medicine, under Dr. Paul B. Goddard, and was graduated in that department at the University of Pennsylvania in 1844. At first he became an assistant in a chemical laboratory, but in 1846 he relinquished the practice of his profession, excepting during the civil war, when he entered the United States volunteer forces, and served as a surgeon in the Satterlee General Hospital. In 1845 he became professor to the chair of anatomy in the University of Pennsylvania, and in 1846 became demonstrator of anatomy in the Franklin Medical College. He visited Europe in 1848, and on his return lectured on microscopic anatomy, and in 1849 began a course of lectures on physiology at the Medical Institute. In 1853 Dr. Leidy became professor of anatomy at the University of Pennsylvania, a chair he held at the time of his death. He was also called to the chair of natural history in Swarthmore College. In 1884, on the establishment of the department of biology in the University of Pennsylvania, he became its director, which office he also filled at the time of his death. Professor Leidy obtained the Walker prize of \$1,000 from the Boston Society of Natural History in 1880, and also the Lyell medal, with the sum of £25 from the Geological Society of London, "in recognition of his valuable contributions to paleontology," and received in 1886 the degree of LL. D. from Harvard University. He was a member of all the prominent societies of his profession at home and abroad. The titles of Professor Leidy's published papers exceed 800 in number, all on biological subjects, of which many are on the specimens obtained on the various surveys under the United States Government, and submitted to him for study. His first paleontological paper, published in 1847, was "On the Fossil Horse," a subject which, in the hands of H. Huxley and O. C. Marsh, has been used in the illustration of the theory of evolution.

## SOCIETIES.

The American Institute of Mining Engineers will hold its sixth meeting at Cleveland, O., beginning on Tuesday, June 2d.

The Engineers' Society of Western Pennsylvania will now hold its regular meetings on the third Tuesday of each month, at 7:30 P. M., at its rooms in the Thaw Mansion, Fifth Street, Pittsburg, Pa.

The Engineers' Club of Philadelphia held a business meeting on the 18th ult., at which it was voted that the club should be incorporated. Mr. John C. Trautwine, Jr., presented for Captain S. C. McCorkle an illustrated paper on "Land-locked Navigation from Long Island Sound to the Mississippi River."

The Royal Society of Canada will hold its annual meeting in Montreal, P. Q., beginning on the 27th inst., and lasting one week. Arrangements have been made with the Canadian and their connecting American railways, for a fare of one and one-third for the double journey, to those proposing to attend the meeting from this country.

The Engineering Association of the South will hold its next regular meeting at Earlington, Ky., on the 15th inst. The day following will be spent in visiting the collieries and coke ovens of the St. Bernard Coal Company. The Chattanooga Tradesman has repeated its offer of last year of a prize of \$25 for the most meritorious paper presented to the association during the present year.

## EXPORT NOTES.

October 12th, 1891, is the date fixed for the trade conference between Canada and the United States.

The government of Honduras has issued a decree continuing for another term of years the charter of the steamship company maintained by Messrs. De Leon and Alger between Puerto Cortez, Belize and New Orleans.

An international exhibition is to be held at San Paulo, Brazil, in January, 1892. Full particulars can be obtained by intending exhibitors by applying to the secretary of the French Chamber of Commerce at Rio de Janeiro, Brazil.

The Colonial Government of Trinidad has entered into a contract with Messrs. Turnbull, Stewart & Co., for a steamship service between Trinidad and the city of New York; also for a coasting service around the Island of Trinidad and to the neighboring island of Tobago.

The government of Honduras has granted to Messrs. E. W. Perry and F. M. Imboden, both citizens of the United States, a concession of land covering the entire region known as Mosquito, the payment for which is to be made in the construction of expensive public works. Inducements will be offered to immigrants.

The draft of the new commercial treaty between Spain and the United States, looking toward partial reciprocity of trade with Cuba, was concluded on the 17th ult. It is understood that the treaty fixes very low duties on flour and other articles imported from the United States into the Antilles.

The committee of bankers appointed by the government, with instructions to examine thoroughly into the various aspects of the financial situation in Brazil, has rendered its report. This report says that there is no danger, so far as Brazil is concerned, of a commercial or financial crisis. The committee recommends the maintenance of the system which requires that customs duties be paid in gold.

The Congress of Uruguay has recently imposed the following additional customs: Imports, 5% ad valorem, calculated upon the official valuations of the existing tariff, with the exception, however, of goods hitherto duty free, and of potatoes, printed books and printing material, flower seeds, sulphuric, nitric and hydrochloric acids, phosphorus in sticks, dye woods, gold jewelry, maps, globes and apparatus for the study of natural, physical and mathematical sciences, coal and precious stones unset, on which the duties remain as before. As to exports, which have hitherto been free, duties are imposed on wool at \$1.30 per 100 kilos, paying the highest duty. Hides, meats and skins are also to pay an export tax.

Mr. Henry Whitmore, writing from Bowden, Jamaica, offers many suggestions for the improvement of trade relations between that country and the United States. During the fiscal year 1889-90 the United States took 50% of all the exports of Jamaica and furnished only 39% of the imports. The trade conditions of Jamaica are somewhat peculiar. There are no wholesale houses on the island. Each store sells many different kinds of goods, the merchants preferring to place their orders for all classes of merchandise with one firm. English and other European export houses have adapted themselves to this method of doing business. If the merchants of the United States desire to engage the trade of Jamaica, one way of meeting this difficulty would be the establishment of trade depots in Kingston, from which to distribute goods of the retailers. Another method, one quite commonly adapted now in trading with southern countries, is for manufacturers to do their business through a commission house, which supplies everything, and which makes one bill for the whole order. The system of long credits is universal. If American merchants desire West India trade they must do two things: First, they must send competent agents to study the needs and desires of the people; second, capable traveling salesmen must be sent to introduce the goods. Kingston merchants say that American manufacturers do not cater to the taste of the islanders. Cheapness is a great desideratum. Everything must be cheap and look well, and but little attention is paid to its wearing qualities. In bread stuffs, salted provisions, carriages and agricultural machinery, the United States hold the control. In cotton goods, woolen and other fabrics its trade is very small. Manufactures of iron and other metals come almost exclusively from the otherside. The United States should supply a much larger proportion of the cracker and biscuit business than it does. In the matter of freights the advantage is on the side of the United States, and Boston has the advantage over New York in rates. The only drawback is that the freight steamers do not go to Kingston—a great distributing point. The landing at other points necessitates a trans-shipment of cargo to Port Antonio. However, the large saving in time made by the merchant in sending to the United States for goods instead of England is telling on the trade of the latter country.

## INDUSTRIAL NOTES.

The Boonton Iron and Steel Works, Boonton, N. J., have been shut down on account of labor trouble.

The Carpenter Steel Works at Reading, Pa., has recently received an order for \$200,000 worth of steel projectiles.

The Cambria Iron Company, of Johnstown, Pa., is soon to make a test of the Adams direct steel process, a furnace for this purpose being now in course of construction over furnace No. 3 in the open-hearth department.

The Illinois Steel Company and its employes have reached an agreement as to wages at the Joliet mill, Illinois. A sliding scale was adopted, to be in effect until the close of 1892. After that time six months' notice of a desired change must be given by either party.

The Birmingham Furnace & Manufacturing Company's furnace, coal and ore properties at and near Trussville, have been leased to, and will be operated by Gilreath, Hardie & Spencer, of Birmingham, Ala., for five years, with the privilege of ten, with option to purchase. The new management will erect 100 more coke ovens, and otherwise improve the properties.

Messrs. Johnson, Matthey & Co., the well-known metal brokers, of London, England, have registered as a joint stock company under the title of "Johnson, Matthey & Co. (Limited)." The nominal capital is £900,000, of which £750,000 is now issued, and £600,000 paid up. The whole of the issued capital is taken up by the members of the firm, who will continue to manage the business as directors.

The Niagara Falls Park Commissioners of Ontario have made an agreement with a strong syndicate of English capitalists, the owners of large electrical works at Deptford, England, who have deposited \$20,000, which is to be forfeited if the operations for the utilization of the power of Niagara Falls are not begun before March 1, 1892. The object of the syndicate is to generate and transmit electricity of an enormously high voltage for motive power, lighting and general purposes to all cities, towns and manufacturing points within a radius of 150 miles from Niagara Falls. The syndicate is to pay for such a privilege \$25,000 per annum for the first ten years, the rental afterwards increasing to \$35,000 in the twentieth year.

Fraser & Chalmers, of Chicago, Ill., have sent us a handsomely bound volume, comprising a full set of catalogues of the mining and metallurgical machinery manufactured by them, to which has been added a paper on "Gold Milling in the Black Hills," by Prof. H. O. Hofman, which was read before the American Institute of Mining Engineers, February, 1889, and a paper on "Losses in Gold Amalgamation, with Notes on the Concentration of Gold and Silver Ores," by Walter McDermott and P. W. Duffield. The volume forms a work of great value, including as it does drawings, descriptions, and data concerning the machinery of this famous firm. The great variety of the apparatus manufactured by them and illustrated in this book is evidence of the important position which Fraser & Chalmers occupy in relation to the mining and metallurgical industry.

The Tin Plate Manufacturers' Association of the United States held a meeting in New York on the 29th ult. for the purpose of electing officers. The following firms and companies were represented: St. Louis Stamping Company, of St. Louis; United States Iron and Tin-plate Company, of Pittsburg; Norton Bros., of Chicago; Jennings Bros. & Co., of Pittsburg; Kirkpatrick & Co., of Pittsburg; Marshall Bros. & Co., of Philadelphia; Britton Rolling Mill Company, of Cleveland, O.; Somers Bros., of Brooklyn, N. Y.; Falcon Iron and Nail Company, of Niles, O.; P. H. Laufmann & Co., of Apollo, Pa.; and Canonsburg Iron and Steel Company, of Pittsburg. This association was formed in 1883 for the purpose of getting a duty placed upon tinplate, and since that was accomplished has been moribund. The object of the present meeting is to revive it.

#### MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If anyone 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.

Any manufacturer or dealer 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 American 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.

These services are rendered gratuitously in the interest of the 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.

2,205. Engine, boiler and a complete plant for the manufacture of furniture, West Virginia.

2,208. A full line of machinery to equip a canning and evaporating factory. Virginia.

2,209. A good floor board machine. Alabama.

2,210. A shingle machine. Alabama.

2,211. A 150-horse power engine, 2 oil presses, 2 heaters, 1 cake former, and a set of crusher rolls, Mississippi.

2,214. A 150 horse-power engine for driving dynamos; 1,300 light alternator and the other 35—1,200 candle-power arc. Tennessee.

2,215. A complete outfit for a towboat, 50 x 12½ feet, twin propellers, 30-inch wheel; also two 5 x 6 engines, and a horizontal hoiler, 3-inch tubes, to burn 4 foot wood. Florida.

2,216. A small steam launch; one that can use coal or wood; prefer second-hand, if in good order. Also a 12-inch, 13-inch or 14-inch center crank engine, good second-hand, and a 60 horse-power boiler. North Carolina.

2,217. Gold mining machinery, especially concentrators. Alabama.

2,218. Brick machinery. Louisiana.

2,219. A stamp mill complete. Georgia.

2,220. Canning machinery. Georgia.

2,221. Machinery for "floating ochre dry." Georgia.

2,222. Machinery for sugar factory. Tennessee.

2,223. A pair of second-hand assay balances. New York.

2,224. A 15 H. P. boiler and a 20 H. P. engine. Texas.

2,225. Two 60 saw cotton gin stands with condensers and feeders. Texas.

2,226. An elevator for cotton. Texas.

2,227. A 20-inch corn mill. Texas.

#### AMERICAN GOODS WANTED ABROAD.

2,203. Samples and prices of bleached and unbleached cotton, Augusta and Toledo plaids, Canton flannel, suspenders, blue denim of all qualities, twill cotton, hosiery, duck, celluloid collars and cuffs, ticks, J. & P. Coats' spool cotton, singlets, shirtings, Merrimack shirtings, and other cotton goods manufactured in America. West Indies.

2,206. A machine with a capacity of 50 tons per day, to treat or disintegrate tailings from a gold mine that have become caked by exposure to air. Machine to be shipped to Brazil. South America.

2,207. A mill for the fine grinding of pure pyrites. Give full particulars as to capacity of mill, tons per day, cost, power required to operate, description of process, etc. Mill to be shipped to Brazil. South America.

2,212. Mineral wool. Canada.

2,213. A ship for towing purposes. Central America.

#### GENERAL MINING NEWS.

A combination of granite producers of the United States was formed in Chicago on the 28th ult. by representatives of almost all the large companies engaged in that industry. The meeting was held in response to a call sent out by D. E. Swan, of the Amberg Granite Company, of Chicago. The object of the combination is said to be to overcome labor difficulties. Over 30 different firms and companies were represented at the meeting. The organization is to be known as the United States Granite Producers' Association. D. H. Freeman, of St. Cloud, Minn., was elected president, and D. E. Swan, of Chicago, secretary.

STANDARD OIL COMPANY.—This company, which a month ago organized a company to lay an oil pipe line from Lima, O., to Chicago, Ill., has been notified by the Erie railroad management, operating the Chicago and Erie road, that it will not be permitted to parallel the present pipe line laid on the Chicago and Erie right of way, as the escaping oil from leaks endangers the company's property and it also injures the passenger business. The line company is now securing the right of way from the farmers along the line, paying from 25 cents to \$1 per rod. The new line will be completed in August.

#### ALABAMA.

(From our Special Correspondent.)

The recently enacted mining law of this state provides that an inspector shall be appointed, who shall visit every underground coal, iron and other mine in the state where 20 or more miners are employed, at least once in every three months, and shall examine the methods and manner of working the mines; and if, in his opinion, any changes are required he shall notify in writing the operator and owner of such changes.

#### JEFFERSON COUNTY.

(From our Special Correspondent.)

ENTERPRISE LAND AND DEVELOPMENT COMPANY.—This company has been incorporated at Birmingham, with a capital stock of \$500,000. The following officers were elected: John Kauff, of Enterprise, Miss., president; F. C. Jordon, of Enterprise, Miss., vice-president; and E. W. Godfrey, of Ft. Payne, Ala., secretary and treasurer, and L. P. Delana, general manager. The general

office of the company will be at Enterprise, which town the company proposes to develop. A branch office will also be established at Birmingham for the purpose of opening and operating mineral lands, building furnaces, etc.

ROCK CREEK COAL AND COKE COMPANY.—This company has been incorporated at Birmingham by W. & J. J. Moore, with a capital stock of \$250,000, for the purpose of developing coal mines, building coke ovens, etc.

TURNER COAL AND IRON COMPANY.—This company has been incorporated at Birmingham, with a capital stock of \$20,000, for the purpose of mining coal at or near that city.

VIRGINIA & ALABAMA COAL COMPANY.—The mines of this company, on the line of the Georgia Pacific Railroad, are on a four-foot seam of coal and are said to be producing 650 tons daily.

#### SHELBY COUNTY.

ALABAMA COAL AND IRON COMPANY.—This company is erecting an extensive ore-washing plant at its furnace mines at Shelby.

#### ALASKA.

According to reports, a small party of prospectors, backed by Eastern capital, was to leave Juneau about May 1st to attempt to locate the copper belt lying east of the St. Elias range. They will take the route up the Chilkat River, over the Chilkat Pass, and follow along the old Indian trail crossing the headwaters of the Alsea River. To the northeast of this point and running thence across the headwaters of Copper River is a porphyritic range showing high mineral colorings, and it is this range the party will penetrate. The Alsea and Copper rivers originate on the west of these mountains, the White River on the east and the Tanamah River on the north, and in the sands and gravel banks of the headwaters of each of these streams nuggets of pure native copper are reported to have been found. By the Chilkat River route this range can be reached within about 75 miles of the coast.

#### ARIZONA.

##### PINAL COUNTY.

(From our Special Correspondent.)

The discoveries of gold in the Silver Reef district, near Casa Grande, are exciting a good deal of attention. Mr. C. Loss has located a group under the name of Standard Gold Mining Company. At two points a shaft has been sunk to a depth of 40 feet, and the bottom of each is in good ore. Assays return from \$94 to \$227 per ton in gold. At one point a tunnel was run on the ledge for 90 feet, and the showing is reported as most satisfactory. This section has been known as long as any mining has been done in the state; but no one ever went beyond the hard top rock, as it was so tough and difficult to handle. In these workings, after the first 15 feet had been passed, the formation changed and mining became much easier. There has always been mineral in sight in this ledge, but no one has ever gone far enough into the rock to determine the amount of gold in it. Mr. Loss himself had a claim on a part of his present find in 1876, but abandoned it long ago. His claims cover something in excess of 7,000 feet, and arrangements are on foot to develop the property with the least possible delay.

CENTRAL SILVER MINING COMPANY.—This company, according to report, has so far arranged its financial difficulties as to be able to resume work within the next two or three months.

#### YAVAPAI COUNTY.

CATCTIN SILVER MINING COMPANY, LIMITED.—The development work on this property continues. Superintendent J. G. Marx reports that the ore body is constantly increasing in width as depth is made. It is the intention of the owners to prospect the property thoroughly and if prospects will warrant it a mill will be erected. A carload of high-grade ore has been shipped, and another carload is already on the dump ready for shipment.

#### CALIFORNIA.

##### AMADOR COUNTY.

BELL WETHER.—Development on this property within half a mile of Jackson is being prosecuted with vigor. The shaft is being put down in the ledge, and as there is considerable water to contend with not more than a foot a day is made. The ore in its general appearance resembles the Zeile rock, and the workings are doubtless on a continuation of the same ledge. The shaft is now down between 50 and 60 feet. Mr. Bright, the owner, intends to have a test crushing of 300 or 400 tons made shortly. The claim embraces 2,000 feet along the lode. Prospect shafts and tunnels have been made at different points.

HARDENBURGH.—The lower levels and stopes of this mine are said to be looking well. The results of a test crushing of 100 tons of rock at the Amador mill were so good that the owners are erecting a 20-stamp mill, which is now well under way. They have at present a large quantity of rock in sight, and are now running a new level at the 400-foot level in a vein of fine-looking quartz.

KENNEDY MILLING AND MINING COMPANY.—The north shaft has reached a depth of 1,350 feet.

and is now 100 feet deeper than the main shaft. After opening the stations the south shaft will be sunk to the same level. The water, which was found to be so troublesome in sinking, ceased below the 1,250 level, and the last 100 feet is comparatively dry. A tank which has been put in catches most of the water at the 1,250 level, and thus saves a lift of 100 feet. The mine continues to yield good gold ore, and holds the place of the largest gold producer in the county.

**LINCOLN MINING COMPANY.**—This company has ceased operations on account of large caves in its ground caused by the heavy rains.

**NORTH STAR MINING COMPANY.**—The bond on this property expires in June, but having expended nearly \$50,000 in search of mineral the company is loath to abandon the enterprise. The discovery of bunches of rich quartz has at different times encouraged further prospecting, but without any definite results. It is likely that an extension of the bond will be asked for, and the company will be reorganized.

#### CALAVERAS COUNTY.

**SANDY BAR GOLD MINING COMPANY.**—This property consists of eleven claims on the Mokelumne River, about two and a half miles northwest of Mokelumne Hill. The mines are being actively developed by tunnel system with tramways to convey rock from the various leads to the 10 stamp mill located centrally at the mouth of Buckeye Gulch. This company has recently secured control of the famous Boston mine, and roads and tramways are being constructed for transporting the ore to the Sandy Bar mill; the Boston 20-stamp mill will be moved to the latter mill site, where the 30 stamps will be run by water power from the Mokelumne River. All these ledges are large, and even low-grade rock will pay well, as it can be milled and mined at a cost of less than \$1 per ton.

#### NEVADA COUNTY.

**DELHI.**—This mine, which is owned principally by R. McMurray of North San Juan, is located between the last-named place and Columbia Hill. Recently a rich strike is reported to have been made at a greater depth than the mine has heretofore been worked. A year or more ago the pay chute in the lowest level was worked out, when a new tunnel was started 330 feet below the lowest tunnel, and near the bed of the river. This tunnel reached the ledge recently, the pay chute of the vein was struck, and the quartz continues of about the same character as in the upper workings. The new level is high enough to give sufficient fall for dumping-ground and all the necessary structures pertaining to the mill between it and the river. At the present time the mill is near the top of the hill, and all the ore taken from the mine has to be raised up to it by means of a tramway, which is driven by water power. The works will be moved to a point below the new tunnel, and the expense of hoisting the ores will thus be saved. The Delhi ore has been high-grade, the average yield having been \$29.75 per ton, while the sulphurets have gone as high as \$800 per ton. The quartz is easily mined and reduced at a cost for mining and milling of about \$2.50 per ton. The mine has paid large dividends in the past, and when everything is in shape it is not unlikely that these dividends may be resumed.

SAN FRANCISCO, April 23.

(From our Special Correspondent.)

**IDAHO MINING COMPANY.**—The new ore body recently found on the 18th level gives every indication of developing into a very valuable find. The quartz carries free gold and high-grade sulphurets. The vein is not yet strong, averaging from 10 to 12 inches but widening as it goes east.

#### PLUMAS COUNTY.

**FEATHER RIVER MINING COMPANY.**—This company's 40-stamp mill, which is situated about eight miles east of Prattsville, will be operated during the coming summer to its full capacity. The mill was completed a year ago, and considerable development work has been done in the mine. So far as prospected, the rock is said to be satisfactory, and a large force will be put to work as soon as the roads are well opened.

**SIERRA BUTTE GOLD MINING COMPANY, LIMITED.**—The forty second general meeting of this company was held in London on the 16th inst. The directors stated in their report that the Sierra Butte mine must now be considered worked out. As regards the Eureka mine the amount of ore milled during the past six months was 27,628 tons, which was about the same amount as in the six months preceding, but the average grade of the ore was only \$4.92, against \$6.80, the average of the three years preceding, the cause of the falling off being the exhaustion of the rich Tregona ore chute. The Uncle Sam mine, a comparatively recent acquisition of the company, had produced from February, 1889, when milling was commenced, to December, 1890, 14,651 tons of ore, yielding an average of \$9.74 per ton, from which the profit had been £10,214. The cost of mining and milling had been materially reduced during the past year, and for the last six months 6,056 tons of ore had been

mined and milled at a cost of about \$4.85 per ton. The profits from the Uncle Sam had all been put in the development of the property. A 20-stamp mill had been built, and it is now to be increased by 10 stamps, and chlorination works are also to be erected. A dividend of 15s., amounting to \$35,150, was paid on Plumas Eureka shares, and 6d or \$15,310, on Sierra Butte. The Plumas Eureka, after paying this dividend, which makes its total to date \$458,785, had a cash balance of £43,600 in the treasury. Including the dividends paid by the Sierra Butte company, and the cash in its treasury, the two companies have yielded their shareholders to date £365,000, in round numbers.

#### SAN BERNARDINO COUNTY.

**SILVER KING MINING COMPANY, LIMITED.**—This company has been organized in London with a capital of £400,000 in 400,000 shares of £1 each, to purchase of John S. Doe, of San Francisco, the Garfield-Occidental and Oriental groups of mines, located near Daggett's Station in this county. The purchase price is £350,000, of which £30,000 is cash, £133,333 in fully paid shares, and the balance in cash or shares, at the option of the directors. A working capital of £50,000 is provided. According to the prospectus these mines were located in 1882; a 15-stamp mill was erected in October, 1883, and between that date and October, 1889, a production of 35,479 tons of ore, yielding 909,630 ounces of silver hulsion, was made. The average cost of mining, milling and transportation is stated to have averaged about \$9 per ton. The mill has been enlarged to 20 stamps, and is now crushing from 1,500 to 2,000 tons of ore per month.

(From our Special Correspondent.)

**SAN JACINTO ESTATE, LIMITED.**—The prospects of this company now appear very bright indeed. Recent developments in the Cajalco mine are of a most promising character. The lowest level is now opened up for a distance of 400 feet and shows a continuous vein at a depth from the surface varying between 100 and 150 feet. Some of the best ore has been obtained in the lowest working. New and quite encouraging prospects have also been discovered in the vicinity of the Cajalco mine. The 5-stamp mill is running regularly, crushing from 8 to 10 tons of ore per day, which is said to average over 10% cassiterite, and the company is now regularly producing pig tin. Grading has already been commenced at the site of the new mill, two miles from the mine.

#### SIERRA COUNTY.

(From our Special Correspondent.)

**BALD MOUNTAIN EXTENSION DRIFT GRAVEL MINING COMPANY.**—The sluices have just been cleaned up after washing the first gravel taken from the new tunnel, and the average has been \$3 per car load. The tunnel has been run nearly 200 feet but has not reached the western rim of the channel. This find has been so encouraging that new developments along the ridge are being contemplated.

#### COLORADO.

##### BOULDER COUNTY.

**ALAMOSA.**—Rich ore is reported to have been struck in the upper levels of this mine. The property is said to have been sold recently, in London, for \$200,000.

**COLUMBIA MINING COMPANY.**—A cross-cut from the bottom of the shaft, recently sunk to a depth of 300 feet, has cut a body of ore said to be of excellent grade. The company will start its own mill of 20 stamps at once, and will also run 40 stamps of the Boston mill. The Columbia property is located at Ward, on the same vein as the Ni-Wot, Madeleine, Boston and Utica mines.

##### CHAFEE COUNTY.

**TWIN LAKES HYDRAULIC GOLD MINING COMPANY.**—This company is making preparations to begin the season's work. Numerous improvements are to be made during the coming summer as regards the water supply for the placer and disposition of tailings.

##### CLEAR CREEK COUNTY.

**COLORADO SILVER MINING COMPANY, LIMITED.**—At the annual meeting of this company held on the 16th inst. the directors reported that the mines had produced during the year preceding ore valued at about \$75,000; the miners had received \$56,000 of this. The property being worked under the tribute system, and the company's balance was about \$19,000. Development work to the amount of 1,972 feet had been done during the year. The prospects of the company were considered good, an important strike of rich ore having been made in the 8th level of the Terrible mine. The liabilities of the old company, £1,933 in the last balance sheet, have been reduced to £407, and the balance of £1,083 to the debit of profit and loss has been reduced to £424.

##### CUSTER COUNTY.

**GEYSER MINING AND MILLING COMPANY.**—This company is still sinking its shaft, which has now reached a depth of over 1,200 feet,

#### EAGLE COUNTY.

**ADELAIDE.**—It is reported that a body of pay ore seven feet thick has recently been exposed in this property, located at Nolan, the new camp on Brush creek, and that ore shipments will be commenced as soon as the wagon road to the camp is finished. This mine was purchased about a month ago by a party of Aspen men for \$40,000. The ore deposits at Nolan continue to excite much attention, and there is promise that much exploration work will be done in the district during the coming season.

#### GILPIN COUNTY.

**GETTYSBURG MINING COMPANY.**—This company, whose capital is \$300,000, in shares of \$1 each, has listed its shares on the Denver Exchange and offers 50,000 shares of treasury stock at 20 cents. The mine is located upon Bates Hill, Central City, and is opened to a depth of 400 feet. According to the prospectus of the company, the vein is said to be from two to six feet in width, producing milling ore assaying from 3 to 20 ounces gold per cord, and smelting ore running from \$35 to \$100 per ton. The mine is said to have produced \$100,000, and now to be paying expenses with seven men at work. The proceeds of the treasury stock are to be used in developing the vein more extensively.

#### LAKE COUNTY.

**ELK MINING COMPANY.**—This company is shipping from 100 to 120 tons of ore per day; recent shipments have shown somewhat of an increase in the silver content of the ore, but it is still of comparatively low grade, however. A large amount of development work is being done in the property.

**NEW LA PLATA MINING AND SMELTING COMPANY.**—The directors of this company have decided to undertake the working of a new mine, the White Cloud, in the Red Mountain district, Ouray county, and are now proceeding with preliminaries toward carrying out this project. The majority of stockholders have expressed approval of the scheme, only about 10,000 not having acquiesced. The directors state that the amount required for the development work is well within the resources of the company, and that no new or additional liability is laid upon the shareholders. The undertaking of the new work will not be allowed to interfere with the present operations at Leadville, and the profits which have been and are accruing from that source will be kept intact for division among the shareholders. The La Plata mines, which are being worked by lessees, are now yielding the company a profit of about \$1,200 a month.

#### LA PLATA COUNTY.

Messrs. Duyckinck & Keith, of Silverton, are said to be contemplating the erection of sampling works of 250 tons daily capacity at Durango.

#### OURAY COUNTY.

**MINE OWNER'S TRUST, LIMITED.**—A cable dispatch has been received at the London office of this company, stating that a good body of ore has been struck in the Colorado Boy mine.

**NEW GUSTON COMPANY, LIMITED.**—At a meeting of the shareholders of this company, in London, on the 15th ult., it was stated by the chairman of the Board of Directors that the issue of 10,000 additional shares of £1 each, for the purpose of acquiring adjoining property, authorized in March, 1890, had been sold for 43s. each. The Little Annie and Smuggler mines were bought for £15,000. During the year the Smuggler alone yielded 1,600 tons of ore, from which £63,000 had been realized. The company had to the credit of its capital account £25,346, to the credit of its revenue account about £13,000, and ore at the mine valued at about £21,000, after paying the interim dividend of £22,000 for the first quarter of 1891.

**TEMPEST.**—A vein parallel to the Tempest vein has been discovered in this property, and a streak of ore, one foot in width, assaying 240 ounces silver per ton and 60% lead, has been exposed. The Tempest is owned by a Louisville syndicate, and is being operated under the management of Mr. L. A. Dunham, of Ouray.

#### PITKIN COUNTY.

**LITTLE ANNIE MINING COMPANY.**—An important strike was made in this property, located on Richmond Hill, Aspen, recently, and it now seems that the ore body uncovered is much richer and larger than was at first supposed. The ore chute is said to be 30 feet thick; its length and width undetermined; and the average grade of the ore 100 ounces silver per ton.

#### SAN MIGUEL COUNTY.

**SAN BERNARDO MINES, LIMITED.**—The output of this company during March was about 200 tons of ore. The last shipments made gave an average net return of \$54 per ton, which shows a decided increase in the grade of the ore.

#### SUMMIT COUNTY.

**ROBINSON CONSOLIDATED MINING COMPANY.**—The east shaft of the Robinson mine and territory adjoining has been leased to the Belmont Improvement & Development Company, of Boston,

Mass., which is already unwatering the shaft preparatory to beginning exploration work. Mr. C. P. Schumacher, of the Dunkin Mining Company, is manager of the Belmont Company, and Lawrence Cronin, of the Robinson, is in charge of the mine work.

(From our Special Correspondent.)

**SELMA CONSOLIDATED MINING COMPANY.**—This company, operating at Kokomo, is extending its developments as rapidly as possible under the incentive of better paying ore, which increases in value as the work progresses. The tunnel is being driven forward at the rate of about 50 to 200 feet per month. To increase the speed, air compressors have recently been added, and other plant betterments are being completed as rapidly as possible. The erection of a mill to dress the low-grade ores is under consideration.

#### FLORIDA.

**PIEDMONT WEST VIRGINIA COKE AND PHOSPHATE COMPANY.**—This company has been chartered by the state of West Virginia with a capital stock of \$1,000,000 for the purpose of developing and operating extensive phosphate tracts near Trenton and Albion, Fla.

#### MARION COUNTY.

(From our Special Correspondent.)

**STANDARD PHOSPHATE MINING COMPANY.**—This company has been incorporated at Alexandria, Va., with a capital stock of \$50,000. The officers are: A. H. Agnew, president; Lewis McKenzie, vice-president, and J. R. Caton, secretary. The company will develop phosphate mines in this county.

#### GEORGIA.

##### SUMPTER COUNTY.

(From our Special Correspondent.)

**HAND MINING COMPANY.**—This company is extending its operations. Concentrators and other machinery to increase the output of the works are now being put up.

#### IDAHO.

##### CUSTER COUNTY.

**BADGER.**—A. M. Essler, part owner of this property, reports that the tunnel which it is intended to drive 1,000 feet into the mountain side, has now passed the 600-foot mark. The face of the tunnel when completed will be 900 feet below the surface vertically. The daily out-put of the mine is now 200 tons, it having been more than quadrupled during the last two years, while over \$150,000 has been distributed among the owners. High grade concentrates is now being shipped to the smelters at Helena and Butte.

##### OWYHEE COUNTY.

**TRADE DOLLAR.**—There are two levels run in on the ledge in this property. The starting points are only about 200 feet apart, but one is 70 feet lower on the vein than the other. The upper tunnel is now in about 370 feet, and work has had to be suspended for want of timbers. A chimney of ore about 70 feet long has been cut, but seems to have pinched out about 60 feet from the present face. This chimney is now being stoped, and in one place the miners are up some 30 feet. The ledge is nearly two feet wide and contains from 2 to 10 inches of rich white quartz full of brittle silver, which assays from 400 to 1,000 ounces of silver per ton; the average value is said to be very light. One hundred and twenty-five sacks of this ore are now piled up at the mine and probably a car load will be ready for shipment by the time the road is open. Owing to the difficulty of getting supplies to the mine and want of timbers, only two men are working in the stope. The lower tunnel is being driven by contract, and the face is still about 150 feet from a winze, which has been sunk from the upper level. The ledge in the lower tunnel looks quite different from what it is above, and there is a possibility that it may be a different one; the walls are further apart and the ore is much lower grade.

##### SHOSHONE COUNTY.

**ARGENTINE.**—According to O. M. Lonsdale, one of the owners of this mine situated in the Cœur d'Alene district, which has been shut down for two years because of a misunderstanding among the stockholders, it will be open in about six weeks. The work of completing a 400-foot tramway that was destroyed by a snowslide this winter has just been done.

#### ILLINOIS.

Natural gas has been struck six miles southeast of Bloomington at a depth of 120 feet. The pressure of the gas is said to be very great, and, when struck, the drilling tools were hurled out of the hole.

#### INDIANA.

##### COAL.

Advices from Terre Haute announce that 3,000 miners in Indiana quit work yesterday because the wage scale for the year beginning May 1 had not been signed.

#### KANSAS.

A special report shows that during the week ending April 25th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,435,240; zinc ore, pounds sold, 733,710; lead ore, pounds sold, 45,510; sales aggregated a total value of \$9,430.

#### MARYLAND.

**CUMBERLAND COAL COMPANY.**—A special meeting of the stockholders of this company was held recently in Baltimore. The capital stock was increased from \$30,000 to \$60,000, the increase was subscribed for by the existing holders pro rata. The company recently leased a tract of 1,500 acres of valuable coal land near Coketon, Tucker county, W. Va., on the line of the West Virginia Central & Pittsburg Railway. Work is now being pushed rapidly forward toward opening up the Douglas mine. It is the intention of the company to erect shortly thirty-six coke ovens, and increase this number as rapidly as possible.

#### MICHIGAN.

For some months the Northern Pacific has had an expert examining the country around Grand Rapids, Mich., it is said, and has made a careful and thorough search into the iron, agricultural and timber resources of the region, and his report has decided the company to build a line of road from Aitken to Grand Rapids. Choppers are already said to be out clearing the way. It is also reported that this expert has been endeavoring to make contracts with some of the iron companies exploring in that section, and has stated to the Itasca Iron Company that the Northern Pacific would be able to contract to carry ore to Duluth docks or to rail connections by November 1st.

#### COPPER.

**QUINCY MINING COMPANY.**—The hearing on the Alfred Marcus petition for the reopening of the Pewabic mine here was finally had on the 27th ult., and resulted in its denial. This practically puts a quietus on this end of the litigation, although it is said that Mr. Marcus will appeal to a higher court. The appeal from the original decision of the court will doubtless be pushed.

#### IRON—MARQUETTE RANGE.

**JACKSON MINING COMPANY.**—There are about 50,000 tons in stock at this company's mine, an amount equal to that at a corresponding period last year. At No. 7, where the cave-in occurred several months ago, mining operations have been resumed. The first shipment was made last week. At the time no sales had been made. The south Jackson is idle. A resumption of operations at this point will depend upon the ore market. It is said that changes in fuel consumption are soon to be made which will save the company about \$300 per month.

**REPUBLIC MINING COMPANY.**—The Ishpeming Iron Ore states that this is the only company of the Lake region which has made a large sale of ore for the season's delivery. The price received is \$1 under that of last year. It is stated the ore is in great demand as a flux, hence the sale.

(From Our Special Correspondent.)

**EAST NEW YORK IRON COMPANY.**—The new ore body, revealed by the diamond drill and previously mentioned in these columns, has since been well opened and its extent approximately determined. It lies in a trough of the formation, is triangular in form, about 52 feet wide under the capping, and 50 feet high; its length, estimated on a horizontal plane, is 125 feet. Raises have been opened into the lense and these will be connected by sub-levels, the deposit to be mined from the top downward, bringing the capping along and running the ore down the raises and loading into the mine cars on the 200-foot level. A drift west on the 150-foot level is expected to open up the deposit west of the shaft. Steps have been taken to reorganize the company under the laws of Michigan, the present charter being based on the laws of Wisconsin.

#### MEMORINEE RANGE.

**LUMBERMAN'S MINING COMPANY.**—At the Ludington mine the new footwall shaft is nearly down to the tenth level, and the cage way in the east end is being made ready. A double-decked cage will be used for timber and for lowering and hoisting men. In the two other compartments skips will be used. As the ore from the eleventh and twelfth levels is now sent down to the thirteenth level of "A" shaft and hoisted from there, this new shaft will be pushed to those levels to make it available for part of this season's output. About 500 tons is the daily output. The shipping season opened last week, and the ore is now being sent to Gladstone. The Worthington pump which was stationed at the 925 foot level at No. 1 shaft has been brought to the surface. It is said that an electric pump is to take its place. A system of electric signals is being placed in the mine.

**PEWABIC MINING COMPANY.**—About 300 men are now employed at this company's mine. The stock pile contains about 24,000 tons, and the daily

average of ore hoisted is 250 tons. A start has been made to open up the third level. The drifters have about 50 feet to go before reaching the ore body, making a total distance of 600 feet from the shaft. Operations are retarded by an excessive amount of water. A good-sized shafthouse is being erected on the property. An air compressor and new hoisting engines have been added to the equipment.

#### GOLD.

**MICHIGAN GOLD MINING COMPANY.**—A second find of rich gold-bearing quartz is reported to have been made in the twelfth level of this mine. A 30-foot boring to the south was made from a point 100 feet east of the shaft, by which a quartz vein three feet thick was penetrated. It lies near the country rock, and is separated therefrom by a few inches of slate. In this vein a string of quartz a few inches wide assays \$264.34 to the ton. The thirteenth level is being opened by a drift started east. The mine is 675 feet deep. The mill is said to be doing good work.

#### MINNESOTA.

##### IRON—VERMILION RANGE.

The ore trains have begun to move into Two Harbors, at the rate of 2,800 tons daily. Mr. M. F. Hannon, superintendent of the docks, states that he expects to ship as large an amount of ore as was shipped in 1890. The docks have a capacity for 40,000 tons. The Vermilion Iron Journal says that at the close of work last week the Minnesota Iron Company had 203,662 tons of ore in stock, over 80,000 tons of which is the product of No. 5 shaft, at present the most productive portion of the mine.

#### MISSOURI.

##### JASPER COUNTY.

(From our Special Correspondent.)

##### JOPLIN, April 27th.

There was a large output of ore, but owing to the low prices offered by buyers, sales did not exceed the average amount. The ruling price for zinc ore was \$22 per ton; lead ruled at \$23 per thousand. Following are the sales from the different camps:

Joplin mines, 1,577,850 pounds zinc ore and 160,490 lead; value, \$21,048.

Webb City mines, 632,320 pounds zinc ore and 46,700 lead; value, \$8,029.10.

Carterville mines, 1,669,950 pounds zinc ore and 60,400 lead; value, \$19,759.20.

Zincite mines, 235,490 pounds zinc ore and 2,290 lead; value, \$2,658.95.

Lehigh mines, 332,000 pounds zinc ore; value, \$3,984.

Oronogo mines, 78,840 pounds zinc ore and 7,160 lead; value, \$1,033.

Galena, Kan., mines, 733,710 pounds zinc ore and 45,510 lead; value, \$8,430.

District, total value, \$65,042.25.

Aurora, Lawrence Co., mines, 600,000 pounds silicate of zinc and 200,000 lead; value, \$8,200.

Lead and zinc belts, total value, as far as reported, \$73,242.25.

Pittsburg and Wier City, Kan., spelter output: R. Lanyon & Co., 188,000 pounds; S. H. Lanyon & Bro., 91,800 pounds; W. & J. Lanyon, 91,600 pounds; Granby M. & S. Co., 91,700; Wier City Zinc Co., 160,000; total, 623,100. Coal output for same week, 998 cars, aggregating 19,960 tons.

The new machinery at the Astor mine is running almost to perfection. This mine has one of the largest concentrating plants in the Joplin district and everything is fitted up according to the best modern practice—underground developments in this mine are kept well ahead and there are large ore bodies now opened. The output of the mine last week was 130,160 pounds zinc ore.

The Mittleberg Lead & Zinc Company, operating on the Oswego land, is proving to be a veritable bonanza to its stockholders, and last week produced 104,170 pounds of clean zinc ore and 9,430 pounds crush rock. This property is entirely owned by St. Louis parties.

The Crescent Mining Company, on the Porter land, within the city limits on the east, is now running steady and producing at the rate of 30,000 pounds zinc ore per week.

Lea Taylor, one of the pioneer mine operators of Joplin, has been doing some prospecting and development on the Kirk land, six miles southeast of Joplin, and last Friday opened up a fine body of ore.

#### NEWTON COUNTY.

(From our Special Correspondent.)

##### SENECA, April 27th.

The concentrating mill of the Seneca Lead & Zinc Company, that has just been completed on the Huber land at an expense of \$10,000, has now started, and for the past few days has been turning out a fine grade of zinc ore.

The Potwin and Holmes mines are still keeping up a steady output, and several new tracts of land are being prospected with favorable indications of opening up producing mines. Seneca promises to come to the front as a steady producing lead and zinc mining camp.

## MONTANA.

## BEAVERHEAD COUNTY.

**GOLDEN LEAF MINING COMPANY.**—This property had been closed down for some time, but was opened anew last September under the management of J. Henry Longmaid. The mill was started on the first of November, but was not running satisfactorily until the end of that month. One of the principal drawbacks here is the scarcity of water. By digging drains and using a pump to force the water to the mill, however, this difficulty has been at last partially remedied. The entire working force consists of 60 men. An average of 4,000 tons of ore has been crushed monthly. With plenty of water the manager hopes to be able to crush 5,000 tons a month in the future. The ore is very low grade, and the tailings carry considerable silver and lead. During November the ore averaged \$2.80 a ton, and the tailings carried \$1.10 a ton, leaving only \$1.70 to pay for mining and other expenses, which amounted to \$8,900 for the month. In December the ore was of a better grade, averaging \$3.70 a ton, \$1.20 of which was lost in the tailings, leaving a net product of \$2.50 a ton. The expenses for December were \$7,100. In January, owing to shortage of water (now remedied), only 3,500 tons were crushed, producing \$11,100, or \$3.20 per ton, at a cost of \$7,500, or \$2.15 per ton, exclusive of \$2,500, cost of development. The mine is worked by the most approved machinery, air drills are used wherever practicable, and there are electric lights throughout the mine. A tramway connects the mine and mill, over which the ore is carried in cars holding about five tons.

**JAY HAWK MINING COMPANY, LIMITED.**—Capt. H. Pridcaux, general manager of this company, in an interview with reference to the condition of the property and operations during the last four months said that the main shaft was timbered 300 feet and sunk 150 feet; cross-cuts had been driven 175 feet; drifts on the vein, 60 feet; raise, 40 feet; two stations had been cut and secured with heavy timber. The vein has lately been found in one of the lower levels and a cross-cut of 15 feet has been driven without reaching the foot wall. Three feet of pay ore was encountered in cross-cutting, but the captain is of the opinion that the richer ore lies against the foot wall. Preparations are being made to begin work on the Bonanza mine, another property belonging to this company.

## DEER LODGE COUNTY.

**BLUE-EYED NELLIE.**—This famous mine, situated on Warm Spring Creek, six miles south of Anaconda, has been a typical poor man's mine, and it is doubtful if any mine in Montana has given so great net return for the amount invested as this. Mr. F. G. Brown is the lucky owner. The ore is a lead-carbonate, averaging 60 ounces silver and 45% lead per ton. The ore chute is in white lime, and the ore occurs in pockets or a series of chambers one above the other, with a connecting stringer of ore between, so that the ore body is never lost entirely. This property is being worked at a depth of 400 feet, and is perfectly dry, not furnishing water sufficient to run a 60-horse power boiler. The shaft house is situated about 2,000 feet above the valley of Warm Spring Creek. The ore is hauled by a surface tramway extending down the hill half a mile where the ore houses are located. Heretofore this ore has been shipped to Denver for treatment, but it will be treated at the mine hereafter, Mr. Brown having built a 40-ton furnace for that purpose.

## JEFFERSON COUNTY.

**HATTIE BELL.**—The Cabbage Brothers have been prospecting for a good many years in the vicinity of Woodville without any good results. Recently a rich strike was made in the Fredericksburg, and now the same body has been uncovered in the Hattie Bell, the adjoining claim.

## LEWIS AND CLARKE COUNTY.

**UNITED SMELTING AND REFINING COMPANY.**—The third stack at the East Helena smelter has been blown in and the plant is now running to its full capacity, treating approximately 270 tons of ore per day. The men employed get wages ranging from \$2 to \$3. Dumpmen get \$2 for a 10-hour shift; potpullers, \$2.50; feeders, \$2.50; weighers, \$2.75; roasters, \$2.50; furnacemen, \$3; foremen, \$5, and master mechanics, \$4.50. It is announced that the company will build eight calciners at once. This will do away with outside roasting. Other improvements and additions to the plant are also in contemplation.

## MEAGHER COUNTY.

**GRASSHOPPER.**—Work is to be resumed in this property, located between White Sulphur Springs and Castle, soon. The mine is now opened to a depth of 160 feet, and a body of high-grade ore is said to have been exposed in the lower level.

## MISSOULA COUNTY.

**EL DORADO MINING COMPANY.**—At a recent meeting of the directors of this company the following officers were elected: President, E. M. Tower; vice-president and treasurer, M. E. Rutherford; secretary, H. Bernard; general superin-

tendent, August Herzog. Among other important matters discussed was the proposition to sink a shaft 200 or 300 feet. As previously stated in the *ENGINEERING AND MINING JOURNAL* January 17th, 1891, the property of the company consists of what was formerly two claims, the Blue Dick and William Tell, which are so located as to cross each other. At the 150-foot level in the King and Queen claims adjoining a crosscut was run through eight feet of solid ore. The owners then drifted on the ledge and laid it bare for 100 feet. At the 300 foot level a crosscut was run through 14 feet of solid ore that assays from 35 to 60 ounces of silver and well up in lead. The direction of these veins is east and slightly north. They have been struck in the O. R. & N. at a point which makes it certain that they continue through the Eldorado property. In the Keystone a two-foot ledge was struck. The same vein has also been discovered in the O. R. & N. and across the creek in the Eureka, where they have found six feet of ledge matter, of which half is ore which appears rich in gray copper, galena and silver and lead carbonates, but has not yet been assayed. It is generally supposed that the Keystone and King and Queen veins intersect in the Eldorado, and at what is believed to be the point of intersection the company will most probably sink its shaft.

## PARK COUNTY.

**RED LODGE.**—It is reported that these coal mines are being operated successfully, considering the limitations under which work must be done. About 350 men are employed under ground and when paid by the day receive \$3. Most of the work is done by contract, however, at from 90 cents to \$1 per ton. The men are not regularly employed, as the company can not get the cars necessary for transporting their output, and are frequently required to shut down in order to get rid of the stock on hand.

## SILVER BOW COUNTY.

**BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.**—During the past week this company retired 21 bonds of the second issue, under the operation of the sinking fund, leaving 453 outstanding. A published statement shows the bonds now outstanding to be:

First-mortgage 7% bonds, first issue, dated August 1st, 1887.....	\$1,000,000
Reduced by sinking fund to date by.....	225,000
Outstanding and subject to interest 1891, less reduction of next July, say about \$47,000.....	\$775,000
First-mortgage 7% bonds, second issue, dated February 1st, 1890.....	\$500,000
Reduced by sinking fund to date by.....	47,000
Outstanding and subject to interest.....	\$453,000
The fixed charges of the company now figure approximately as follows:	
Per annum.	
Seven per cent. on \$775,000 bonds.....	\$54,250
Seven per cent. on \$453,000 bonds.....	31,710
Sinking fund, first issue.....	100,000
Sinking fund, second issue.....	50,000
Total.....	\$235,960
Dividends, \$1 per quarter, \$1 per year.....	500,000
Total to be earned net per annum on present basis.....	\$735,960

Suit was recently brought against this company for \$20,000 damages. It is claimed by the estate of John O'Connor, who was killed in a boiler explosion at the Colusa smelter, that the casualty was due to carelessness of the defendant. The sum of \$20,000 is asked for the widow and one child.

**BLUE BIRD MINING COMPANY, LIMITED.**—Two suits growing out of the dispute over the Little Darling quartz lode claim in the Independence district were dismissed as settled in Judge McHatten's court recently. One was an action entitled "The Blue Bird Mining Company, Limited, against James A. Murray and others, for damages," and in the other, which was also for damages, the relative positions of the parties were reversed.

(From our Special Correspondent.)

**LATE ACQUISITION.**—A two-foot body of galena and lead carbonate ore, averaging 50% lead, 27 ounces silver, and \$8 gold per ton has been exposed by leasers in this mine. The indications are that this will prove quite an extensive chute, it having been opened up in several places, making a lengthy and continuous showing. Butte has never been considered a lead camp, and the smelters here will not pay for the lead, not being fixed to save it. The K. C. S. & R. Co., of Kansas City, Mo., has contracted for the output of this mine, and the leasers will commence shipping at once. Several other mines in the vicinity are producing a quantity of argentiferous galena ores, notably the West Gray Rock, Moscow, and Pacific mines.

## NEVADA.

## ELKO COUNTY.

(From our Special Correspondent.)

## SAN FRANCISCO, April 23.

The Union Mill at Tusearora will start up on the 27th inst, the roads now being sufficiently clear of snow to allow the hauling of ore.

**NAVAJO MINING COMPANY.**—The stopes at the 350-foot level are improving, and while the vein is small the ore is of an unusually high grade.

**NORTH BELLE ISLE MINING COMPANY.**—The last crosscut from the North drift, on the 400 level, shows three feet of ore in the face, 10 inches of which is very high grade. Last week 90 cars of first-class and 73 cars of second-class ore were taken out.

**NORTH COMMONWEALTH MINING COMPANY.**—Raise No. 3 from the south drift is up 30 feet, and has cut the vein 65 feet south of the stopes, exposing good ore. Three cars of first-class ore extracted last week averaged \$256 per ton, and 45 cars of second-class ore averaged from car samples \$20 to \$70 per ton.

## ESMERALDA COUNTY.

**HOLMES SILVER MINING COMPANY.**—The company has recently established a library and reading room for the miners in its employ. The mine is producing about the usual amount of ore. The average battery assay for the past week was 37 ounces silver. The leaching works were engaged during a portion of last week on roasted ore from the mill. No clean up has yet been made, but it is anticipated that results will be satisfactory.

## EUREKA COUNTY.

**CORTEZ MINES, LIMITED.**—The production of the mines of this company in March was 52,272 ounces silver; expenses amounted to \$15,500. There were 787 tons of ore crushed and \$2,735 spent in development work.

## STOREY COUNTY—COMSTOCK LODE.

(From our Special Correspondent.)

The amount of ore milled for Comstock mines during the past week, with battery assays, was as follows:

Mine.	Tons.	Assay value.	
Con. Cal. & Virginia.....	1,375	April 18.	April 11.
Chellat.....	542	\$35.80	\$34.10
Con. Imperial.....	400*	18.02	20.00
Gould & Curry.....	518	23.68	.....
Overman.....	629	14.25	14.77
Savage.....	580	17.59	15.60
Yellow Jacket.....	640*	18.00	18.00

\* Estimated.

**POTOSI SILVER MINING COMPANY.**—Some good-looking quartz has been encountered in the top of the south drift from the 1,300 level station of the incline winze. Superintendent Hamilton is hopeful of developing some ore at this point, as he considers the indications promising.

**SIERRA NEVADA MINING COMPANY.**—Crosscut No. 1, 630 level, is 55 feet in the syenite rock that lies west of what is ordinarily understood as the foot wall of the Comstock lode. According to the *Virginia Enterprise*, there are three distinct outcrops of quartz on Cedar Hill, overlooking this mine. The management of the company proposes to explore the ground for these ledges.

## WHITE PINE COUNTY.

(From our Special Correspondent.)

**OSCEOLA & CUMBERLAND MINING COMPANY.**—This company has been organized to work a group of mines in this county which it has just purchased. Negotiations for the sale had been pending for some time through Messrs. Whitney & Co., of Boston. The Boston syndicate, which is the purchaser, has put up \$30,000 as working capital to be expended on the property, and pays \$20,000 cash and \$30,000 par value of stock of the new company for the property. The cash payment has already been made.

## NORTH CAROLINA.

(From our Special Correspondent.)

The geological survey of this state will be begun in June, in Ashe County, in the extreme north-western part of the state. The United States Geological Survey will begin its work on the new topographical map of the state at the same time and place, the two surveys working together.

## PENNSYLVANIA.

## COAL.

**JEDDO TUNNEL IMPROVEMENT COMPANY.**—In the Luzerne county court, at Wilkesbarre, Charles Williams, of Conyngham Valley, has made application for an injunction to restrain this company from draining the Hazleton region by the great Buck Mountain tunnel now in process of construction. The tunnel, it is calculated, will pour forty millions of gallons of mine water every day into the little Nescopeck Creek. The farmers say the mine water will ruin their crops, and Prof. George A. Koenig, of the University of Pennsylvania, has made an affidavit to that effect. The court granted a temporary injunction.

## SOUTH DAKOTA.

## LAWRENCE COUNTY.

(From our Special Correspondent.)

**BLANQUILLA MINING COMPANY.**—The strike in this property, recently reported in the columns of



the ENGINEERING AND MINING JOURNAL, continues most promising. The vein is six feet in thickness, dipping at an angle of about 30°. This is said to be the first mine in the Black Hills where bromo-chloride of silver is found in quantity, and constitutes the principal value of the ore, although sulphuret and chloride are found associated with it.

**DEADWOOD & DELAWARE SMELTING COMPANY.**—This plant, which until recently has been used as an experimental plant merely, will be dismantled, and another plant, with a capacity of 60 tons per day, it is said, will be erected in its place. Should this report prove true, there will be three smelters in course of construction here this summer.

#### TENNESSEE.

The threatened strike of the coal miners in the Knoxville district has been averted. The men have signed a contract for another year on the same terms as have prevailed for the last five years.

#### ANDERSON COUNTY.

(From our Special Correspondent.)

**EDES, MIXTER & HEALD ZINC COMPANY.**—Mr. Peter Blow, superintendent of this company, states that the mining industry is in a prosperous condition in this region. The Edes, Mixter & Heald Company recently sunk a shaft in the range of hills east of Clinton, but found that the mineral ledge pitched at such an angle that it could be opened and mined more economically by a tunnel. Having run a tunnel and intersected the vein an excellent body of good carbonate ore was found, and is now being opened. This company is turning out a good yield of both lead and zinc from its works. Mr. Blow is of the opinion that the new field opening up in eastern Tennessee promises to be a strong rival to the oldest lead and zinc district of Missouri.

#### UTAH.

##### BEAVER COUNTY.

**HORN SILVER MINING COMPANY.**—A reporter of the ENGINEERING AND MINING JOURNAL obtains from the Eastern office of this company the following summary of operations for the three months ending March 31st: Sales for ore, January, \$19,633.20; February, \$20,166.95; March, \$50,385.88; total, \$90,186.03. To this are to be added receipts from other sources or \$4,052.38. Plus a cash balance of \$269,787.17 on hand January 1st, we have a total of \$364,025.58 on hand April 1st. The disbursements have been as follows: Mining expense, \$33,943.97; general expense in the West, Frisco and Salt Lake City, \$2,202.49; New York office, \$2,970.97; dividend No. 21, \$50,000; total, \$89,177.43. From this it will be seen that the surplus earnings for the three months, after the payment of a 50c. dividend or \$50,000 is \$5,121.93. Of the \$274,908.15 cash on hand, \$2,000, is deposited with the United States Trust Company, \$59,962.17, with the First National Bank, and \$4,936.46 with the Deseret National Bank.

##### JUAB COUNTY.

**CHRISTMAS MINING COMPANY.**—This company has been organized with a capital of \$1,500,000 in 150,000 shares of \$10 each, to operate the Iron Mask, Emma, Annie, Iron Head, Gertie, Iron Pot, Flossy and Genie mines in the Dugway district and the Xmas at Clifton. E. D. Hoge is president, and E. H. Kohler secretary and treasurer of the company.

**EUREKA HILL MINING COMPANY.**—The main shaft has now reached a depth of 1,100 feet, and a station is being cut preparatory to driving a level at that point. The ore bodies opened in the upper levels of the mine are found extending to the lowest workings as strong and as rich as ever. The ore reserves left standing in the mine are very large. This company is now one of the largest dividend-payers of Utah.

**UNDINE.**—A body of ore 2 feet wide, assaying 200 ounces silver, has been struck by a winze from a tunnel driven in this property. The mine produced considerable ore from surface workings several years ago.

##### SALT LAKE COUNTY.

**INLAND SALT COMPANY.**—The capital stock of this company has been purchased by a syndicate of Kansas City capitalists. The price paid is understood to have been \$200,000. The capacity of the works has been doubled. Mr. F. W. Meegan, of Kansas City, becomes manager of the company.

##### SUMMIT COUNTY.

**MASSACHUSETTS MINING COMPANY.**—At a meeting of this company, held in Salt Lake City on the 22d inst., 122,550 of the 150,000 shares being represented, it was voted unanimously to make the stock assessable. An assessment will be levied at once in order to prosecute the work in the mine for which preparations are now being made, the company having no funds in its treasury.

##### WASHINGTON COUNTY.

**DIXIE MINING COMPANY.**—The cross-cut tunnel driven by this company in its property near St.

George, cut the vein of copper ore looked for, at a distance of 350 feet. The ore body, so far as cut, is five feet thick, and the hanging wall has not yet been reached. A lot of ore has already been broken out, and a car load of the first class is to be shipped as a test. The ore is sorted so that the first class will carry above 50% copper, and the second class 33%. The Dixie vein was very large on the surface and this tunnel has cut it at a depth of 300 feet. At the surface there was a band of lead carbonate ore lying above the copper and it is expected that lead ore will be found at this depth in the same position as further progress is made towards the hanging wall.

**ST. GEORGE MILLING AND MINING COMPANY.**—This company, which is operating the Chloride and Copperopolis claims near St. George, is reported to be uncovering some good copper ore in the latter.

#### VIRGINIA.

##### AMHERST COUNTY.

**JAMES RIVER STEEL AND IRON COMPANY.**—This company has been organized at Richmond for the purpose of operating in iron deposits located at Riverville and Stapleton, on the James River. The capital stock is \$100,000 minimum and \$1,000,000 maximum. The incorporators are Gov. McKinney and J. Dillard, of Lynchburg; Edgar Whitehead, of Amherst; George W. Mayo and J. R. McMurdo, of Richmond.

##### WISE COUNTY.

**VIRGINIA COAL AND IRON COMPANY.**—The Louisville & Nashville Railroad will reach the coal openings at Big Stone Gap shortly. This company will then resume work.

#### WASHINGTON.

##### OKANOGAN COUNTY.

(From our Special Correspondent.)

A large amount of capital is being invested in the mines of this section, mostly from California and the East. Pat Kirwin, a well-known Comstock miner, is at present in the county, in the interest of Messrs. Mackay and Fair, investigating mining property.

##### SPOKANE COUNTY.

The Spokane Mining Exchange, of Spokane, Washington, was organized in May, 1890. A call board was established and several prospected mines were listed. Lack of interest in this feature caused the call to be discontinued last November, and the association, which was incorporated with a capital of \$50,000, came near going to pieces. It has now been reorganized on an entirely different basis. A fine exhibit of the ores and minerals from all districts tributary to Spokane has been collected, and tastefully arranged in a room in the Hotel Spokane block, and, in connection with this, a bureau of mining information, under the charge of a thoroughly posted mineralogist, has been established.

##### STEVENS COUNTY.

**EAGLE.**—This property is owned by I. S. Kaufman and C. D. Ide. The main shaft is now down 200 feet and quite a good deal of ore is in sight. The property is now being worked through three incline shafts which will be abandoned as soon as the perpendicular shaft is down 225 feet.

#### WISCONSIN.

##### LAFAYETTE COUNTY.

(From an Occasional Correspondent.)

**WISCONSIN LEAD AND ZINC COMPANY.**—The principal mining operations about Shullshurg in Southern Wisconsin are conducted by the Wisconsin Lead and Zinc Company, of Chicago, which has two mills for crushing and concentrating, the two having a combined capacity of about 100 tons of raw ore per day of 10 hours. This company has a large area of mining ground, from which only the upper deposits of lead ore have been extracted; but sufficient work has been done to show that much remains, and that there are large beds of blende ("jack") below. The lead ore is massive galena, and is generally known as "mineral," while the zinc carbonate resulting from the decomposition of blende is called "bone." These three ores are more or less mixed in with iron pyrites called "sulphur," which is easily separated from the galenite by jigging, but remains with the blende and bone. This "sulphur" has been the bane and trouble of the miners for years, and has discouraged the working of the beds below the horizon of decomposition of the blende and the pyrites. A suitable furnace for roasting the pyrites has long been a desideratum and this want has recently been supplied by Prof. W. P. Blake, who has designed and erected a 16-foot revolving table furnace in which the ore is perfectly roasted without injury to the zinc minerals or to the remnants of lead left in the first rough concentration. The great efficiency and rapid roasting of this furnace are due to the liberal supply of superheated air which sweeps over the surface of the table

and burns out the sulphur of the pyrites. The action of this furnace is automatic. The raw concentrates are fed in at the top, over the center of the table; and by means of rables diagonally fixed, this ore is gradually spread and falls from the center outward from one annular terrace or level to the next below until finally the roasted ore is turned off from the outer edge of the table and falls into an iron car. Patents are now pending to protect the novel and original points of this furnace, which seems to be especially well adapted to this class of ores, and will make much of this heretofore refuse ore available for concentration, for, after roasting, the oxide of iron formed can be separated from the blende by jigging.

#### FOREIGN MINING NEWS.

##### AUSTRALIA.

##### NEW SOUTH WALES.

Cinnabar has been found at Bingara, in this province, and according to preliminary reports of representatives of the mines departments the strike is promising. In one property the lode has been opened to a depth of 30 feet, and at that point is over six feet wide, neither walls having been found. The ore is of good average grade. The lode lies between formations of schist and serpentine.

##### BRITISH COLUMBIA.

(From our Special Correspondent.)

##### HOT SPRINGS DISTRICT.

**DICTATOR.**—After running the tunnel 145 feet the ledge was tapped and found to be 3 feet 6 inches wide. Assay value not yet known.

**NUMBER ONE.**—During the winter a drift has been run on the vein for upward of 100 feet. The vein is 16 inches wide (carbonate ore) and assays from \$65 to \$600. Work is now stopped, owing—so it is said—to a scarcity of candles and other supplies.

**SKYLINE.**—Work has been suspended on the shaft—now down 190 feet—owing to a lack of piping. If the vein be not struck at the 200-foot level a crosscut will be run to the ledge.

**WEST KOOTENAI MINING COMPANY.**—This company has been organized with a capital stock of \$1,000,000, in \$10 shares. President, J. B. Sargent; vice-president, W. H. Lynch; manager, C. M. Parker. It is to work the Thor, Tax, Top and Look-Out claims which are supposed to be located on extension of the Skyline.

##### NELSON DISTRICT.

**DANDY.**—A. M. Esler, of Gem, Idaho, has just purchased a one-eighth interest in this property, and has secured a 12-months' bond of the remaining seven-eighths. One hundred and seventy-five thousand dollars is stated to be the figure, but I have good authority for saying that this is well above the mark. The Dandy is the west extension of the Silver King, and is developed by a 32-foot shaft and a 33-foot tunnel. Mr. Esler intends to sink a shaft on the higher part of the claim and to run a tunnel simultaneously as low down as possible; a depth of 210 feet can be obtained in this way.

**MAUD A.**—A working bond has been secured on this claim, situated on the north side of the Kootenay River, by coast capitalists. The ore is present in quantity, but runs low in gold, silver, copper, and nickel. The bond is for \$7,500; \$500 in development before July 20th, the remainder in cash payments on various dates before the end of September, 1892.

**PIONEER.**—A tunnel has been run in over 20 feet on the ledge, and the vein is now two feet wide, showing free-milling ore and sulphurets running \$15 to \$25 per ton in gold.

**SILVER KING.**—The lower tunnel has made connection with the crosscut at the bottom of the 162-foot winze, and is now being extended easterly towards the Kootenay Bonanza ground. A new crosscut has been started about 40 feet west of the winze, and the latest information is that it is in 24 feet and still in ore. There is no doubt but that the winter's work on this property has exposed a very large quantity of ore, much of which is high grade, \$200 per ton and upwards.

#### CANADA.

##### PROVINCE OF NOVA SCOTIA.

**GARDINER MINING COMPANY.**—This mine, which has been idle for a number of years, is about ready to start operations. Mr. J. T. Burchel, who had previous experience at the Ontario mine, superintended the operations, draining the mine. The pit is now so far free of water, and has been put in such ship-shape condition that hoisting coal for the market was expected to begin during the past week. The coal will be banked. All the coal used for raising steam at the works has been taken from the pit for some time back. The coal

is a first-class article suited for steam or domestic purposes. A pump which was submerged in the mine from the time it was abandoned years ago is now doing good work pumping the water.

#### PROVINCE OF ONTARIO.

The proposed legislation by the government of this province is causing much excitement in the Sudbury district. A deputation of mining men from the district has waited upon Premier Oliver Mowat to protest against the projected law, which, it was argued, was inexpedient, and would greatly injure the mining industry of the province. The principal objection is raised to the proposed royalty on ore mined. It is considered that there is little doubt that the government will carry through this mining law. The only question now is concerning the amount of royalty to be levied. It is said that the government has agreed to forego for the present the proposed tax of 2% on iron ore.

**BADGER SILVER MINING COMPANY.**—It is now nearly a year since Mr. Angus J. McDonnell effected the sale of the Porcupine mine to this company, and the mine, it is said, never looked better than it does to-day. Sinking the shaft from the second level has commenced, and it is now down about 20 feet below the 200, and good ore is being encountered. Work is also being pushed in the No. 3 vein. It is expected that the mill will resume operations in about two weeks, or as soon as water can be obtained. A shipment of 40 barrels of ore was recently made to the Balbach Smelting and Refining Company, Newark, N. J.

**MURRAY.**—Mr. Daw, who has been local manager of this property since last fall for the Vivians of Swansea, England, gave up the position and returned to England a fortnight ago. He was a very energetic manager, and the works at the mine were pushed well toward completion under his charge. The smelter had to be idle part of the winter for want of an adequate supply of water, but it is proposed to bring water from a small lake about a mile from the mine. The Copper Cliff mine and the Dominion mine have to depend on rather small creeks for their water supply. The western end of the range is better watered by the Vermillion River and its numerous tributary streams.

**WEST END SILVER MOUNTAIN.**—Manager H. N. Nicholl is ably assisted in the management of this property by Capt. W. Ramsey. Development is carried on in the east and west drifts from No. 2 shaft, and in the No. 4 or east shaft. Considerable smelting and milling ore is being mined, but the water is again troublesome, and additional machinery is being imported. The average depth of snow in the valley of the West End was far above the average this year. About 40 men are employed about the mine.

#### ENGLAND.

The wages of the miners in the Cleveland mining district of Yorkshire have been reduced five per cent.

A movement has been started, according to reports, to create a trust to control the output of the collieries in Yorkshire, Lancashire, Derbyshire, and Staffordshire. The avowed objects of the new trust are to bring the consumer in direct contact with the producer, and to place the profits on a less fluctuating basis.

#### GERMANY.

It is reported that a discovery of potassium salts has lately been made at Duderstadt. Borings are to be made at once on behalf of a syndicate of Westphalian firms. The first boring will be made on the south side of the Sulberg, at a distance of a quarter of a mile from the city.

#### MEXICO.

##### GUANAJUATO.

**VICTORIA TUNNEL COMPANY.**—The stockholders of this company met at the principal office, 40 Wall street, on the 24th ult., and elected the following officers: E. Green, president; W. B. Schofield, treasurer, and F. B. Bates, secretary. The company has acquired a concession from the Mexican government to drive a tunnel to tap La Luz vein in the district of Guanajuato, for the purpose of draining, exploring and operating the mines, which have been much troubled with water. La Luz vein has been opened by underground works for a distance of several miles, and has produced a large amount of hullion.

##### SAN LUIS POTOSI.

**GUADALCAZAR QUICKSILVER MINING COMPANY.**—Mr. James Mactear, resident engineer at these mines, reports that they have large bodies of ore which can be easily worked, and recommends the immediate erection of two muffle furnaces of 12 tons daily capacity each. The ore worked averages 3% mercury, and he estimates that a production of about 6,500 flasks per annum can be made.

**RAMOS MINING COMPANY.**—Mr. T. S. Kirkland, of Milwaukee, is reported to have purchased from

Señor Pedro Dies Gutiérrez the great mining concession of Ramos, about 120 kilometers north-west of the capital of the State and about 70 kilometers to the east of the city of Zacatecas. The mines at this point were discovered about the year 1804 and were worked until the year 1847 and then not again until about 1798. In 1810 the revolutionists made sad havoc in this flourishing camp. The owner, one De la Rosa, was shot and all the woodwork of the shafts and buildings were burned or destroyed. In 1813 the mines were again started up above the water level and from 1818 to 1826 the Zacatecas mint coined \$767,193 worth of silver that they had produced. It was then that a new company was formed that tried to drain the mine with the rude appliances of that epoch. The workings were finally abandoned, however, about 60 years ago, and have never been touched since. The ores are gray copper, native silver, silver sulphides, horn silver and ruby silver. There is also an extensive deposit of cinnabar. The dumps left by the old workers are very extensive, consisting of the copper ores, which they were not able to work to such advantage as the unmixed silver ores. It is said that the assays from these old dumps show from 19% to 43% of copper, and from 62 to 400 ounces of silver per ton of 2,000 pounds. The company is to be called the Ramos Mining Company of Milwaukee. The zone which has been purchased includes a large number of mines, the principal ones being the San Vicente, San Joaquin, El Muerto, San Juan and La Cocinera. The government, both general and state, have conceded exemption from all taxes for 10 years.

#### ZACATECAS.

**MAZAPIL COPPER COMPANY.**—This company has been registered in London with a capital of £50,000 in shares of £10 each. The object is to buy the Mazapil mines, erect smelting works, etc.

#### NEWFOUNDLAND.

**PYRITES COMPANY, LIMITED.**—This company has been organized with a capital stock of £300,000 to acquire and work the mine of the Standard Pyrite Company, Pilley's Island.

#### PORTUGAL.

**MASON & BARRY, LIMITED.**—The Directors of this company after writing off the had debt incurred by non-payment by the *Société des Métaux*, and, as usual, the sum £37,664, and placing to credit of sinking funds the sum of £22,000, have declared a final dividend of 3s. per share, which, with the interim dividend of 3s. paid in October, makes 3% on the capital of the company for 1890. The balance carried forward was £2,193, against £44,204 last year. The dividends of this company for the past eight years have been as follows: 1883, 12%; 1884, 8%; 1885, 3¼%; 1886, 2¼%; 1887, 5%; 1888, 9%; 1889, 3%.

#### SPAIN.

**THARSIS SULPHUR AND COPPER COMPANY, LIMITED.**—The mineral extracted from the Tharsis mine in 1890 was 268,287 tons, against 296,192 in the previous year; from the Calañas mine, 233,193 tons, against 292,856 in 1889, the total production of both being 502,479 tons, a falling off of 96,509 tons. As accounting for this decrease, it is stated that, in view of the decree of the Spanish Government prohibiting calculation at the mines going in force at the end of 1890, it was considered advisable to restrict the quantity of mineral raised for this purpose. This decree, however, has now been set aside. A further cause of decrease was the temporary interruption to work at the Calañas mine by a fire which occurred in the extraction shafts, whereby the platform and machinery at the pit-head were seriously damaged. The rainfall at Tharsis and Calañas was again very small which, following on the much reduced quantity of water in store at the commencement of the year, has considerably lessened the quantity of copper produced in Spain. The shipments of pyrites in 1890 were 259,414 tons large mineral and 5,783 tons of small—in all, 265,197 tons, an increase of 14,779 tons over the quantity shipped in 1889. There were 4,676 tons of copper precipitate shipped, against 6,024 tons the previous year, a decrease of 1,348 tons. Cardiff Works' operations were interrupted for some months. All repairs and additions having been charged against revenue, and the sum of £7,327 9s. 2d. written off for depreciation, the net profits for the year ended December 31st, 1890, together with the balance of £14,237 1s. 6d. brought forward from 1889, amounted to £27,457 15s. 7d. A dividend of 9s. per share, amounting to £281,250, equal to 22¼% on the paid-up capital of the company, has been declared for the year, a surplus of £16,237 15s. 7d. being carried forward. Following are the rates of dividends paid in former years: 1882, 27¼%; 1883, 27¼%; 1884, 20%; 1885, 10%; 1886, 7¼%; 1887, 10%; 1888, 20%; 1889, 20%.

#### MEETINGS.

Consolidated Imperial Mining Company, at the office of the company, Room 3, Stock Exchange Building, San Francisco, Cal., May 8th, at 11 A. M.

Commonwealth Mining Company, at the office of the company, Room 20, Stock Exchange Building, San Francisco, Cal., May 13th, at 1 P. M.

East Sierra Nevada Mining Company, at the office of the company, No. 310 Pine street, San Francisco, Cal., May 11th, at 11 A. M.

Iron Springs Mining Company, at the office of the company, in New York City, May 6, at 1 P. M.

Scorpion Mining Company, at the office of the company, No. 310 Pine street, San Francisco, Cal., May 11th, at 1 P. M.

Union Consolidated Mining Company, at the office of the company, Room 11, No. 303 California street, San Francisco, Cal., May 25th, at 11 A. M.

#### DIVIDENDS.

Granite Mountain Mining Company, dividend No. 76 of 25 cents per share, 100,000, payable May 11th at the office of the company, Room 128, Laclede Building, St. Louis, Mo.

Mollie Gibson Consolidated Mining and Milling Company, dividend No. 3 of five cents per share, \$50,000, payable May 11th at the office of the company in Colorado Springs, Colo. Transfer books close May 5th and reopen May 11th.

#### ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nt' in office.	Day of sale.	Am'tt per share.
Alpha, Nev.....	6	Mar. 14	Apr. 17	May 7	.25
Andes, Nev.....	37	Apr. 4	May 8	May 28	.30
Big Hole Placer, Ut.....	.....	Mar. 10	Apr. 22	May 12	.01
Chollar, Nev.....	29	Apr. 6	May 12	June 2	.50
Cons. New York, Nev.....	5	Apr. 3	May 8	May 19	.15
Consolidated, Nev.....	6	Feb. 24	Apr. 7	Apr. 29	.10
Guscaran & Cal., C. A.....	4	Mar. 10	Apr. 15	May 4	5.00
Hale & Norcross, Nev.....	99	Mar. 17	Apr. 22	May 14	.50
Kentuckee, Nev.....	1	Mar. 31	May 5	May 26	.20
Mexican, Nev.....	42	Mar. 9	Apr. 14	May 5	.25
Scorpion, Nev.....	2	Apr. 14	May 22	June 15	.10
Teresa, Mex.....	3	Mar. 28	May 1	May 19	.10

#### MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 547 and 548.

New York, Friday Evening, May 1.

The mining stock market has been quiet throughout the week. There is no fault to be found with prices, as they have all been fairly well maintained, but an inactivity, due in a great measure to an indisposition on the part of the eastern public to invest, and a disposition of the western capitalist to place his orders nearer home, have been most characteristic. Holders have shown no anxiety to sell, and as a matter of fact much of the stock which was on the market last November and December is now in hands which have taken it to hold. Present prices will not bring out any great amount of it. The feature of the week was the rise in Comstocks, which is fully noted elsewhere in this report. There have been no indications to warrant the prediction of a particularly lurid future nor of a particularly bright one. The market can be best described as a waiting, indifferent one.

The sales for the week amounted to 47,410 shares, of which 14,500 were dividend-paying. The sales for the corresponding period of last year were 109,250 shares.

Among the securities sold at auction on the Real Estate Exchange this week we note the following: 46 shares of Pennsylvania Coal Company at \$237 per share; 100 shares Central City Gold and Silver Mining Company at 10c. per share; 300 shares of Phoenix Mining Company at 42c. per share.

To give the reader some idea of the amount of business transacted daily by the two Exchanges of the city the following summary of operations is made of last Wednesday's business: The total sales at the New York Stock Exchange were 253,709 listed and 140,000 unlisted shares, and 24,272 ounces silver. At the Consolidated Exchange they amounted to 114,930 shares railway and other stocks, \$66,000 in bonds and 6,300 mining shares, and 16,000 barrels of oil.

Augusta Mining and Investment Company, a statement of whose affairs appeared in the ENGINEERING AND MINING JOURNAL of February 14th, the time at which it made application for listing, was admitted to the Exchange on Thursday. It was started Friday at the quotation of \$15.13, and on a second call was raised to \$15.25; 200 shares changed hands. On a call for the bonds they were placed at 90%.

Of the Comstocks, Belcher, which sold at \$3.20 March 21, disposed of 100 shares on Saturday at \$2.70. Bulwer opened at 38c. and closed at 43c. on light sales against the closing of 40c. April 16. Comstock Tunnel led a very active career, 16,700 shares changing hands at 19c., at 20c. and 21c. It closed strong at 20c. Comstock bonds received a single sale on Wednesday of 2,000 at 36.50%.

Several odd lots of scrip sold at 37% on Monday Consolidated California and Virginia surprised even its most sanguinary friends. It was inactive until Wednesday after closing at \$12.38 the previous week. First sale was made at \$14.75, the stock reacted to \$14.88, and to-day it closed at \$15.50 asked. Its strength is due to sympathy with the San Francisco stock market. Gould & Curry which received a quotation of \$3.30 on April 13th, opened Saturday at \$3.35, sold up to \$3.40 on Tuesday, and has not since been on the market. Hale & Norcross has fallen considerably. It closed last week at \$4.20, entered the market on Tuesday at \$4.25, and declined to and closed on light sales at \$3.45. (Four hundred and twenty shares of Navajo sold at \$3.25, the average quotation. Ophir was quite active on very small sales, from \$7.13 on Monday it fell to and closed at \$7.33 on Wednesday. Savage was quoted at \$3.30 and \$3.40 as against \$2.85 of the previous week. The sales were light. Yellow Jacket sold on Saturday at \$3, a gain of 25c. It was not quoted during the balance of the week. Alta was quite active on small sales. During the fore part of the week it sold at \$1.25; on Wednesday and Thursday at \$1.20, and closed to-day at \$1.15. Best & Belcher from closing last week at \$7.50 reacted to and closed at \$7.38. It reached \$7 during the period under review, and closes strong at our quotations. Chollar received quite a number of small sales at reduced prices. Closing at \$3.65 it opened at \$3.10, dropped to \$2.65, and rallied to and closed at \$2.90. Mexican from the closing last week of \$4.50 opened at \$4.10, rose to \$4.70, and closed at \$4.50. Nevada Queen made its first appearance in the market since Jan. 3, when it sold at 60 cents. A 100-share lot sold on Saturday at 75c. Potosi, from the closing last week of \$4.90, opened at \$4.60 and reacted to \$4.30 on Monday. It has not appeared in the market since that day. Tornado Consolidated, a comparative stranger in the market, sold 500 shares on Saturday at 15 cents. Utah, which was quoted at \$1.25@1.35 last week, opened at \$1.15 and sold on light sales up to \$1.20.

Of the California stocks, Plymouth was inactive at \$2, its usual price. Astoria sold 3,500 shares at 2c. Belmont was remarkably active on small sales, opening at 45c. and closing at 48c., the highest point yet reached. One thousand eight hundred shares were involved in the transaction. Brunswick sold steadily at 10c., the closing price of last week.

As to Colorado stocks, we note considerable activity in Freeland. It sold on Saturday and Monday at 16c.@17c., and then did not again appear on the board. Leadville Consolidated sold at 12c., receiving one quotation of 11c.; 1,200 shares changed hands. Robinson Consolidated, which has been in good demand, during the past three or four weeks, and which has been mostly picked up at prices ranging from 40c.@45c. sold to-day at 53c for a lot of 100 shares. Chrysolite sold 1,300 shares on Saturday and Monday at 25c. as against a price of 24c. the week previous. Ward Consolidated, after a long absence, entered the market on Tuesday and sold at 30c. for 100 shares.

Of the copper stocks we note a sale of 100 shares of Butte & Boston at \$15.85; 100 Huron at \$2.75; 100 Atlantic at \$16.60, and 100 Osceola at \$36.75. These prices are nearly identical with those quoted on the Boston Stock Exchange.

Mutual Smelting and Mining Company sold on Monday and Tuesday at \$1.45 for 300 shares, a gain of about 5c.

Phoenix of Arizona was very quiet. It sold on Tuesday at 48c.@50c., and to-day at 47c., as against 45c.@55c. of the week previous; 300 shares changed hands. Silver King sold on Saturday and to-day at 20c. ex-assessment. It sold three weeks ago with assessment of 20c. cn, at 4c.@5c.

Horn Silver was remarkably active during the week. From a closing of \$3.60 it opened at \$3.65, sold down to \$3.50, closing sale to-day being made at \$3.60, while \$3.70 is now asked. Stormont sold 100 shares on Tuesday at 5c.

Silver Hill of Nevada sold 1,600 shares on Saturday at 35c., as against 32c. of the week previous. Alice received one sale of 100 shares at \$1.60.

A lot of Father de Smet consisting of 200 shares was picked up on Monday at 48c. and 49c., which is to be compared with the quotation of 43c. of last week. It is the highest quotation received for some time.

**Boston.** April 30.  
(From our Special Correspondent.)

The market for copper stocks the past week has shown but little activity and not much variation in prices. There is no disposition to speculate in them, and orders are principally for investment in the dividend-paying mines.

Calumet & Hecla advanced from \$260 to \$265, and is quite steady at that price.

Tamarack also is firm at \$148@150, with sales of about 100 shares.

There was quite a little spurt in Boston & Montana early in the week, which carried the price up to \$43½; but the advance was subsequently lost, and it declined to \$41¼@41½.

Osceola also advanced from \$36 to \$37½, but did not hold the price, receding to \$36¼.

Quincy advanced on the report that the sale of

the Pewabic property had been confirmed, from \$105½ to \$110, with subsequent sales at \$108@108½. Franklin, also, was in better demand, selling up to \$18, a gain of \$1 per share, one-half of which was subsequently lost.

Centennial sold at \$15½ and Kearsarge at \$13½, both lower than last week. The speculation in these two mines seems to have entirely died out.

Butte & Boston sold at \$15½ in a small way. Allouez holds quite steady at \$3¼@3½. National sold at \$3 and Arnold at 75c. Santa Fe sold at 62½@65c. and is fairly strong at these prices. Bonanza declined from 60c. to 55c. In the silver stocks Dunkin is firm at 65c.; Catalpa sold at 25c., and Napa Quicksilver at \$5.

By Telegraph.—Boston and Montana, \$41½ bid. Centennial, \$15½; Tamarack, \$150.

**St. Louis.** April 22.

(From our Special Correspondent.)

The market was not as brisk this last week as usual. Prices ruled slightly lower on nearly all stocks. Elizabeth was the most attractive stock, and there was a fair demand for it during the whole week. Owing to the recently reported strike, the stock opened at quite a high figure, but later the market resumed its old position. The stock was quoted on the opening at \$2.55, but fell off during the day to \$2.37½, and later was bid as low as \$1.97½; a reaction set in, however, and the stock rose to \$2.40, falling back to \$2.32½. The week's sales aggregated 11,100 shares. The stock closes to-day at \$2.30.

Yuma was fairly steady during the week. The market opened at 68¾c., rose the following day to 71¼c., but fell back again to 70c. On Monday 72½c. was bid, and on Tuesday the stock was quoted at 70c.; it closes at 70c. Sales amounted to 500 shares.

There were two sales of Granite Mountain. The stock has not seemed very active of late, and the price, despite of encouraging reports from the mine, remains unchanged to any extent. The market opened at \$26 and closes at \$25.50. Sales amounted to 52 shares. The shipments for the week were 46 bars, containing 61,635 ounces of silver and 95 ounces of gold.

A few sales of American & Nettie were made. It opened at 36¼c., fell to 33¼c., then rose again to 36¼c., fell to 25c., and closes at 26¼c. Sales amounted to 1,200 shares, most of which sold at 36¼c.

Breen opened at \$1.35 and closes at \$1.07½. One thousand shares were sold, of which 400 sold at \$1.40 and 300 at \$1.25. The market appears weak.

Central Silver had a sale of 1,000 shares at 3¼c. Little Albert opened at 10c., sold 5,000 shares at 10½@11¼c. on Friday, 500 shares more went at 11¼c. on Saturday, and 1,100 shares more at 11½@12c. on Monday; the market closes firm at 11¼c.

Silver Age had a sale of 300 shares at \$2.22½@2.25. The mine seems to be coming into strong favor and the market is rising daily. The stock opened at \$2.05 and on Monday rose to \$2.52½, closing to-day at \$2.40.

Adams had a sale of 500 shares at \$1.80. The market opened at \$1.72½ and closes at \$1.70.

On Tuesday 100 shares of Montrose sold at 63¾c.; present quotation 58¾c.

Small Hopes sold at 85c. this week, 200 shares going at that figure. The market closes at 78¾c.

**San Francisco.** April 23.

(From our Special Correspondent.)

The advance in the leading Comstocks, and the activity along the line of Comstock shares, that were the main feature of last week's trading, have given place during the current week to comparative inaction and a tendency in prices to more or less steady decline.

A week ago Consolidated California & Virginia sold strong at \$14.75, and to-day is barely steady at \$13, and has during the interim sold down as low as \$12. The official letter received in the early part of the week was not very satisfactory, and this, with a decrease in the assay value of the ore, has had an unfavorable influence on the stock market.

Joplin has during the week suffered a decline of 87 cents, being quoted this morning at \$7.25, with very fair sales.

Best & Belcher sold from \$7.75, the ruling price a week ago, down to \$6.37½, but recovered yesterday to \$7.50, with considerable sales.

Potosi is one of the exceptional stocks that have scored an advance within the last six days. A week ago it sold for \$4.50 with sales very light, and on Monday jumped to \$4.75. Since then it has steadily declined to \$4.65, the ruling rate to-day.

Chollar has been purchased freely and has been fairly steady, having declined only 10 cents during the week, the ruling figure this morning being \$3.15.

The Gold Hill & South End stocks have received little attention. Overman sold steadily at \$3.90 until Tuesday, when it dropped 30 cents, and to day is ruling at \$3.55. The remainder of the group have been dealt in sparingly, and generally at a decline over the previous day's prices.

While trading in the outside stocks has not been very large or important, the Tuscaroras have been

the most active and received most attention. Belle Isle has sold steady at 65 cents; Nevada Queen and North Belle Isle each advanced 5 cents, and are ruling to-day at 50@90c. respectively. North Commonwealth has advanced from 55 cents, the ruling figure a week ago, to 95 cents, this morning's quotation, with important sales.

In the Bodie & Quijotoa stocks the sales have been small and prices irregular.

Taking it altogether the market has, during the week, been dull and unsatisfactory, not only because trading has been lighter and prices less strong than a week ago, but because the "chipping" element has, for the time being, gained control, and whenever that occurs prices are inevitably irregular, being manipulated a few cents either way. This enables the "chippers" and curbstone brokers to make the difference between prices in the two boards, and turns stock operations into a gambling game pure and simple.

By Telegraph.—The quotations at 10 A. M. Friday, the 1st inst., were as follows: Alta, \$1.05; Best & Belcher, \$7½; Bodie, \$1.20; Bulwer, 35c.; Consolidated California & Virginia, \$5½; Chollar, \$2.75; Crown Point, \$2.45; Commonwealth, 90c.; Gould & Curry, \$3.40; Mexican, \$4.40; Hale & Norcross, \$3.40; Mono, 65c.; Navajo, 35c.; North Belle Isle, 85c.; Nevada Queen, 40c.; Ophir, \$7½; Potosi, \$4.45; Savage, \$3.25; Sierra Nevada, \$3.50; Union Consolidated, \$4.05; Utah, \$1.15; Yellow Jacket, \$2.75.

**Chicago.**

(From our Special Correspondent.)

The Chicago Metal, Mining and Stock Exchange was opened in club-room 10 of the Grand Pacific Hotel on the 28th ult. The opening was attended by hundreds of Chicagoans interested in the stocks to be listed, as well as by many prominent stock brokers from out of town. A number of addresses were made by the officers and prominent guests. In his opening speech President Sheridan said the Exchange would work for the establishment of a depository in Chicago for silver bullion, calling attention to the fact that in this city \$2,000,000 in bullion was annually refined.

**Denver.**

Prices and sales for the week ending April 25th, 1891:

Company.	Open- ing.	H.	L.	Clos- ing.	Sales.
Allegany	14½b	15	14	13½	300
Amity	15½	05¼	04¾	04¾	22,100
Bangkok-C-B	09½	*10¼	09¼	09¼	30,400
Bates-Hunter	67b	70	70	70	100
Brownlow	07b	07¾	06	06	600
Calliope	1¾b	.....	.....	17¼	.....
Cash	.....	.....	.....	.....	.....
Clay County	109b	110	109	109	500
Leavenworth	18b	18½	118	17¼	900
Little Rule	108b	108	108	108	500
Matchless	275b	.....	.....	.....	.....
May-Mazepa	119b	*122	119	120	1,400
Oro	.....	.....	.....	50	.....
Pay Rock	03b	03¼	03	02¾	14,900
Puzzler	07¼b	07¼	06¾	06¾	9,700
Reed National	55b	.....	.....	55	.....
Running Lode	25b	26	25	25	2,700
Whale	.....	.....	.....	.....	.....
Bal. Smuggler	*91b	95	95	.....	100
Prospects.	.....	.....	.....	.....	.....
Argonaut	16b	.....	.....	16	.....
Big Indian	09¼b	09	07¼	*09	300
Big Six	18¼	*17	14¼	14¼	10,600
Century	25b	.....	.....	20	.....
Claudia J.	07¾b	*07¾	06¾	*09	14,300
Nat. G. & Oil Co.	14	*15	13	13	13,700
Diamond B.	09	09	06¾	06¾	65,200
Emmons	*47¼	47¼	45	45	16,700
Golden Treas.	33¼b	34	33	33	1,800
Ironclad	05¼b	05¼	04	04	2,200
John Jay	08b	08¼	07	07	800
Justice	13¼b	13¼	13	13	600
Legal Tender	07b	*07¼	*06	05	5,200
Morning Glim.	.....	45	44	45	500
Park Consolidated	18¼	*20	18	18	1,400
Potosi	09b	09	08	08	11,000
Rialto	89b	86	85	81	1,200
Total	.....	.....	.....	.....	230,500

\* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked. b Bid.

**Lake Superior Iron Stocks.**

(Special Report by A. M. Helmer, Milwaukee, Wis.)

IRON STOCKS.			
Ashland	\$53.00 Vermillion P. I. & L. Co. \$2.25		
Aurora	8.75 Jackson	110.00	
Anvil	3.50 Lake Superior	61.50	
Brotherton	2.75 Milwaukee Iron Co.	5.00	
Germania	9.00 Sheridan	5.00	
Gogebic Iron Syndicate	.30 East New York	1.75	
Bessemer Consol	..... Pittsburg & Lake	.....	
Bonds	20½ Angeline	148.00	
Inter-Ocean	.30 Republic	27.50	
Great Northern Iron & Steel Co.	1.00 Illinois Steel Co.	85.00	
Iron Belt	..... River Side	2.25	
Montreal	11.25 Chandler	37.50	
Metropolitan	58.00 Chapin	30.00	
Northern Chief	35.00 Chicago & Minne-	.....	
Odanah	11.00 sota Ore Co.	110.00	
Pence	1.75 Minnesota Iron Co.	74.00	
Clingstone	.25 Vermillion	.30	
Ryan	.50 MISCELLANEOUS:	.....	
Sec. 33	.50 Ropes Gold and Sil-	.....	
Champion	15.50 ver Mining Co.	1.25	
*Wisconsin Iron and Steel Co.	78.25 Michigan Gold Min-	.....	
American	..... ing Co.	45	
Cleveland	16.50 Badger Silver Min-	.....	
		ing Co.	.....

\* Formerly Pence & Snider Co.

**Salt Lake City.**

PRICES AND SALES FOR THE WEEK ENDING APRIL 25, 1891.

Name and Location of Company.	Open-1891.	High-1891.	Low-1891.	Clos-1891.	Ing. Sales.
Alice, Mont.	1.70	1.70	1.50	1.50	.....
Alliance, Utah.	.....	.....	.....	.....	.....
Anchor, Utah.	6.60	6.60	6.25	6.50	.....
Apex, Utah.	.11	.114	.10	.104	5,650
Barnes Sulphur, Utah	.....	.....	.....	.....	.....
Big Hole Placer, Mont.	.06	.07	.06	.07	.....
Centen'l Eureka, Utah	.....	.....	.....	.....	.....
Congo, Utah.	.15	.20	.15	.19	9,500
Crescent, Utah.	.32	.33	.30	.32	900
Daly, Utah.	18.50	18.75	18.50	18.75	100
Glencoe, Utah.	.....	.....	.....	.....	.....
Horn Silver, Utah.	3.15	3.30	3.15	3.30	1,000
Malad Con., Idaho.	.024	.024	.02	.02	24,000
Mammoth, Utah.	3.60	3.60	3.40	3.60	.....
Northern Spy, Utah.	.....	.....	.....	.....	.....
Ontario, Utah.	.....	.....	.....	.....	.....
Stanley, Utah.	.15	.174	.15	.16	7,000
Utah L. & C. Co.	.....	.....	.....	.....	.....
Utah Oil Co., Utah.	.....	.....	.....	.....	.....
Woodside, Utah.	2.00	2.00	2.00	2.00	300
<b>Total sales</b>					<b>48,450</b>

**PIPE LINE CERTIFICATES.**

Business yesterday turned into June options in the Consolidated Exchange which accounted for part of the advance, but there was some little improvement aside from the natural difference between May and June option; otherwise the tendency during the week has been downward. Though the market has been very narrow and transactions are small, but little significance has attached to the business of the week.

Nothing is doing in Ohio oil. There has been a considerable increase in the number of certificates as against credit balances in Ohio oil, and it is fair to assume that the Standard has had some object in putting oil in this shape rather than leaving it in a condition where a delivery cannot be made in the Exchange.

If the hull speculation now running along at a rapid pace in the stock market communicates itself to petroleum, quotations should be advanced very quickly because the public at large have no oil to sell.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
April 25.....	.....	.....	.....	.....	.....
27.....	69	69	69	69	24,000
28.....	69	69	67 3/4	67 3/4	9,000
29.....	67 3/4	67 3/4	66 3/4	66 3/4	12,000
30.....	67 1/2	67 1/2	66 1/2	66 3/4	160,000
May 1.....	68	69 1/2	68	69 1/2	12,000
<b>Total sales in barrels</b> .....					<b>217,000</b>

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
April 25.....	.....	.....	.....	.....	.....
27.....	69 1/4	69 1/4	69 1/4	69 1/4	5,000
28.....	.....	.....	.....	.....	.....
29.....	.....	.....	.....	.....	.....
30.....	.....	.....	.....	.....	.....
May 1.....	66 1/2	68 3/4	66 1/2	68 3/4	31,000
<b>Total sales in barrels</b> .....					<b>36,000</b>

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, May 1.

STATEMENT of shipments of anthracite coal (approximated) for the week ending April 25th, 1891, compared with corresponding period last year.

Regions.	Apr. 25, 1891.	Apr. 26, 1890.	Difference.
Wyoming Region-Tons	328,393	310,414	Inc. 17,979
Lehigh Region .. "	86,459	126,910	Dec. 40,451
Schuylkill Region "	228,369	197,503	Inc. 30,866
<b>Total.....Tons</b>	<b>643,221</b>	<b>634,827</b>	<b>Inc. 8,394</b>
<b>Total for year to date</b>	<b>Tons 10,296,513</b>	<b>8,548,746</b>	<b>Inc. 1,748,067</b>

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending April 25th, 1891, and year from January 1st, in tons of 2,000 lbs.: Week, 38,488 tons; year, 921,503 tons; to corresponding date in 1890-1,797,725.

PRODUCTION OF BITUMINOUS COAL for week ending April 25th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1891.	1890.
	Week.	Year.
Phila. & Erie R.R.	1,416	41,695
Cumberland, Md.	176,373	1,273,515
Barclay, Pa.	3,407	55,397
Broad Top, Pa.	9,130	186,076
Clearfield, Pa.	88,411	1,414,728
Allegheny, Pa.	29,583	455,178
Beach Creek, Pa.	41,183	733,074
Poconong Flat Top	54,770	761,249
Kanawha, W. Va.	147,424	719,835
<b>Total.....</b>	<b>351,607</b>	<b>5,640,747</b>

\* Estimated.  
† Week ending April 18th.

WESTERN SHIPMENTS.

Pittsburg, Pa.	21,355	290,427	302,958
Westmoreland, Pa.	35,727	647,594	581,014
Monongahela, Pa.	14,318	181,924	82,701
<b>Total</b>	<b>71,400</b>	<b>1,119,945</b>	<b>966,673</b>
<b>Grand total</b> .....	<b>423,697</b>	<b>6,760,692</b>	<b>6,082,685</b>

**Anthracite.**

The output for the week ending April 25th, was 643,221 tons, an increase of 8,394 tons. The production this year to date has been 10,296,513 tons, an increase of 1,748,067. By referring to a file of the ENGINEERING AND MINING JOURNAL, it will be seen that this excess is no greater than that of a month ago.

The general improvement in the conditions of the trade which manifested itself last week has assumed a very pronounced form during the period under review. A feeling of security as to the future has taken the place of uncertainty. There is every promise that the present plan of action, viz., restriction and the strict maintenance of prices, will be followed until the market is in a thoroughly healthy condition. With a judicial management manifest along these lines the logical conclusion reached is that the trade will enjoy a good coal-selling year.

There has developed a scarcity of Lehigh coals, due to restriction in the face of the popular demand in which these coals are always held. Prices are being advanced by all the operators.

The firm of Coxo Bros. & Co. has received its freight bills from the Lehigh Valley Railroad Company for the week beginning April 20th, or the date on which the Interstate Commerce Commission ordered a reduction. There was no change in the charges. In an interview with Mr. E. B. Ely, general sales agent of Coxo Bros. & Co., we learned that, to-day, his firm will officially notify the Commission, that so far as it knows, the Lehigh Company has failed to comply with the order. This will throw the action on the Interstate Commerce Commission. In summing the matter up, Mr. Ely very logically remarked: "If the Commission cannot compel obedience to its mandate the firm of Coxo Bros. & Co. certainly cannot." The end of this case is evidently far off. The trade has already outgrown the custom of speculating upon the effect that a reduction in freight rates would have on prices.

Boston advices are that the trade is picking up and that those heavily interested are satisfied with its tone. Buyers are being gradually drawn into the market. Our Chicago correspondent writes that stagnation prevails, but that dealers are of the belief that the restriction now being carried on by the Eastern operators promises a good season's business, at high prices.

**Bituminous.**

The 1st of May failed to bring with it a strike in the bituminous regions shipping to tide-water. During the week there has been more or less agitation among the coal miners of the country, and in most cases with no results other than a postponement of action.

There is not much doubt that this talk of a strike acted as a stimulus to prices and to trade. Now that it has failed to materialize it would be natural to suppose that a reaction would follow. This may come, but not in the degree of the advance. The trade had been waiting for something to stimulate it to activity. Now that it has advanced, marked retrogression is not probable.

Trade is strong, and the market has settled contentedly down to the enjoyment of a good summer business. The best coals are in good demand, while poorer grades are beginning to enjoy considerable trade.

It is whispered that there has recently been developed a little inharmonious action in the Seaboard Association. It seems that a faction agreed to make the price of coal to all railroads \$2.40 f. o. h. shipping port, whether the tonnage of said company be large or small—a figure 10c. below the Seaboard price. Later the remaining members of the association were asked to ratify this action. This difference, however, was passed, and from all that can be learned, the association is once more a unit.

The local trade is brisk and summery in its nature. Prices are somewhat stiffer, the best coals selling at \$3.15@3.25 f. o. h. Amboys. Freight rates are about as follows: Philadelphia to Sound ports, 75c.; to Boston, Salem and Portland, 85c. Baltimore to Sound ports, 85c.; to Boston, Salem and Portland, 95c.

The situation in the Connellsville coke district is summed up as follows: On April 30th there were 24 plants in operation under the sliding scale, embracing 2,567 ovens and employing 2,681 men. There are 12,000 ovens in the district and 15,000 men went on a strike. On the date in question there were 160 cars of coke shipped from the region.

**NOTES OF THE WEEK.**

Judge Alvey has granted the trustees of the Chesapeake & Ohio Canal an extension from May 1st to August 1st in which to complete the work of repairing the canal. One thousand men are employed in the work.

**Boston.** April 30.

(From our Special Correspondent.)

The anthracite market continues to pick up, and at present agents, particularly the larger ones, are well satisfied with its tone. The demand is not specially large but continues to show steady improvement over the past few weeks. Buyers display a half willingness to enter the market, and it is thought that in a short time they will be really anxious to purchase. Some operators are making large offerings, but this fact is having little if any effect on the market. Brokers continue in short supply. Prices have a firm tone, and as a rule one figure prevails. Some handlers think well enough of the market to anticipate an advance in prices, which they claim the conditions warrant.

The bituminous situation is unchanged. A firm feeling is noted and the trade is evidently satisfied with the prices realized on the new contracts. The Fitchburg Railroad contract for 25,000 tons of Clearfield coal by water was awarded this week. Prices rule steady and the passing business is commanding \$2.50 f. o. b. A few contracts are still unclosed, but the coming week will dispose of them.

Freights are ruling fairly steady. Vessels are plentiful, and shippers say that they will be able to operate to advantage during the coming months. From New York, 60c. is quoted; from Philadelphia, 80@80c., and from Baltimore, 90c.@\$1.

The retail demand continues very small. Dealers are in possession of fair supplies with which to meet the present call. Prices are fairly steady, the coal exchange figures generally prevailing.

The receipts of coal at this port for the week ending April 25th were 39,469 tons of anthracite and 31,636 tons of bituminous, against 36,723 tons of anthracite and 30,027 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 409,140 tons of anthracite and 419,912 tons of bituminous, against 340,012 tons of anthracite and 303,627 tons of bituminous for the same period last year.

**Buffalo.** April 30.

(From our Special Correspondent.)

Navigation is now fully opened to all Lake ports including Duluth and Superior, as well as the Sault Ste. Marie river and canal.

Freight rates by Lake are unchanged, excepting those to Toledo and Detroit, which are lower. Charters have been made at 60c. to Chicago, 50c. to Milwaukee, 60c. to Racine and Kenosha, 40c. to Duluth and Superior, 55c. to Sheboygan, 30c. to Toledo, and 25c. to Detroit.

As near as possible the figures show that thus far this season 31,300 net tons of coal have been shipped to Chicago, 3,000 tons to Milwaukee, 10,800 tons to Duluth, 3,500 tons to Superior, 17,000 tons to Gladstone, 120 tons to Bay City, 20,700 tons to Toledo, 6,700 tons to Racine, 1,450 tons to Kenosha and 800 tons to Sheboygan, aggregating, say, 69,270 net tons.

After May 1st, until further notice, anthracite prices will be as follows: Grate, egg, stove and nut at retail, delivered, per \$2,000 pounds, \$4.50; to dealers on cars at Buffalo and the bridges, per 2,240 pounds, for grate, \$4.15; for egg, stove and chestnut, \$4.25; f. o. b. vessels at Buffalo, per 2,240 pounds, for grate, \$4.40; for egg, stove and chestnut, \$4.50. Pea size is selling at retail, per 2,000 pounds, delivered, at \$3.75.

As far as known there seems to be a fair demand for anthracite coal at May figures, but it is too early to say much about the subject.

Bituminous coal is firm and with good demand; many consumers are well stocked, as they anticipated trouble in the mining districts and ordered ahead of immediate requirements.

The bids for supplying coal for the Water Department of this city were opened yesterday and found to be higher than were expected, being 23c. per ton over 1890 figures. The bids were: Lehigh Valley Coal Company, per Colonel Horton, \$3.84; E. L. Hedstrom, \$3.82; Henry E. Smith, \$3.70, and Albright & Smith, \$3.91, for grate size anthracite, which is to be unloaded from canal boats and wheeled to the sheds of the pumping house.

The meeting of the Buffalo R. R. Freight Committee to arrange coal and iron freights for the season, held on the 24th ult., was not at all satisfactory as it was found that the trunk lines had not agreed upon rates. Action was postponed.

**Chicago.** April 29.

(From our Special Correspondent.)

The anthracite coal market is almost stagnant so far as new business is concerned. However, the buoyant attitude of the market East is not without its effect here, and there is firm conviction on the part of operators and wholesalers that, on account of the restriction in output, better prices will be realized this year than were obtained last season.

Demand has been extraordinarily good for bituminous coal for the past month, owing entirely to the expected strike on the 1st prox. The failure of the miners to strike, which now seems probable, will leave a large surplus on the market.

Furnace and foundry grades of coke are very scarce, and supply entirely inadequate to demand. West Virginia coke fetches \$4.50@5. The supply is far short of demand.

The new Chicago Coal Board meets to-day to consider the subject of permanent quarters.

Prices of anthracite per ton of 2,000 pounds f. o. b. Chicago, are: Lehigh lump, \$6.75; large egg, \$5; small egg, range, and chestnut, \$5. Retail prices per ton are: Large egg, \$6.25; small egg, range, and chestnut, \$6.50.

Prices of bituminous per ton of 2,000 pounds f. o. b. Chicago, are: Pittsburg, \$3.25; Hocking Valley, \$3; Youghiogheny, \$3.40; Indiana block, \$2.35; Illinois block, \$2@2.20.

Coke.—Connellsville, 72-hour, per ton f. o. b. Chicago, \$5.50; crushed, \$5.40; Walston, \$5.20; New River, \$5.50.

**Pittsburg.** April 30.

(From our Special Correspondent.)

**Coal.**—The market rules firm with a steady trade demand. The Ohio River being low, there were no shipments since our last report. The situation along the Monongahela Valley is as follows: First pool—Number of men employed, 1,200; price of coal at tippie, \$5.50 per 100 bushels. Second pool—1,800 men employed; price of coal at tippie, \$5.25 per 100 bushels. Third pool—1,600 men at work; price of coal at tippie, \$4.75 per 100 bushels. Fourth pool—2,000 men at work; price of coal at tippie, \$4.25 per 100 bushels. There are about 3,000,000 bushels loaded to leave on the first rise. Mining will be continued as long as there are boats and barges to load. The lower markets are well supplied; prices are unchanged.

**Connellsville Coke.**—The market has undergone no particular change. The war between the contending parties continues; the coke men refuse to have any dealing with the labor leaders. New plants are being fired and coke shipments steadily increasing. The strike is now in the twelfth week. The number of active ovens is estimated at about 4,000. The resumption of the big Edgar Thompson steel works indicates that the H. C. Frick Coke Company feels confident that it is prepared to honor the Edgar Thompson's requisitions. The price of coke is still in an unsettled condition, fancy figures being still demanded and received. The operators are making all they can of the situation, realizing that it won't last much longer.

**FREIGHTS.**

From Philadelphia to: Annisquam,\* \$1.10; Alexandria,† 85c.; Boston, 85c.@1.05; East Braintree, Mass.,\* \$1; Newbern, N. C., 80c.; New Bedford, 75c.; New York,† 90c.; Norfolk, 50@55c.; Portland, 85@90c.; Portsmouth,\* 85c.; Providence, 75c.; Richmond, 60c.; Saco, Me.,\* \$1.05; Washington, D. C.,† 85c.

\* And discharging.  
† Alongside.

**METAL MARKET.**

NEW YORK, Friday Evening, May 1.

**Prices of Silver Per Ounce Troy.**

April	Sterling Exch'ge.	London Price.	N. Y. Cts.	April	Sterling Exch'ge.	London Price.	N. Y. Cts.
25	4 88	44½	97½	29	4 88½	44½	97½
27	4 88	44½	97½	30	4 88½	44½	97½
28	4 88½	44½	97½	1*	4 88½	44½	98½

\* May 1st.

There has been considerable inquiry for silver this week, and large purchases have been made, but it is not yet definitely known whether the demand springs from a commercial order for the Continent, or whether purchases have been made purely on speculative account.

The United States Assay Office at New York reports the total receipts of silver for the week to be 115,000 ounces.

**Silver Bullion Certificates.**

	Price.		Sales.
	H.	L.	
April 25.....	97½	97½	160,000
April 27.....	97½	97½	165,000
April 28.....	97½	97½	194,000
April 29.....	97½	97½	215,000
April 30.....	98¼	97½	192,000
May 1.....	99¼	98½	375,000
Total sales.....			1,391,000

**Foreign Bank Statements.**

The governors of the Bank of England, at their weekly meeting on Thursday, made no change in the minimum rate of discount, which remains at 3½%. In the week the bank lost £477,000 bullion, and the proportion of reserve to liabilities was reduced from 36.63% to 34.81%, against a decline from 44.45% to 41.03% in the corresponding week last year, when its discount rate was unchanged at 3%. On the 30th ult. the bank gained £34,000 bullion on balance. The weekly statement of the Bank of France showed an increase in specie of 7,575,000 francs gold and 2,975,000 francs silver. There was no change in sight bills on London.

**Domestic and Foreign Coin.**

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

	Bid.	Asked.
Trade dollars.....	76	79
Mexican dollars.....	76½	77½
Peruvian soles and Chilean pesos.....	73½	75
English silver.....	4.86	4.88
Five francs.....	94	95
Victoria sovereigns.....	4.87	4.89
Twenty francs.....	3.87	3.88
Twenty marks.....	4.74	4.78
Spanish doubloons.....	15.55	15.70
Spanish 25 pesetas.....	4.80	4.85
Mexican doubloons.....	15.55	15.70
Mexican 20 pesos.....	19.50	19.90
Ten guilders.....	3.96	4.00
Bar silver.....	98½	99

**Copper.**—The market continues just as lifeless as for some time past; transactions in Lake are at a standstill, the bulk of the consumers having contracts with a guarantee against decline, whilst those who have not, seem to find means of securing what they need to cover their wants in a hand to mouth way, at prices which are below the nominal quotation of 13½c. The fact that no sales at all are reported at this latter figure goes to show that copper must be sold under it. Other sorts are also somewhat easier; Arizona ingot ruled from 12½c. to 12¾c.; Arizona pig at from 11c. to 11½c., and casting copper at from 11½c. to 11¾c.

The foreign market has been somewhat firmer, but only so for G. M. B.'s, while other sorts are more neglected, and by far not in so good demand as up to a month ago. The consequence of this is that while G. M. B.'s fluctuate, the finer grades of copper do not in the least follow any upward movement, but are, on the contrary, very much pressed for sale as everybody tries to take advantage of the slightest better tone that rises in the speculative market for G. M. B.'s. The latter closed to day at £51 10s. for spot and £51 17s. 6d., three months. Other sorts unchanged.

The much reported sale, i. e., transfer, of the Anaconda Copper Company to an European syndicate, is not confirmed by the parties who ought to be the best posted as to what is going on.

The exports of copper during the past week were as follows:

To	Copper Matte.	Lbs.	
By S. S. City of Berlin.....	6,447 bags.	682,765	\$40,000
" Columbia.....	503 "	62,505	4,000
To Liverpool—	Copper.	Lbs.	
By S. S. Columbia.....	45 casks.	56,250	\$6,188
" Hindo.....	90 "	112,500	16,000
To Hamburg—	Copper.	Lbs.	
By S. S. Rhaetia.....	514 bars.	113,251	14,000
" ".....	20 pkgs. old.	26,341	2,313
" ".....	108 casks.	162,585	19,961
To Rotterdam—	Copper.	Lbs.	
By S. S. Obdam.....	352 cakes.	112,012	13,441

**Tin.**—This metal has recovered somewhat from its recent slump here, though not to the full extent the European market has. This is explained by this market being rather overstocked, and notwithstanding the fact that prices ruling are considerably below the importation price, values have not advanced much, offerings exceeding by far the demand on the part of dealers and consumers, who are buying somewhat sparingly. We quote: Spot and May, 1970c.; June, 1970c.; July, 1980c.; August, 1985c.

The foreign market, which opened at £89 7s. 6d. bid and £89 10s. asked for spot, and £89 12s. 6d. bid and £89 15s. asked for futures, closes to-day £90 7s. 6d. bid, £90 10s. asked for spot, and £90 10s. bid and £90 12s. 6d. asked for futures.

**Lead.**—The market has become a little firmer, demand having improved somewhat and offerings being not quite as plentiful as last week. This may especially be said of the Western market, where some speculative demand turned up early this week, but as soon as that was satisfied things dropped back into their accustomed lethargy. A few hundred tons have changed hands at 420@425c., and there remain buyers at the latter figure.

**Chicago Lead Market.**—Messrs. Everet & Post telegraph us as follows: "The market has been steady, but the demand has not been as brisk as it was at the close of last week. There is little lead to be had here, and holders have been rather firm at 410c. There have been buyers in the market most of the week at 405c., and sales of 300 tons are reported at this price. The closing quotations are: 405c. bid, 410c. asked."

**St. Louis Lead Market.**—The John Wahl Commission Company telegraphs us as follows: "Lead is strong, and prices have advanced from 390c. to 4c. Consumers feel rather friendly toward the metal. At the close lead has more buyers than sellers at 4c."

**Spelter.**—Spelter continues very dull and neglected. What little business we hear of is being done at from 475 to 480c., New York, but there is no big demand, nor are the offerings at the lower prices very plentiful.

**Antimony.**—Antimony keeps on declining; prices from England coming lower almost every day. We quote Cookson's 16½c.; L. X., 15½c., and Hallett's, 14½@15c.

**Nickel.**—Nickel is in good demand with very limited supplies at 65@70c.

**Quicksilver.**—Under a slightly increased demand the local market has shown signs of recovering, and nothing could probably be done now under \$43@44. Business on the London market has been very slow. Quantities have been offering and dealers have been forced to make concessions. The latest sales were made at £7 15s., and this price could probably be shaded.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, May 1.

In some cases reports from inland cities indicate a slightly better demand for pig iron, and somewhat firmer prices. These are the exceptions, however, and in most of the iron centers the week has passed without bringing forth any change in the situation. In New York the market occupies the same position of inactivity; if anything, it is rather duller even than last week.

Consumers are, apparently, quite indifferent towards the market. Feeling their position secure, they are content to let the dealers carry the stocks and themselves buy only for their immediate wants. On the other hand prices remain firm, and there is not the slightest tendency noticeable, at the present time, towards lower figures.

Altogether, the general condition of the iron market at the present time is puzzling. That the production of pig iron should have been reduced at such an extraordinary rate as it has been since the 1st of January without causing any more movement in the market implies an unusual condition of affairs. Matters have, of course, been complicated by the coke strike, and until that is definitely settled, it is hardly likely that a sound opinion can be formed of the market.

**American Pig Iron.**—The market has been dull and shows no change from last week. Prices remain in the same notch and are well maintained. The only feature of interest is the slightly increased inquiry for Southern iron, which is noted. We quote prices: Northern, No. 1 X, \$17.50@18; No. 2 X, \$16.50@17; Southern, No. 1 X, \$17.50@18; No. 2 X, \$16.50@17.

**Spiegeleisen and Ferro-Manganese.**—The market for both spiegeleisen and ferro-manganese is very dull. No transactions of consequence are reported. We quote, nominally, spiegeleisen, 20%, \$27.50@28.50; ferro-manganese, 80%, \$63.50@64.50.

**Steel Rails.**—Business is dull. There have been small orders placed during the week, but not one of any magnitude. Rolling mills continue to quote \$30 at the mill and the price is firm at that figure.

**Rail Fastenings.**—The topic of interest in this branch of the trade has been the meeting of the spike manufacturers held in this city during the past week. Nothing has been made public concerning their transactions or the objects of their meeting. One result, however, has been an advance in the price of spikes from 2c. to 205@210c. We quote: Angle plates, 170@180c.; bolts and square nuts, 265@275c.; hexagonal nuts, 285c.; complete joint, iron and steel, according to weight.

**Tubes and Pipe.**—The demand continues fair and there is no change in the market. We quote discounts on car-load lots as follows: 47½% on butt, black; 40% on galvanized; 60% on lap, black; 47½% on lap, galvanized; boiler tubes, 50% on all sizes; casing, all sizes, 50%.

**Structural Iron and Steel.**—The trade is agitated by the position which certain of the rolling mill companies have taken, in dealing directly with the owners of large buildings in contemplation or course of construction instead of with the architectural iron works. The reason for this step was thus stated by Mr. A. R. Whitney, of Carnegie, Phipps & Co., in an interview:

We had not received our fair proportion of orders from the iron men who take contracts for the large buildings going up. We, therefore, notified the owners that we could furnish them what wrought steel and wrought iron were needed for their buildings at the standard rates. We make steel columns and steel beams at our Pittsburg mills, but we do not furnish all the material. We allow the iron workers to furnish the cast iron portion, and they put all the material in the building. The first intimation we had that they objected to this was the passage of a bill by the Assembly, claiming the approval of the Building Bureau of the city, which required about twice as much rolled steel and wrought iron in columns, and prohibiting the use of steel columns in buildings. I have called the attention of the Senate Committee in charge of the bill to its injustice, and they have agreed to have it properly amended before passing it.

As a substitute for this bill the steel men have had an amendment introduced, practically as follows:

The factor of safety in the case of all columns, posts or pillars shall be not less than one to five for such columns when made of cast iron, and as one to three for such columns when made of wrought iron or rolled steel.

The action of Carnegie, Phipps & Co. in dealing directly with the builders has incensed the architectural iron workers greatly, and a meeting is reported to have been held for the purpose of boycotting the Pittsburg company.

The market for structural iron remains about the same, but prices are still low. We quote

Universal plates, \$2.15; bridge plates, \$2.10; angles, \$2.20; beams, \$3.10.

**Merchant Steel.**—The market still has a weak feeling. We quote prices: Best English tool, 15c., net; American tool steel, 7@8c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3½c.; open-hearth machinery, 2.60c.; open-hearth spring, 2.60c.; tire steel, 2.60c.; toe calks, 2.60c.; first quality sheet, 10c.; second quality sheet, 8c.

**Old Rails.**—The market is lifeless. We quote \$22@23 for tees and \$25 for doubles.

**Wrought Iron Scrap.**—There has been nothing doing. We quote, nominally, \$20@22 at yards.

**Cleveland.** April 30.

(From our Special Correspondent.)

Although navigation is practically open, both to Lake Superior and to Lake Michigan, yet but very few boats have started. It is not expected that any ore will be shipped before the middle of May. No charges have as yet been reported, but it is expected that rates will open at about \$1 per ton from Lake Superior and 80 to 85 cents per ton from Escanaba. Further reports are being heard of reductions in force at the mines. The Lake Superior Iron Company, one of our strongest mining corporations has made a further reduction of force, to take effect May 1st, of 100 men. The Michigan game Company closed down entirely two weeks ago. This mine produced last year 80,000 tons of ore. These reductions in force are inevitable as long as the present situation continues.

There has been no change in the quotable prices since last week, and they may be quoted as follows:

Specular and Magnetic Ores.	
Bessemer.....65@69%	\$5.50@ \$6.25
".....60@64%	4.25@ 5.25
Non-Bessemer.....55@63%	4.75@ 5.25
".....62@65%	4.00@ 4.75
".....57@60%	3.75@ 4.00
Soft Hematites Dried at 212°.	
Bessemer.....62@65%	\$4.50@ \$4.75
".....58@61%	4.00@ 4.25
Non-Bessemer.....55@63%	3.50@ 4.25

Above prices are for deliveries on docks at Lake Erie ports.

**Chicago.** April 30.

(From our Special Correspondent.)

There is some little improvement in crude iron, but in finished iron the situation is disappointing so far as new business is concerned. Local mills and agents for outside concerns are endeavoring to bolster up prices. Demand from manufacturers, car builders and railroads still continues light, though warehouse trade is somewhat better. Generally prices are unchanged, excepting that a little stiffening is noticed in Lake Superior charcoal iron, and some brands of softeners.

**Pig Iron.**—More sales of Lake charcoal iron have been made in this market at low prices, but not quite as low as a week or ten days ago. As most of these cheap lots have been sold at figures below cost of production, \$16.50@16.75, the stronger furnaces will now take their innings. Foundry grade of local make is becoming quite scarce, and will be scarcer yet if the coke strike continues much longer. The Illinois Steel Company has only six furnaces in blast out of eighteen. On account of the scarcity of Ohio softeners, silveries are being substituted. Southern coke irons are quiet, and many are reported as well sold up. There is a more confident feeling that improvement in demand and prices cannot long be delayed.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$17.25@18; Lake Superior coke, No. 1, \$15.50@16; No. 2, \$15@15.50; No. 3, \$14.50@15; Lake Superior Bessemer, \$17; Lake Superior Scotch, \$16.50@17; American Scotch, \$18.50@19; Southern coke, Foundry No. 1, \$16.25; No. 2, \$15.75; No. 3, \$15.25; Southern coke, soft, No. 1, \$15.75; No. 2, \$14.75; Ohio silveries, No. 1, \$18; No. 2, \$17; Ohio strong softeners, No. 1, \$18.25; No. 2, \$17.50; Tennessee Charcoal, No. 1, \$18; No. 2, \$17.50; Southern Standard Car Wheel, \$21@23.

**Structural Iron and Steel.**—Demand continues very good, and for some specialties, such as beams and bridge material, it is active. The iron and steel for a large hotel building was let this week, footing up 1,220 tons, and the estimated figures are \$72,000. Quotations remain unchanged for car lots f. o. b. Chicago: Angles, \$2.20@2.25; tees, \$2.75@2.85; universal plates, \$2.35@2.45; sheared plates, \$2.40@2.50; beams and channels, \$3.20.

**Plates.**—Mill business is a little better and improving, and store trade is very fair, considering the season. Quotations remain unchanged: Steel sheets, 10 o 14, \$2.70@2.80; iron sheets, 10 to 14, \$2.60@2.70; tank iron or steel, \$2.50@2.70; shell iron or steel, \$3@3.25; fire-box steel, \$4.25@5.50; flange steel, \$3.25@3.40; boiler rivets, \$4.25.

**Merchant Steel.**—Orders are for the most part small, though we hear of several large contracts placed for spring steel for delivery through the year. Store trade for tool steel is better than it has been of late. Prices remain unchanged: Tool steel, \$6.75@7; tire steel, \$2.30@2.50; toe calk, \$2.50@2.65; Bessemer machinery, \$2.20@2.30; open-hearth machinery, \$2.60@2.75; open-hearth spring, \$2.75@3; crucible spring, \$3.75@4.

**Steel Rails.**—Immediate demand for track supplies of all kinds is mainly for small quantities. The Illinois Steel Company has considerable work ahead, sufficient for several months for its South Chicago plant at least. Its Union Works are not running and the Joliet plant is turning out light sections only. Several good orders were booked for steel splice bars last week. Quotations remain unchanged at \$31.00@32.50 per ton f. o. b. Chicago. Splice bars at \$1.95@2 for steel and \$1.85@1.95 for iron, and spikes at \$2@2.10 per 100 pounds.

**Galvanized Sheet Iron.**—An improved demand is reported from all branches of trade, cornice makers, manufacturers, house furnace makers, etc. Discounts are unchanged, but not very firm, at 67% off on Juniata and 65% and 5% off on charcoal.

**Black Sheet Iron.**—Demand is very light, and the few inquiries from dealers and jobbers is for late summer delivery, and mill agents won't quote later than July delivery on account of expected trouble when the scale comes into question. Quotations are \$2.85@3 for No. 27 f. o. b. Chicago for car lots.

**Bar Iron.**—Demand is easing up considerably and mill agents are becoming more firm and antagonistic to the persistent hammering down of prices by consumers. They argue that, with the excellent crop prospects, demand will be larger in June and July from railroads and car builders, and the low prices now ruling are entirely too close to cost, and higher figures will obtain. Local mills quote 1.60c., and Valley Mills, 1.55c., half extras at mill. Out of store prices are 1.85@2c., according to quantity and quality.

**Nails.**—With manufacturers both steel cut and wire nails are in light demand, and factory prices are weak at \$1.00 for the former and \$2@2.05 for the latter. Demand from store is fair at \$1.85 for cut and \$2.30 for wire in small lots.

**Scrap.**—This market is almost featureless. Demand is confined to small lots, carloads and upwards of forge grades. Mixed steel and cast are very dull, and prices nominal. Quotations per net ton f. o. b. Chicago are: No. 1 railroad, \$18.50; No. 1 forge, \$18; No. 1 mill, \$14; fish-plates, \$21; axles, \$23.50; horseshoes, \$18; pipes and flues, \$13; cast borings, \$8; wrought turnings, \$11; axle turnings, \$13; machinery castings, \$11.50; stove plates, \$8; mixed steel, \$11; coil steel, \$15.50; leaf steel, \$15.50; tires, \$17.

**Old Rails and Wheels.**—Supply of iron rails is good, but holders and buyers are about 75c. to \$1 apart, the former asking \$23.25, with no transactions reported. Old steel rails and old wheels are a drug on the market, and are nominally quoted at \$13.50@16.50, according to length, freedom from frogs, etc.; old wheels, \$16.50.

**Louisville.** April 25.

(Special Report by Hall Bros. & Co.)

The week under review has evinced a better feeling and a more liberal buying spirit. Sales and inquiries have been more frequent, and for larger quantities, ranging from 100 to 500, 1,000 and 2,000 tons. Prices have been fairly well maintained, though on some grades concessions have been made where attractive deliveries were offered. Favorable crop reports, which promise active employment to railroads for which they are making extensive preparations, serve to add more confidence to the situation, and on the whole it may be said that things generally are looking somewhat better. We quote:

**Hot Blast Foundry Irons.**—Southern coke, No. 1, \$14.25@14.50; No. 2, \$13.75@14; No. 3, \$13.25@13.50. Southern charcoal, No. 1, \$16.50@17; No. 2, \$16@16.50. Missouri charcoal, No. 1, \$17.50@18; No. 2, \$17@17.50.

**Forge Irons.**—Neutral coke, \$12.50@13; cold short, \$12.50@13; mottled, \$12@12.25.

**Car Wheel and Malleable Irons.**—Southern, standard brands, \$21@22; Southern, other brands, \$17.50@18. Lake Superior, \$21.50@22.50.

**Philadelphia.** April 30.

(From our Special Correspondent.)

**Pig Iron.**—The possibility of a sudden turn in the crude iron market has suggested itself to a few large users, who have within two days ordered with unexpected promptness. The irons called for are of the better grades, and are getting scarce. Good No. 1 Foundry has been ordered at \$18, No. 2 at \$17. Brokers have taken orders today for forge in large lots at \$15. Whether this is the start of an upward movement, it would not be safe to say, but the fact of an improving demand, although limited to a comparatively small number of buyers, has had a good effect. Several round lots of Bessemer also have been taken, at figures ranging from \$18 to \$20, according to quality, and brokers say it is probable they will handle a good deal within the next few days.

**Foreign Material.**—There is a fair probability of business in the next week or two at about \$66.

**Steel Billets.**—Several orders were booked within a day or two at \$23. The lower quotations

are for the present withdrawn. Nail slabs are active at \$26.50 at mill.

**Merchant Iron.**—Iron has been contracted for at a few interior mills this week at lower prices than for a year past. Some orders were taken at \$1.55, for what is called good iron. There are rather contradictory statements in the offices concerning the merchant iron trade. Car builders have not bought as largely as it was thought they would. Refined iron is \$1.80.

**Nails.**—Sales are made here on a tide water basis of \$1.65.

**Sheet Iron.**—More sales have been made, but the expected heavy summer business is still held back; but high hopes are entertained of a heavy summer business.

**Skep Iron.**—Negotiations are hanging fire for large lots. Quoted at \$1.70@1.85.

**Wrought Iron Pipe.**—Another modification of prices is forced by secret cutting.

**Plate and Tank.**—There is no shading from March quotations. Prices are at bed rock and there is no change in the character of business.

**Structural Iron.**—Not a single change has been developed in market condition or prices.

**Steel Rails.**—The mills are steadily gaining in business at their asking prices, viz., \$30@31.

**Old Rails.**—Quoted nominally at \$22.50.

**Scrap.**—All the scrap that can be delivered will sell on sight, at \$22 for No. 1 R. R.

**Pittsburg.** May 1.

(From our Special Correspondent.)

**Raw Iron and Steel.**—The market, since our last report, has undergone a decided improvement for certain descriptions. Bessemer, that for some time was very dull and sold down to a very low figure, in fact the lowest reached for a long time—on April 3d we reported sales of 4,000 tons at \$15.75—has advanced in less than a month \$1.50@1.75 per ton. To-day sales are reported for prompt delivery at \$17.50.

There are of course different opinions in regard to what caused the advance; some say one thing, some another; the fact, however, is self-evident, that stocks had been so reduced that it was absolutely necessary for consumers to have Bessemer without regard to cost, or stop their works. The stock of raw iron, particularly standard brands, has been steadily reduced. Certain parties that owned turnaces were liberal buyers of raw iron. We could name parties that could sell out and make a handsome profit in iron purchased since the first of April.

A well-informed ironman has this to say: "It is certainly true that intrinsically the market is in a better condition than at any time since the first of January. Business is certainly beginning to pick up along the entire line, so that the demand for pig iron should improve accordingly. The immense reduction in the output should be felt pretty soon."

There are only four blast furnaces running in the Mahoning Valley—the two furnaces of Brown, Bonnell & Co., the production of which is entirely consumed in their own mills; the Girard furnace, of which H. M. Byers & Co. consumes one-half, the other half being placed on the market; and the Thomas, which is the only one making Bessemer for the market.

The demand for iron ore is improving, although many buyers are still holding off; we hear of lots comprising 350,000 tons Bessemer f. o. b. on wharf, Cleveland, sold at \$4.25@4.50 per ton to Pittsburg parties.

New steel rails are in fair demand; current rates \$30 at works.

The steady advance in Grey forge noted last week is fully maintained. City furnace iron is most fancied. Sales of steel slabs and billets were liberal at a further advance. Ferro-manganese was not so firm. The demand for muck bars fell off, and they can be purchased below last week's figures. Bloom and billet ends are a shade lower. Steel wire rods, unchanged. Skelp iron, sheared and narrow grooved, a shade lower; wide grooved quoted 2½ cents higher. Old iron and steel rails dull and neglected. Scrap material, demand fallen off.

**Coke Smelted Lake and Native Ores.**

2,500 Tons Bessemer, May.....	\$16 50 cash.
2,000 Tons Bessemer.....	16 25 cash.
1,500 Tons Bessemer.....	16 50 cash.
1,500 Tons Bessemer.....	16 70 cash.
1,000 Tons Bessemer.....	17 00 cash.
1,000 Tons Grey Forge.....	14 00 cash.
1,000 Tons Grey Forge.....	14 10 cash.
1,000 Tons Grey Forge.....	14 15 cash.
1,000 Tons Grey Forge, valley furnace.....	14 20 cash.
500 Tons Grey Forge.....	14 00 cash.
500 Tons Grey Forge, valley furnace.....	14 25 cash.
500 Tons Grey Forge, valley furnace.....	14 15 cash.
500 Tons Grey Forge, valley furnace.....	14 25 cash.
500 Tons Bessemer, immediate.....	17 25 cash.
500 Tons Bessemer, immediate.....	17 50 cash.
350 Tons Bessemer, immediate.....	17 00 cash.
350 Tons Bessemer, immediate.....	17 25 cash.
550 Tons White Iron, Southern.....	13 25 cash.
300 Tons Grey Forge.....	14 25 cash.
100 Tons No. 2 Foundry.....	15 50 cash.
100 Tons No. 2 Foundry, all ore.....	16 50 cash.

<b>Charcoal.</b>	
100 Tons Cold Blast.....	26.00 cash.
100 Tons No. 2 Foundry.....	22.00 cash.
100 Tons Warm Blast.....	22.50 cash.
<b>Muck Bar.</b>	
1,000 Tons May and June.....	26.25 cash.
500 Tons May.....	26.00 cash.
500 Tons Neutral.....	26.50 cash.
500 Tons Neutral.....	26.00 cash.
<b>Steel Slabs and Billets.</b>	
3,000 Tons Red Billets.....	25.50 cash.
1,500 Tons Red Billets.....	25.25 cash.
1,500 Tons Billets, May and June.....	25.50 cash.
1,000 Tons Billets, May and June.....	25.50 cash.
<b>Steel Wire Rods.</b>	
500 Tons American, June.....	26.25 cash.
<b>Ferro-Manganese.</b>	
100 Tons 80%, Jersey City.....	64.25 cash.
100 Tons 80%, Pittsburg.....	66.50 cash.
75 Tons 20%, New York.....	64.50 cash.
<b>Bloom Rail and Heavy Scrap.</b>	
2,000 Tons Bloom and Rail Ends.....	17.25 cash.
1,500 Tons Heavy Steel Scrap.....	17.00 cash.
<b>Skelp Iron.</b>	
300 Tons Sheared Iron.....	1.85 4 m.
200 Tons Narrow Grooved.....	1.60 4 m.
785 Tons Wide Grooved.....	1.85 4 m.
<b>Scrap Material.</b>	
300 Tons No. 1 W. Scrap, Valley del., Net	21.00 cash.
250 Tons Open W. Scrap, Gross.....	17.00 cash.
100 Tons No. 1 W. Scrap, Net.....	20.00 cash.
100 Tons Sheet Steel Halls, Gross.....	17.00 cash.
75 Tons Iron Axles, Hammered, Net.....	28.00 cash.
75 Tons Cast Borings, Gross.....	12.00 cash.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, May 1.

The disheartening condition of this market remains practically unchanged. During the last two or three days a somewhat better feeling has prevailed, but in the aggregate business has been unimportant. Importers are yet suffering from the railroad discrimination in favor of Boston, and, unless the matter is adjusted it will seriously, and possibly permanently, impair business in chemicals with the Western trade centres. Competition with Boston for Western orders, and the fact that caustic soda is here in large quantities, have caused quite a fall in values, and even at the lower figures, which are much below cost of importation, business is hardly more than of a nominal character.

As has been predicted in this column for some time past, the small stock carried by manufacturers has at last caused some of them to come into the market and buy more liberally. Unfortunately the movement is far from general and has only affected one line of goods materially. Carbonated soda ash has met with considerable inquiry, and closes probably the firmest article on the list.

Of the lighter chemicals, phosphate rock has experienced a slight upward movement in values, consequent upon the long continued shut down of the Coosaw Mining Company. The developments in the nitrate of soda market have been rather unfavorable for any advance. The statistical position of the chemical now is much easier than a fortnight back, and under the circumstances, there seems little doubt but what we have seen the highest prices for some time to come. The danger of any nitrate famine may be said to have been entirely removed by large arrivals here, in Philadelphia and in Baltimore.

Caustic Soda, 60%.—The demand has been small, and under large arrivals, part of which was put on the market, values have developed a downward tendency. During the last two days the tone of the market has been slightly better. We quote for shipment during May and June, 3'30@3'35c., 70 and 74%. The arrivals have been larger than usual and weighed heavily on the market, so that dealers were forced to offer considerably below our last quotations. Violent effort was made to compete with Boston in the Western markets, but the aggregate of sales has not been large. Business for spot in round lots could doubtless be done at 3'00c.; contracts for shipment are held a little higher and could probably not be made under 3'07½@3'10c., 77%. The demand has shown signs of falling off, though not sufficiently so to materially affect the market. For contracts 3'10c. is still being asked and for large lots this price could probably be shaded.

Alkali, 48%.—Fairly large arrivals have come in and gone almost entirely into second hands. Inquiry has been extensive and resulted in sales of both spot and to arrive. Dealers are quoting 1'57½@1'60c. as to quantity, etc. Business in high test B. M. has left no room for complaint. Large arrivals have gone into second hands at from 1'45. to 1'50c. Other high test has not been so salable, and business has been done at much less. Dealers have again offered to make large concessions to save cost of storing, and quite frequently without success.

Caustic Soda Ash, 48%.—The Alkali Union declines to make any concessions on this chemical, and, as stocks are very small, no particular desire to realize leaves values firm at from 1'50@1'55c., our last quotation. Buyers have placed a few orders to fill current wants.

Carbonated Soda Ash, 48%.—The various Liverpool makes have come in in fairly large quantities and have met with a better demand. Quite large sales of both spot and to arrive have been made at 1'55@1'60c., at which the market closes firm. High test is held at 1'55@1'57½c., while contracts for

shipment could probably be placed at from 1'50@1'55c.

Sal Soda.—The market is dull, the demand continues small, and dealers anxious to get rid of the fast accumulating stocks, are making concessions. We quote: .95@1c.

Bleaching Powder.—The curtailed production abroad has had at least the effect of strengthening the tone of the market. The demand, however, remains nearly as unsatisfactory as heretofore. Dealers are quoting 1'70@1'75c.

Messrs. P. R. McQuie & Son, in speaking of the Liverpool market under date of April 17th. say: "On one article (bleaching powder), and for one market, United States of America, has the 'Union' nailed its colors to the mast, and £7 per ton f. o. b. hardwood, net cash, is the official minimum; we note occasional re-sellers, however, at a shade less price. Though several brands of bleaching powder are very scarce, stocks generally have been accumulating here; but at last the Alkali Company is taking steps to remedy this evil, and a reduction in 'make' of 25% is being enforced. Seeing the ease with which production can now be regulated, we only wonder that bleach works should have been allowed to steam full speed ahead for so long."

Acids.—The acid manufacturers will meet in Philadelphia on the 5th inst. It promises to be a largely attended and representative meeting. As to any proposed plan of combination absolute silence is preserved, and ostensibly the only reason why everybody is going is simply to exchange ideas concerning the trade.

This will be a most excellent opportunity for some of these gentlemen to show what they have learned during the past year, as doubtless some method for holstering the acid business will come under consideration. The tendency to cut has become again a feature of the market and buyers could doubtless shade our prices by careful manipulation. Acetic acid has met with a moderate consumptive demand, while nitric and muriatic have passed into second hands a little more freely than heretofore.

We quote acid per 100 pounds in New York and vicinity: Acetic, \$1.50@\$.2; muriatic, 18', 80c.@\$.1; muriatic, 20', 90c.@\$.1.10; muriatic, 22', \$1@\$.1.20; nitric, 40', could probably not be touched for less than \$4.50 and from that upward according to quantity, etc.; nitric, 42', \$5@\$.5.25; sulphuric, 60', 80c.@\$.1.05; sulphuric, 66', 95c.@\$.1.12½, with the market far from firm at this figure.

Fertilizers.—Consumption has again been playing havoc with stocks, and the market generally is tighter than it was. The Coosaw River difficulty is commencing to have some effect on the price of phosphate rock. According to the latest advices, the Miners' Exchange has advanced prices to \$6.50 and \$7.50 f. o. b. vessels and cars at mines, wet and dry respectively. Here the market is very firm, and the demand most satisfactory to dealers.

We quote \$7.50@\$.7.75 per ton. Ground rock is selling at from \$8.50@\$.11.50.

Sulphate of ammonia, made from gas liquor, is again very scarce, but values have not been seriously affected, as the "St. Rawlins," which is due, is understood to have a good supply; 3'17½@3'25c. has been the basis for a good deal of business, and large lots could doubtless be had at these figures now. The supply of bone sulphate is also not large, and the demand throughout the week has been fair. Sales have been made at from 3'15 to 3'20c. Dried blood continues to find an easy market, but as the supply is rather larger than it was values have fallen a little. We quote 2@2'05c. for high grade, and 1'90@1'95c. for low-grade blood. Azotine is here in small quantities only, but could easily be bought for shipment to the West. Dealers are asking 2'05c. Bone black is offering at \$20, at which price the market is firm, while the position of bone meal remains practically the same; it is selling at from \$22.50@\$.23. Sulphate of potash has continued to come in freely, but, as almost everything was on contract, the available spot supply has not been much increased. The demand continues good, and is satisfied at from 2'07½ to 2'12½c. Double manure salt is in a most advantageous position. The supply is hardly sufficient for the demand, and causes values to remain firm at from 1'12½ to 1'15c.

Muriate of Potash.—The market is not as active as it has been, manufacturers seem pretty well supplied, and, under the large arrivals of the preceding fortnight, the demand has become less urgent. The arrivals of the week amounted to fully 500 tons, everything by steam, and the sales aggregated about 200 tons. As a feature of the market, the fact may be mentioned that sales of spot at an advance on syndicate's agents' quotations have ceased.

Kainit has been very quiet, the trade seems to have been nearly finished for the season. We quote \$8.50@\$.9 per ton.

Brimstone.—The scarcity of spot in first hands continues a prominent feature of the market, and makes quotations merely nominal. For shipment values have been well maintained at our last quotation, \$31@\$.32 per ton, for May and June, but business has not been very extensive. We quote 75c.@\$.1 less for thirds.

Nitrate of Soda.—No new arrivals have come in during the week, but the position of this chemical is not as firm as heretofore. Within the past fortnight arrivals at all ports have amounted to 112,970 bags, and positive information has been re-

ceived to the effect that a number of vessels have been able to clear from the beleaguered ports, thus virtually removing all danger of a possible nitrate famine and permanently checking any further great rise in values. About 70,000 bags are thus understood to be on the way to the United States, and, while this information has depressed the tone of the market a little, values remain very nearly the same. Manufacturers are pretty well supplied now, and there remain some quantities in first hands which will probably have to be stored when, doubtless, the price will again be slightly advanced. We quote 2'10@2'15c.

Liverpool. April 17.

(Special Correspondence by Geo. G. Blackwell.)

Minerals.—The firmness reported last week has continued, and prices remain practically the same. Manganese: Arrivals have still increased, but there is little alteration to report in prices, which continue firm. Magnesite: The large stocks are unreduced; prices easier. Raw ground, £6 10s., and calcined, £12 10s. Bauxite (Irish Hill brand): The strong demand continues at advanced figures. Barytes: Carbonate easy; sulphate of fine quality in demand. "Angel White" No. 1, 70s. Pumicestone: In lump and ground more doing. Iron ore quieter, also manganeseiferous and Santander; Irish and Cumberland in good demand at full prices. Emerystone: A good business done for best qualities. No. 1 lump £5 10s.@.£6; smalls £5@.£5 10s. Fullers' earth unchanged; best lump, 55s. 6d; fine impalpable ground, £7. "Emerald" ground, 80s. Chrome ore firmer, especially for high grades. Antimony ore and metal steady. Asbestos firm, especially for Canadian Rock. Potter's lead ore of best quality easier; smalls, £13@.£14; selected lump, £15@.£16. Calamine: High qualities sought after at full prices. Strontia sulphate (celestine); More inquiry. Limespar in more demand; English manufactured old G. G. B. brand in request at 50s. (ground). Felspar and fluorspar firmer. Plumbago: Best qualities sought for; Spanish, £6; best Ceylon lump at last quotations. Irish moss dull. Bog ore (oxide of iron) steady; finest quality 22s.@.23s.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, May 1

The old story of continued large arrivals, is only varied this week by the fact, that the quality of the brick is much inferior to what it has been. Washed, pale and swelled have been coming down the river in large quantities, and indicate that the yards are being cleaned up before starting to stock again for the year. It may be stated, in a general way, that by the middle of next week, all the manufacturers who are going to produce during the coming summer, will have commenced doing so. The continued favorable weather has allowed those, who have already started, to accumulate quite a large stock at the yards. Some anxiety has been felt, as to a possible labor movement to originate to-day, and this feeling seems keenest in the lumber trade, which, of course, cannot fail to have a retarding influence on building operations, which might otherwise have been under way by this time.

Bricks.—The market feels the burden of large stocks, but business has been sufficiently brisk to allow dealers to maintain values as per our last quotations. Haverstraws are selling at from \$6 to \$6.50. Pale are changing hands in pretty large quantities at \$2.25 per M, and Jerseys and Keyports are held at from \$4.50 to \$5.50 per M.

Lime.—The supply in this market continues to be kept down as near as possible to the requirements of the trade, but the demand is so poor that business may almost be said to be nominal. Prices have been kept at the same level. Dealers are quoting \$1 for finishing and 90c. for common. It is thought that the beginning of next week will witness quite an awakening in building circles.

Cement.—This article is no exception to the general inactivity which characterizes the building materials market. Shipments by the canals have not yet commenced, and dealers continue to compete most actively for each other's business, so that it is rather difficult to give any quotation. Almost any reasonable figure can be shaded by proper manipulation.

NOTES OF THE WEEK.

Over 4,500 men struck yesterday for eight hours work at 45 cents an hour. During the past year they have been working nine hours a day at 40 cents per hour. The Housemiths' Union is the main organization affected, and as most of these men are architectural iron workers, the work on a score or more of big buildings in course of erection will have to be stopped. The officers of the union say that they are prepared to stand a strike of six months' duration, but at the same time express confidence that all bosses will yield by next Monday, as with their perfect organization and the rush of work at this season of the year the bosses cannot afford to hold out against them any length of time.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Name and Location of Company, Capital Stock, Shares, Assessments. Includes entries for Adams, S. L. C., Alice, S., Alma & Nelwood, etc.

G., Gold, S. Silver, L. Lead, C. Copper. \* Non-assessable. † This company, as the Western, up to Dec. 31, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends, and the Terra \$47,000. Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Co. Virginia 40,000,000. ¶ 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 \$190,000 before reorganization in 1890. ††† This company acquired the property of the Raymond & Ely Company, which had paid \$3,075,000 in dividends.



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

Main table containing stock quotations for various mining companies, including columns for company names, dates (April 25-30, May 1), and sales figures.

\*Ex dividend. †Dealt at in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. ¶Dividend shares sold, 14,500. Non-dividend shares sold, 32,910. Total New York, 47,410.

BOSTON MINING STOCK QUOTATIONS.

Table containing Boston mining stock quotations, including columns for company names, dates (April 24-30), and sales figures.

Boston: Dividend shares sold, 3,869. Non-dividend shares sold, 5,051. Total Boston, 8,920.

COAL STOCKS.

Table containing coal stock quotations, including columns for company names, par value of shares, and prices for various dates (April 25-30, May 1).

\*\*Sales in New York, 33,770; in Philadelphia 14,876. Total sales, 48,646.

San Francisco Mining Stock Quotations.

CLOSING QUOTATIONS.

Table containing San Francisco mining stock closing quotations, including columns for company names and prices for various dates (April 24-30).

STOCK MARKET QUOTATIONS.

Baltimore, Md.

Table with columns: COMPANY, Bid, Asked. Lists various coal and iron companies with their respective market prices.

Birmingham, Ala. April 29.

Table with columns: COMPANY, Bid, Asked. Lists various coal and iron companies with their respective market prices.

Pittsburg, Pa. April 30.

Table with columns: COMPANY, B, A, Closing. Lists various gas and coal companies with their respective market prices.

St. Louis. April 29.

Table with columns: COMPANY, H, L. Lists various metal and commodity prices.

Table listing various commodities and their prices, including items like Mickey Breen, Mountain Key, and various oils.

Trust Stocks. May 1.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange: CERTIFICATES.

Trust Receipts.

Sales at the New York Stock Exchange week ending May 1: American Cotton Oil, National Lead, etc.

Foreign Quotations.

Table with columns: COMPANY, Highest, Lowest. Lists various international commodity prices.

Paris. April 16.

Table listing various commodity prices in Paris, including items like Belmez Spain, Callao Venez, etc.

CURRENT PRICES.

Those quotations are for wholesale lots in New York. CHEMICALS AND MINERALS. Acid-Acetic, No. 8, pure, 1.04, etc.

Table listing various chemical and mineral products and their prices, including items like Absolute, Ammoniated, Alum-Lump, etc.

Table listing various chemical and mineral products and their prices, including items like Ammonia-Sulph, Aqua Ammonia, etc.

Table listing various chemical and mineral products and their prices, including items like Acid phosphate, Argols, Arsenic, etc.

Table listing various chemical and mineral products and their prices, including items like Baryum-Nitrate, Barytes-Sulph, etc.

Table listing various chemical and mineral products and their prices, including items like Bichromate of Potash, Bismuth, etc.

Table listing various chemical and mineral products and their prices, including items like Cobalt-Oxide, Copper-Sulph, etc.

Table listing various chemical and mineral products and their prices, including items like Cream of Tartar, Eryolite, etc.

Table listing various chemical and mineral products and their prices, including items like Feldspar, Fluorspar, etc.

Table listing various chemical and mineral products and their prices, including items like Lead-Red, Lime Acetate, etc.

Table listing various chemical and mineral products and their prices, including items like Chlorate, Carb, Caustic, etc.

Table listing various chemical and mineral products and their prices, including items like Pyrites, Quartz-Ground, etc.

Table listing various chemical and mineral products and their prices, including items like Soda-Nitrate, Prussiate, etc.

Table listing various chemical and mineral products and their prices, including items like Strontium-Nitrate, Syllvinit, etc.

Table listing various chemical and mineral products and their prices, including items like Terra Alba-French, English, etc.

Table listing various chemical and mineral products and their prices, including items like Vermillion, Am. quicksilver, etc.

Table listing various chemical and mineral products and their prices, including items like Zinc Oxide, Antwerp, etc.

Table listing various chemical and mineral products and their prices, including items like Aluminum, Arsenic, Barium, etc.

THE RARER METALS.

Table listing various rare metals and their prices, including Aluminum, Arsenic, Barium, Bismuth, Cadmium, etc.

BUILDING MATERIAL.

Table listing various building materials and their prices, including Bricks, Building Stone, etc.

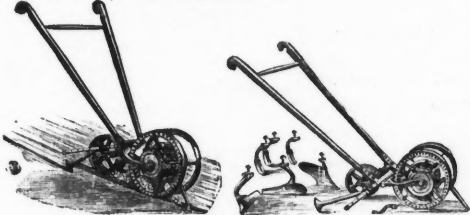
**NEW YORK PRICES CURRENT  
MAY 2, 1891.**

In the interest of the extension of the markets for American manufactures the ENGINEERING AND MINING JOURNAL has secured the services of gentlemen thoroughly acquainted with the export trade and with foreign markets, and it offers its services to foreign buyers who may desire information concerning any article whatever of American manufacture. No charge will be made for these services, either directly or indirectly through commissions on goods purchased. The proprietors of the ENGINEERING AND MINING JOURNAL are neither commission merchants nor exporters, but they have many sources of information, both at home and in foreign countries, and place these at the service of manufacturers and exporters here and of importers and consumers in other countries.

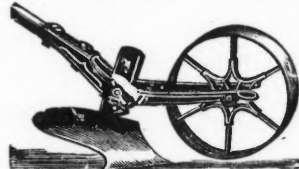
The names and addresses of the manufacturers of goods quoted in this list can be obtained by applying at this office.

**Discounts are for Wholesale Export Only.**

**Agricultural Implements.**



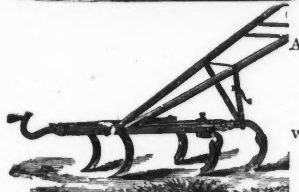
"Planet, Jr." No. 2 Seed Drill, \$9. Dis. 30%.  
Combined Drill Cultivator, Rake, Plow, etc., \$12. Dis. 30%.



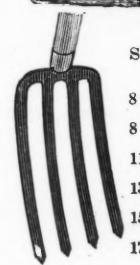
"Fire Fly" single-wheel Hoe, Cultivator and Plow, \$5.  
"Fire Fly" Hand Plow, \$2.50.  
30% discount, f.o.b. New York.



All Steel Horse Hoe and Cultivator combined, with wheel, \$6 75-100 net.



All Steel Plain Cultivator.  
With wheel, \$4.50;  
without wheel, 60c.



**HAY FORKS.**  
Standard Spading Forks.  
Solid Steel Shanks, Gold Bronze Finish, Patent Overcaps.  
Per doz.

8 D 4 light angular tine, iron D, plain ferrules, \$17.00.  
8 D S 4 light angular tine, iron D, strapped ferrules, \$18.50.  
11 D 4 light angular tine, iron D, plain ferrules, blue, half polished, \$16.00.  
13 D 4 light angular tine, iron D, strapped ferrules, blue, half polished, \$17.50.  
15 D 5 tine, angular tine, iron D, plain ferrules, \$21.00.  
17 D 5 tine, angular tine, iron D, strapped ferrules, \$25.50.

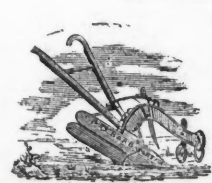
**Flat Tines.**  
D 4 tine spading fork, flat tine, iron D, plain ferrules, \$17.00.  
D S 4 tine spading fork, flat tine, iron D, strapped ferrules, \$18.50.



7 1/4 4 tine spading fork, flat tine, 4 ft. handles, plain ferrules, \$16.00.  
7 1/4 S 4 tine spading fork, flat tine, 4 ft. handles, strapped ferrules, \$17.50.  
Dis., 65 and 5% and 2 1/2%.

**Manure Forks.**  
4 D, oval, 4 tine, 13 in. tine, iron D, plain ferrules, \$13.50.  
4 D S, oval, 4 tine, 13 in. tine, iron D, strapped ferrules, \$15.00.  
5 D, oval, 5 tine, 13 in. tine, iron D, plain ferrules, \$20.50.  
5 D S, oval, 5 tine, 13 in. tine, iron D, strapped ferrules, \$22.00.  
6 D, oval, 6 tine, 13 in. tine, iron D, plain ferrules, \$23.50.  
6 D S, oval, 6 tine, 13 in. tine, iron D, strapped ferrules, \$25.00.  
Dis., 65 and 5% and 2 1/2%.

**PLOWS.**  
Reversible Oneonta Clipper.



16. Oneonta Clipper, Reversible, Iron beam Cutter, \$14.  
" Oneonta Clipper, Reversible, Iron Wheel and Cutter, \$15.  
18. Oneonta Clipper, Reversible, Iron Beam Cutter, \$15.  
" Oneonta Clipper, Reversible, Iron Beam, Wheel and Cutter, \$16.

Hard Metal, Reversible, Iron Beam Cutter, \$16.

17. Hard Metal, Reversible, Iron Beam, Wheel and Jointer, \$17.  
19. Hard Metal, Reversible, Wood Beam Cutter, Wheel and Jointer, \$16.  
20. Steel Mould Board, Reversible, Wood Beam Cutter and Cutter, \$15.

**Iron Beam Plows.**  
Two-horse Sod and Stony Land, 8.50 plain.  
Curtis's Sod Two horse, 11.50.  
" " " " " " 13.00 cutter.  
" " " " " " 14.25 wheel & cutter.

**Subsoil Plows.**  
Two-horse 9.50 Draft Rod, 11.00 Wheel and Draft Rod.  
Hitchcock's Potato Digger and Shovel Plow.  
Improved adjustable handle shovel plow, 7.00.  
Hitchcock's Potato Digger, 8.00.  
" " " " " " and shovel plow, 10.50.  
Dis. 30%.

**HOES.**  
Blade Solid Shank Hoes.

Field, 7 x 5 in., selected handles, \$8.00.  
" 7 1/2 x 4 1/2 " " " " 8.00.  
" 8 x 4 1/2 " " " " 8.00.  
" 8 1/2 x 4 1/2 " " " " 8.00.  
" 8 x 5 " " " " 8.00.



Field Socket Hoes, \$9.00.  
Dis., 65% and 5%.

**RAKES.**  
The S. R. N. Improved.  
20 Teeth, \$28.00.  
22 " " " " 29.00.  
24 " " " " 30.00.  
26 " " " " 31.00.  
Dis., 33 1/2%.



Golden Farmer Self-Dumping Rake, \$19.00; 22 eu. ft., 430 lbs. gro., 250 lbs. net.  
Chieftain Hay Tedders, \$27.00; 700 lbs. gro., 450 lbs. net.  
Potato Diggers, \$5.00; 100 lbs. gro., 60 lbs. All net cash, f.o.b. ship New York or Boston.

**RAKES (GARDEN).**  
Malleable Iron Garden Rakes, Per Doz.

Plain.	
8 teeth, 6-ft. handles, straight shank	\$5.00
10 " " " " " "	5.50
12 " " " " " "	6.00
14 " " " " " "	6.50
16 " " " " " "	7.00

For braced goods, add 50 cents per dozen to list.

**Cast Steel Garden Rakes, Per Doz.**

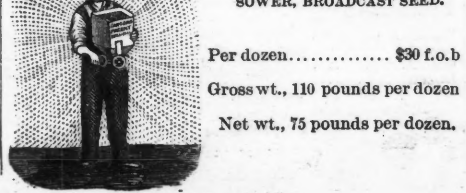
Plain.		Braaced.	
8 teeth, 6-ft. handles	\$8.00	9.50	10.50
10 " " " " " "	9.00	10.50	11.50
12 " " " " " "	10.00	11.50	12.50
14 " " " " " "	11.00	12.50	13.50
16 " " " " " "	12.00		

**Lawn Rakes and Gravel Rakes same price as Garden Rakes.**  
Discounts on Rakes from list.  
The P. H. & M. Co., 60 and 10%.  
W. & C. Mfg. Co., 70%.  
S. F. & T. Co., 70 and 5%.  
G. T. Co., 70 and 5%.  
Phila. S. H., 60, 10 and 5%.

**SCYTHES (GRASS).**  
Waldron's pattern, oiled, \$3.50.  
Silver steel, painted, 8.50.  
Western dutchman, bronzed and painted, 9.00.  
Clipper, polished web, 10.00.  
Fine cutlery steel, full polished, 10.00.  
All steel, full polished, 11.00.

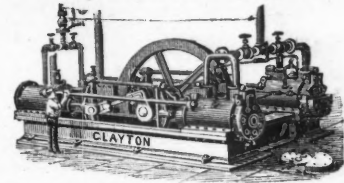
**Grain Scythes.**  
Waldron's pattern, oiled, 11.25.  
Silver steel, painted, 11.25.  
Clipper, oiled, 11.25.  
Clipper, bronzed and painted, 11.50.

**Lawn Scythes.**  
Clipper, bronzed and painted, 9.0.  
Dis., 40 and 10%.



**SOWER, BROADCAST SEED.**  
Per dozen, \$30 f.o.b.  
Gross wt., 110 pounds per dozen.  
Net wt., 75 pounds per dozen.

**Air Compressors.**  
Clayton Duplex Air Compressors.



Special design for export. Shipping weight, 8,000 lbs. No one piece weighing over 300 to 400 lbs. Size No. 314. Steam cylinders, each 12 in. diameter; air cylinders, each 12 in. diameter, and stroke, 13 in.; capacity, six 3 in. rock drills. Price, \$3,000 f.o.b. New York. Dis., 20%.

**Anvils.** "Eagle anvils."  
Weight about \$1.00 No. 4, 40 lbs., \$4.25.  
" " " " " " 1.75 " 5, 50 " " 5.00.  
" " " " " " 2.25 " 6, 60 " " 5.50.  
" " " " " " 2.75 " 7, 70 " " 6.00.  
" " " " " " 3.00 " 8, 80 " " 7.00.  
" " " " " " 3.75 " 9, 90 " " 8.00.  
Anvils weighing 100 to 300 lbs., 10 cts. per lb. Discount 15 and 10%.

**Arms and Ammunition.**  
Wood Powder, 1/4 kegs, 6 1/4 1 lb. lbs. cans, 5.00 .85.  
Trap for first quality arms \$19.50.  
9.85 trap, 8.60 let'd grades.

A, for large bore, 17.00 4.35 .75.  
C, for general use, 17.00 4.35 .75.  
D, fine for small bore and rifles, 17.00 4.35 .75.  
E, very fine for small bore rifles and gallery shooting, 17.00 4.35 .75.  
Dis., 20-5 and 5%.

Bullet Breech Caps, per lb. 1.60 10.  
Cortical Bullet Caps, " 1.75 10.  
Rim Fire Cartridges, 60 10.  
Military Rim Fire Cartridges, 15 10.  
Central Fire Pistol and Rifle Cartridges, 40 10.  
Central Fire Metallic Cartridges for Target and Sporting Rifles, 30 10.  
Military Cartridges, Central Fire, 30 10.  
Lefauchaux Cartridges, 60 10.



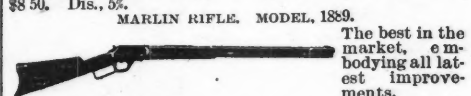
Gatling Cartridges, 25 special.  
Primed Shells and Bullets, 20 10.  
Friction Cannon Primers, 20 10.  
Primers, 20 10.  
Perussion Caps, F. C., per M., 33c.  
U. M. C., 42 1/2c.  
Musket, 60 10.  
Brass Shot Shells, U. M. C., 1st qual., 65 10.  
Club brand, 65 10.



**Paper Shot Shells.**  
14, 16 and 20 ga. First quality, 30, 10 and 10 per cent.  
4, 8, 10 and 12 ga., First quality, 25, 10 and 10 per cent.

14, 16 and 20 ga. Club brand, 30, 10 and 10 per cent.  
10 and 12 ga. Club brand, 33 1/2, 10 and 10 per cent.  
Gun Wads, 20 and 10 per cent.

**RIFLES.**  
Colts' Lightning Magazine.  
Discount 10 p cent.  
10 / 60 and 45 / 60 calibre octagon barrel, 10 lbs., \$15.38.  
" " " " round " " 9 1/2 " 14.25.  
" " " " carbine " " 9 " 14.25.  
32, 38, and 44 calibres, octagon " " 7 1/2 " 15.50.  
" " " " round " " 6 1/2 " 12.38.  
" " " " carbine " " 6 1/2 " 12.38.  
" " " " baby carbine " " 5 1/2 " 12.38.  
22 calibre, rim fire, octagon barrel, 15.38.  
" " " " round " " 14.25.  
Remington Light (Baby) carbines, 44 cal., blue, \$8; nick., \$8.50. Dis., 5%.



**MARLIN RIFLE, MODEL 1889.**  
The best in the market, embodying all latest improvements.  
38 an d 44 calibres, using the same cartridges as Winchester rifles of the respective sizes.  
Octagon barrel, 24 inch, 6 1/2 lbs., \$19.50.  
" " " " " " 26 " 6 1/2 " 21.50.  
" " " " " " 28 " 7 " 23.50.  
Round " " " " " " 24 " 6 1/2 " 18.50.  
Carbine " " " " " " 20 " 5 1/2 " 17.50.  
Discount, 25, 10 and 10%.

**REVOLVERS.**  
S & W.  
32, Single Action, 3, 3 1/2 in., \$8.00.  
32, Double Action, 3, 3 1/2 in., \$9.35.  
32, Safety Hammerless, 3, 3 1/2 in., \$ 00.  
38, Single Action, 3 1/4 in., \$9.40; 38, Single Actio 4 in., \$9.65; 38, Single Action, 5 in., \$10.00; 38, Double Action, 3 1/4 in., \$10.40; 38, Double Action, 4 in., \$10.65; 38, Double Action, 5 in., \$11.00; 38, Safety Hammerless, 3 1/4 in., \$ 00.



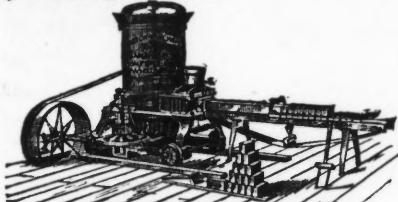


**Brick Machinery.**



Heavy Steam Power Machine.....	\$25.00
Horse-Power Machines.....	300.00
Additional Horizontal Pugmill.....	225
Brick Moulds.....	\$2.50 to \$3.00
Brick Trucks.....	5.00 to 13.50
Brick Barrows.....	7.25
Brick Barrows with Springs.....	8.20
Sand Barrows, steel tray.....	6.40

**Clay Working Machines.**



No.	Capacity.	Price.
No. 20 A brick machine.....	60,000 to 80M	\$3,500
No. 20 B " ".....	50,000	2,500
No. 15 D " ".....	40,000	1,800
No. 10 D " ".....	40,000	1,500
No. 15 S " ".....	30,000	1,400
No. 10 S " ".....	25,000	1,200
Upright stock brick machine.....	25,000 to 30M	1,200
No. 7 S brick machine.....	20,000	650
No. 6 S " ".....	15,000	575
No. 2 E " ".....	H. P..... 6,000 to 8,000	400

**Brushes.**

PAINT BRUSHES. Intermediate prices not quoted. Prices per dozen.

No.	4.	2.	0.	3-0.	5-0.	7-0.	Dis.
X.....	\$1.15	\$1.30	\$2.50	\$3.15	\$4.00	\$5.25	\$6.75 25%
Atlantic.....	1.25	2.15	3.80	5.25	7.00	10.00	13.00 25%
Standard.....	1.60	2.60	4.00	6.00	8.00	11.00	16.00 25%

**VARNISH OVAL.**

No.	4.	2.	0.	3-0.	5-0.	7-0.	Dis.
Globe.....	\$1.15	\$1.80	\$2.50	\$3.25	\$4.60	\$6.00	\$8.00 25%
Crown.....	1.25	2.00	2.75	4.00	5.25	7.00	10.00 25%

**VARNISH FLAT.**

No.	1 1/4.	2.	2 1/4.	3.	Dis.
X.....	\$0.48	\$0.72	\$0.96	\$1.20	\$1.40 25%

**SASH BRUSH.**

No.	1.	3.	5.	7.	9.	Dis.
X.....	\$0.25	\$0.40	\$0.60	\$0.85	\$1.20	25%
XX.....	0.40	0.75	1.10	1.40	2.00	25%

**WHITE-WASH.**

No.	6.	7.	8.	Dis.
Brown.....	\$1.25	\$1.60	\$2.00	25%
Pure.....	2.40	4.00	6.00	25%

**SHOE.**

No.	9.	25.	15.	26.	Dis.
10.....	\$11.50	\$12.50	\$15	\$18	25%

**HORSE.**

No.	Patent.	Dis.
18.00	Per gross, dis., 25%.	\$30.00
\$20.00		\$24.00

**SCRUB.**

No.	Patent.	Dis.
\$6.50	Per gross, dis., 25%.	\$12
\$3.50		\$14

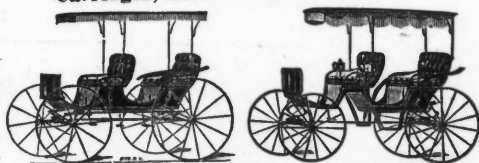
**SHAVING.**

No.	Dis.
\$0.36	Per doz., dis., 25%.
\$0.60	\$1.00
\$1.00	\$1.50
\$2.50	

**COUNTER.**

No.	Dis.
\$3.00	Per doz., dis., 25%.
\$4.00	\$5.00

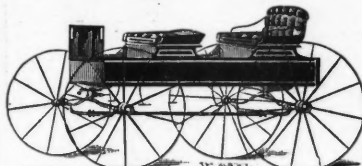
**Carriages, Etc.**



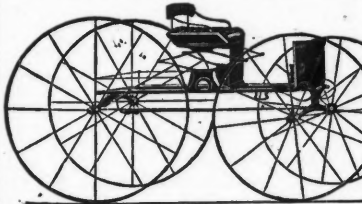
WindSOR Surrey. Open, \$120.	Cut under Surrey. Canopy top, \$185.
Canopy top, \$145.	Leather extension top, \$220.
Pole or shafts.	



Brewster Spring. Open, \$55. Rubber top, \$76. Leather top, \$100.



Runabout, \$65.



Buckboard. \$30 : shafts.



No. 0. Cart, top and fenders.....\$150  
 No. 1. Cart, top and fenders..... 90  
 No. 2. Cart, one man cart, open..... 65  
 No. 2. Cart, one man, top and fenders..... 88  
 No. 3-H. Cart, two man, open..... 54  
 No. 4. Cart, two man, top..... 86  
 No. 5. Cart, two man, top..... 90  
 No. 6. Cart, two men, top and fenders..... 90  
 No. 7. Two man combination cart..... 110

Wide track 5 feet. Narrow track 4 feet 8 inches. Discount 3 1/2 per cent. off.

**Crucibles.**

No.	Height.	Width.	Crucibles.	Covers.	Price.
BATTERSEA	4 1/2	4 1/2	\$1.00	\$0.50	
T.....	4	3 1/2	0.80	0.50	
U.....	3 1/2	3 1/2	0.60	0.40	
V.....	3 1/2	2 1/2	0.45	0.40	
W.....	2 1/2	2 1/2	0.35	0.30	
X.....	2 1/2	2 1/2	0.30	0.30	
Y.....	2 1/2	2 1/2	0.25	0.30	
Z.....	1 1/2	1 1/2	0.20	0.30	

Battersea Muffles, any size, made to order. See illustration in advertisement.

No.	Long.	Wide.	High.	Price.
A.....	7	3 1/2	2 1/2	\$ .60
B.....	7 1/2	4 1/2	2 1/2	.75
C.....	8	4 1/2	3	.85
D.....	8 1/2	5	3 1/2	1.00
E.....	9	5 1/2	3 1/2	1.15
F.....	10	6	4	1.25
G.....	11	6	4 1/2	1.00
H.....	10 1/2	5 1/2	3 1/2	1.00
J.....	12	6	4	1.25
K.....	14	8	5	1.75
L.....	15	9	6	2.00

Export discount 15 %.

**Cutlery.**

**KNIVES—TABLE.**

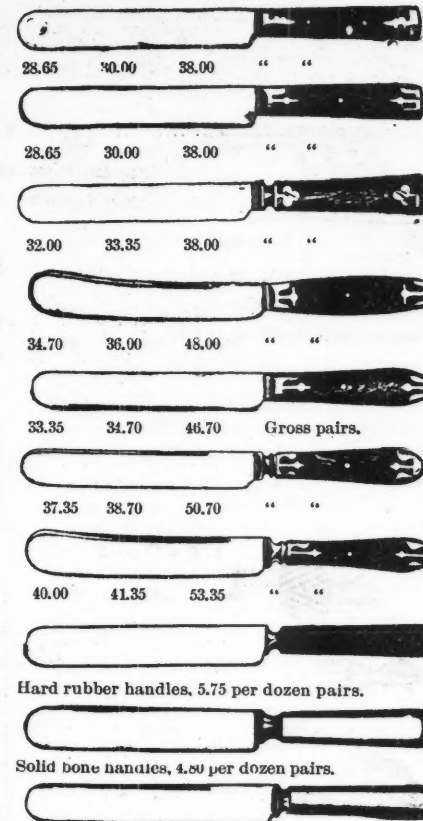
14.70	16.00	18.70	“	“	medium size.
17.35	18.70	24.00	“	“	full size.
17.35	18.70	21.35	“	“	medium.
20.00	21.35	26.70	“	“	full size.
22.70	24.00	29.35	“	“	
27.35	28.70	38.00	“	“	

Cocobola Ebony handles. 10.70 12.00 15.35 gross pairs.

Bone handles. 14.70 16.00 18.70 “ “ medium size. 17.35 18.70 24.00 “ “ full size.

22.70 24.00 29.35 “ “ medium. 27.35 28.70 38.00 “ “ full size.

Cocobola Ebony handles. 28.00 29.35 38.00 “ “ gross pairs.



Hard rubber handles, 5.75 per dozen pairs. Solid bone handles, 4.50 per dozen pairs. Celluloid handles, 7.35 per dozen pairs. Forks are made to match all above patterns, with either three or four prongs. Discount 25 %.

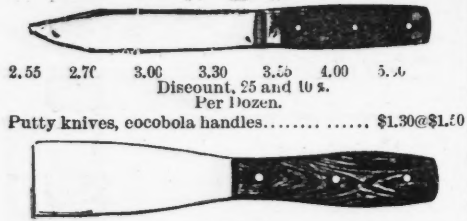
**BUTCHERS'—COCOBOLA HANDLES.**

1 and 1/2 in.	5 in.	5 1/2 in.	6 in.	6 1/2 in.	7 in.	8 in.	9 in.	10 in.
1.15	1.20	1.30	1.40	1.70	1.90	2.35	3.00	3.70 5.00
2.00	2.15	2.30	2.35	2.70	3.00	3.50	4.25	5.00 7.50
2.45	2.70	2.95	3.15	3.45	3.70	4.35	5.00	6.00
2.10	2.20	2.35	2.50	2.80	3.40	4.35	5.30	6.85
3.40	3.55	3.70	4.10	4.60	5.30	7.00	8.75	11.00
4.10	4.25	4.40	4.80	5.30	6.00	7.75	9.50	12.50
2.00	2.15	2.30	2.35	2.70	3.00	3.50	4.25	5.00

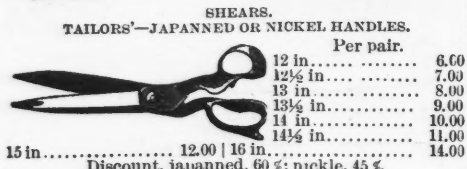
Discount 25 and 10 %.

HUNTING—EBONY HANDLES. 5 1/2 in. 6 in. 6 1/2 in. 7 in. 8 in. 9 in. Per Dozen.

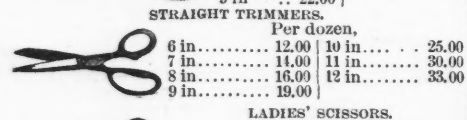
55 2.70 3.00 3.50 3.55 4.00 5.00



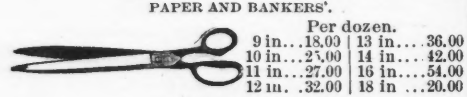
2.55 2.70 3.00 3.30 3.50 4.00 5.00  
Discount, 25 and 10 %  
Per dozen.  
Putty knives, cocobola handles..... \$1.30@\$1.70



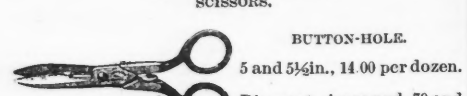
**SHEARS.**  
TAILORS'—JAPANNED OR NICKEL HANDLES.  
Per pair.  
12 in..... 6.00  
12½ in..... 7.00  
13 in..... 8.00  
13½ in..... 9.00  
14 in..... 10.00  
14½ in..... 11.00  
15 in..... 12.00 | 16 in..... 14.00  
Discount, japanned, 60 %; nickel, 45 %.



**BENT TRIMMERS.**  
Per dozen.  
6 in..... 13.00 | 10 in..... 27.00  
7 in..... 15.00 | 11 in..... 30.00  
8 in..... 17.00 | 12 in..... 33.00  
9 in..... 22.00



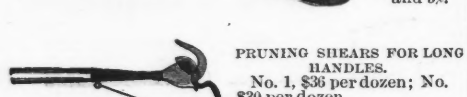
**STRAIGHT TRIMMERS.**  
Per dozen.  
6 in..... 12.00 | 10 in..... 25.00  
7 in..... 14.00 | 11 in..... 30.00  
8 in..... 16.00 | 12 in..... 33.00  
9 in..... 19.00



**LADIES' SCISSORS.**  
Per dozen.  
4½ in..... 10.00 | 6 in..... 11.00  
5 in..... 10.00 | 6½ in..... 12.00  
5½ in..... 10.50 | 7 in..... 13.00



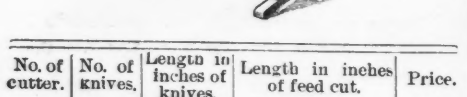
**PAPER AND BANKERS'.**  
Per dozen.  
9 in..... 18.00 | 13 in..... 36.00  
10 in..... 23.00 | 14 in..... 42.00  
11 in..... 27.00 | 16 in..... 54.00  
12 in..... 32.00 | 18 in..... 72.00



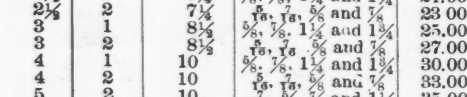
**BARBERS'—Per dozen.**  
7½ in..... 15.00 | 9 in..... 18.00  
8 in..... 16.00 | 9½ in..... 20.00  
8½ in..... 17.00



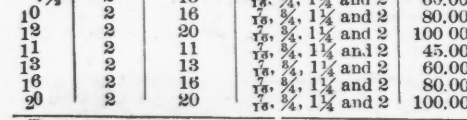
**SCISSORS.**  
**BUTTON-HOLE.**  
5 and 5½ in., 14.00 per dozen.  
Discount, japanned, 70 and 10 % nickel, 60 and 10 %



**PRUNING.**  
1 B., 9 in., 24 per dozen; 2 B. 3½ in., 21; 3 B., 7¾ in., 9.80.



**PRUNING SHEARS FOR LONG HANDLES.**  
No. 1, \$36 per dozen; No. \$30 per dozen.  
Discount, 40 and 5 %.



**Cutters.**  
LION CUTTER  
FEED.

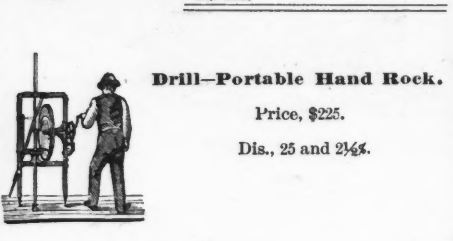
No. of cutter.	No. of knives.	Length in inches of knives.	Length in inches of feed cut.	Price.
1	2	6½	1½, ¾ and 1½	\$18.00
2	2	7½	1½, ¾ and 1½	21.00
2½	1	7½	¾, ¾, 1½ and 1½	21.00
2½	2	7½	¾, ¾, 1½ and 1½	23.00
3	1	8½	¾, ¾, 1½ and 1½	25.00
3	2	8½	¾, ¾, 1½ and 1½	27.00
4	1	10	¾, ¾, 1½ and 1½	30.00
4	2	10	¾, ¾, 1½ and 1½	33.00
5	2	10	¾, ¾, 1½ and 1½	35.00
6	2	11	¾, ¾, 1½ and 1½	45.00
6½	2	11	¾, ¾, 1½ and 2	45.00
7	2	13	¾, ¾, 1½ and 2	60.00
7½	2	13	¾, ¾, 1½ and 2	60.00
10	2	16	¾, ¾, 1½ and 2	80.00
12	2	20	¾, ¾, 1½ and 2	100.00
11	2	11	¾, ¾, 1½ and 2	45.00
13	2	13	¾, ¾, 1½ and 2	60.00
16	2	16	¾, ¾, 1½ and 2	80.00
20	2	20	¾, ¾, 1½ and 2	100.00

The knife arbors for all sizes are made of machinery steel. 30 per cent. dis.

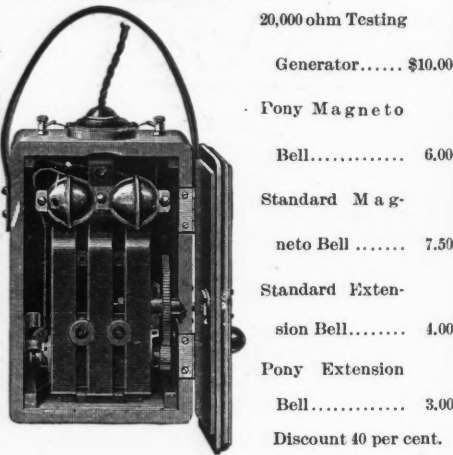
**VEGETABLE—GALE'S.**

Size.	Weight of Fly Wheel, Pounds.	Will cut per hour, Pounds.	Price
No. 1½	20	1,500	\$12
No. 2½	32	1,700	15
No. 3½	52	1,700	15
No. 4	42	2,000	18
No. 5	50	3,000	25
No 10	65	8,000	35

30% dis.



**Drill—Portable Hand Rock.**  
Price, \$225.  
Dis., 25 and 2½ %.

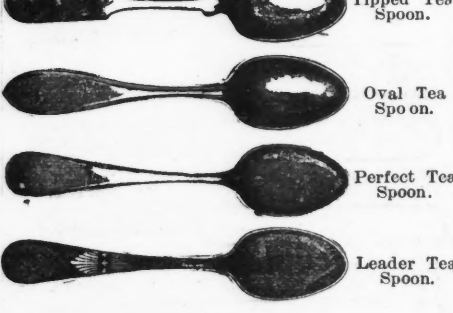


**Electrical Appliances.**  
20,000 ohm Testing Generator..... \$10.00  
Pony Magneto Bell..... 6.00  
Standard Mag-neto Bell ..... 7.50  
Standard Extension Bell..... 4.00  
Pony Extension Bell..... 3.00  
Discount 40 per cent.

**Electroplate.**

	Extra plate, per doz.	Double plate, per doz.	Triple plate, per doz.
Oyster forks.....	7.00	9.00	11.00
Sugar shells.....	9.00	11.00	13.00
Sugar tongs.....	25.50	31.50	37.50
Butter knives, twist or reversed handles.....	10.50	12.50	14.50
Nut picks.....	4.75	6.00	7.25
Pie knives, engraved blades.....	42.00	51.00	60.00
Soup ladles.....	48.00	60.00	72.00

Dis. 60 and 2%.  
Aesthetic medium fork.



Tea spoons. 7.50  
Table spoons. 15.00  
Medium forks. 15.00 per gross.  
Discount, 30 and 5 %.

Children's sets on cards. 3 pcs. 4 pcs.  
Leader pattern, as per cut... 21.00 24.00 doz. 60 and 5 %  
Aesthetic pattern, as per cut.. 5.75 7.25 doz. 30 and 5 %

**SPOONS, FORKS, ETC., BEST PLATE ON HARD WHITE METAL**

Tipped Tea Spoon.  
Oval Tea Spoon.  
Perfect Tea Spoon.  
Leader Tea Spoon.

5 oz. or extra plate—Perfect and Tipped Oval Leader.  
Tea spoons.... 4.25 4.50 4.75 per doz  
Dessert spoons... 7.50 8.00 8.50 " "  
Table spoons... 8.50 9.00 9.50 " "  
Coffee spoons... 4.25 4.50 4.75 " "  
Dessert forks... 7.50 8.00 8.50 " "  
Medium forks... 8.50 9.00 9.50 " "

Discount, 60 and 5 %.  
Spoons and forks, German silver, tipped pattern.  
Tea spoons. Table spoons. Medium forks.  
22.50 45.00 45.00 per gross.  
Discount, 60 and 2½ %.

Spoons and forks, made from brass, and silver plated or a coating of hard, white nickel.

**CASTERS.**



1,200—Dinner. Dis., 60 and 5%. 232—Breakfast.

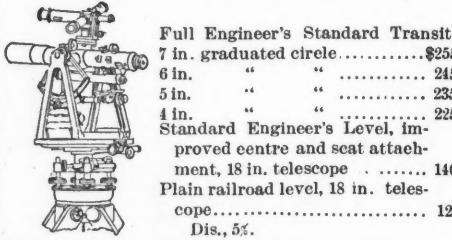


**PICKLE DISHES**  
No. 144, 12 in. high, \$3.50  
No. 66, 10½ in. high, \$2; as sorted colored glass.  
No. 155, 12 in. high, \$4; as sorted colored glass.  
No. 148, 12½ in. high, \$9; hand decorated glass.  
No. 156, 12½ in. high, \$6; hand decorated glass.

**TEA SETS.**  
No. 255, 6 pieces, \$35, quadruple plate.  
No. 391, 4 pieces, \$23, quadruple plate.  
No. 1847, 6 pieces, \$42, quadruple plate.

No. 146.  
No. 255.  
Dis., 60 and 5 %.

**Engineering Instruments.**



Full Engineer's Standard Transit.  
7 in. graduated circle..... \$255  
6 in. " "..... 245  
5 in. " "..... 235  
4 in. " "..... 225  
Standard Engineer's Level, improved centre and seat attachment, 18 in. telescope ..... 140  
Plain railroad level, 18 in. telescope..... 12  
Dis., 5 %.

**Explosives.**

Dynamite, 75% Nitro-Glycine, per lb..... .32  
60% " "..... .25  
40% " "..... .20  
Blasting powder A, per keg 25 lbs..... \$2.40  
" B, " "..... 1.90  
Sporting powder, standard brands, per keg 25 lbs... 5.00  
" " " " 12½ lbs. 2.75  
" " " " 6¼ lbs. 1.50  
" " " " 6¼ lbs. 3.00  
" " " " per can 1 lb... 60  
" " " " 1 lb..... 1.00  
Discounts special for quantity.  
Safety fuse, cotton, 12 M. ft. in case..... \$2.85 per M. ft.  
" single tape, 6 M. ft. in case.... 3.85 " "  
" " double tape " " " 4.85 " "  
" " triple tape " " " 5.60 " "  
Discount 17½ %.  
Detonating caps, triple force, 25 M. in case... \$5.00 per M.  
" quintuple force, 25 M. in case..... 7.50 per M.  
Electrical exploders, 4 ft. wires..... \$3.00 per 100  
" " " " 6 " " " 3.54 " "  
" " " " 8 " " " 4.08 " "  
" " " " 10 " " " 4.62 " "  
Discount 15%. Long lengths to order.

**Flouring Mill Machinery.**



20-inch New Era Mill for Wheat, Corn, and Middlings.  
Size. Power. Pulley. Capacity  
Inch. H. P. Inch. Bush.  
20 4 to 10 14 x 7 12 to 40  
Speed. Weight. Price.  
Lbs. Lbs. Lbs.  
500 to 800 600 150  
Farm and Plantations Mills.



Assd. tumblers, 8 to 9 1/2 oz., per doz., 25 c.



9 oz., per doz., \$2.50.

11 oz., assorted patterns, per doz., 25 cts.

1 oz. to 12 oz., nested for shipping, per doz. nest, \$2.

9. Goblets, banded, per doz., 65 cents; plain, 50c.  
9. Claret to match, per doz., 55 cents; plain, 45.  
9. Wines, to match, per doz., 50 cents; plain, 35c.  
9. Cordials, to match, per doz., 45 cents; plain, 35c.

No. 10. Goblets, per doz., 50 cts.  
Claret, " 45 "  
Wine " 35 "

No. 8. Banded, open, hollow stem. Champagne, per doz., \$1.25.

10. 1 1/2 Pt. tumbler, per doz., .50 cts.  
1/2 Pt. mug to match, " .65 "  
10. Goblet, " " .50 "

Spoon holder, cream pitcher, sugar butter dish to match. Sets of 4 pieces, per doz. sets, 48 pieces, \$3.50.

**Hand Carts**

No. 0 42 wheel in. tread, 1 in. axle-box 48x28x10 deep, \$10.50.  
No. 1, 36 wheel, 1 in. tread, 3/4 in. axle, box 40x23x10 deep, \$9.00.  
No. 2, 30 wheel, 3/4 in. tread, 3/4 in. axle, box 32x20x9 deep, \$8.25.  
With Wagon-Seat Spring.

No. 6, same sizes as No. 1, 10.50  
No. 7, same sizes as No. 1, 10.50  
No. 8, " " " " " " 9.75  
No. 9, " " " " " " 9.75

With Third Wheel, Without Springs.  
No. 3, same sizes as No. 0, \$12.00  
No. 4, " " " " " " 10.50  
No. 5, " " " " " " 9.50

**Hardware Specialties.**

**AUGERS.**

Patent Adjustable Hollow. No. 3.  
Cuts from 1/4 to 1 1/4. pivoted jaws, graduated scale to 1-16ths, per doz., \$60.00.  
Discount, 15 and 10%.

Patent Hollow Auger. No. 6.  
Inch..... 5-16 3/8 7-16 1/2  
With bits... 12.00 12.00 12.00 12.00  
Without bits 8.00 8.00 8.00 8.00  
9-16 3/4 1 1 1/2  
14.00 14.00 14.00 16.00 16.00 20.00  
9.00 9.00 9.00 13.00 13.00 14.00  
1 1/4 1 3/8 1 1/2  
20.00 24.00 24.00  
14.00 16.00 15.00

Discount, 15 and 10%.

**BENCH DRILL.**

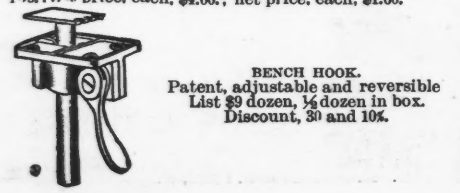
Adjustable bed plate. 26 1/2 high drills to 1/2 in. hole, 3/4 run of screw.  
List price, each \$10.00  
Net, " " " " 4.25



**Bench Vise, Steel Jaws, 3 1/2 in., opens 3 in.; weight, 12 lbs.; list price, each, \$4.00; net price, each, \$1.60.**

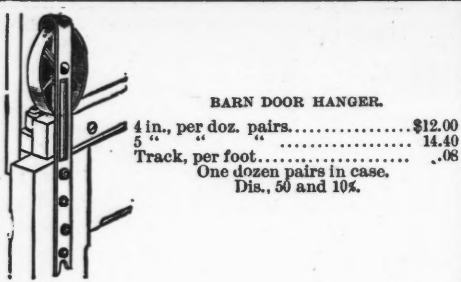
**BENCH HOOK.**

Patent, adjustable and reversible. List \$9 dozen, 1/2 dozen in box. Discount, 30 and 10%.



**BARN DOOR HANGER.**

4 in., per doz. pairs.....\$12.00  
5 " " " " " " 14.40  
Track, per foot..... .08  
One dozen pairs in case.  
Dis., 50 and 10%.



**BLACKSMITH'S TONGS.**

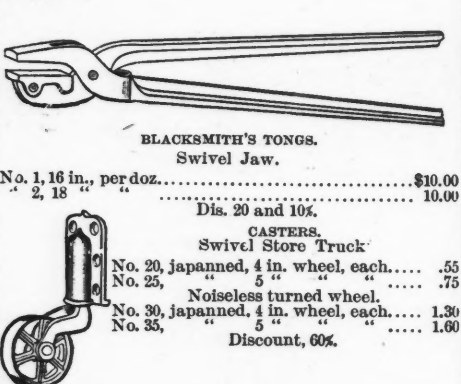
Swivel Jaw.

No. 1, 16 in., per doz.....\$10.00  
2, 18 " " " " " " 10.00  
Dis. 20 and 10%.

**CASTERS.**

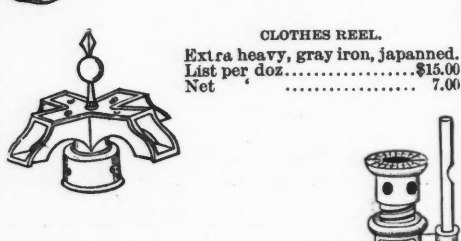
Swivel Store Truck

No. 20, japanned, 4 in. wheel, each..... .55  
No. 25, " " " " " " .75  
Noiseless turned wheel.  
No. 30, japanned, 4 in. wheel, each..... 1.30  
No. 35, " " " " " " 1.60  
Discount, 60%.



**CLOTHES REEL.**

Extra heavy, gray iron, japanned.  
List per doz.....\$15.00  
Net " " " " 7.00

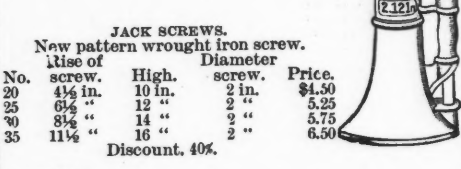


**JACK SCREWS.**

New pattern wrought iron screw.

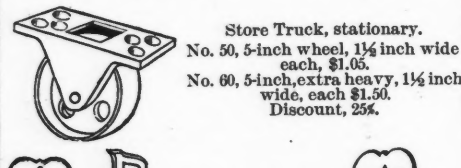
No.	Use of screw.	High.	Diameter.	Price.
20	4 1/2 in.	10 in.	2 in.	\$4.50
25	6 1/2 "	12 "	2 "	5.25
30	8 1/2 "	14 "	2 "	5.75
35	11 1/2 "	16 "	2 "	6.50

Discount, 40%.



**Store Truck, stationary.**

No. 50, 5-inch wheel, 1 1/2 inch wide each, \$1.05.  
No. 60, 5-inch, extra heavy, 1 1/2 inch wide, each \$1.50.  
Discount, 25%.

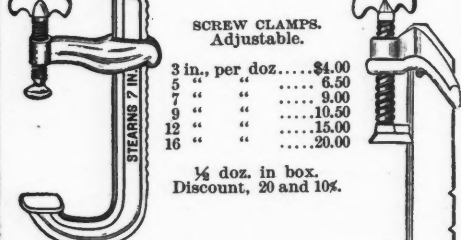


**SCREW CLAMPS.**

Adjustable.

3 in., per doz.....\$4.00
5 " " " " " " 6.50
7 " " " " " " 9.00
9 " " " " " " 10.50
12 " " " " " " 15.00
16 " " " " " " 20.00

1/2 doz. in box.  
Discount, 20 and 10%.



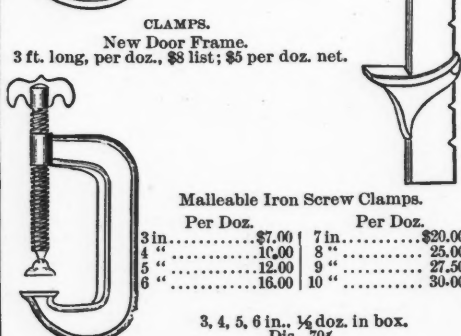
**CLAMPS.**

New Door Frame.  
3 ft. long, per doz., \$8 list; \$5 per doz. net.

**Malleable Iron Screw Clamps.**

Per Doz.	Per Doz.
3 in.....\$7.00	7 in.....\$20.00
4 ".....10.00	8 ".....25.00
5 ".....12.00	9 ".....27.50
6 ".....16.00	10 ".....30.00

3, 4, 5, 6 in., 1/2 doz. in box.  
Dis., 70%.



**WINDOW SCREEN FRAMES.**

Patent Japanned Corners.  
No. 25, 36 by 36 corners and screws, without bead, per doz., \$2.50.  
No. 25, 36 by 36 corners and screws, with bead, per doz., \$2.90.  
No. 35, 42 by 42 corners and screws, without bead, per doz., \$2.90.  
No. 35, 42 by 42 corners and screws, with bead, per doz., \$3.30.  
Black satin stain, sticks 3/4 by 1 in.  
Dis., 25, 10 and 5%.



**PULLEY HOOK (New Floor.)**

Deep cut thread, forged point.

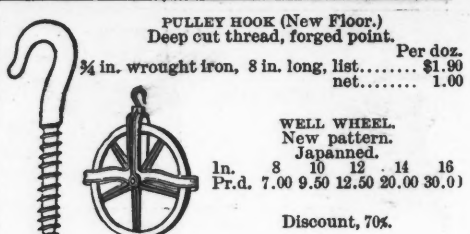
3/4 in. wrought iron, 8 in. long, list.....\$1.90  
net..... 1.00

**WELL WHEEL.**

New pattern.  
Japanned.

In.	8	10	12	14	16
Pr.d.	7.00	9.50	12.50	20.00	30.00

Discount, 70%.

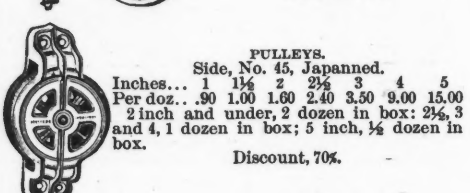


**PULLEYS.**

Side, No. 45, Japanned.

Inches...	1	1 1/2	2	2 1/2	3	4	5
Per doz. . . . .	.90	1.00	1.60	2.40	3.50	9.00	15.00

2 inch and under, 2 dozen in box; 2 1/2, 3 and 4, 1 dozen in box; 5 inch, 1/2 dozen in box.  
Discount, 70%.

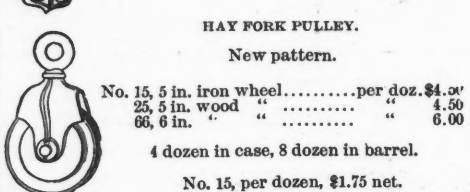


**HAY FORK PULLEY.**

New pattern.

No. 15, 5 in. iron wheel.....per doz. \$4.00  
25, 5 in. wood " " " " 4.50  
66, 6 in. " " " " 6.00

4 dozen in case, 8 dozen in barrel.  
No. 15, per dozen, \$1.75 net.

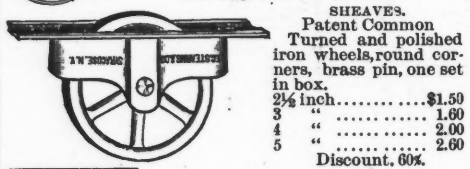


**SHEAVES.**

Patent Common  
Turned and polished  
iron wheels, round corners, brass pin, one set in box.

2 1/2 inch.....\$1.50
3 " " " " " " 1.60
4 " " " " " " 2.00
5 " " " " " " 2.60

Discount, 60%.

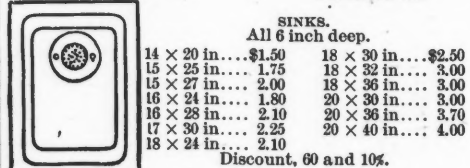


**SINKS.**

All 6 inch deep.

14 x 20 in. ....\$1.50	18 x 30 in. ....\$2.50
15 x 25 in. .... 1.75	18 x 32 in. .... 3.00
15 x 27 in. .... 2.00	18 x 36 in. .... 3.00
16 x 24 in. .... 1.80	20 x 30 in. .... 3.00
16 x 28 in. .... 2.10	20 x 36 in. .... 3.70
17 x 30 in. .... 2.25	20 x 40 in. .... 4.00
18 x 24 in. .... 2.10	

Discount, 60 and 10%.



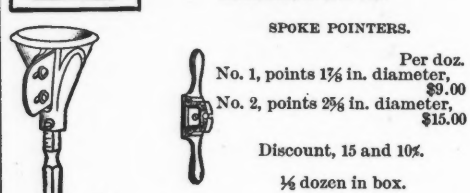
**SPOKE POINTERS.**

Per doz.

No. 1, points 1 1/2 in. diameter, \$9.00  
No. 2, points 2 1/2 in. diameter, \$15.00

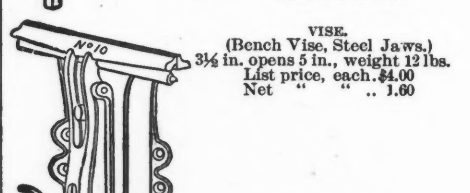
Discount, 15 and 10%.

1/2 dozen in box.



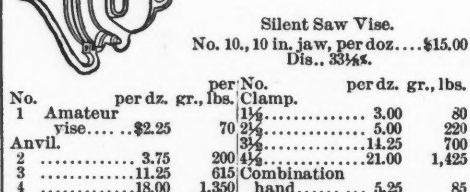
**WISE.**

(Bench Vise, Steel Jaws.)  
3 1/2 in. opens 5 in., weight 12 lbs.  
List price, each, \$4.00  
Net " " " " 1.60



**Silent Saw Vise.**

No. 10, 10 in. jaw, per doz. ....\$15.00  
Dis., 33 1/2%.



No.	per dz.	gr.	per No.	per dz.	gr., lbs.
1	Amateur		1 1/2	3.00	80
	vise.....\$2.25		70 3/4	5.00	220
2	Anvil	3.75	200 4 1/2	14.25	700
3		11.25	615 Combination	21.00	1,425
4		18.00	1,350 hand.....	5.25	85
10		24.00	1,675		

Spot cash discount, 33, 20 and 2, f.o.b.  
Nos. 1, 1 1/2, 2 and 2 1/2 are packed in dozens; Nos. 3 and 3 1/2 in half dozens; Nos. 4, 4 1/2 and 10 in quarter dozens, and No. 20 singly. Each hand vise is put up in neat box and packed in half dozen lots.  
1 Hinge pipe vise, 0 to 2 in. pipe..... Each \$10.00  
2 " " " " 0 to 4 in. pipe..... 20.00  
1 Malleable pipe vise, 0 to 2 in. pipe..... 8.00  
1 Combination pipe and bench vise, 0 to 2 in. pipe... 16.00  
Discount, 50%.

**WRENCHES.**

**Coes Wrenches.**

**BLACK.**

Knife Handle.

Size.	Per doz.	Size.	Per doz.
6 inch.....\$9.00	10 " " " " " " 12.00	15 inch..... 24.00	
8 " " " " " " 10.00	12 " " " " " " 14.00	18 " " " " " " 30.00	
	21 inch..... 36.00		

**BRIGHT.**

Knife Handle.

4 inch.....\$10.00	10 inch..... 14.00	18 inch.... 32.00
6 " " " " " " 10.00	12 " " " " " " 16.00	21 " " " " " " 33.00
8 " " " " " " 11.00	15 " " " " " " 26.00	

Discount, 55, 10, 7 1/2 and 3%.

Coes Mechanics' Screw Wrenches, same list, less 50, 10, 10, 7 1/2 and 3%.

Patent Screw Wrench, same list. Dis. 50, 10, 7 1/2 and 3%.







**PAPER LAMPS.**  
Lined with oil proof composition.

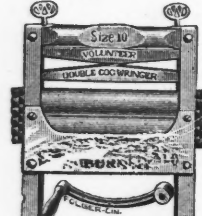
No. 0.	Height, 2 1/4 in.,	per doz...	\$1.00
No. 1.	" 3 "	" "	85
No. 2.	" 3 3/4 "	" "	1.25
No. 3.	" 5 "	" "	1.50
No. 4.	" 6 1/4 "	" "	1.75



**Washing Machine.**  
**THE CATARACT.**  
All Metal.  
Cubic Measurement 15 ft.  
Price \$20.  
Dis., 25%.



**Rolls.**  
"Volunteer." Length, 10 in. x 1 1/4 in. dia. \$40 per doz.  
"Volunteer." Length, 11 in. x 1 1/4 in. dia. \$50 per doz.  
"Volunteer." Length, 12 in. x 1 1/4 in. dia. \$60 per doz. Dis., 40%.



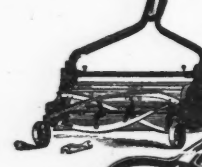
"Volunteer." Two independent pressure screws.  
"Daisy." Length, 10 in. x 1 1/4 in. dia. \$30 per doz.  
"Daisy." Length, 12 in. x 1 1/4 in. dia. \$18 per doz. Dis., 40%.



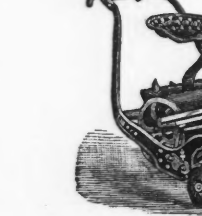
"Empire." Length, 10 in. x 1 1/4 in. dia. \$63 per doz.  
"Empire." Length, 11 in. x 1 1/4 in. dia. \$74 per doz.  
"Empire." Length, 12 in. x 1 1/4 in. dia. \$84 per doz.  
"Empire." Length, 12 in. x 1 3/8 in. dia. \$87 per doz.  
"Empire." Length, 14 in. x 2 1/4 in. dia. \$155 per doz.  
"Empire." Length, 14 in. x 2 1/4 in. dia. with pulleys. \$220 per doz.  
"Empire." Length, 16 in. x 2 1/4 in. dia. with pulleys. \$360 per doz. Dis., 40%.



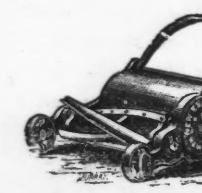
**Lawn Mowers.**  
n. Weight, 30 3/4 lbs. \$13.00  
2 " 31 1/2 " 15.00  
4 " 36 " 17.00  
16 Weight, 38 lbs. \$19.00  
41 " 21.00  
34.00  
Dis. 60 and 5%.



**Forward Cut Mowers.**  
10 in. \$13.00  
12 in. \$15.00  
14 in. \$17.00  
16 in. \$19.00  
18 in. \$21.00  
20 in. \$23.00  
24 in. \$30.00  
Geared at both ends. Dis. 60 and 10 and 5 and 5%.



**New Excelsior Horse Lawn Mower.**  
in. cut, without shafts or seat. \$65.00  
" " " with shaft and seat. 110.00  
" " " " " " " " 135.00  
" " " " " " " " 170.00  
boots, per set. 12.00  
Dis. 50%.



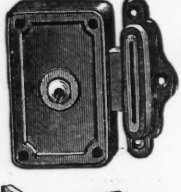
**Excelsior Three-Blade Mower and Roller.**  
8 in., \$11.00; 10 in., \$13.00; 12 in., \$15.00; 14 in., \$17.00; 16 in., \$19.00; 18 in., \$21.00; 20 in., \$23.00  
Dis. 60% and 5% cash, 30 days f.o.b. New York.

**Link Belting.**  
Price per running foot, net.

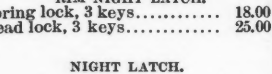
No.	Price.	No.	Price.
25	\$0.13	78	\$0.40
32	.13	83	.45
40	.12	85	.50
45	.13	88	.50
50	.14	95	.60
12	.16	103	.75
15	.16	105	.70
21	.20	106	.80
25	.25	107	.80
35	.22	108	.80
7	.24	109	.90
12	.30	114	1.10
16	.30	122	1.50
7	.30	124	1.30
15	.35	146	1.40
77	.35		

**Sprocket wheels.** 25%  
**Locks.**

**YALE PATENT. RIM STORE LATCH.**  
Per doz.  
3 x 5 in., 4 keys. \$48.00  
2 1/2 x 4 in., 3 keys. 39.00



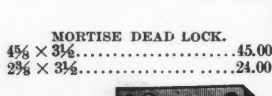
**RIM NIGHT LATCH.**  
Spring lock, 3 keys. 18.00  
Dead lock, 3 keys. 25.00



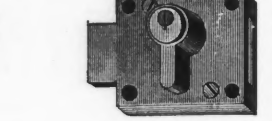
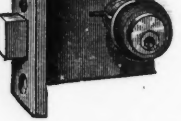
**NIGHT LATCH.**  
Escutcheon. 39.00  
" 36.00



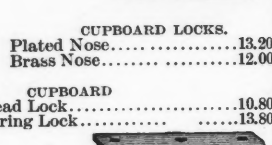
**MORTISE DEAD LOCK.**  
4 1/2 x 3 1/2. 45.00  
2 1/2 x 3 1/2. 24.00



**CUPBOARD LOCKS.**  
Plated Nose. 13.20  
Brass Nose. 12.00



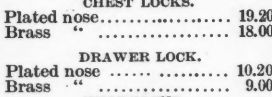
**CUPBOARD.**  
Dead Lock. 10.80  
Spring Lock. 13.80



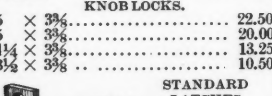
**CHEST LOCKS.**  
Plated nose. 19.20  
Brass. 18.00



**DRAWER LOCK.**  
Plated nose. 10.20  
Brass. 9.00



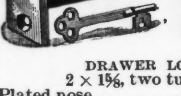
**KNOB LOCKS.**  
5 x 3 3/4. 22.50  
5 x 3 1/2. 20.00  
4 1/4 x 3 3/4. 13.25  
3 1/2 x 3 3/4. 10.50



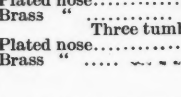
**STANDARD LATCHES.**  
Dead locks.  
3 3/4 x 2 3/4. 24.00  
2 1/4 x 3 3/4. 14.00  
1 3/4 x 2 3/4. 12.00



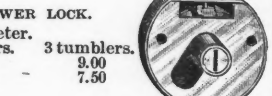
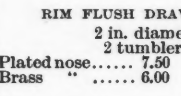
**NIGHT LATCHES.**  
3 1/4 x 3 3/4. 20.00  
2 1/4 x 3 3/4. 18.00



**DRAWER LOCKS.**  
2 x 1 1/2, two tumblers.  
Plated nose. 7.50  
Brass. 6.00  
Three tumblers.  
Plated nose. 9.00  
Brass. 7.50



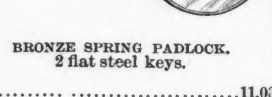
**RIM FLUSH DRAWER LOCK.**  
2 in. diameter.  
2 tumblers. 7.50  
3 tumblers. 9.00  
Brass. 6.00



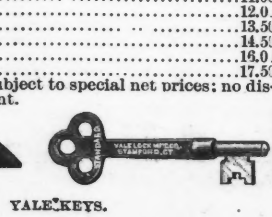
**BRONZE SPRING PADLOCK.**  
2 flat steel keys.

In.	11.00
1 1/4	12.00
1 1/2	13.50
1 3/4	14.50
2	16.00
2 1/4	17.50

Subject to special net prices; no discount.



**YALE KEYS.**  
SECURITY  
YALE LOCK WORKS  
TRADE MARK

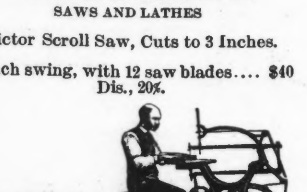


**Machinery—Foot Power.**

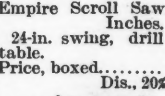
**Engine Lathes**  
8 in. swing, 20 in. bet. centers, 36 in. bed, 240 lbs. weight, \$60.  
8 in. swing, 30 in. bet. centers, 46 in. bed, 260 lbs. weight, \$70.  
8 in. swing, 36 in. bet. centers, 52 in. bed, 280 lbs. weight, \$75.  
Boxing for export, \$2.50 extra; f.o.b. at Cincinnati, 25% dis.



**SAWS AND LATHES**  
Victor Scroll Saw, Cuts to 3 Inches.  
24-inch swing, with 12 saw blades. \$40  
Dis., 20%.



Empire Scroll Saw, Cuts to 3 Inches.  
24-in. swing, drill and tilting table.  
Price, boxed. \$25  
Dis., 20%



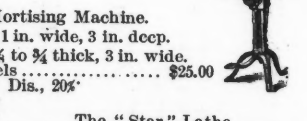
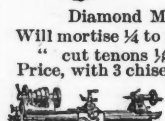
**The Acme Combination Saw.**  
Hand or steam power.  
Adjustable table and gauges.  
Price, boxed. \$40  
Scroll saw attachment. 10  
Boring attachment. 10  
Moulding attachment. 10  
Dis., 20%.



**Paragon Self Feed Rip Saw.**  
Two changes of speed; three changes of feed.  
Price, with one 10 in. saw, \$50.00  
Dis., 20%.



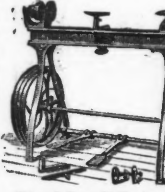
**Diamond Mortising Machine.**  
Will mortise 1/4 to 1 in. wide, 3 in. deep.  
" cut tenons 1/4 to 3/4 thick, 3 in. wide.  
Price, with 3 chisels. \$25.00  
Dis., 20%



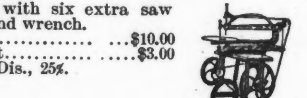
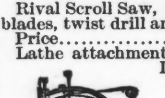
**The "Star" Lathe.**  
Swings 9 x 25 in., back geared screw cutting.  
Feeds in or out, right or left. Ad justable Tail Stock for Tapers.  
Price, No. 1. \$75.00  
Dis., 20%.



**The Crown Lathe.**  
Swings 8 x 24 in.  
Price, boxed, No. 1. \$30.00  
Compound slide rest. 10.0  
Countershaft. 10.0  
Dis., 20%.



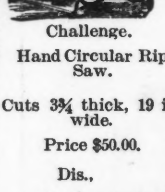
Rival Scroll Saw, with six extra saw blades, twist drill and wrench.  
Price. \$10.00  
Lathe attachment. \$3.00  
Dis., 25%.



**Challenge.**  
Hand Circular Rip Saw.  
Cuts 3 1/4 thick, 19 in. wide.  
Price \$50.00.  
Dis.,



**Scroll and Circular saw Combined. Combined Machines.**  
Combined circular scroll saw and boring attachment—2 circular saws, 12 assorted scroll saws, boring attachment, and self-centering drill chuck. \$50.00  
Combined circular and scroll saw—2 circular and 12 scroll saws. 40.00  
Circular saw—1 extra rip and 1 cross-cut saw. 35.00  
Counter shaft for steam power. 10.00  
Dis., 25%.





Foot Power Former.  
\$20.00; Knives extra, \$1.00 each.  
Dis., 35%.



Mortising Machine.  
\$22.00; Chisels, \$1.00 each.

Dis., 35%.  
Blind Slat Chisels, 3 set bits, \$5.00.  
Dis., 20%.



Tenoning Machine.  
Price, \$25.  
Dis., 35%.



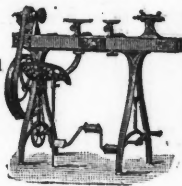
Velocipede Scroll Saw.

Without boring attachment.....\$20.00  
With 1 doz. saw blades, } Included. Dis., 35%.  
1 3-16 bit.

Lathe.

centres, 1 spur, 2 tool rests and sockets, 1 turned face-plate, \$35.

Dis., 30%.



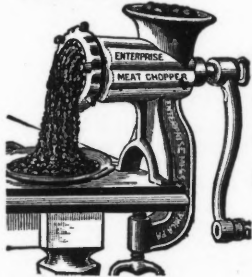
Lathe.

One turned face-plate, two pointed and one spur center, two rests, with sockets and plate for hand tools, slide rest-wrench, belting, etc., \$40.

Dis., 25%.



Meat Cutters.

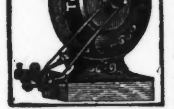


5, each.....\$2.00  
10, ".....3.00  
22, ".....4.00  
41, ".....50.00  
This is a power machine.

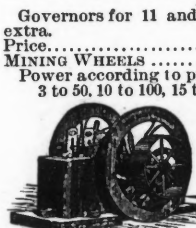
Dis., 50%.

Enterpris Motors (Water).

Size No. 8, for Sewing Machines, etc., \$18 each.  
No. 9, 1/4 horse-power (30 lbs. pressure), 1/4 b. p. (50 lbs.), 1/2 h. p. (100 lbs.), 3/4 b. p. (150 lbs.), 1 b. p. (200 lbs.), \$30.  
No. 10, 1/2 horse-power (30 lbs. pressure), 1/2 h. p. (50 lbs.), 1 b. p. (100 lbs.), 1 1/2 h. p. (150 lbs.), 2 b. p. (200 lbs.), \$35.  
No. 10 1/2, 3/4 horse-power (30 lbs. pressure), 1 h. p. (50 lbs.), 2 h. p. (100 lbs.), 3 h. p. (150 lbs.), 4 b. p. (200 lbs.), \$75.  
No. 11, 1 horse-power (30 lbs. pressure), 1 1/4 h. p. (50 lbs.), 3 b. p. (100 lbs.), 4 1/4 h. p. (150 lbs.), 6 h. p. (200 lbs.), \$100.  
No. 12, 2 horse-power (30 lbs. pressure), 3 h. p. (50 lbs.), 6 h. p. (100 lbs.), 9 b. p. (150 lbs.), 12 h. p. (200 lbs.), \$175.  
No. 13, 3 horse-power (30 lbs. pressure), 5 b. p. (100 lbs.), 10 h. p. (150 lbs.), 15 b. p. (200 lbs.), 20 h. p. (250 lbs.), \$285.  
Dis., 30%.



Governors for 11 and 12, \$25 extra; for No. 13, \$35 extra.  
Price.....\$120 \$160 \$200 \$250 \$300  
MINING WHEELS.....16 18 20 22 24  
Power according to pressure:  
3 to 50, 10 to 100, 15 to 150, 20 to 200, 30 to 300 H. P.



Concentrating Machinery.

Blake Improved Crusher: 10x7, weight 7,500; \$410.00.  
Blake Improved Crusher: 15x9, weight 9,000; \$580.00.  
Discount 25%.

Cornish Crushing Rollers:  
20 diameter, 10 face, weight 5,400; \$450.00.  
Cornish Crushing Rollers: 20 diameter, 14 face, weight 6,000; \$500.00.  
Cornish Crushing Rollers: 22 diameter, 14 face, weight 2,500; \$623.00.  
Cornish Crushing Rollers: 27 diameter, 14 face, weight 13,000; \$750.00.  
Cornish Crushing Rollers: 30 diameter, 14 face, weight 15,000; \$850.00.  
Discount 25%.

Complete Sizing Arrangement, consisting of Revolving Screens of Steel Sheet and Hydraulic Classifier.  
For Concentrator, 25 tons capacity, \$250; 50 tons capacity, \$350; 75 tons capacity, \$450; 100 tons capacity, \$600.  
Automatic, 10 per cent.  
Automatic working Jig Machines, all complete, wood-work included, with slide motion: 2 sieves, \$30; 3 sieves, \$360; 4 sieves, \$450.

With Eccentric Motion, all complete, woodwork included: 1 sieve, \$200; 2 sieves, \$270; 3 sieves, \$320; 4 sieves, \$330.  
Automatic working Double Jig Macbines, all complete, woodwork included: 4 sieves, \$210; 6 sieves, \$335; 8 sieves, \$425. Discount, 25 per cent.  
Single Rittinger Percussion Tables, all the iron parts, \$350; Double Rittinger Percussion Tables, all the iron parts, \$500. Discount, 10 per cent.  
Improved Rotary Tables, all the iron parts and pipes, \$2.0. Discount, 25 per cent.

Nails and Tacks.

Swedes.		Tacks.	
Per doz.	1/4 3/4 1 1 1/2 2 2 1/2 3	1 1 1/2 2 2 1/2 3	
1/2 wt.	35 40 46 50 55 60 65 75	18 20 24 28 32 36 40 44	
6 8 10 12 14 16 18 20 24 oz.			
85 1.00 1.20 1.40 1.60 1.75 1.85 2.15 2.55			
Doz. full weight	1/2 3/4 1 1 1/2 2 2 1/2 3 4		
6 8 10 12 14 16 18 20 24 oz.			
1.60 1.90 2.30 2.70 3.10 3.40 3.80 4.20 5.00			
lb., bulk	1/2 3/4 1 1 1/2 2 2 1/2 3 4		
or paper	1.60 1.25 1.00 80 66 53 52 46		
6 8 10 12 14 16 18 20 24			
36 32 31 30 29 28 28 23 23			

O. H. Swedes.

Price, same as Swedes.  
Swedes steel tacks same list price as iron.

Discounts, 7 1/2%, 10 and 2%.

Cut Tacks.		Price per dozen ounces.	
1/4 wt.	1 1 1/2 2 2 1/2 3 4 6 8 10	1 1 1/2 2 2 1/2 3 4 6 8 10	
1/2 wt.	1 1 1/2 2 2 1/2 3 4 6 8 10	1 1 1/2 2 2 1/2 3 4 6 8 10	
Full wt.	1 1 1/2 2 2 1/2 3 4 6 8 10	1 1 1/2 2 2 1/2 3 4 6 8 10	

Carpet Tacks, flat and oval heads.

Blued, doz.	oz. 4 6 8 10 12 14 16 18 20
1/4 wt.	35 40 45 50 55 65 75 85 95
1/2 wt.	1.05 1.15
Full wt.	4 6 8 10 12 14 16 18 20
1.10 1.25 1.40 1.55 1.70	
80 90 90 1.00 1.10 1.20 1.30 1.50	
10 12 14 16 18 20	
1.80 2.10 2.40 2.70 3.00 3.30	

Finishing Nails.

Inch.	2-8..... .50	3-8..... .60	4-8..... .65	4-8..... .72	5-8..... .78	6-8..... .85	7-8..... .90
1 1/2	1.12	1.12	1.26	1.32	1.52	1.82	2.25
1 3/4	1.26	1.32	1.52	1.82	2.25	2.43	
2	1.82	2.25	2.43				

Common and patent brads.

Price per doz.	Price per doz.	Price per lb. in papers or bulk.
1/2 wt.	full wt.	
1.00 1.00 1.25		
1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00		

Oil.

Lubrolaine A cylinder oil 50 in. barrels.  
Lubrolaine D cylinder oil 40 in. barrels.  
Lubrolaine A machine oil 45 in. barrels.  
Lubrolaine B machine oil 35 in. barrels.  
Lubrolaine A engine oil 50 in. barrels.  
Lubrolaine B engine oil 40 in. barrels.  
In cases 50 gal. extra.  
Crescent Axle Grease.—Barrels, 3c per lb; 100-lb. kegs, 3 1/2c lb; 2-lb. decorated tins, \$12, gross less 5 per cent.  
Texas Star Axle Grease.—Barrels, 2 1/2c per lb; 100 lb. kegs, 3c per lb.  
See Axle Grease, page 2.

Packing.

Eureka, 75c per lb. Dis., 40%.  
Soapstone—Standard, 8c per lb.  
Crown—No. 1, 23c per lb.  
Crown—No. 2, 26c per lb.  
Climax, 9c per lb.  
Selden's Patent.  
For Steam, Air, Water and Ammonia.  
With Rubber Core, 60 cents per lb.  
Dis., 25 and 5%.  
With canvas core, 50 cents per lb.  
Dis., 30 and 5%.

Paper, Waxed.

White.	Per ream.
XX, 24 x 36.	\$2.20
"Sparks" A No. 1 Brand, 21 x 36.	2.10
"Progress No. 2," 24 x 36.	1.60
"Climax," 24 x 36.	1.60
24 x 36.	1.35

FF, or B. F., 24 x 36.	4.00
Colored.	
A, 24 x 36.	2.40
B, 24 x 36.	2.00
Manilla.	
A, 24 x 36.	1.85
"Climax," 24 x 36.	1.40
Discount, 5%.	

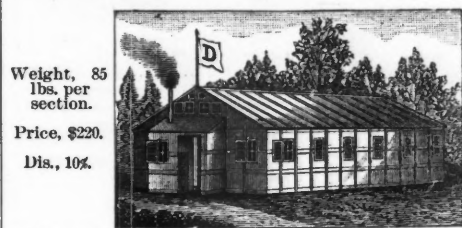
Manilla.		White.	
No.	Flat bags.	Sq. bags.	Flat bags.
1/4	Per M.	Per M.	Per M.
1/2	\$1.25	\$1.40	\$1.70
3/4	1.50	1.75	2.05
1	1.85	2.15	2.60
1 1/2	2.00	2.30	2.80
2	2.25	2.60	3.12
3	2.70	3.10	3.70

Mikado.		Mikado.	
No.	Per M.	No.	Per M.
1/4	\$1.40	1/2	\$2.30
1/2	1.75	3/4	2.60
1	1.85	1	3.10

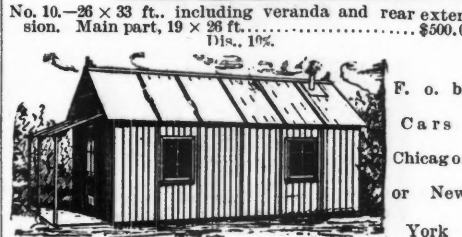
Discount, 10% Portable Houses.



Weight, 450 lbs.  
Price, \$150.  
Closes securely.  
Dis., 10%.



Weight, 85 lbs. per section.  
Price, \$220.  
Dis., 10%.



No. 10.—26 x 33 ft., including veranda and rear extension. Main part, 19 x 26 ft.  
Dis., 10%.

Size.	Doors.	Windows.	No. porch.	End porch.	Side porch.
7 x 9	1	2	\$64.00	\$71.00	\$73.00
7 x 12	1	2	75.00	82.00	87.60
7 x 16	1	2	93.00	97.00	106.00
7 x 19	2	4	117.00	124.00	136.00
10 x 9	1	2	70.00	80.00	79.00
10 x 12	1	2	92.00	102.00	104.00
10 x 16	1	4	108.00	118.00	124.00
10 x 19	2	4	134.00	144.00	153.00
10 x 26	2	4	172.00	182.00	198.00
10 x 32	2	6	203.00	213.00	235.00
12 x 12	1	2	102.00	114.00	114.00
12 x 16	2	4	138.00	150.00	154.00
12 x 19	2	4	160.00	172.00	179.00
12 x 26	2	4	193.00	205.00	219.00
12 x 32	2	6	245.00	257.00	277.00

Post Hole Diggers.

Little Giant.....	\$36.00	doz 11 cu.ft.
Hercules.....	30.00	" " "
New Champion....	20.00	" " "
Scheidler.....	36.00	" " "

Presses.

41, 42, 43, 44, 45.  
Combined press for cutting, forming, boring and seaming.  
Particulars of flat front presses, including beds, slides, bolsters, plates, etc.  
Prices are net, delivered on steamers in New York, including insurance, etc.

Nominal size of press.....	41	42	43	44	450
Price, including etc. ceteras.....	\$140	\$220	\$300	\$420	\$700
Weight, about.....	600	1050	1900	3600	7200
Greatest diameter that can be wired.....	ins 5	7	10	14	20
Greatest depth that can be wired.....	ins 8	10	13	16 1/2	20
Hole through bed—circle intersecting.....	ins 4 1/2	6	8 1/2	12	17
Hole through back—width.....	ins 8	9 1/2	12	16 1/2	20 1/2
Width between die clamps—clear.....	ins 8	11	15	20	27
Distance back from center of slide bar.....	ins 4 1/2	5 1/2	7	9	12
Height to slide-bar, when up.....	ins 5 1/2	6 1/2	7 1/2	8 1/2	9
Stroke of slide-bar.....	ins 1	1 1/4	1 1/2	1 3/4	2
Adjustment of slide-bar.....	ins 1	1 1/4	1 1/2	1 3/4	2
Diameter of fly-wheel.....	ins 20	26	32	38	44
Width of fly-wheel.....	ins 3	4	5	6	7
Weight of fly-wheel, about.....	lbs 125	250	420	725	1100
Speed per minute, about.....	rev 120	110	100	90	80
Cubic feet boxed, about.....	cu ft 30	40	50	60	70



cap. stroke, 1 1-5 gal. Price, iron, \$45.00; brass cyl \$120.00. Dis., 45%.

No.	Diam. cyl.	Cap. stroke.	Stroke.	Pipe.	Price.
0.....	2 in.	1-11 gal.	7 in.	1 in.	\$21.50
00.....	2 1/2	1-7	7	1	23.00
1.....	3	1-5	7	1 1/2	25.25
Fig. 287. 2.....	3 1/2	1-3	7	1 1/2	27.25
3.....	4	4-10	7	2	30.50
3 1/2.....	4 1/2	1-2	7	2	37.50
4.....	5	8-10	10	2 1/2	44.00
4 1/2.....	5 1/2	1	10	2 1/2	47.00
5.....	6	1 1-5	10	3	50.00

Dis., 45%.

No.	Diam. cyl.	Cap. stroke.	Diam. pipe.	Price.
1.....	2 in.	1-5 gal.	1 in.	\$39
2.....	2 1/2	1-3	1 1/2	41
3.....	3	1-2	1 1/2	45
4.....	3 1/2	6-7	2	51
5.....	4	7-8	2	63
6.....	4 1/2	1	2	80

Dis., 45%. Br's Iron. cyl.

With Tight and Loose Pulleys.

No. 1, cap. per rev., 1-6 gal.; size of pipe, 1 1/4 in.; price, iron, \$26; bronze, \$45.  
 No. 2, cap. per rev., 1-5 gal.; size of pipe, 1 1/2 in.; price, iron, \$31; bronze, \$55.  
 No. 4, cap. per rev., 1-3 gal.; size of pipe, 2 in.; price, iron, \$48; bronze, \$75.

Fig. 197. Pulleys on Nos. 1 and 2 are 8 in. diam., 2 1/2 in. face; on No. 4, 12 in. diam., 3 1/2 in. face.  
 Balance wheels for above pumps, \$1, \$2, and \$3, according to size. Dis., 50%.

No. 2, 1/2 to 2 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, 3/4 in.; discharge, 3/8 in.; price, \$9.  
 No. 3, 1 to 4 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, 1 in.; discharge, 3/8 in.; price, \$11.

Fig. 208. No. 4, 2 to 8 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive 1 1/2 in.; discharge 1/2 in.; price \$14.  
 No. 5, 3 to 14 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive 2 in.; discharge 1 in.; price \$22.  
 No. 6, 4 to 25 gal. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 2 1/2 in.; discharge, 1 1/4 in.; price, \$40.  
 No. 7, 8 to 60 gals. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 4 in.; discharge, 2 in.; price, \$75.  
 No. 8, 12 to 120 gal. per min.; length of drive pipe, 30 to 50 ft.; calibre of pipes, drive, 6 in.; discharge, 2 1/2 in.; price, \$125. Dis., 50%.

**Pulsometer Pump.**

No.	Height.	Space occupied.	Size of steam pipe.	Size of suction pipe.	Size of discharge pipe.
1...	14 in.	9 x 7	1/4 in.	1 in.	1 in.
2...	20 "	15 x 12	1/4 "	1 1/2 "	1 1/2 "
3...	23 "	1' x 14	3/8 "	2 "	2 "
4...	30 "	21 x 16	1/2 "	2 1/2 "	2 1/2 "
5...	34 "	24 x 20	5/8 "	3 "	3 "
6...	40 "	28 x 22	3/4 "	3 1/2 "	3 1/2 "
7...	43 "	30 x 24	7/8 "	4 "	4 "
8...	54 "	33 x 29	1 "	5 "	5 "
9...	61 "	37 x 31	1 1/4 "	7 "	7 "
10...	80 "	52 x 45	2 "	8 "	8 "

Gal. per minute.	Weight.	Net price.	Size boiler.
10	35	\$50	.....
20	125	75	3
60	210	100	5
100	355	150	6
175	475	175	8
300	695	225	12
425	850	275	15
700	1,600	400	20
1,000	2,000	500	3
2,000	5,000	1,000	40

**Rat Traps.**



1 doz. in box.  
 1 gross n case.  
 \$30 per gross.  
 Dis. 50 and 10%.

**Roofing.**

CORRUGATED IRON.  
 2 1/2 inch corrugations.

Gauge.	Per square.
No. 18, painted red.....	\$9.10
No. 20, " " ".....	7.60
No. 22, " " ".....	6.50
No. 24, " " ".....	5.35
No. 26, " " ".....	4.65
No. 27, " " ".....	4.35
No. 28, " " ".....	4.00
No. 18, galvanized.....	13.30
No. 20, " " ".....	10.60
No. 22, " " ".....	9.10
No. 24, " " ".....	7.45
No. 26, galvanized.....	7.05
No. 27, " " ".....	6.95
No. 28, " " ".....	6.75

Dis., 10%. F. o. b. N. Y.

**Railroad Dumping Cars and Carts.**



Cars.	Gauge.	Cap. Net.	Cap. Net.	Cap. Net.
Side Dumping	24"	1 c. y. \$55	2 c. y. \$65	3 c. y. \$75*
End	"	" 55	" 65	" 75*
Revolving "	"	" 70	" 80	" 90*
Bottom	"	" 80	" 90	" 100*
Tunnel	"	" 55	" 65	" 75*
Mine	"	" 50	" 60	" 70*
Plantation	30"	43		
Logging	30"	170		
Hand	4' 8 1/2"	185		
Push	4' 8 1/2"	45		
R.R. Construction	4' 8 1/2"	60		
Carts	4' 8 1/2"	65		
Plantation and Railroad		45		
Wagons		75		
McEwen Patent Dumping	1 "	175 1 1/2	200	

\*These cars built of any gauge from 18" to 56 1/2" and of any capacity from 1/2 to 6 cu. yd.

**Sash Chains.**



No. A. "Giant" metal, 15c. pr. ft., wts. not over 125 lbs.  
 No. 1. "Giant" metal, 12c. pr. ft., wts. not over 75 lbs.  
 No. 2. "Giant" metal, 10c. pr. ft., wts. not over 40 lbs.  
 No. 0. "Giant" metal, 8c. pr. ft., wts. not over 25 lbs.  
 No. 1. Red metal, 10c. pr. ft., wts. not over 40 lbs.  
 No. 2. Red metal, 8c. pr. ft., wts. not over 30 lbs.  
 No. 0. Red metal, 6c. pr. ft., wts. not over 15 lbs.  
 No. 1. Steel, 8c. pr. ft., wts. not over 75 lbs.  
 No. 2. Steel, 6c. pr. ft., wts. not over 30 lbs.  
 No. 0. Steel, 4c. pr. ft., wts. not over 15 lbs.  
 No. 1. Steel, black enameled, 9c. pr. ft., wts. not over 75 lbs.  
 No. 2. Steel, black enameled, 7c. pr. ft., wts. not over 30 lbs.  
 No. 0. Steel, black ena'd, 5c. pr. ft., wts. not over 15 lbs.  
 Fastenings for hanging a window of 2 sashes for Nos. 1 and 2 chains, consisting of 4 books, 4 rings, 4 sash irons, a set, 18c. per set.  
 Fastenings for hanging a window of 2 sashes for No. 0 chains, 14c. per set.  
 Dis. on "Giant" metal chain..... 40 10 10%  
 " " Red metal chain..... 40 10 10%  
 " " Steel..... 40 10 10%  
 " " Fastenings..... 40 10 10%

**Saws.**

PATENT GROUND AND TEMPERED SOLID TOOTH CIRCULAR SAWS.

Diameter.	Thickness.	Gauge.	Price each.	Extra for each additional gauge, heavier.	Prices for beveling new saws, beveling old saws, extra. Per gauge.
1	2 1/2	3/8	\$0.50	\$0.01	\$0.06
2	2 3/8	3/8	.60	.01 1/2	.08
3	2 1/2	3/8	.70	.02 1/2	.10
4	1 9/8	3/8	.90	.03	.14
6	1 1/2	3/8	1.30	.05	.18
8	1 1/2	3/8	1.75	.08	.22
10	1 1/2	3/8	2.30	.12	.28
12	1 1/2	3/8	3.00	.17	.35
16	1 1/2	3/8	5.50	.25	.50
20	1 1/2	3/8	8.50	.35	.70
24	1 1/2	3/8	12.00	.55	.90
28	1 1/2	3/8	16.00	.80	1.20
32	1 1/2	3/8	20.00	1.00	1.40
36	1 1/2	3/8	25.50	1.40	1.70
44	1 1/2	3/8	35.00	2.00	2.40
48	1 1/2	3/8	52.50	3.00	3.40
52	1 1/2	3/8	70.00	4.00	4.40
56	1 1/2	3/8	90.00	5.00	5.40
60	1 1/2	3/8	115.00	7.00	7.40
64	1 1/2	3/8	145.00	9.00	9.40
68	1 1/2	3/8	180.00	12.00	12.40
72	1 1/2	3/8	225.00	18.00	18.40
76	1 1/2	3/8	290.00	24.00	24.40
			375.00	30.00	30.40

Circular saws to cut metal or ivory, 50% advance. No extra charge for saws one gauge thicker than list. Circular saws beveled one gauge without extra charge up to 4 inches; 4 1/2 inches and larger, beveled two gauges without extra charge. Dis., 45%.

Hand--London Spring Steel four brass screws. 26 in. \$30.00 per doz. Dis., 20%.  
 Hand--Skew Back Saw, Apple Handle; 5 screws. 26 in. \$22.00 per doz.  
 Hand--Grained Blade, Beech handle, polished edge; 4 screws. 26 in. \$20.00 per doz. Dis., 20%.  
 One man Cross-Cut--Supplementary Handle.  
 3 ft. 3 1/4 ft. 4 ft. 4 1/4 ft. 5 ft. 5 1/4 ft. 6 ft. Great American, \$2.75 \$3.00 \$3.50 \$4.00 \$4.50 \$5.00 \$5.50  
 Champion Tooth, 2.35 2.60 3.15 3.50 3.85 4.25 4.65  
 One man cross cut handles, \$4.50 per doz. Dis., 45%.

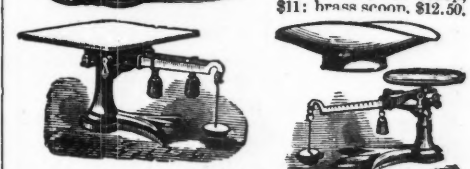
**Saw Set.**  
 Adjustable ball and socket saw clamp, Japanned, \$14 per doz.

**Scales.**—Discount on scales, 50, 10 and 5 per cent. Postal scales.  
 No. 1, capacity 1/2 to 9 oz. \$3.00.  
 No. 2, capacity 1/2 to 12 oz. \$4.00.  
 No. 3, capacity 1/2 to 34 oz. \$6.00.  
 No. 4, capacity 1/2 oz. to lbs., \$8.00.



**Butter Trip Scales, slab, weights and scoop.**  
 No. 7, 1/2 oz. to 10 lbs., 10 in. slab, without side beam \$10.50  
 " " " " " " with " " " " " " 11.50  
 " 8 " " " " " " without " " " " " " 12.50  
 " " " " " " " " " " " " " " " " 13.50

**Tea Scales—All Seamless Scoops.**  
 Capacity. Scoop. Capacity. Scoop.  
 1/4 oz. to 10 lbs. Tin ..\$8.00 1/4 oz. to 10 lbs. Brass .. 9.00  
 Capacity. Scoop. Capacity. Scoop.  
 1-16 oz. to 8 lbs. Tin ..\$10.00 1-16 oz. to 8 lbs. Brass ..\$11.00  
 Even balance trip scales, seamless scoops, with weights.  
 No. 1, capacity 1/2 oz. to 2 lbs., tin scoop, \$5.50, brass scoop, \$6.50.  
 No. 2, capacity 1/2 oz. to 4 lbs., tin scoop, \$6.50; brass scoop, \$7.50.  
 No. 2 1/2, capacity 1/2 oz. to 18 lbs., tin scoop, \$11; brass scoop, \$12.50.



**Counter.**  
 Capacity. Scoop. Capacity. Scoop.  
 1/2 oz. to 36 lbs. Tin ..\$10.00 1/2 oz. to 36 lbs. Brass ..\$12.00  
**Grocer.**  
 Capacity. Scoop. Capacity. Scoop.  
 1/2 oz. to 62 lbs. Tin ..\$12.00 1/2 oz. to 62 lbs. Brass ..\$14.00  
 Meat or Butter Scales, with Slab.  
 1/2 oz. to 62 lbs., with Single Beam..... \$14.00.  
 " " " " " " Double " " " " " " 15.00.

Patent Boston platform, 13 1/4 in. long by 10 in. wide.  
 Pillar, 18 in. high, double beam, marked both sides.  
 With large seamless tin scoop, \$25.00  
 " " " " " " brass " " " " " " 27.00



**Platform scales. - Without Wheels.**

No.	Capacity.	Platform.	Price.
.....	400 lbs.	21 1/2 by 15 inches.	\$23.00
.....	600 lbs.	25 by 16 "	30.00
.....	800 lbs.	25 by 17 "	34.00
.....	1,000 lbs.	26 by 17 "	39.00
.....	1,200 lbs.	28 by 20 "	45.00
.....	1,600 lbs.	29 by 21 "	55.00
.....	2,000 lbs.	32 by 23 "	70.00

**With Wheels.**

No.	Capacity.	Platform.	Price.
1.....	400 lbs.	21 1/2 by 15 inches.	\$26.00
2.....	600 lbs.	25 by 16 "	33.00
3.....	800 lbs.	25 by 17 "	38.00
4.....	1,000 lbs.	26 by 17 "	43.00
5.....	1,200 lbs.	28 by 20 "	49.00
6.....	1,600 lbs.	29 by 21 "	60.00
7.....	2,000 lbs.	32 by 23 "	75.00

Brass sliding poise at same price if so specified in order.

No.	Capacity.	Platform.	Price.
4.	1,000 lbs.	26 by 17 inches.	\$51.00
5.	1,200 lbs.	28 by 20 "	59.00
6.	1,600 lbs.	29 by 21 "	70.00
7.	2,000 lbs.	32 by 23 "	82.00
8.	2,500 lbs.	33½ by 24½ "	94.00
9.	3,000 lbs.	38 by 30 "	125.00

Shears.

The Patent "Eureka"



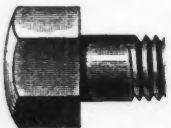
No. 1 cuts round metal up to ¼ in. steel to ¼, \$12.  
 No. 2 cuts round metal up to ½ in. steel to 3-16, \$20.  
 Discount, 25%.

Steel Wire Mats.



Galvanized Steel Wire. (Style A) "Hartman Flexible."  
 No. 2. Size 16x24. Each \$1.50  
 No. 3. " 18x30. " 2.00  
 No. 4. " 22x36. " 3.00  
 No. 5. " 26x48. " 4.50  
 No. 6. " 30x48. " 5.25  
 No. 7. " 36x48. " 6.50  
 No. 8. " 36x60. " 8.00  
 No. 9. " 36x72. " 10.00

Brass mats "list" double the price of galvanized Style A) for similar sizes.  
 3 doz. lots, dis. 33½%.  
 6 doz. lots, dis. 40%.  
 12 doz. lots, dis. 40 and 5%.



Screws.

STEEL SCREWS ADD 50% TO LIST. Prices are per 100.  
 Hexagon Cap Screws.  
 Heads on Steam-tight Screws not polished, unless so ordered. Can make these 12 inches long.

Diam. head.	7-16	¼	9-16	⅝	¾	13-16	⅞	1	1 ¼	1 ½	1 ¾	1 ⅞
Length head.	¼	5-16	¾	7-16	¼	9-16	⅝	¾	¾	1	1 ¼	1 ½
Diam. screw.	¼	5-16	¾	7-16	¼	9-16	⅝	¾	¾	1	1 ¼	1 ½
Length under head.	¾	3.00	3.25	3.75	4.40	5.50	7.00	9.50	12.20	16.00	21.20	29.00
Thread to in.	20	18	16	14	12	12	11	10	9	8	7	
Add for each ¼ in.	30	40	50	60	80	1.00	1.30	1.60	2.00	2.40	3.00	

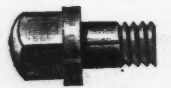
Dis., heads ground, 60 and 10%; dis., heads black, 60, 10 and 5%; dis., heads extra finish, 50 and 10%; dis., heads case-hardened, 55 and 10 dis.; dis., heads polished after hardening, 45 and 10%.



SQUARE CAP SCREWS.

Diam. head.	¾	1	1 ¼	1 ½	1 ¾	1 ⅞	2	2 ¼	2 ½	2 ¾	3	3 ½	4
Length head.	¼	5-16	¾	7-16	¼	9-16	⅝	¾	¾	1	1 ¼	1 ½	1 ¾
Diam. screw.	¼	5-16	¾	7-16	¼	9-16	⅝	¾	¾	1	1 ¼	1 ½	1 ¾
Length under head.	¾	2.40	2.75	3.20	3.80	4.40	5.75	7.70	10.50	14.00	18.00	22.50	28.00
Thread to in.	20	18	16	14	12	12	11	10	9	8	7		
Add for each ¼ in.	25	35	45	55	65	90	1.20	1.50	1.80	2.30	3.00		

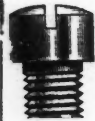
Dis., heads ground, 65 and 10%; dis., heads black, 65, 5 and 5%; dis., heads extra finish, 55 and 10%; dis., heads case hardened, 60 and 10%; dis., heads polished-hardened, 50 and 10%.



MILLED HEADS, COLLAR SCREWS 25 and 10% discount.

Diameter of Collar.	¼	½	¾	1	1 ¼	1 ½	1 ¾	2	2 ¼	2 ½	2 ¾	3
Diameter of Screw.	¼	⅝	¾	1	1 ¼	1 ½	1 ¾	2	2 ¼	2 ½	2 ¾	3
Length under Head to Point.	¾	2.50	2.80	3.10	3.75	4.40	5.00	6.25	8.60	11.20	15.00	20.00
Threads to inch.	40	30	20	18	16	14	12	12	11	10		
Add for each ¼ inch.	30	40	50	60	80	1.00	1.30	1.60	2.00	2.40		

MILLED FROM SOLID BAR.



Diam. Head	Fillister.			Bevel Head.			Button Head			
	3-16	¼	⅝	7-16	9-16	⅝	¾	13-16	¾	1
Length Head	¾	3-16	¼	3-16	¾	7-16	¼	9-16	⅝	¾
Diam. Screw	¼	3-16	¼	5-16	¾	7-16	¼	9-16	⅝	¾
Length under Head.	¾	2.00	2.25	2.50	3.00	3.50	4.00	5.00	6.00	9.00
Thread to in.	40	30	20	18	16	14	12	12	11	10

Head on Bevel and Button Head Screws, 1-16 larger in diameter than above specifications.  
 Price, according to size of head.  
 Discount, 50 and 10%; case hardened, 45 and 10%; case hardened and polished, 35 and 10%.

Spades and Shovels.

JONES Patent plain black solid cast-steel shovels and spades.

No.	Description	Per Doz. Black.	Per Doz. Pol'd
20.	D. or long handle sq.-point shovels, 2	\$15.50	\$16.50
21.	" " " " " 3	16.25	17.25
22.	" " " " " 4	17.00	18.50
23.	" " " " " 6	17.50	19.00
24.	" " " " charcoal, 8	20.50	22.00

Pt. plain back solid cast steel shovel.

25. D or long handle round-point shovels, 3 16.25 17.25

Patent solid cast steel spade.

28. D or long handle spades, 2 6.00 17.00  
 29. " " " " " 3 16.50 18.00

Patent plain back solid cast steel.

26. Long round joint shovel No. 2, 15.50 16.50  
 27. " square No. 2, 15.50 16.50

32. D. handle square-point molders' shovels, 2 17.00

33. D. handle square point railroad, extra heavy, 2 15.75

34. D. handle round point railroad, extra heavy, 3 16.50  
 35. L. handle round point shovel, with foot cap, 2 16.00 17.00

GRAY'S CAST. Patent plain back solid-steel shovels and spades.

50. D. or long handle sq.-point shovels, 2 \$12.00 \$13.00  
 51. " " " " " 3 12.75 14.00  
 52. " " " round point " 3 12.75 14.00  
 55. D. handle spades, 2 12.25 13.25  
 56. " " " " " 3 13.00 14.25

Jones' patent plain back solid corrugated cast steel scoops.

90. D. or long handle solid cast steel, 2 \$13.50 \$14.50  
 91. " " " " " 4 14.50 15.50  
 91½. " " " " " 6 16.50 17.50

No.	Description	Price	Price
92.	Cast steel D. or long handle, 2	13.50	14.50
93.	" " " " " 4	14.50	15.50
94.	" " " " " 6	16.50	17.50
	Half polished.		
95.	" " " " " 8	\$20.00	
96.	" " " " " 10	22.50	
97.	" " " " " Loco-		
	otive or coal (heavy), 6	17.50	
98.	" " " " " Long or D. handle for salt heavy), 6	17.50	
99.	" " " " " D. handle flour and house furnace, 6	10.50	
100.	" " " " " D. handle r'd-pt. for coal (extra heavy), 6	20.00	
101.	" " " " " ash pit, furnace L. handle, 2	Polished, 13.00	
102.	" " " " " 32 in. D., 2	13.50	
103.	" " " " " 42 " iron D. handle, 2	14.00	

Ditching spade.

124. D handle ditching (flat), 18.00 19.50  
 125. D handle post hole (concave), 18.00 19.50  
 126. D handle Alcock (for clay and brick), 16.00 17.00  
 Discount on shovels and spades, 50 and 10% scoops, 50.

Boxed f.o.b. New York, Boston or Montreal. The solid shovels, spades and scoops are made from cast steel bars by a recently patented process, the blade and strap being in one piece, not welded. All goods are American patterns.

Stencil Inks. Black.

No.	Per can.	Per cake.	No.	Per can.	Per cake.
1.	7 cents	3 cents	3.	20 cents.	12 cents
2.	10 "	5 "	4.	30 "	20 "
	10 cents.	6 cents	3.	30 cents.	22 cents
	15 "	9 "	4.	50 "	40 "
	12 cents	8 cents	3.	50 cents.	42 cents
	20 "	15 "	4.	90 "	80 "

Red and Green. Indelible Ink.

Small bottles per 100, \$2.75  
 500, 12.00  
 1,000, 20.00

STENCIL COMBINATIONS. Contains Alphabet, Figures, Brush, and Ink.



Size	Price per doz.
¼ inch.	\$4.80
1 ¼ "	5.40
1 ½ "	5.40
1 ¾ "	7.50
2 "	8.40
2 ¼ "	10.00
2 ½ "	10.00
3 "	15.00

Tools. ARTISANS.

Chisel (Mason). Stone, 5 and 8c. lb., net.

Mill Picks. Cast steel, 2 to 3 lb. \$22 per doz. Dis., 60 and 5%.

Stone Axes, Cast Steel. All sizes, 50c. per lb. Dis., 70 and 10%.

Five lbs. and over, 40c.; with teeth, 45c.; 3 to 5 lbs., 45c.; with teeth, 50c.; under 3 lbs., 50c.; with teeth, 55c.

Nos. 40 and 41, spalling or stone hammer, 5 lbs. and over, 36c.; 3 to 5 lbs., 40c.; under 3 lbs., 45c. per lb. Nos. 40 and 41, spalling hammers, 9 to 20 lbs., steel face per lb., 17c. Dis., 70 and 10%.

Ship or Top Mauls, Steel Face 4 to 8 lbs., 28c. per lb. Dis., 50, 10 and 5%.

Steel Wedges, wood, 1st qual., 5c. lb.

Cooper Froes. 8 in. doz. \$13.00  
 10 in. doz. 13.50  
 12 in. doz. 14.00  
 14 in. doz. 14.50  
 16 in. doz. 15.00

Discount, 60%.

60 days, 25 10 days.

Vise.

No. 1. Solid Box Vises.

No. 25, 3 3/8 in. Jaw	Each	\$12.00
" 30, 3 3/8 "	"	11.00
" 40, 4 "	"	10.00
" 45, 4 1/4 "	"	10.50
" 50, 4 1/2 "	"	11.50
" 55, 4 3/4 "	"	12.00
" 60, 4 3/4 "	"	13.00
" 65, 4 3/4 "	"	14.00
" 70, 5 "	"	15.00
" 75, 5 "	"	16.00
" 80, 5 1/4 "	"	17.50
" 85, 5 1/4 "	"	18.50
" 90, 5 1/2 "	"	20.00
" 95, 5 1/2 "	"	21.00
" 100, 6 "	"	22.00
" 105, 6 "	"	23.00
" 110, 6 1/4 "	"	24.00
" 115, 6 1/4 "	"	25.00
" 120, 6 1/2 "	"	26.00
" 125, 6 1/2 "	"	27.50
" 130, 6 3/4 "	"	29.00

No. 135, 6 3/4 in. Jaw	Each	\$31.50
" 140, 7 "	"	33.00
" 145, 7 "	"	35.00
" 150, 7 "	"	36.00
" 160, 7 1/4 "	"	41.50

Dis., 60 and 10% MINERS.

Adze Eye Coal Picks. Same list and dis. as No. 16.

Anthracite Coal Picks. Same list and dis. as No. 16.

Stone Picks, per doz. No. 18, 6 to 7 lbs... \$16.50. No. 18, 7 to 8 lbs... 17.50. No. 18, 8 to 9 lbs... 18.50. Dis., 60 and 10%.

No. 16, Weight, 2 lbs.	Coal Picks.	Per doz.
16, " 2 1/2 "	"	\$8.50
16, " 3 "	"	9.00
16, " 3 1/2 "	"	9.50
16, " 4 "	"	10.00
16, " 4 1/2 "	"	10.50
16, " 5 "	"	11.00
16, " 5 1/2 "	"	11.50
16, " 6 "	"	12.00
16, " 6 1/2 "	"	12.50
16, " 7 "	"	13.00
16, " 7 1/2 "	"	14.00

Adze Eye Miners Picks—Surface, Drifting and Poll. Packages oblarged at cost. Dis., 60, 10%.

No. 19, Surface, No. 1, 4 lbs.	per doz.	\$14.00
19, " No. 2, 4 1/2 "	"	15.00
19, " No. 3, 5 "	"	16.00
19, " No. 4, 5 1/2 "	"	17.00
19, " No. 5, 6 "	"	18.00
19, " No. 6, 6 1/2 "	"	19.00
19, " No. 7, 7 "	"	20.00
20, Drifting, No. 1, 3 "	"	12.50
20, " No. 2, 4 "	"	14.00
20, " No. 3, 4 1/2 "	"	15.00
20, " No. 4, 5 "	"	16.00
20, " No. 5, 6 "	"	17.50
21, Poll, No. 1, 3 1/2 "	"	15.00
21, " No. 2, 4 "	"	16.00
21, " No. 3, 4 1/2 "	"	17.00
21, " No. 4, 5 "	"	18.50
21, " No. 5, 6 "	"	20.00
21, " No. 6, 6 1/2 "	"	21.50

Tamping Picks.

Adze eye, 6 to 7 lbs., per doz.	\$17.
Adze eye, 7 to 8 lbs., per doz.	\$18.
Adze eye, 8 to 9 lbs., per doz.	\$19.
Hunt eye, 6 to 7 lbs., per doz.	\$17.
Hunt eye, 7 to 8 lbs., per doz.	\$18.
Hunt eye, 8 to 9 lbs., per doz.	\$19.

Ore Picks.

No. 54, Adze Eye, 5 to 6 lbs.	per doz.	\$12.00
54, " 6 to 7 "	"	\$13.00
54, " to 8 "	"	\$14.00

56, Steel Lake Superior Mining Pick\* (Special Price and Quality.)

Dis., 60, 10 and 5%.

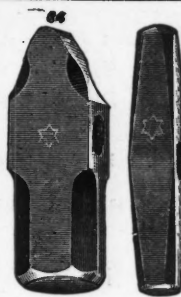
Steel Face Hammers.

No. 43, hand drilling hammers, 2 to 5 lbs.; No. 45, napping hammers, 2 to 5 lbs.; No. 39, mason hammers, 3 to 8 lbs.; No. 42, smiths' hand hammers, 2 to 5 lbs.; No. 44, smiths' striking hammers, 2 to 5 lbs., all steel face, per lb., 26c. Dis., 70, 10 and 5%.



No. 43, hand drilling hammer, 5 lbs. and over, 36c.; 3 to 4 lbs., 40c.; under 3 lbs., 45c. per lb. Dis., 70, 10 and 5%.

No. 42, blacksmiths' hand hammer, 5 lbs. and over 30c.; 3 to 5 lbs., 34c.; under 3 lbs., 45c. per lb. No. 44, drilling or striking hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 30c.; under 3 lbs., 45c. per lb. No. 45, napping hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 35c., under 3 lbs., 45c. per lb. Dis., 70 and 10%, 5.



Steel Face Sledges. No. 34. Smiths' sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 35. Stone sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 36. Striking sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 37. Coal sledges, 5 to 10 lbs., steel face, 18c. per lb.

Cast Steel Sledges. No. 34. Blacksmiths' sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb. No. 35. Stone sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb. No. 36. Striking sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.

RAILROADS. Railway Track Punch



Round Point. 15c. lb. net. Track Wrench.

7 1/2 lb., net.

Ra Fork.

9c. lb. net.

Crow Bars. Wedge Points, 3/8c. lb., net. Pinch Point, 3/8c. lb., net.

65 Tamping Bar, 6c. lb., net.

66 Claw Bar, 7c. lb., net.

Railroad Spike Mails 6 to 16 lbs., Steel Face 18c. lb. Dis., 50, 10, and 5%.

Steel Track Chisel, 15c. per lb., net.

Railroad or Clay Picks.

No. 11, Adze eye, 4 to 5 lbs.	Per doz.	\$11.00
11, " 5 to 6 "	"	12.00
11, " 6 to 7 "	"	13.00
11, " 7 to 8 "	"	14.00
11, " 8 to 9 "	"	16.00
11, " 9 to 10 "	"	18.00
12, Hunt eye, 4 to 5 "	"	11.00
12, " 5 to 6 "	"	12.00
12, " 6 to 7 "	"	13.00
12, " 7 to 8 "	"	14.00

Dis., 60, 10 and 5%.

Mattocks—Price per doz.

2, Adze Eye, Long Cutter, 6 lbs.	\$16.00
3, Adze Eye, Short Cutter, 5 1/2 lbs.	\$15.50
2, Adze Eye, Long Cutter, Light, \$15.00.	
3, Adze Eye, Short Cutter, Light, \$15.00.	
4, Hunt Eye, Long Cutter, 6 lbs.	\$16.00
5, Hunt Eye, Short Cutter 5 1/2 lbs.	\$15.50.

Adze Eye Pick Mattocks.....\$16.

Hunt Eye Pick Mattocks.....\$16

Dis., 60, 10 and 5%.

Grub Hoers.

Western Pattern, No. 0, 3 lbs., per doz.	\$10.50.
Western Pattern, No. 1, 3 1/2 lbs., per doz.	\$11.
Western Pattern, No. 2, 4 lbs., per doz.	\$11.50.
Western Pattern, No. 3, 4 1/2 lbs., per doz.	\$12.
Baltimore Pattern, No. 1, 3 1/2 lbs., per doz.	\$11.

Baltimore Pattern, No. 2, 4 1/2 lbs., per doz., \$11.75. Baltimore Pattern, No. 3, 5 lbs., per doz., \$12.75. Baltimore Pattern, No. 4, 5 1/2 lbs., per doz., \$13.75. Dis., 60 and 10%, 5.

CARPENTERS' BEADER (Universal Hand.)

For Beading, Reeding, Fluting, or for light Routering. No. 66. Iron Stock, with seven Steel Cutters, \$1.00.



BOXWOOD RULES.

Two feet, four-fold, 1 inch wide. Plate. Middle. Edge. Bound. Round joint.....\$4. Square ".....5 \$7 \$15. Arch ".....6 8 16.

Two feet, four-fold, 1 1/4 inches wide. Plate. Middle. Edge. Bound. Square joint.....\$7 \$9 \$18. Arch ".....9 11 20.

Two feet, two-fold, 1 1/2 inches wide. Square joint. Arch. Arch Bound. \$5 \$7 \$16. \$12 14 24. Gunter's Slide. Dis., 80, 10 and 10%.



LEVELS.

10 to 18 to	16 in.	24 in.
Arch top plate, 2 side views.	\$9.00	\$12.00

FLUMBS AND LEVELS. Arch top plate, 2 side views. Polished.....\$14.00 \$16.00 \$18.00. Mahogany tip'd and lip'd 27.00. Polished and lip'd..... 24.00. Polished and tipped..... 28.00. Polished, lip'd and tip'd..... 35.00.

Mason's level, 2 plumbs, polished, in. 36, \$30.00. Mason's level, 2 plumbs, p'd and tip'd, 36, 38.00. Mason's level, 2 plumbs, polished, 42, 38.00.

PATENT ADJUSTABLE PLUMBS AND LEVEL. Arch Top plate, 2 side views 26 to 30 in. Polished and lip'd.....\$27.00. Polished and tipped..... 30.00. Polished, lip'd and tipped..... 39.00. Mahogany..... 27.00. Mahogany, lip'd..... 33.00. Mahogany, lip'd and tipped..... 48.00. Polished, triple stock, lip'd and tipped..... 48.00. Mahogany..... 60.00. Rosewood, lip'd and tipped..... 90.00.

POCKET LEVELS.

Iron top, Japanned..... 2 00. Brass top..... 3 00. Dis., 70, 10, 10%.

SCREWDRIVERS.

Varnished handles, pat. metallic fastening. Size 1 1/2, \$1 per dozen; 2, \$1.50; 3, \$2; 4, \$2.50; 5, \$3; 6, \$3.50; 7, \$4; 8, \$4.75; 10, \$6; 12, \$8. Dis., 75%.

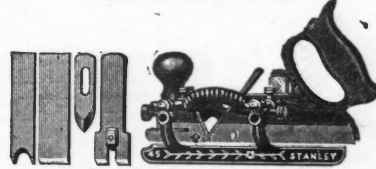
BAILEY'S PATENT WOOD PLANES.

Smooth. Handle smooth. 9 x 8 1/4 in. 8 x 2 in. 9 x 2 in. \$2 \$2.50 each. Jack. Fore. Jointer. 15 x 2 1/4 in. 20 x 2 1/4 in. 26 x 2 1/4 in. \$2.50 \$2.75 \$3.25 each. Dis., 40, 10 and 10%.

PLANES, BAILEY'S PATENT IRON.

With pat. lateral adjustment. Smooth, 8 n. x 1 1/4 in., \$3; in. x 2 in., \$3.25; 10. in. x 2 1/4 in., \$3.75 each. Jack, 14 in. x 2 in., \$3.75. Fore, 18 in. x 2 1/4 in., \$4.75. Jointer, 22 n. x 2 1/4 in., \$6.50 each. Dis., 40, 10 and 10%.

STANLEY'S BEADING, RABBET, SLITTING AND MATCHING PLANE. Eighteen Tools, Bits, etc.



\$8 each. Dis., 20, 10 and 10%.

STANLEY "ODD JOBS."

Embraces in combination with ordinary Carpenters' Rule: (1) Try square. (2) Mitre square. (3) T-square. (4) Marking gauge. (5) Mortise gauge. (6) Depth gauge. (7) Mitre level. (8) Spirit level and plumb. (9) Beam compass. (10) Inside square for making boxes and frames. Price 75 cents. Dis., 20, 10 and 10%.

