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CONTENTS.

THE English Board of Trade returns for the month of January present some interesting features and a very healthy state of affairs in the export trade of the country. The total quantity of iron and steel exported amounted to 302,751 tons, with a value of £2,531,563, compared with 300,324 tons and a value of £2,158,689 in January, 1889. The export of unwrought copper amounted in value to £165,118 against £52,224 in January last year, when the price was much higher, thus contrasting strongly the difference in the volume of trade in a free and natural market and one restricted by manipulation and artificial prices.

ANOTHER chapter, perhaps the concluding one, in the history of the great French copper corner, has commenced. The French Government has ordered the prosecution of M. Secretan, and two of his colleagues on the Board of Direction of the *Société des Metaux*, on the charge of having distributed fictitious dividends. This charge, if proved, will render the accused liable under the Penal Code of France to a term of imprisonment of from one to five years, and to a fine of from 50 to 3,000 francs. M. Secretan is also arraigned under another charge, viz.: for the illegal forestalment of merchandise, which, if brought home to him, will render him liable to an additional term of imprisonment and a heavier fine. The legal advisers of the French Government decided that there was no case for prosecution of the other members of the Board.

ON another page we give a description and illustrations of the Walnut Grove Dam, Arizona, before the recent disaster. The illustrations are from photographs, and the details are given on good authority. In connection with this subject we also reprint, as appropriate, an abstract of a paper by Dr. P. Kresnick, on the safety and service of reservoir dams, recently published in the proceedings of the Institution of Civil Engineers. The evidence presented in this paper constitutes a valuable addition to the data at the command of those of the profession who pay special attention to this branch of engineering, and is a reiteration of the principles we have on former occasions laid down, viz.: That, given a strict adherence to well-known rules with regard to foundation, proportions and waste weirs, all dams can be made safe whether of masonry or earth.

A BILL has been introduced into the Senate by Mr. REAGAN, prepared by Major J. W. POWELL, chief of the Geological Survey, providing for the survey of the arid land of the United States by the Irrigation Department. Irrigation districts are to be laid out, following the hydrographic basins, and it shall be the duty of the irrigation survey officers to designate the irrigable lands and those that can be cultivated and irrigated with the greatest economy; to designate the trunk sections of the rivers, and to determine and locate the places where dams for supplying irrigating canals may be constructed. All lands designated by the United States surveys as irrigable lands may be acquired by persons in tracts of 80 acres under the provisions of the homestead law. Mining and coal lands may also be acquired under the same provisions. The bill also provides for the appointment of a Superintendent of Forestry and a Superintendent of Pasturage, with their several assistants.

FOR THE apparent purpose of satisfying a clamoring public, the State Geologist of Arkansas has recently made to the Governor of that State a short preliminary report upon the mineral resources of northern Arkansas. As usually happens in such cases, the clamoring public is further from being satisfied than ever, and the local papers have joined the chorus of the Hot Springs and Bear Mountain bogus mine boomers. Many persons would be puzzled to know what there is in this brief statement to displease the people of northern Arkansas, for the showing would certainly be a most gratifying one to most people. We strongly suspect that the disappointment comes from the conservative position taken by the State Geologist upon the occurrence of zinc in that region. We have long been accustomed to hear encouraging and even extravagant stories of the zinc deposits of northern Arkansas; but popular reports and stories, like shadows, are as often made by thin and trifling substances as by solid and substantial ones. Prof. BRANNER seems to have passed judgment upon these zinc deposits only in so far as he was warranted by facts, and to have left visions entirely out of account. This was of course his plain duty in the case.

Fortunately zinc does not offer such inducements for fraudulent practices as the so-called gold fields, and sharps have not invaded the region to such an extent. It is to be hoped that the people of northern Arkansas will not lend themselves to crooked operations by giving ear to irresponsible speculators rather than to the State Geologist, who is trying to protect them by being frank with them, and who has already done the State valuable service.

WHILE our coal operators are complaining that the unusually warm winter has diminished the consumption of coal, and caused an increase of stocks on hand at all shipping points, complaints are being made in England that coal is both scarce and dear, and there are prospects of a famine in the coal market. The London papers sstate that considerable difficulty has been experienced at blast furnaces and other industrial establishments in securing adequate supplies of fuel. Some qualities of manufacturing coal have risen 75 per cent. upon the price of a year ago, and prices of coke are 100 per cent. above their previous minimum. On the continent of Europe the situation is the same. The 30,000 miners in the Charleroi district, in Belgium, have gained not only a 10 per cent. advance in wages, but shorter hours, and it is proposed to legislate against the employment of female labor in the mines of that country. In Germany the miners have decided to enter with the beginning of March upon a socialistic campaign that will, at all events, bring some amelioration of their condition, but which will aggravate the situation of the market. In France, the miners' strike in November resulted in the gaining of important concessions. The industrial movement must have the effect of maintaining the present position of fuel on the continent. There, as in England, it is both scarce and dear. The following are the prices of coal and coke in Europe: Germany, Düsseldorf, at the pits—Coking coal (rough unscreened), $3 to $3.37; large, $4; small, $3.25 to $3.62; steam coal (unscreened), $3.12 to $3.25; large, $4 to $4.75; nut, $5; small, $2; foundry coke, $6; blast furnace coke, $6; briquettes, $4.25. England, Newcastle-upon-Tyne, f.o.b.—Best steam, $3.25; seconds, $2.87; small, $2.12; coke, $6. Cardiff, $3.75 to $4. Belgium, Charleroi—small coal, $2.75 to $3.25; best engine, $4; middling, $3.40 to $3.80; coke, $8.20 to $8.40; briquettes, $5 to $5.20. France, Northern District—Nuts, $4.60 to $5; picked, $5 to $4.40; sifted, $3.40 to $4.40; briquettes, $5 to $6; coke, $8.

HOW NOT TO MAKE AN EXPORT TRADE IN MINING MACHINERY.

We learn from our various correspondents, American mining engineers, in the Transvaal, that the epithet "enterprising" cannot be applied to our manufacturers and exporters of mining machinery and supplies, with regard to that profitable market. The demand for such articles has been, and still is, more active there than in any other part of the world, and American machinery is strongly recommended by engineers who have the largest consulting practice, and its superiority is fairly well recognized by those requiring it; but, unfortunately, our manufacturers seem to make but little effort to secure the trade. The English manufacturers, on the other hand, have not waited for orders, but being well assured of the demand, place machinery, even stamp mills, in stock in Johannesburg. Spite of its inferior quality, from the fact of its being immediately available, it sells, and such first-class goods as stamp mills by our best makers, pumps such as Worthington's, Blake's, Knowles', Cameron's, Davidsons' and Hall's, Ingersoll and Rand drills, air compressors, etc., are passed by, solely in consequence of the length of time necessary for filling the orders. In one instance a 25 H. P. electric installation was arranged for on the basis of paying for it in New York, a man to be sent out at the expense of the buyers to put it up and hand it over in running order; but as the buyers proposed that the money was to be drawn from the bank in New York (lodged there before the shipment of the plant) only when it was so handed over, the American firm declined the transaction, and naturally the order went to an English house on these terms. The miners in the Transvaal can hardly be blamed for not caring to pay for machinery when it is 10,000 miles away and without any guarantee that it will be delivered in good order.

There are a dozen or so American concentrators in use, but there has been no one there on the part of the manufacturers to see that they were properly set up or put in charge of competent men to run them. The consequence is that the so-called concentrates are usually composed of 30 per cent. pyrites and 70 per cent. sand.

One more illustration. Two American diamond drills were introduced, one under the charge of a man competent to run it, owing to the common sense of the engineer through whom it was ordered, but the other was left to take its chance in the hands of a man who had never even seen one before. Naturally it made a bad showing, being beaten in rapidity of work for a considerable time by ordinary shaft sinking. This has given such a "black eye" to American diamond drills that there are now at least three English diamond drills for every one American.

This mode of extending our export trade will not do, and we speak thus plainly and give these unpalatable facts in the hope that they may arouse our manufacturers to greater emulation and more liberal methods of doing business, so as to take advantage of a good market.

THE RAIYAN RESERVOIR PROJECT.

Elsewhere in this issue an account is given of a project for improving irrigation in Egypt, which is attracting considerable attention, and which is noteworthy on several accounts—from its historical associations, its engineering features, and its bearing upon the agricultural interests of that country. As it appears likely that extensive operations may be undertaken at no very distant day to reclaim the arid lands of the Far West, the national government having already devoted large sums for surveys, all information of the kind will be welcome. India and Egypt are the two countries to which we shall have to look for experience in irrigation on the large scale; though, owing to the very different conditions, our engineers will be called upon for originality as well as familiarity with foreign methods, in designing works for this country.

In 1886 Mr. COPE WHITEHOUSE discovered a depression in the desert to the southwest of the Fayoum, some 40 meters below the level of the Mediterranean, which is thought to correspond to the Lake Moeris of Herodotus and other historians. This basin is also known as the Wadi Raiyan, so named from the monarch who, according to tradition, employed JOSEPH to construct a canal connecting it with the Nile, thus forming an immense reservoir, which being fed at high Nile to a sufficient level could be drawn upon at low stages of the river, thus relieving the flood surplus at one season and returning it when needed to prevent drought. Mr. COPE WHITEHOUSE, who is an enthusiast on the subject, proposes to restore the system of the ancient engineers by again connecting the Wadi Raiyan (Lake Moeris) with the river by means of a large cutting corresponding to the "Canal of Joseph." Four possible lines have been suggested, the two preferred being 46 and 30 kilometers in length—short distances, but involving in the case of the longer route (the one marked "proposed reservoir canal" in the map) the removal of some 23,000,000 cubic metres of earthwork.

Although much time has been devoted to the problem and a number of contours and levels have been run, there seems to be much uncertainty still as to the precise extent of the work, and more accurate surveys and closer figuring are evidently needed. The estimates of cost range all the way from $4,000,000 to over $10,000,000, and there is also a difference of opinion as to the time required. In the United States a proposition to expend the larger sum on any work which could be shown to be based on good judgment would be met at once with favor by investors, and there would be no difficulty in raising the necessary money. But in Egypt the case is quite different. Egypt is already struggling under a debt one-third as large as that of the United States, with a population of less than 7,000,000. If the English occupancy were really a permanent annexation, the finances of the country would be sound enough. But the political future of the country is uncertain, and she is not in a position to absolutely guarantee the returns of any foreign company which might undertake to carry out the Raiyan project on its own account. Yet the scheme is so promising that it is quite possible that the work will be attempted in some manner. The difficulty appears to be one of finance, not of engineering.

If the Raiyan project is carried out, it will be a curious reversion to the ancient engineering methods of 4,000 years ago, after all these centuries of experimenting.

In a few years, after surveys and study have crystallized into definite plans, the capitalists of this country will have before them schemes of far greater magnitude than the one now referred to. The problem of utilizing for agriculture the vast undeveloped regions of the Far West is one of supreme importance, demanding the finest engineering skill and the investment of much capital, and offering tempting returns. When projects for storage reservoirs and irrigating canals in the West shall be formulated upon good grounds, there will be no such hitch about money matters as may now possibly impede the Raiyan scheme.

THE SENATE SILVER BILL.

The silver question is arriving at an acute stage in Congress. Secretary WINDOM'S scheme, still further modified since last published in these pages, has not materialized in a bill, but the Senate Committee on Finance has reported a bill of its own, which is as follows:

A bill to authorize the purchase of gold and silver bullion and the issue of Treasury notes in payment therefor.

Be it enacted, etc., that the Secretary of the Treasury is hereby directed to purchase from time to time the silver bullion to the aggregate amount of $4,500,000 worth in each month, at the market price thereof, not exceeding $1 for 371¼ grains of pure silver, and also to purchase such gold bullion as may be offered at the Treasury, or any Sub-Treasury, of the United States at a price not exceeding $1 for $23\frac{22}{100}$ grains of pure gold; and to issue in payment for such purchases of silver and gold bullion, Treasury notes, to be prepared by the Secretary of the Treasury in such form and of such denominations, not less than $1 nor more than $1,000, as he may prescribe, and a sum sufficient to carry into effect the provisions of this act is hereby appropriated.

SEC. 2. That the Treasury notes issued in accordance with the provisions of this act shall be redeemable on demand in lawful money of the United States, at the Treasury of the United States, or at the office of any Assistant Treasurer of the United States, and when redeemed shall be canceled; and such Treasury notes shall be receivable for customs, taxes, and all public dues, and when so received may be reissued; and such notes when held by any national banking association may be counted as a part of its lawful reserve.

SEC. 3. That the Secretary of the Treasury shall coin such portion of the gold or silver bullion purchased under the provisions of this act as may be necessary to provide for the redemption of the Treasury notes herein provided for, and any gain or seignorage arising from such coinage shall be accounted for and paid into the Treasury.

SEC. 4. That the gold and silver bullion purchased under the provisions of this act shall be subject to the requirements of existing law and the regulations of the mint service governing the method of determining the amount of pure gold or pure silver contained, and the amount of charges or deductions, if any, to be made.

SEC. 5. That so much of the act of February 28th, 1878, entitled "An act to authorize the coinage of the standard silver dollar and restore its legal-tender character," as requires the monthly purchase and coinage of the same into silver dollars of not less than $2,000,000 or more than $4,000,000 worth of silver bullion is hereby repealed.

SEC. 9. That this act shall take effect thirty days from and after its passage.

The objections to this measure are numerous. In the first place it, like a great deal of the recent and prospective legislation, is proposed in the interest of a class at the expense of the nation. The silver miners and smelters are not paupers or invalids, that they should be made pensioners on the nation. It is true (and it will always be true whatever the price of silver may be) that many silver mines are unprofitable. Poor gold and silver mines will always be worked at a loss in the expectation that they will some day strike bonanzas, just as men buy, and will continue to buy, lottery tickets at more than their intrinsic value, in the hope of drawing a prize. It is not, however, the duty of the government to compensate, with the people's money, those who have spent their means in lottery tickets and have failed to draw prizes.

As a whole, the silver mining industry is as prosperous as at any previous period in our history, and does not call for any donation or pension from the taxpayer's money. Neither are those engaged in the smelting and refining of silver, objects of charity; on the contrary, they are earning comfortable dividends. One of the largest of these, the Kansas City Smelting and Refining Company, has just declared a semi-annual dividend at the rate of ten per cent. a year, while the St. Joseph Lead Company, smelting a non-argentiferous ore, was recently reported in these pages to have paid a regular dividend of eight per cent. and a large extra dividend in addition.

No doubt it would help the stock of those great bonanza mines, the

Granite Mountain that has already paid $7,800,000 in dividends on an investment of about $600,000, the Ontario, that has paid $10,775,000 in dividends on an investment of less than $1,000,000, and others like them, but no one can claim that these stockholders are entitled to any gratuity from the public funds, yet the officers of the former company are the most active advocates of free coinage and other devices for advancing the price of silver. If there be any class of mine owners in this country that need public assistance, whose profits are small as compared with their investment and the risk they run, it is certainly the coal miner, yet no one proposes that the government should come to their relief by cornering the coal market.

Merely on industrial or economic grounds there is no more reason, not as much reason, in fact, why the Government should undertake to advance the price of silver by buying all that is produced than there is for advancing, in the same way, the price of coal or iron, or lead or copper, or peas or potatoes.

We are quite aware of the sentimental grounds on which the advocates of these silver schemes claim exception for silver from a rule that they admit it would be preposterous to apply to coal or iron or agricultural products.

Silver is a "money metal," they say, but so are copper and nickel, and so was iron, and zinc, and tin in the form of brass, and if a use as money entitles the material to special protection against depreciation in market value, then paper should be cared for.

But why take space in answering such transparently absurd arguments? The reason, the only reason, for asking the government to advance the price of silver by buying all that is produced in this country, is to make still more profitable the business of the mines and smelters, and chiefly those who are the richest and least necessitous in each department. The other advocates of these measures are those who see opportunities for making money out of the "boom" an inflation of the currency would foster, and those who are anxious to spend the Treasury surplus in order to maintain the present exorbitant tariff on the goods they manufacture, for the surplus is a standing argument in favor of reduction of taxation.

The bill above quoted requires the purchase of $54,000,000 of silver a year at last year's price, or about $11,000,000 more than the entire product of silver in 1888 was worth. We may count 40,000,000 ounces as the production, after deducting the silver used in the arts. This bill then proposes that the government shall buy the whole ofour production at $1.29 an ounce, and allow the manufacturers to buy foreign silver for their business.

This bill would, of course, lead to the almost immediate advance in the price of silver to $1.29 an ounce, as, indeed, is its chief object. It would also tend to drive gold out of the country, for no one will take, in exchange for gold, certificates which are liable at any moment to be at a heavy dis count. The country could not continue buying silver in this quantity indefinitely. A few years would show that it would lead to a single silver standard, and when the act would be repealed, as it inevitably would be, then silver would decline to a lower point than ever before, and the in dustry would not for many years recover from the injury this bill would have caused it. If the government wants to help mining let it stop applying these unbusinesslike measures, and teach our silver miners that self-reliance which other classes of miners have to practice. Good judgment in investing in mines and skill and economy in their management are of more value to the industry than any scheme for securing public plunder.

The ENGINEERING AND MINING JOURNAL speaks the views of the great majority of silver miners when it says, "We are not paupers nor pensioners; we do not ask that our fellow laborers in other industries shall be taxed to pay us more than a fair market value for what we produce. We are willing to stand our chances with the rest and want no government 'trust' or corner in silver."

NEW PUBLICATIONS.

ELEMENTARY BUILDING CONSTRUCTION AND DRAWING. By Edward J. Burrell. Published by Longmans, Green & Co., London and New York, 1889. Cloth, 12mo, 248 pp.; illustrated. Price, 80 cents.

This will be found to be a very convenient little book for those who do not wish to go very deeply into the subject. It is systematic in arrangement, and the text is in clear and condensed shape. The numerous small diagrams (which are, very sensibly, dimensioned) will serve to make plain the text and are very numerous.

The author describes his aim to be to place before the student numerous examples of constructive details, which shall not only serve as illustrations but shall also afford the data necessary for making scale drawings of the various parts. Brief notes are given on the selection of drawing instruments for setting out, inking, coloring and finishing working drawings.

The examples given in the cuts are rather sketchy, both as to the line work and the lettering; but such a system is in far better taste than an ambitious failure in the way of fine drawing. Those who are not accomplished draftsmen too often make the mistake of attempting too much when an unpretentious sketch would answer the purpose and look better. But we do not mean by this that Mr. Burrell's recommendations are in any way out of line in the preliminary training of the professional draftsman. They are simply meant to assist builders and others who are not, but who may have occasion to put on paper their plans, and, as just said, form a groundwork for the beginner.

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.

West Kootanie, British Columbia.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I beg leave to make the following remarks respecting the communication on the mineral resources of the West Kootanie District of British Columbia, which appeared in your issue of February 22d, in which Mr. Geo. E. R. Ellis, M.E., complains of the lack of information on that district in the publications of the Geological Survey of Canada.

Mr. Ellis refers to and quotes only the "Catalogue of the Economic Minerals of Canada," printed for the Geological Survey in London in the summer of 1886, in connection with the Colonial and Indian Exhibition. Now as the discovery of rich ore on Toad Mountain was made late in the autumn of the same year, and as nothing was done towards its development till the spring of 1887, it is scarcely reasonable to expect that mention should have been made of this ore in the Catalogue named. It is true that galena deposits on Kootanie Lake (now covered by the Blue Bell and other claims and generally known as "Hendryx") were discovered as long ago as 1825 by the eminent botanist Douglass, and that claims were staked at Hot Springs (or Warm Springs) on the opposite side of the lake as early as 1883; but the ores obtained from these first discoveries contained but a small percentage of silver, and it was not till the find of rich ore at Toad Mountain became known that the general attention of prospectors was drawn to the district, and numerous discoveries of high grade galena ores and "Carbonate ores" occurred. If Mr. Ellis will turn to my report entitled "The Mineral Wealth of British Columbia"* he will find some details respecting the West Kootanie District (p. 59 R) with such authenticated assays of ores as were available up to that date (pp. 76 R, 77 R.)

During the past summer I made a preliminary examination of the important deposits lately found on Toad Mountain, and elsewhere in the vicinity of Kootanie Lake, and of the geology of the region, the results of which will shortly be issued by the Geological Survey, and which may, I trust, be found to afford some further useful information on this new mining district.

I may state, in conclusion, that I have much pleasure in being able to agree with Mr. Ellis in the very favorable opinion which he has formed of the future prospects of this district. The result of my own observations has been to convince me that its importance has not been exaggerated, and has, in fact, scarcely yet been generally appreciated. The number of discoveries of rich ores already made, and the considerable area over which these discoveries have occurred, is such as to guarantee a large and permanent output of ore as soon as adequate means are provided for the transport of the product of the mines to market. The Canadian Pacific Railway is at present, I believe, preparing to connect the Kootanie Lake region with its main line at Revelstoke, where a large and well equipped smelter has been constructed and is merely waiting the arrival of these ores to commence operations. It is, however, to be anticipated that additional smelters will before long be required on the lake itself, as advocated by Mr. Ellis.

GEORGE M. DAWSON.

Geological Survey of Canada, Ottawa, February 25th, 1890.

Use of Bichloride of Mercury in the Saving of Fine Gold.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In an article on the "Use of Bichloride of Mercury in the Saving of Fine Gold," written by B. F. Wilson, Jr., in your issue of the 11th ultimo, are some points that, to say the least, need explanation.

1st. Mr. Wilson suggests that, by an increase of the silvered copper plates, much beyond the present measure, the gold yield would be proportionately increased. Speaking of Southern ores, this is a fallacy thoroughly exploded by many costly trials.

2d. The cause of the loss of the gold in Southern mills is given to be the extreme or extra fineness of the gold. Unqualified by several important factors, this is not so. The cause of the loss, speaking generally, is the becoming perfectly dissolved in the mercury of this very fine gold, instead of remaining only coated or permeated by mercury, as coarser gold does. Gold thus dissolved runs off the plates in minutest globules, and will not settle or be caught again on any amount of lower plate, but is easily caught in well arranged settlers, drag mills, buddles, dolly tubs, or even Chili mills running deep. All Southern mills, in addition to concentrators, should have these cheap gold savers in profusion, and most gold mills in the South before the war did have them, but only one example comes to my mind just now among the large number of Southern mills that I have seen, which is thoroughly equipped in this respect.

3d. If the "Electric gold and silver chloridizing Company" had only changed the poles, and put the one at which the "blue mud" so unexpectedly appeared into the solution, and the other into the quicksilver, a valuable aid, and so far the only one that has stood the test of time, would have been the result, namely solid sodium amalgam with proper precautions would have been obtained, and this even in the minutest amount if used in the Wiswell would have been of greatest benefit *in keeping the gold in the mill.* Or, finally, if the operation of running the current in the direction as was done would have been continued until *all* the quicksilver was changed into "blue mud," and beyond, the "blue mud" would have been dissolved as bichloride. Even by thoroughly stirring this solution with "blue mud" and quicksilver in it, and the current on it would have rapidly changed to $HgCl_2$

* Published by the Geological Survey in May, 1889, and sold at 25 cents. To be obtained in New York through B. Westermann & Co.

4th. The benefits to be derived from the use of bichloride of mercury in the saving of gold, rest, according to Mr. Wilson, as indicated by his test of the strength of the solution, on the expectation that the gold will take away the chlorine from the quicksilver, thus producing, if I may so call it, nascent quicksilver, and that this quicksilver will then easily alloy with the (balance of) gold. Thus, of course, chloride of gold would have to be formed. Whether this be so, I hesitate to say (see Designolle's experiments), as the action of so homeopathic a solution is too uncertain. But if dichloride act as described, gold chloride must be formed, and at some stage of the operation the gold would be left very pure and bright at the surface, and be easily amalgamated by the surplus quicksilver charged, but the dissolved gold would be irredeemably lost either in battery, Chili mill, or Wiswell. That would be a deadful way of "saving gold."

5th. Why Mr. Wilson took aqua regia to make dichloride out of calomel is a mystery. (Hg_2 Cl + × Cl = × Hg Cl, this is the formula given to explain the formation of mercury dichloride in the generator boxes. It should have been—Hg_2 Cl_2 + × Cl = × Hg Cl_2. But of course this was probably a typographical blunder,)

Chlorine gas would have been better, according to the same formula. × Hg_2 Cl_2 + × Cl = × Hg Cl_2, for the solution, as prepared by Mr. Wilson, of course contains plenty of nitrate of mercury, and this compound in much more dilute solution, and much more emphatically than the dichloride, dissolves copper and precipitates upon the fresh surface of the *copper wire*, quicksilver, *but not upon gold wire.*

6th. The "use of bichloride in the saving of fine gold" may be in its infancy, but a method that has "been tried a hundred times," to quote Mr Wilson, and upon which several patents are based, and upon which, to my knowledge, no less than four experimental reduction works were built in the United States alone, must be admitted to be rather a lusty "infant," however moribund.

A MUSCULAR AMALGAMATOR.

NEW YORK, Feb. 22, 1890.

THE WALNUT GROVE DAM DISASTER IN ARIZONA.

The failure of the great Walnut Grove dam on the Hassayampa in Arizona, which is reported to have caused the death of some 150 persons, is a matter of very serious import to our Western States, not alone from the magnitude of the disaster, but from the effect which it will have upon the plans for irrigation which are now becoming so popular.

The Walnut Grove dam was built in 1887 and was planned by Prof. W. P. Blake, not, however, as it was ultimately built, for he merely commenced its construction and it was completed by contract. The cañon in which it is placed is quite narrow, the completed dam being only about 400 feet across on the top while it is 100 feet high. As originally planned the dam was commenced on the rock over the greater part of its length, but in the centre it did not reach the bed rock. This, however, is not supposed to have had anything to do with the failure of the structure. It is certain, however, that some water passed below the dam, though this is understood to have come through fissures in the rock, which were filled with gravel and which it was not possible to clean out. The structure itself was commenced with rock quarried from the adjoining hills, and with clay which is there abundant and of good quality for puddling.

The foundation was carefully laid, the stones being bedded and all carefully packed in with the clay; after a time, however, this method of construction was abandoned, the building of the dam was let by contract at an extravagant figure, something like $2 a cubic yard, we believe, and the supervision appears to have been lax, to state the case very mildly. The engineer of the company was Edward Robinson, and it has been stated that some of his near relatives were among the contractors. The dam was built by the contractors by simply dumping in rock and surface soil loosely from a trestle which was built at the height of the finished dam and was buried in it, and no particular pains was taken to lay the stone or to pack the material properly.

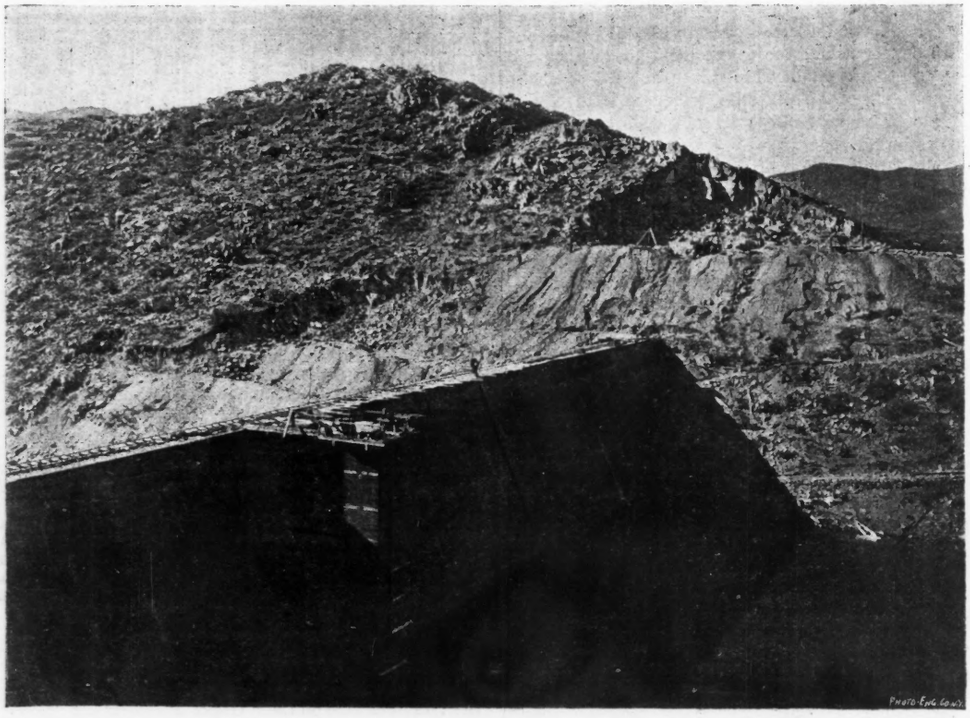
Mr. Luther Wagoner, Civil and Mining Engineer, of San Francisco, who was called in while the work was in progress, condemned the work, and declared the dam to be unsafe on account of bad workmanship, while approving of the plans made for the dam.

Once before the water rose almost to the crest of this dam without carrying it away, though either at that time or previous to that the pressure of the water bulged the dam out of line, but without making a break through it for the water. After this indication of weakness a quantity of rock and waste material was dumped over the back of the dam in its centre and formed an additional support for it. The waste weir was cut in the solid rock and was sufficient in size for ordinary floods, but on one occasion, at least, it became choked with drift wood, which very nearly resulted in the destruction of the dam. This experience should have secured efficient protection against its repetition.

The accompanying illustrations reproduced from photographs show the reservoir and the dam before the additional material was dumped over the back of the dam at its centre.

Professor Wm. P. Blake has furnished us at our request the following particulars of the work:

The Walnut Grove Dam was not built from my plans and sections, and I am unable to send you copies of the plans showing its lines as completed. My foundations were laid for an 80-foot dam, and an initial dam 20 feet high had been carried across the stream, when the company decided to have a dam 100 feet high, and to have it built by contract. The plans, angles of slopes, base and mode of construction were then entirely changed, and my connection with the work ceased.



THE WALNUT GROVE DAM, ARIZONA—FRONT VIEW.

The method adopted by the contractors was to dump the granite rock *en masse*, without mortar, between two roughly laid facing walls with considerable batter on both faces, upstream and down stream, and to hold the water back by means of a double planking on the upper face. This planking was spiked to timbers laid upon the rock work.

The outlet for surplus water was made in the rock of the bank around the west end of the dam, and probably was not large enough for a great flood, or it may have become clogged with drift-wood, so as to impede the flow of the water and back it up sufficiently to throw the water over the crest of the dam, where, once in contact with the loose stone, it would make rapid havoc, and cut the stonework out. The stonework once gone, in part, the pressure of water on the "skin" or woodwork would quickly burst the planking.

Soon after the completion of the dam the outlet became partly clogged by drift-wood, and only by the most strenuous exertions of the people of Walnut Grove the dam was then saved from destruction. The water rose nearly to the top of the dam, and if it had commenced to flow over probably the dam would have been destroyed.

The canyon below the dam is narrow, rocky and very rugged for some fifteen miles. It is not passable for wagons, but at a point about ten miles down a mountain road enters on the left bank and follows the stream for a few miles to Mahoney's camp, where two or three persons lived and worked a gold mine. With this exception there were no residents in the canyon last year, above the neighborhood of the lower dam which I have not visited. This dam was intended, I believe, as a distributing or service dam, and has been twice more or less injured by floods. The valley just above Wickenburg opens out so widely that the flood from the broken dam must have spread out and lost a great part of its destructive force by the time it reached the town, which for several years has been nearly deserted, so it is

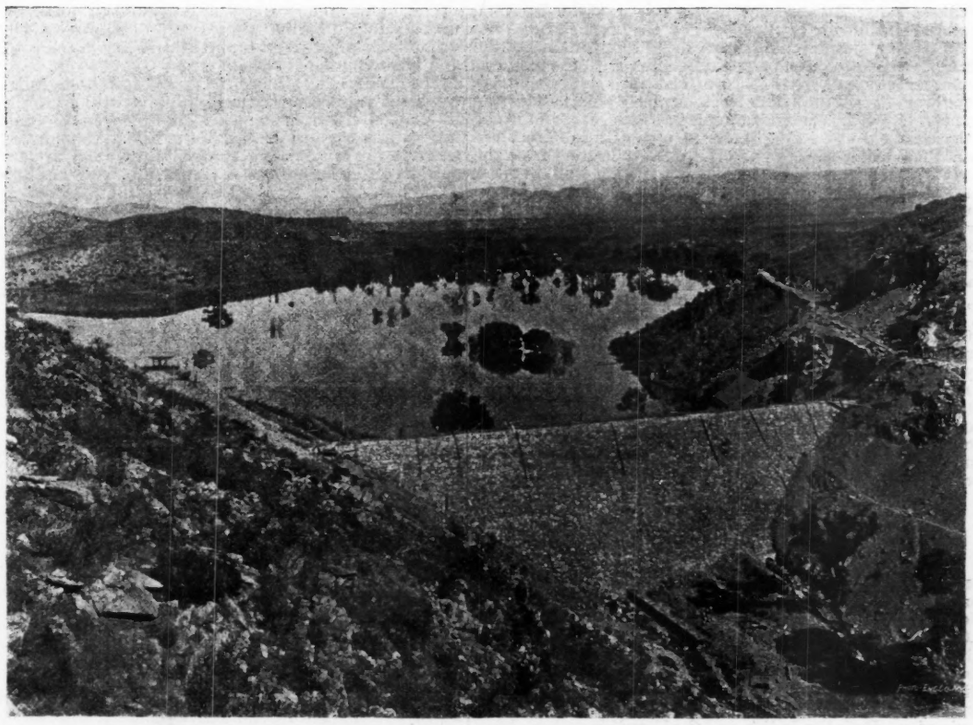
not probable that there was much loss of life there. But there may have been teams and travelers crossing the wide sandy valley in the desert and unable to escape the waters.

The great dam caused a beautiful lake to form above it. The water was clear and deep and had great shoals of fish, chiefly carp, which moved through it like dense black clouds. The sudden draining of this lake, a mile and a half long, must result in the destruction of quantities of these fish and in the exposure of a great area of silt to the sun with the prospect of engendering a dangerous malarial atmosphere in that region.

The dam has proved beyond any question that there is water enough to be stored—a matter of great doubt with some before it was built—and has shown also that a very considerable flow of water can be maintained throughout the dry season without any great change in the level of the water in the lake.

The Hassayampa is a peculiar stream, sometimes flowing as a little brook and again as a raging torrent large enough to float a steamboat. These great and sudden changes of volume make it a difficult stream to dam. The destruction of this dam is a most unfortunate disaster, and probably the lesson in construction it will teach will be that greater provision should be made for the harmless escape of waste water at the time of floods.

A representative of the Prescott *Journal* returned February 27th from the Walnut Grove dam. He interviewed Captain Hunt, late of the United States Army, who was on watch with Superintendent Brown when the dam gave way. The captain says that all day Friday twenty men were employed in blasting the waste water-way to increase its capacity. The sign of the break was the snapping of a large steel cable connecting the tower in the middle of the dam with the bank. The next instant the tower tottered, and it seemed as if the entire dam, containing 90,000 tons of rock, all moved bodily at once. The messenger sent to warn those at the lower dam, and who failed to do so on account of becoming intoxicated, has not been seen since.



THE WALNUT GROVE DAM, ARIZONA—VIEW FROM THE BACK.

MEASURES ADOPTED FOR THE SAFETY AND SERVICE OF RESERVOIR DAMS.

By Dr. P. Kresnik.*

This paper refers mainly to the numerous examples of dams constructed across valleys in France (including Algeria) and Spain.

The object of such dams is to provide for an increased demand for water by the formation of storage-reservoirs which may serve any or all of the following purposes, viz., irrigation of the land, water supply of the districts or towns, driving water wheels or other motors, feeding navigable canals; and it is stated that where the local conditions are such that a dam of moderate height (up to 66 feet) would suffice, there would be little difficulty in providing for its safety; but the case is different where dams 200 feet high have to be built; here the greatest care has to be taken with every constructive detail of the work, and it is the object of the paper to point out what precautions are necessary, and to show what injury has resulted from a neglect of such precautions.

(1) *Nature of the Foundations.*—In the case of dams of masonry (a material equally good for low as for the highest dams), it is stated that this should be so bedded in and incorporated with the foundation soil as to form a homogeneous whole, which can only be perfectly attained if that foundation be rock, and as examples are given the Almansa and Alicante dams in Spain, built 300 years ago. These are 68 feet and 134 feet high, respectively, are founded upon rock, and stand to this day: while the Puentes dam (164 feet high), which was built about 100 years ago on alluvial soil, was destroyed in 1802, after ten years' existence only, by a flood which never rose higher than 10 feet below the crown of the dam. When this work was reconstructed in 1881–86 the foundation was considerably widened, and carried down nearly 80 feet below the valley bottom in order to reach rock. The Grands-Cheurfas dam, in Algeria, is 98 feet high, and founded on limestone rock; but on the mountain slope, into which one end of the dam was built, a cleft full of sand was found, through which the water passed when the reservoir was first filled (January, 1885), and this brought about a breach nearly 33 feet wide a month after, through which the water rushed and overturned the Sig dam, lower down the valley. The Gros-Bois dam (France) was built on clay soil, which became moistened as the reservoir filled and produced a sliding and bulging of the lower slope, which, however, partially recovered as the reservoir was emptied. But this phenomenon was more striking in the case of the Bouzey dam (72 feet high), which bulged out about 15 inches on the lower side for a length of nearly 150 feet.

As regards the foundation of earthen dams, it should be on an earthy soil free from vegetable matter, so as to secure thorough incorporation of the material of the dam with that of the soil beneath; but if this soil be not thoroughly impermeable it is usual to build a puddle wall, or core, in the body of the dam, as in England, a good example of which is quoted in the Jarrow dam of the Liverpool Waterworks scheme, which is over 85 feet high. An exception to the above rule is that the Marengo dam in Algeria—an earthen dam 101½ feet high, built on basalt rock; but the greatest possible care was taken in the construction of it to prevent percolation of water at the base of the dam, and it has stood well to this day.

A curved plan of foundation is recommended, and is adopted in the Spanish and some French dams; but in Algeria the straight plan obtains, and three dams of this type as above shown, viz., the Habra, Grands-Cheurfas, and Sig, have been breached.

(2) *Cross Section.*—In masonry dams this varies very much, most of the old Spanish dams having an extravagant breadth, while those of France are, on the contrary, too slight, the section having been computed on the assumption that the highest water is more or less below the crown of the dam, and to this error the breach of the Habra dam (Algeria) has been attributed; for the flood of December, 1881, exceeded the highest normal water level in the reservoir by 7 feet and stood at 2 feet above the crown. As regards earthen dams, the case is different, as the top is usually very wide and the slopes very flat; what is to be avoided is a rush of water over the crown, and the calculations for stability must be made on the assumption that in high floods the water stands at a level with the crown.

(3.) *Precautions in Construction.*—In the case of masonry dams the stones should be dressed and squared and laid in the best hydraulic cement. Sometimes, for the sake of economy, the best mortar is used only at and near the faces of the dam, and inferior mortar in the centre, as in the Sig dam, in Algeria, which, as before mentioned, was breached. It is evident, therefore, that there is a limit to such economy.

In earthen dams the material should, it is stated, be a mixture of two-thirds clay and one-third sand, and should be tipped in thin layers inclined upwards, and made as compact and watertight as possible by ramming and rolling, and it is recommended to water the surface of each layer before tipping the next above it. The English method of building a core of puddled clay, it is said, has this disadvantage, that the parts of the dam in contact with the core are apt to crack, unless the greatest possible care is taken. The combination or conjunction of masonry with earthen dams is to be avoided, and masonry culverts under high earthen dams are to be regarded as dangerous, and as an instance the bursting of the dam of the Sheffield reservoir is quoted.

* (Wochenschrift des Osterreichischen Ingenieur- und Architekten-Vereines, 1889, p. 313), abstracted for the Institution of Civil Engineers, London.

(4) *Limit of Highest Water Level in a Reservoir.*—This should always be below the crown, especially in the case of earthern dams, and can be arranged in various ways, viz., by discharge-channels with sluice at the head, which can be made to work automatically, and by free overfalls or weirs, the length of which can be determined by prescribed formulas, dependent on the area of the catchment basin. Examples are given of the Almansa masonry dam, where the sill of the overfall is 6½ feet below the crown, and is only 39 feet wide, the corresponding catchment area being 77 square miles. The Habra dam has a catchment area of 91 square miles, with an overfall 49 feet wide on the right side, and another 124½ feet wide on the left side of the dam, the sill of each being about 10 feet below the crown. In rare cases only would it be necessary to make a tunnel or culvert through the mountain side for the discharge of flood waters: but an example is met with in the Fureno reservoir, where the sill of the tunnel is 24½ feet below the crown of the dam. Occasionally the under or scouring sluices are used for discharging surplus floods, and the Habra dam being quoted as an example; but this led to the destruction of the dam when the sluice shutters failed to act.

(5) There should be telegraphic communication between the dam and the village lying below the reservoir, in case of a breach, and it is stated that, for want of such warning when the old Puentes dam was breached in 1802, six hundred and eighty inhabitants of the village of Lorca (about seven miles down the valley) were drowned; but this defect was remedied on the reconstruction of the dam in 1885.

Arrangements for Service.—These are, first, the appliances for drawing off the water; and secondly, those for cleansing the reservoir from the mud, sand, &c., brought down by floods. For the first purpose the Spanish system consists of a well, built just within the upper face of the dam and extending to the bottom, and communicating with the water in the reservoir by numerous small openings furnished with shutters, and is drawn off on the lower side through a culvert or pipe passing under the dam. In the French system the openings are fewer and larger, and in the Gros-Bois dam there are only two, the sill of the upper being 18 feet and that of the lower 60 feet below the crown. The culvert leading from the bottom of the well is sometimes divided by a short partition wall, in order to make the shutters more easy to work; for instance, in the Vingeanne dam (France) the two branch channels are 2 feet 7 inches wide and 3 feet 3 inches high, while the main culvert is 6 feet 3 inches wide, and a similar arrangement obtains in the Bouzey reservoir.

Scouring or under sluices are constructed for the second purpose above mentioned. The amount of silt deposited in reservoirs depends on the catchment area, the rainfall, and the geological character of the soil. In the Sig, Tlelat, Djidionia, and Habra reservoirs, in Algeria, the yearly deposit is from 0·16 to 1·6 cubic yards per acre of catchment basin. It is stated that the most simple and effectual method of cleansing the bed of a reservoir is by the sudden opening of a large under sluice, which produces a violent rush of water, which carries off the silt with it; but this involves a great waste of water. The Alicante reservoir was cleansed in this way after an accumulation of ten years' deposit; the cost was £400, and 2,600,000 cubic yards were removed. But reservoirs should be cleaned out annually or every three or four years, as the silt is then looser and easier to carry off.

IRRIGATION IN EGYPT—THE PROPOSED RAIYAN (LAKE MOERIS) STORAGE RESERVOIR.

In the ENGINEERING AND MINING JOURNAL of the 1st inst., the elaborate irrigation system adopted by the British government in India was discussed at some length, and it was shown that the outlay, already amounting to over $100,000,000, had been in the main judiciously expended, estimating the results on a purely commercial basis and without regard to the indirect benefits, such as saving of life and avoidance of loss of revenue and expenditures for relief. We have now to consider a somewhat parallel case, that of irrigation in Egypt, and especially the form of storage or "basin" irrigation. Both the Indian and the Egyptian systems have received the long and careful study of accomplished engineers, and are therefore especially worthy of attention in view of similar works to be projected for the benefit of the arid lands of the United States.

For the information given in the following condensed account, we have drawn upon two new and important sources—Mr. W. Willcocks' magnificent memoir,* and the interesting monograph of Mr. Cope Whitehouse.† For the accompanying illustrations we are indebted to the courtesy of the American Geographical Society. Engineers who are interested in studying the subject in more detail than space permits to be given here, would do well to consult both of the publications referred to.

There has been a great deal of discussion among modern geographers as to the accuracy of the accounts given by ancient historians as to the character, location and extent of Lake Moeris, and among engineers as to the magnitude of the engineering achievements of the Egyptians of almost prehistoric times. As is well known, Mr. Cope Whitehouse has vigorously wielded the cudgels in behalf of the veracity of Herodotus, Diodorus, Strabo and Pliny, and has steadfastly upheld the professional skill and boldness of the engineers of old. After a prolonged exploration and a lively controversy he appears to have made good his case, and now announces the vindication of the integrity and intelligence of the ancient historians and the splendid engineering works of remote antiquity.

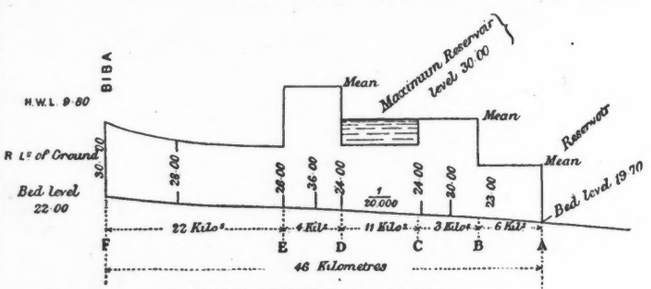
Diodorus thus describes what he saw during his visit to that part of Egypt (the Fayoum): "A little south of Memphis a canal was cut for a lake, brought down in length from the city 40 miles. Its usefulness was worthy of all admiration and the magnitude of the work incredible. The circuit of the lake is said to be 450 miles; and in many places it is 300 feet in depth. Who is he, therefore," he exclaims, "that considers the greatness of this undertaking and does not feel impelled to ask: 'How many thousands of workmen were employed, and how many years were spent in completing it?' Yet, considering the benefit and advantage brought to Egypt by this great work, none ever could sufficiently extol it according to what the truth of the thing deserves. For inasmuch as the Nile never kept to a certain and constant height in its inundation, and the fruitfulness of the country depended upon its uniform and regular supply, this lake was formed to receive such water as was superfluous, that it might neither immoderately overflow the land, and so cause marshes and stagnant ponds, nor, by flowing too little, prejudice the crops for lack of water. Accordingly the king dug a canal from the Nile to the basin, 10 miles in length, and 300 feet in breadth. Into this the water was allowed to run at stated times, and at other times it was diverted and turned over the cultivated land for seasonable periods, by means of sluices which were opened or closed, not without great labor and cost. This lake continues to the benefit of the Egyptians for these purposes to our own time, and is called the Lake of Myris or Meris to this day."

The plain account had been flatly contradicted, and finally the scientific world came to the unanimous conclusion that Moeris was an artificial reservoir, 45 miles round, 25 feet deep at high Nile and drained at low Nile when the waters had been used upon the fields of the Fayoum. It was everywhere stated that the position of the lake had been satisfactorily determined, in this sense, by M. Limant de Bellefonds. The map reproduced from the "Egypt" of Rawlinson (1881) shows the then accepted view. A fac-simile of the map of Claudius Ptolemy, from the edition printed in Rome in 1508, is also given. This can now be compared with an official map stamped with the approval of the International jury at the Paris Exposition.

The undoubted existence of comprehensive and stupendous works, still used for their original purpose after the lapse of 4,000 years, shows what estimate should be formed of the capacity of the rulers of Egypt to design and its inhabitants to accomplish.

The condition of things in Egypt has brought about a survey of this neglected region, not merely with a view to gratify curiosity in respect of its past condition, but to point out the means of guarding against calamitous results from the action of the Nile. These investigations are apparently on the eve of being turned to practical account, and a part of the surplus of the inundation diverted into the Wadi Raiyan.

The contour of high Nile, quitting the Nile Valley at el-Lahun, which is shown on the accompanying map, girdles an area of 250 square miles.



ROUGH SECTION OF CANAL.

If the Arab tradition is correct, King Raiyan invested Joseph with the insignia of Prime Minister as a reward for about 400,000 acres of land, perennially irrigated. Manetho says that this region was abandoned in the religious wars which broke out at the time elsewhere fixed as the birth of Moses.

The region might well be described, in the fifth century before our era as a vast reservoir and back-water from the Nile, with a surface level above low Nile at Memphis, fifty miles southwest of that city. It was about fifty fathoms deep, longer than its width, extending from north to south, surrounded by the Libyan desert, with an indented coast as long as the smooth sand-banks which form the Mediterranean shore of Egypt. Flood-gates at the double mouth of the canal cost $50,000, and these improvements relieved Egypt from a dangerous flood, or stored up and distribute the water which entered or issued from the canal.

The *Lacus Meridis* of the Ptolemaic maps—the Raiyan Moeris—is confined to the Raiyan depression, with an extension into the narrow valley of Muellah.

THE RAIYAN PROJECT.

The whole subject of Egyptian irrigation has been treated with thoroughness and ability by Mr. Willcocks. His book embodies the information collected during four and a half years of the irrigation systems of Egypt, and a *resumé* of the works carried out by Sir C. C. Scott-Moncrieff. The literature of irrigation, in general, is singularly scanty. Scarcely a dozen titles can be found in the catalogue of any library. The volumes published by the State of California will soon be supplemented by those to be issued from the State Department in Washington. Mr. Willcocks provides a treatise which discusses systems of irrigation practised with eminent success for 4,000 years. It is curious to read how steel may now be introduced with advantage in the sluice-gates of canals for which the Sphinx was sculptured as warder. One of its eleven chapters is devoted to the Raiyan project.

Mr. Willcocks appears to urge that summer irrigation impoverishes the land, and that basin irrigation, or an annual crop from flooded land is, in the long run, more productive. He has, however, explained that he objects to perennial irrigation when unaccompanied by those periodical floodings, in which the rich red waters of the Nile deposit the detritus of the Abyssinian mountains, mingled with the decaying vegetable matter transported by the White Nile from the swamps and marshes of Equatorial Africa.

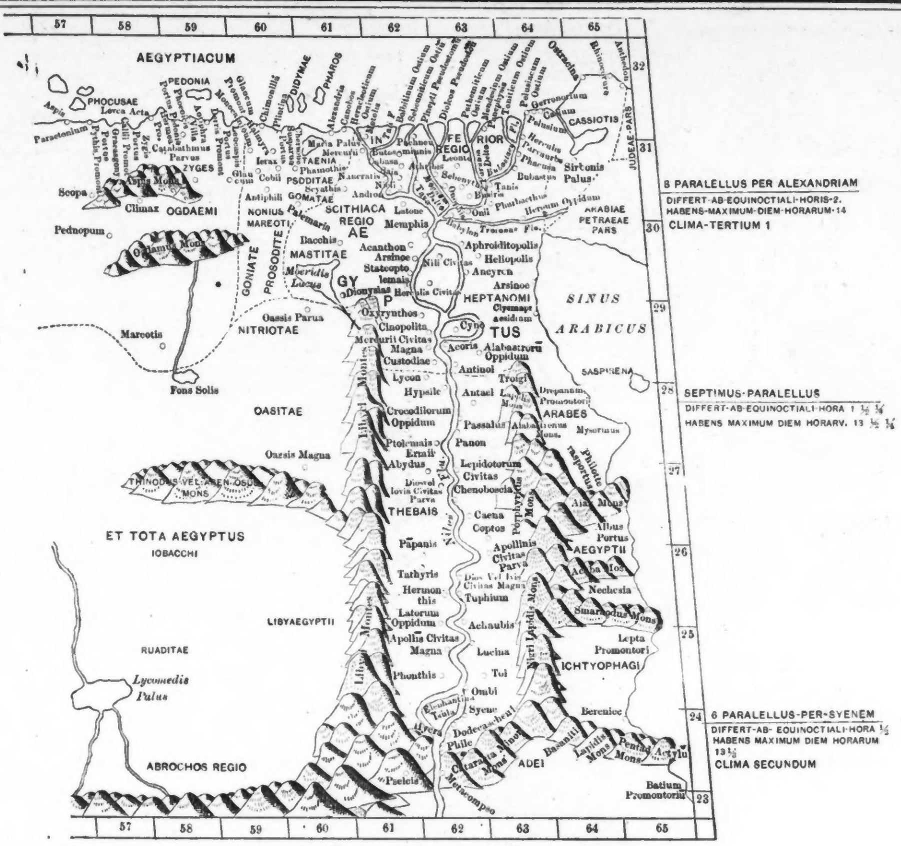
Colonel Ross, in his preface, shows the difficulty of draining Middle Egypt, especially the tract alongside of the Ibrahimiyah Canal, between Beni-Suef and Assiut. The Nile flood absolutely bars drainage into the Nile; the Raiyan basin offers the ultimate solution of this problem.

The Raiyan project, as advocated by Mr. Whitehouse, admits of the choice of four possible channels by which the Raiyan basin can be put in communication with the Nile.

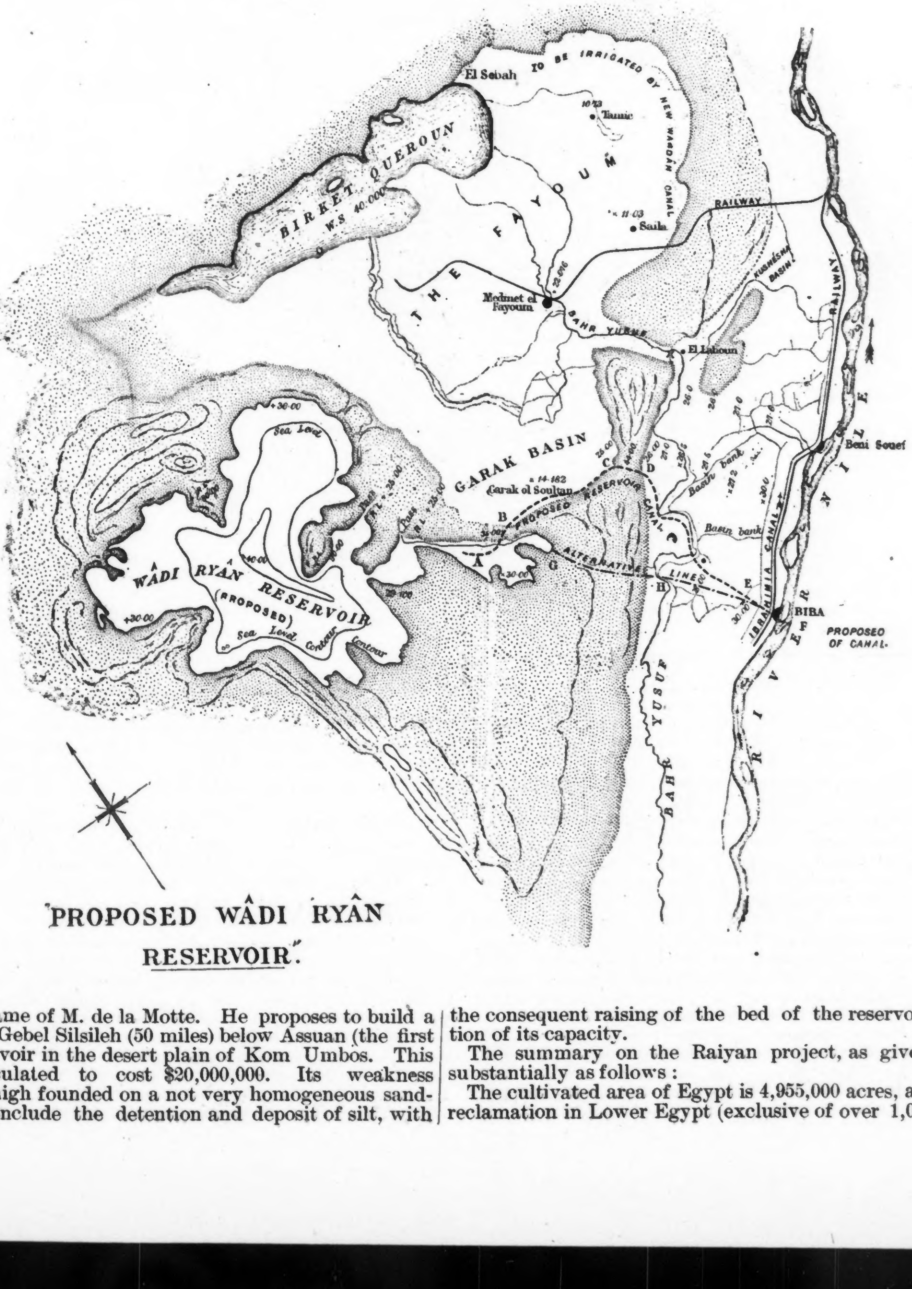
The only alternative scheme for the impounding of the surplus flood is

* "Egyption Irrigation." By W. Willcocks, M. I. C. E., Inspector of Irrigation Egypt. With Introduction by Lieut.-Col. J. C. Ross, R. E., Inspector-General of Irrigation. Published by E. & F. N. Spon, London and New York, 1889. Cloth, large 8 vo, xxvii + 367 pp., with numerous maps and diagrams. Price $15.

† "The Raiyan Moeris." By Cope Whitehouse. Printed by Clark & Zugalla, New York, 1890. Paper, 8vo, 52 pp., with maps. [Containing the substance of an address made to the American Geographical Society, November 11th, 1889.]



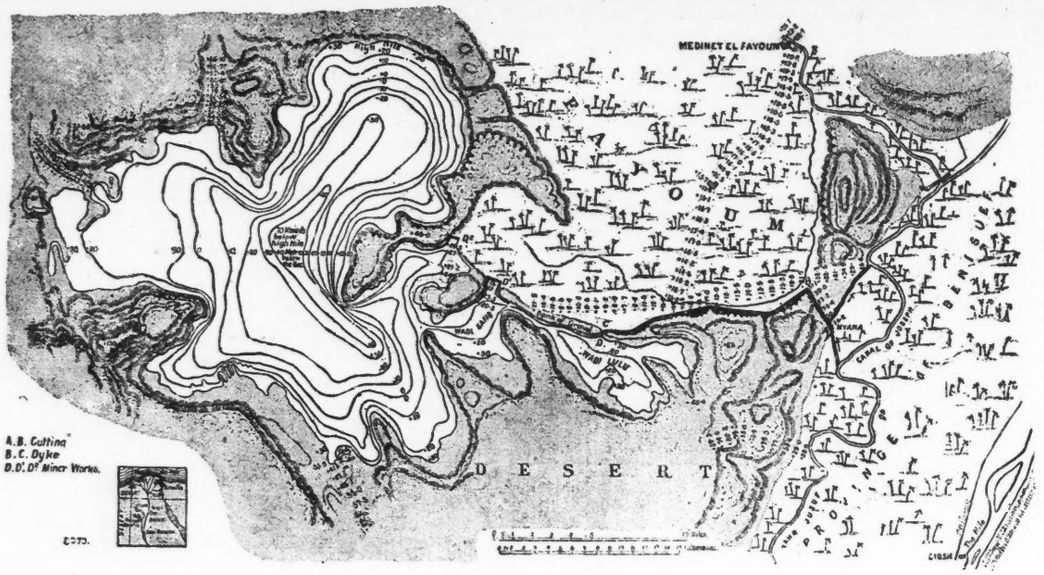
ANCIENT EGYPT, ACCORDING TO PTOLEMY.



that associated with the name of M. de la Motte. He proposes to build a dam across the Nile at Gebel Silsileh (50 miles) below Assuan (the first cataract) and make a reservoir in the desert plain of Kom Umbos. This scheme is roughly calculated to cost $20,000,000. Its weakness lies in the dam 60 feet high founded on a not very homogeneous sandstone. Other objections include the detention and deposit of silt, with the consequent raising of the bed of the reservoir and annual diminution of its capacity.

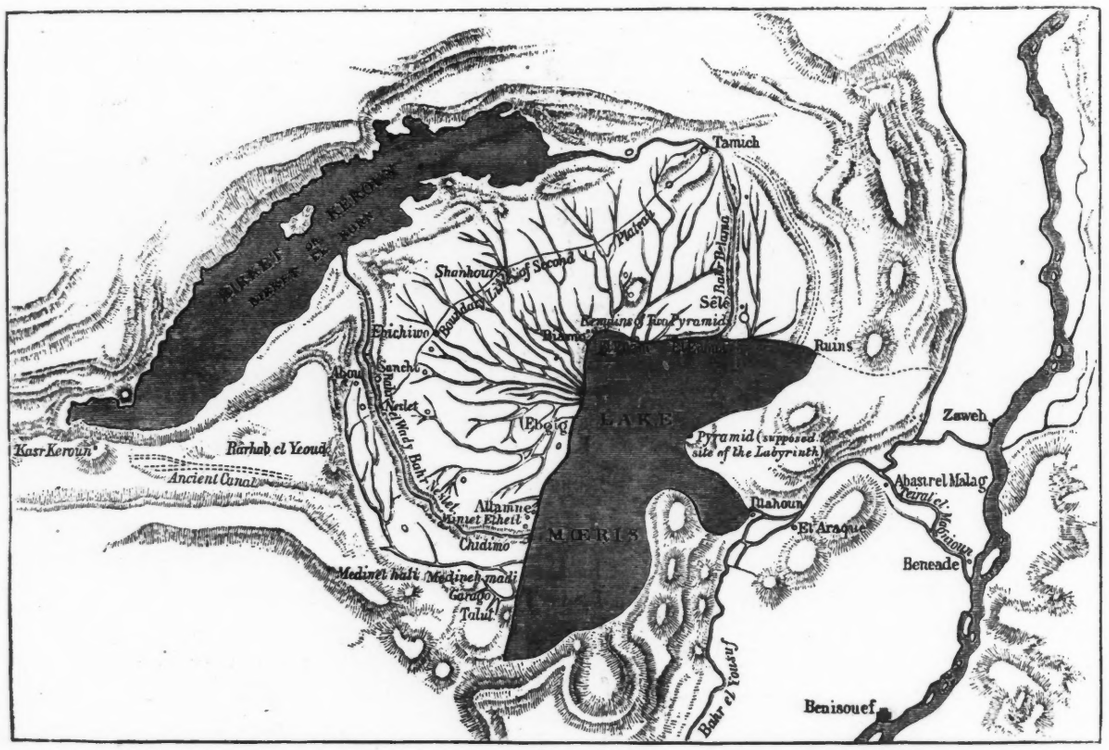
The summary on the Raiyan project, as given by Mr. Willcocks, is substantially as follows:

The cultivated area of Egypt is 4,955,000 acres, and the land capable of reclamation in Lower Egypt (exclusive of over 1,000,000 acres contained



THE RAIYAN BASIN.

Drawn by Cope Whitehouse, 1888.



THE ARTIFICIAL LAKE MŒRIS, ACCORDING TO LIMANT DE BELLEFONDS.

in the areas now abandoned to the Mediterranean, and forming the brackish lakes bordering upon it, together with at least 500,000 acres elsewhere), is 1,260,000 acres. If one-third of the cultivated land and the whole of the land to be reclaimed were to be irrigated in summer, there would be required a summer supply of 93,000,000 cubic metres per day, of which the lands to be reclaimed would alone require 50,000,000 cubic metres per day. The mean summer discharge of the Nile is 42,000,000 cubic metres per day (16,800 cubic feet per second), at Assuan, while there are years when it falls to 24,000,000 cubic metres per day, and hence the impossibility of doing any reclamation by summer cultivation on a large scale without storing water somewhere. The best known scheme is that of Mr. Cope Whitehouse for storing water in a reservoir to the southwest of the Fayoum. This reservoir would be fed by a canal from the Nile in flood, and discharge back into the Nile in summer. The time during which the reservoir would be drawn upon would be from the 15th of April to the 25th of July, when the Nile is at its lowest.

The principal elements of the problem are as follows:

I. *Size of the Reservoir.*—At the contour of 30 metres above sea level (high Nile), the area would be 686,600,000 square metres; contents, 20,559,640,000 cubic metres. At the sea level contour: area, 301,100,100 square metres; contents, 6,142,100,000 cubic metres. At the 40 metre contour below sea level (the basin being a depression considerably below the surface of the Mediterranean), the area would be 22,057,500 square metres; contents, 22,057,500 cubic metres on an average depth of one metre.

II. *The Reservoir Canal.*—Mr. Willcocks says: "Biba is the point chosen for the take-off of the canal from the Nile. It is 163 kilometres above the Barrage along the deep channel of the Nile (85 miles south of Cairo by rail). There are two lines given for the canal; one is called the 'proposed reservoir canal,' and has been levelled and surveyed. The other is called the 'alternative line.' All calculations have been made on the former. If the surveyors can find a fairly good line along the latter, it will be decidedly the better line, as it makes straight for the reservoir and avoids the banking up in the Fayoum Valley necessary on the former line."

Neither line presents any engineering difficulty, or would be above the capacity of a native provincial chief engineer. The direct line involves a tunnel about five miles in length through horizontal limestone. With a bed width of 80 metres, and a height of 10 metres, it would be more convenient to drift a series of openings.

The total length of the proposed canal is 27 miles from Biba to the

point A in the reservoir. The length of the alternative line is about 18 miles. The slope of the canal will be 1:20,000, the ordinary canal slope in Egypt. This slope, with a hydraulic mean depth of 20 feet will give a mean velocity of about one metre per second (2¼ miles an hour), a velocity which allows neither silt deposit nor scour in the Nile Valley.

III. *Flood and Summer levels of the Nile at Biba.*—The maximum flood of 1874 discharged 1,032 million cubic metres in a single day; the minimum flood of 1877 discharged 465 million cubic metres.

Mr. Willcocks puts the entire discharge of the Nile during the year at 93,000 million cubic meters.

IV. *Levels at which the Nile must be maintained for flood irrigation.*—In an average year, from the 1st of September, there is available a discharge of 57,500,000 cubic metres per day, increasing to over 100,000,000 on the 15th September.

As far as a high Nile flood is concerned, a canal should be capable of carrying 100 million cubic metres per day at the high flood gauges. A canal with a bed width of 80 metres (250 feet) and side slopes of ½ will accomplish this result.

The diagram gives a rough longitudinal section of the proposed canal.

V. *Cost.*—According to Mr. Willcocks' estimates the total cost of the canal would be: Earthwork, $6,632,500; masonry (including regulators, crossings and syphon), $1,072,500; land, $240,000; total, $7,945,000.

According to Mr. Whitehouse's estimates, however, the Raiyân Canal of escape and supply would cost $2,500,000; works in the Nile Valley, $1,500,000; total, $4,000,000.

The estimates of total cost of all works including reclamation works in lower Egypt, interest, etc., are discrepant and somewhat uncertain.

VI. *Quantity of water available without pumping, and time of filling reservoir.*—At the end of the third year after completing the canal, the lake would be filled to 27 metres above sea level, or five metres above low Nile, and could give a half supply that year, according to Mr. Willcocks. In the fourth year the lake would be in full working order and could be filled to 28 metres above sea level. Allowing one metre as loss by evaporation from April 1 to July 31 (which Mr. Whitehouse considers an excessive estimate) the water in the reservoir could be utilized (without pumping, either to fill or empty), to the depth of two metres, *i. e.*, a stratum of water 1,263,920,000 cubic metres, or a discharge of 12,639,200 cubic metres per day (about 3,000 million gallons for 100 days).

Mr. Whitehouse considers that the Manchester Ship-Canal has established a rate of excavation and earthwork which would enable a contractor of equal energy to open the canal of escape in a single year, and therefore that it would immediately begin to earn the amount agreed upon as remuneration for this part of its duty. The small basin, the Lulu reservoir, would be also available for storage, and a crop grown on the plateaux of the Raiyan depression wherever water lodged for over ten days. The masonry works would not be required until the third year after the escape canal had been completed, and it would be inexpedient to undertake them until after the escape had been worked.

VII. *Quality of the Water.*—Some apprehension having been expressed that the Moeris basin, being 40 metres below the sea, the stored water would have a tendency to become brackish from infiltration from the Fayoum basin or from elsewhere, evidence has been presented that such an effect is not probable. Experimental pits have been sunk in the basin, showing salt only in insignificant quantity, and the bottom of the present lake is rock, covered with clay and drifted sand. The question of salting is important, as it is the intention to supply good drinking water to towns not lying upon the main branches of the Nile.

VIII. *Passage of the Raiyan Water through the Canals of Lower Egypt.*—The canals taking off from above the Barrage would be capable of utilizing 44,000,000 cubic meters at the gauge of 14 metres on the Barrage, which is the maximum gauge to which water is to be held up in summer. Since the *mean* summer discharge of the Nile at Cairo is 34,000,000 cubic metres per day, and the reservoir can supply at least 12,000,000 per day in summer, the existing canals will (to that extent) suffice.

IX. *The Lands to be reclaimed near the Sea* will have to be provided with canals and drains. An expenditure of $10 per acre on the land to be reclaimed must be considered in all estimates of cost of reclamation, in addition to the water supply in summer. The winter supply will have to be provided against also in some of the provinces.

FIFTY HORSE-POWER ELECTRIC MOTOR.

We illustrate in this issue a new 50 horse-power stationary electric motor, manufactured by the Sprague Electric Railway and Motor Company, of New York, which will undoubtedly meet with extensive use in mining work where a motor of this kind is frequently required.

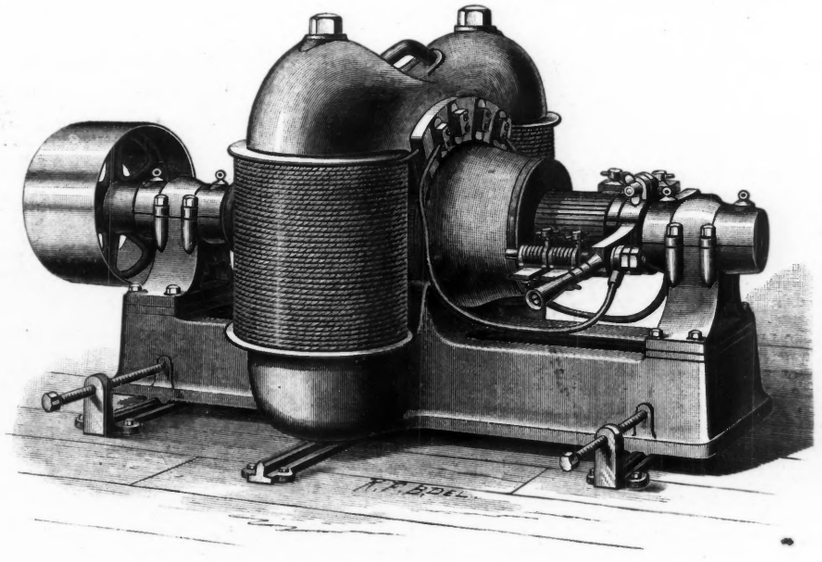
Especial attention has been paid in the construction of this motor to make it durable, reliable, automatic in operation and otherwise especially suitable for the requirements of such a machine when used in mines. With this end in view special devices are used which reduce the wear and necessary attendance and care to a minimum.

The bearings are of the ring self-oiling type, such as are used on the Edison lighting and power dynamos, by means of which a thorough and complete lubrication of the armature shaft in the bearings is maintained, and the necessity of a constant attention to this part of the machine is avoided.

Where a constant speed of the motor with varying loads is desired, as in the case of stamp mills, ore crushers and many other styles of machines, this condition is secured by a special winding of the motor. The governing device being inert and not being dependent upon the movements of the mechanical parts, as with the steam engine, it is much more reliable and less liable to get out of order.

Among other special advantages of the Sprague stationary motors are their economy, minimum wear, fixed position of the non-sparking point under the brushes and completeness of all mechanical and electrical details.

The efficiency of this machine is said to be over 90 per cent. That is, of every ten power units drawn from the line in the form of electric current, more than nine are delivered from the motor pulley for work.



50 H. P. ELECTRIC MOTOR FOR MINING PLANTS.

The electric motor is probably the simplest machine for producing power which has ever been invented. There is only one moving part, only one set of bearings and only one other place, i. e., the commutator, where any wear can occur. The greater part of the first cost of the machine lies in the frame, magnets and armatures, and these should never wear out.

The Sprague Company has made a specialty of building electric mining apparatus and electric motors in large sizes for mining work and long distance transmission of power, and we understand that every plant installed by this company is giving great satisfaction.

Preparation of Manganese from Manganese Chloride and Magnesium—Crystallized manganese chloride is first dehydrated in a porcelain basin, powdered, and 100 grms. of the powder mixed with 200 grms. of dry powdered, potassium chloride. This mixture is brought into a Hessian crucible, stamped down, closed with a loose lid and melted down in a wind furnace. A moderate heat only is requisite. The crucible is now withdrawn, and 15 grms. of magnesium thrown in, in pieces of 3 to 4 grms. at intervals of two to three minutes. The fused mass should not be heated to too high a temperature before the addition of the magnesium, otherwise the reaction is so violent that the contents of the crucible are thrown about. A dull red heat necessary to keep the mass molten is sufficient. The crucible is now covered with the lid, and returned to the furnace, heated strongly again, and allowed to cool in the furnace. On opening the crucible, a lump of manganese is found weighing from 20 to 25 grms. The metal thus obtained has a metallic fracture, which does not oxidize in dry air, is non-magnetic, and has a specific gravity of 7·3921 at 22 degrees.—*Jour. Soc. Chem. Ind.*

THE WASHINGTON MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.—II.

While the list of papers read by title at this Washington meeting of the Institute was very large, there were but a small number actually read at the meeting and but little discussion of those that were read. It was supposed that the aluminum meeting, in which a great number of papers were read or announced to be read, would have drawn out a good deal of discussion, the subject being comparatively new and the papers important. This, however, was not the case. The more important papers, abstracts of which we will hereafter publish in these pages, were read and the discussion crystallized into a pretty sharp personal contest between the advocates of the Heroult and Cowles processes. Mr. E. A. Hunt, of Pittsburg, read a paper on "The Properties of Aluminum," and Mr. Oberlin Smith, of Bridgeton, N. J., read a paper on "Aluminum in the Drawing Press," and also one on "Aluminum in Search of a Nickname," the substance of which latter was that we should have a shorter name for the metal than even the abbreviated form of "aluminum." Some of the professors were of the opinion that 'aluminium" was the correct thing, but this met with little favor from the practical men. F. P. Dewey, of Washington, read a paper on the Heroult process, illustrating the furnaces, and this was the occasion of the most notable discussion during the meeting. Several of the members promptly inquired the difference between the Heroult and Cowles processes, and got more or less satisfactory answers from Mr. Dewey. Mr. Eugene H. Cowles, the inventor of the Cowles process, emphatically claimed that the Heroult process was nothing more nor less than the Cowles process, and in the interests of his associates in business he placed this statement upon record. Metallurgically, the question comes down to the point as to whether there is actually electrolytic action in the Heroult point, or whether the reduction is simply by carbon, as in the Cowles. The opinions of the majority of the members seemed to be that there is practically no difference metallurgically between the processes. Mr. Hunt, of Pittsburg, speaking for the Hall process, which he represented, claimed also that the Heroult people have taken his process and are endeavoring to introduce it abroad. It was to be regretted that Mr. Hunt did not describe the Hall method of producing aluminum, which is in use at his works. It is understood that it is an electrolytic method in which fluoride solutions are used, and that the heat is maintained in the crucible by means of an electric current, which produces also electrolytic action which reduces the alumina.

At an earlier meeting Mr. John Birkinbine described a deposit of remarkably pure magnetite which is found in the Lover's Hole mine at Port Henry, N. Y. The analysis made by Mr. T. Reed Woodbridge, chemist for Witherbees, Sherman & Co., at Port Henry, showed that some of the samples reached even 72 per cent. of iron, and that out of nearly 40,000 tons the average was 68·60 per cent. of iron and ·033 per cent. of phosphorus. This ore is, we believe, without an equal in iron mining in its quality; the grade, in fact, is extremely uniform both in iron and in phosphorus, but one lot having gone below 65 per cent. of iron.

Mr. F. A. Pocock, of Boston, of the Thomson-Houston Company, read a paper on electric haulage at the Hillside Coal and Iron Company's collieries near Scranton, Pa.

On Thursday evening the members and their ladies enjoyed a banquet at the Arlington Hotel, and on Friday afternoon they were received by President and Mrs. Harrison at the executive mansion.

On Saturday a number of them visited the gold mines in Montgomery County, Maryland, where they were not a little surprised to find ore of very considerable richness, containing free gold, and veins so large as to promise a profitable enterprise. There is evidently need of some improvement in the mill management, but the mine shows such an amount of ore as should justify the establishment of much more extensive works than are now in operation, and should secure the services of competent mill men.

On the whole, the Washington meeting was one of the most largely attended in the history of the Institute. It was an extremely enjoyable reunion socially, but professionally it had but little interest. It was no doubt necessary that such claims as we have above referred to should be answered and the answer put upon record since the paper describing the Heroult process was read; but the place for their settlement is not in the Institute but in the courts, where, no doubt, they will be adjudicated in due time. This personal altercation and the number of papers which had to be read prevented any profitable professional discussion of the subject, so that little benefit was derived from the meeting beyond what would have resulted from a purusal of the papers in print. It would be very desirable were all papers put in print and distributed before the meetings, and the reading of them dispensed with, so that the time available would be devoted solely to their discussion and not to their reading. This opinion is shared in by a large number of the members of the Institute.

An Ice-Breaking Steamer.—The ice-breaking steamer "Martaja," built at Finnbodazand, Sweden, for the Finnish Government, was launched recently. This is a very powerful ice-breaker, being intended to force a thickness of 25 inches ice. She will be stationed at the Hangö Harbor. Her principal dimensions are: Length, 160 feet; breadth, 37 feet, and depth, 20 feet. The engine is on the compound system, and indicates 1,200 H. P. There are four independent boilers made of best Swedish Siemens-Martin boiler plate. The ice belt is of the best Surahammer puddle plate, and the vessel altogether is built of the best possible material.

Russian Production of Gold.—Russian mines are said to be lessening their output of gold. According to a Russian newspaper this is due to a smaller quantity of gold being now found in the gold sand of Yakutsk than in the past. On the other hand, the production of gold in quartz has arisen from about 3,000 pounds to nearly 6,000 pounds per annum. This fact is considered of favorable augury for the future. The chief deficiency in the Siberian mines is the want of labor, and this can only be supplied by the construction of the Siberian Railway.

A MINERAL ODE.

By an A.I.M. E.

(Lines read by DR. R. W. RAYMOND, at the Banquet of the American Institute of Mining Engineers, Washington, February 20, 1889.)

The furnace-man his Mary Ann
Once praised in smelting mood;
And kindly they who heard him say,
He did the best he could!

His mining pard, a modern bard,
Of San Francisco, Cal.,
Begs me to read the following screed
About Miss Minnie Rall.

Let others be content, says he,
With what the poets sang;
I stake my claim to love and fame
On no such common gangue!

Once and again I sought in vain,
Till Cupid, expert god,
The sulph-eyed maid to me betrayed
With his divining-rod.

Then his long bow he drew (you know
Experts do that!), and laughed,
As in my soul he made a hole
With love's discovery-shaft!

I well-nigh swooned to feel the wound;
Indeed, so great a shock,
Methinks, would quite, like dynamite,
Make a whole country rock.

Ah, she was fair, as she stood there,
Gently to me inclined;
Her hanging head, just tinged with red;
Her foot, so well-defined!

Her gentle breast no faults confessed
By fitful heaves and throws;
No thermal tides her slick insides
Disturbed in their repose.

A hroidered line of selvage fine
Her graceful figure traced.
Ah, surely ne'er such body fair
Displayed so little waste!

To bide with her, the apex were
Of sublunary bliss;
Such joy as swelled when Eden held
The paragenesis!

Her iron hat she doffed; and that
Left her bright face revealed,
The while this word I thought I heard:
"Assay me, and I'll yield."

Quoth I, "Dear witch, the prospect's rich;
"But I've been there before.
"I've ta'en my pick till I was sick,
"And tested o'er and o'er.

"A silver glance has made me dance
"Till skips wore out my pumps.
"I could do naught with all I wrought
"But add it to my dumps!

"This warned me I should never try
"To prove love's different sorts
"By turning lens on specimens
"At single pints or quartz.

"Grown wiser so, I fain would know
"As prudent scientist,
"What you will be in quantity.
"In short, *will you persist?*"

With modest mien and ruby sheen,
She whispered low, "Will *you?*"
(Whoever tries two crystal eyes
Will know this tale is true.)

"At least you can," I re-began,
"If you're refractory, state;
"Mispickel there looks very fair,
"But won't amalgamate."

"I think," said she, "that I should be
"Not difficult to treat
"With stamps enough, and pans and stuff
"Of various kinds, and heat!"

Said I: "'Twere well if I could tell
"Which way your course will tend.
"Will it or not unto my lot
"Be faithful to the end?

"These strikes of folks, they are no jokes.
"I'd har that trouble here;
"If here at last my lines are cast,
"I want my title clear!"

She answered: "Such a claim's too much
"For me to grant, I think;
"If you don't like my present strike,
"You'd better drift or sink!"

"One question more," I said, "before
"I act upon the rest:
"Could I expect a good effect
"From having you well dresesd?

"Your gravity I fain would see
"Specifically figured;
"Would you prefer a Rittinger?"—
She answered, "I'll be jiggered!"

And such a glance she shot askance,
I felt myself unable
My passion's weight to concentrate
On my heart's shaking table.

I changed the theme. "Did you ne'er dream,
"In earlier days than this
"You passed through strange mysterious change,
"Or met a morphosis?

"Have you ne'er climbed in clouds sublimed
"From scenes of igneous strife,
"Or have you led thus far, instead,
"A sedimentary life?

"That is, sweet friend, did you ascend,
"As every parvenu must,
"Or come through chinks, as Emmons thinks,
"Down from the upper crust?

"Not that I care from what or where
"Your beauty came to me;
"I judge by fruit, and not by root,
"Your geological tree.

"Yet there are those who still suppose
"If they can tell, Whence was it?
"They're on the road that parts a lode
"From merely a deposit."

"Naught do I know, if from below
"Or from above I came;
"Only this fact is quite exact:
"I got here all the same!

"So tease me not to tell you what
"To me is all unknown,
"And fear no harm, but put your arm
"Around my mineral zone!"

"Enough!" I cried; "my charming bride!
Your worth I do divine;
"Till beyond doubt you peter out.
"I'll proudly call you *Mine*."

THE SALT DEPOSITS OF KHEWRA IN THE PUNJAB.

By E. Rodger.*

In the northwest corner of the Punjab, extensive deposits of rock salt are situated in a chain of hills which are singularly barren and rise boldly and abruptly from a level alluvial plain through which, not far from the base of the mountain, flows a tributary of the Indus. The small village Khewra, almost only inhabited by miners, is connected by rail with Lahore, whence it can be reached in about twelve hours.

A short tunnel is cut horizontally into the hillside to reach the salt; then a chamber 45 feet deep, from front to back, and of a height and length according to convenience and the size of the salt deposit, is excavated in this.

A wall of the solid salt, 25 feet thick, with only a 12-foot gallery running through it, is left standing to support the roof, and then another 45-foot chamber is commenced beyond. No work is done below the level of the plain on account of water as well as the extra labor of carrying the salt up. The chambers in the various levels coincide; when one chamber is worked out another is started directly above and worked downward until forming one with that, or those, below. The height of the chambers is occasionally 180 feet, so that a small fire balloon must be resorted to in order to show the upper part. Although more than twenty chambers, several of them of such large dimensions, are open, besides all the galleries and small cuttings, only the outskirts of the deposit have so far been touched. The salt runs in layers for 900 feet above the level of the plain, besides what may be below this, and is so compact that, of the picturesque cavities so frequent in other salt mines, only one of small extent has been found. It is, as generally is the case, filled with brine and its roof covered with crystals.

As is usual in subterranean workings, the temperature of the mine is very constant, warm in winter and cool in summer. As 86 degrees Fahr. is hardly ever much exceeded, the office work is, in the hot season, done in the mine.

The blast hole is bored by means of a long iron bar, the "jumper," which the miners thrust in without using any tools, and when it jams, loosen with a small hammer. The powdered salt is removed from the hole with a scraper and the small dust utilized for tamping. The salt is blasted out by means of powder, the lumps cleaned if need be, broken into pieces of a convenient size and carried by women to the loading stations of the tramway that runs through the principal galleries of the mine, and is worked by coolies for economical reasons. The salt is stored near the railroad station, packed in bags and transported in closed trucks with locked doors.

The best samples contain 99 per cent. of chloride of sodium, the poorest 96.4 per cent.; the balance consisting of water and mostly insoluble matter. Fine crystals are rare; the color of the salt in large masses is a pale pinky red, but snowy white when finely ground. The cost of the salt at the mine is so small that the splinters and fragments from the blasting and trimming is the cheapest material at hand to fill up old chambers—the only feature of the working that at first appears uneconomical. Outside the mine the price is considerably higher, owing to the duty upon salt, which is 2.8 rupees per 82¼ pounds. About 900 laborers are employed at wages averaging 8 annas a day on piece work; their actual number is 1,200, but they spend three months in celebrating their Mohammedan holidays. The mines have been in operation long before 1849, how long is not known.

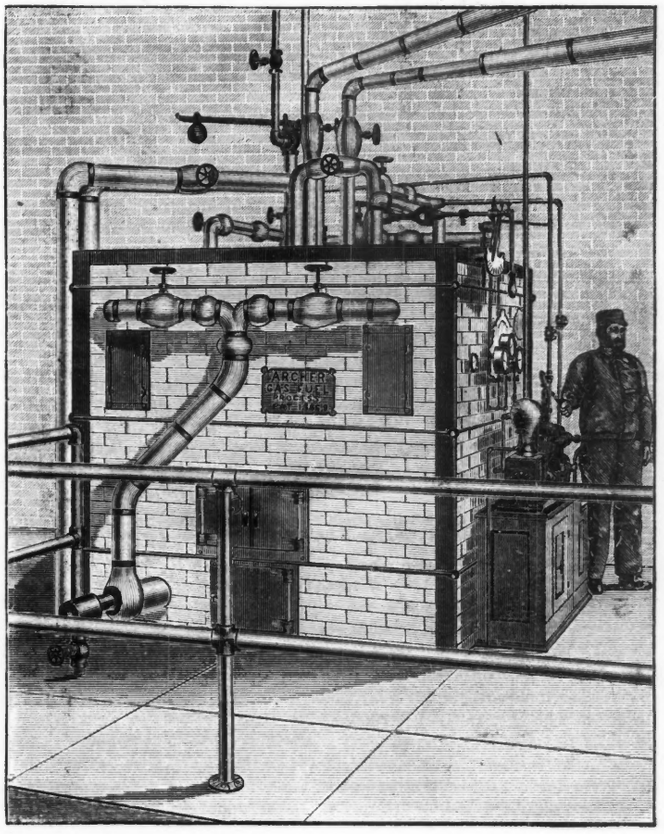
* Abstract of a paper in the *Journal* of the Society of Chemical Industry.

THE ARCHER GAS FUEL PROCESS.

The Archer Gas Fuel Process and its product has now been so long in operation and used on such a scale of both size and variety that the results deserve careful attention.

By this process, in a few words, crude oil, already heated to about 400 degrees, is, by a small pump, forced into a coil of one-half inch pipes and still further heated there before entering the vaporizers, where its contact with steam, similarly superheated, causes an instantaneous decomposition, the carbon uniting with the oxygen, and together with the liberated hydrogen producing the fuel gas. The experience of those who have used it is that it is uniform in quality, clean, pure, particularly free from sulphur, and gives rise to no smoke or residuum. Any quantity of gas and degree of heat, from 500 to 5,000, can be at once obtained and continuously maintained, by simply regulating the supply of oil and steam. As the gas is not produced faster than used, and as the oil without inconvenience can be kept 2,000 feet away from the producer, neither gas nor oil need to be stored in the building. In fact, no accident has happened in the two or three years in which this process has been in practical operation, which is probably greatly due to the inexplosive character of the apparatus. This latter, all bricked up, is small; a plant that will furnish fuel enough to heat 1,000 tons of steel ingots per day, occupies a space only six feet square by about seven feet high, and a producer of double this capacity requires only one attendant.

Regarding the caloric power of the fuel it is claimed that furnaces which



THE ARCHER GAS FUEL PRODUCER.

with natural gas require 6 to 8-inch pipes, or with coal gas, 30-inch mains, need only 2-inch pipes when the Archer water-oil-gas is used. According to carefully conducted comparative tests made during two weeks in the Cleveland (O.) Rolling Mills last year, where the system is adopted, the cost of fuel per ton of 4′ × 4″ steel billets rolled, using a Siemen's regenerative furnace supplied with coal fuel gas, was 35 cents, whilst the use of Archer fuel gas with the Archer furnace reduced the cost to 20 cents, besides saving, in oxidation of metal, 2,000 pounds to each 100 tons.

The cost per ton, by direct coal-firing, in a large coal furnace in the same works operated with fan blast, was 60 cents, and the saving in oxidation of metal in favor of fuel gas amounted in this case to 4,000 pounds on each 100 tons of metal. The cost per ton of iron bars in the Plate Mill Department of the same concern with fuel gas in a new regenerative furnace was 30 cents, with direct coal firing in a common air blast furnace 68 cents, the saving of metal in reduced oxidation being 5,000 pounds in each 100 tons over coal.

This great saving in oxidation, however, we are inclined to attribute to the form of the Archer furnace rather than to the special qualities of the fuel.

The cost per ton of wire rod in the Rod Mill with direct coal firing and gas-fuel was respectively 50c. and 23½c. To keep the plant in repair did not cost the firm more than fifty cents per week.

These direct as well as indirect economic features, such as saving in labor of handling coal and cinders, seem to secure for the Archer system a brilliant future, and it is hard to say to what purpose it could not be applied. Certainly we expect to see it extend to branches of metallurgy other than iron and steel, and we do not know why it should not be applied

to boiler firing for steamships. A large amount of fuel occupying but little room, and capable of being stored in otherwise valueless spaces means on shipboard practically an increased carrying capacity or reduction of weight, thereby gaining speed.

OFFICIAL REPORTS.

THE QUINCY MINING COMPANY.

The directors submit the following report of the business of the mine for the past year, and statement of the financial condition of the company. The product of the mine was 7,820,010 pounds, or 3,910 $\frac{10}{2000}$ tons of mineral, yielding about 81 $\frac{3}{5}$ per cent., or 6,405,686 pounds of refined copper, for which has been realized the gross sum of $766,244.36; realized from sale of silver, $2,195.87; total, $768,440.23.

The expenses of the year are as follows: Running expenses at mine, $337,740.72; building and construction account, $87,667.80; Quincy and Torch Lake Railroad, $71,882.63; smelting, transportation and all other expenses, 102,856.87; total, $600,148.02; leaving as mining profit, $168,292.21.

There has also been realized during the year, from interest on loans, $12,508.93; received from real estate, Hancock, $1,800; making the income of the year, $182,601.14.

The statement of assets and liabilities in our last report showed a balance on hand, as of date: January 1, 1889, $562,766.41; add earnings of 1889, $182,601.14; total, $745,367.55.

Deduct dividend of February 15, 1889, $200,000; deduct dividend of August 15, 1889, $80,000; total dividends, $280,000; leaving balance of assets January 1st, 1890, $465,367.55.

A dividend of $3 per share, or 120,000 payable February 17th, has been declared, which, with dividend of $2 per share, paid August 15th last, makes total for the year $200,000.

The usual financial statements are submitted, and also the report of the agent, which states clearly the present condition of our property.

NEW YORK, February 10th, 1890. THOMAS F. MASON, President.

General Summary of Receipts and Expenditures of the Quincy Mining Company from its Organization to December 31st, 1889.

EXPENDITURES.

For expenditure on location previous to 1856	$42,097.98
For expenditure on Quincy vein, 1858, not now worked	55,000.00
For openings and explorations on 3,800 feet, "east" or Pewabic vein, extending to Portage Lake preparatory to future work	11,500.00
For real estate and permanent improvements on same, including dwelling houses, stamp mill, machinery, steam engines, railroad, dock warehouse and other buildings and roads	1,353,248.48
For mining and surface labor, expenses of smelting and marketing copper and all incidental expenses	13,282,909.88
Balance carried down	5,715,367.55
	$20,460,123.89

RECEIPTS.

From capital stock paid in	$200,000 00
" proceeds copper and silver (106,627,134 pounds copper)	19,971,215 06
" interest	149,021 24
" profit on sale P. L. & R. Improvement Company stock and other investments	79,637 16
" sales of real estate, Hancock, Mich	60,250 43
	$20,460,123 89
By balance brought down, being receipts over expenditures	$5,715,367 55
Deducting dividends declared, Nos. 1 to 42 inclusive	5,250,000 00
Leaving balance	$465,367 55

SUMMARY FOR YEAR.

Average force employed	485 men.
" number of miners	145 "
" wages of miners on contract per month	$49.15
Total rock mined	167,077 tons.
" " hoisted	123,998 "
" stamp-rock treated	117,785 "
Yield of rock stamped	2·82% mineral
Product stamp mineral	6,641,785 lbs.
" masses	1,178,225 "
" refined copper	6,405,686 "

With reference to the Quincy & Torch Lake Railroad, which may be considered an extraordinary expenditure, the agent reports:

The Quincy & Torch Lake Railroad was practically finished in October last, a small gap only being necessarily left open at the mine end. This road throughout is well built, and is fully equipped to meet all probable requirements for many years to come.

The foregoing shows that, deducting the extraordinary expenses of building and construction account, $87,667.80, and Quincy & Torch Lake Railroad, $71,882.63, the cost of producing and marketing a pound of fine copper was 6$\frac{3}{4}$ cents. Including these two items, it was about 9$\frac{3}{4}$ cents.

HIGH SPEED IN OCEAN STEAMERS.

Written for the Engineering and Mining Journal by B. Schieldrap, C. E.

It is the object of the present paper to investigate from what source and under what conditions high speed can be obtained by ocean steamers.

When a vessel runs at an even speed its resistance and propelling power are equal. To alter this speed it is necessary to change the proportion between power and resistance; thus a higher speed can be obtained either by increasing the power or reducing the resistance. An increase of speed must come from one of these sources. I do not say that it is exclusively by increasing the power that advancement as to speed has been made of late years; but I have good reasons for believing that the second source for high speed—reduction of resistance, and the governing principles upon which such reduction necessarily must be based—has not generally been given so prominent a consideration in the construction of certain steamships as it deserves. It is obvious that there must exist a certain relation between the form and volume of the submerged part of a steamer and the speed to which it can be driven. Economy, letting alone other practical considerations, sets a limit to the speed of each vessel, and although this limit may not be very marked or distinct, it will, notwithstanding, make itself plainly felt. But our knowledge of the natural laws by which this relation is governed is very slender. From time to time a great number of disconnected and contradictory theories have been advanced; but any development of a settled theory as to the resistance of vessels has not been in question. Mr. W. H. White says*: "Again and again has the discovery been announced of 'the form of least resistance,' but none of them have largely influenced the practical work of ship designing, nor can any be regarded as resting on a thoroughly scientific basis. In fact, a century and a half of almost continuous inquiry has firmly established the conviction that the problem is one which pure theory can never be expected to solve."

A theory is necessary in every art, because it furnishes the light indispensable for true advancement; and the absence of theory must necessarily breed a confusion of ideas which not only can do no good, but a great deal of harm. Under these circumstances it becomes a difficult, not to say impossible, task to furnish such a basis for an inquiry of this subject which everybody will accept as fundamental and true; and the results of such an inquiry can be advanced as an individual opinion only, however strong personal conviction may be.

Ship building as an art rests on the fundamental law first established by Archimedes, that a floating body must displace a quantity of fluid equal in weight to the body. Is it not then a sound and natural proposition that this law must also be the fundamental one for resistance—that there must exist a close and direct relation between the vessel's weight and its resistance? Vessels of equal weight may have very different resistances; but under otherwise similar circumstances a reduction in weight must call forth a reduction in resistance. If this was not so, we would arrive at the conclusion that it is possible to transport an additional weight, however small, on the water without a consideration of some kind in return; a conclusion which shows its utter falsity on its face. It has been the tendency of all investigators of this subject to consider the resistance due to some certain feature of the vessel to the exclusion of others. In some cases it is the midship section, in others the curvature of the longitudinal lines or the surface friction, and the modern tendency is to attribute the chief importance to the wave-making features (lengths of entrance and run) of vessels designed for high speed.

To demonstrate that the vessel's weight is the original source for all resistance is my object in the following. A certain weight may produce a variety of resistances according to the vessel's form and other circumstances, but the fundamental principle upon which the pursuit of high speed must be based will always be: *Saving of weight.*

According to the modern theory, the resistance to a vessel's motion is composed of three parts, viz.: (1) Frictional resistance due to the gliding of particles over the rough bottom of ships; (2) eddy-making resistance at the stern; (3) surface disturbances or wave-making resistance.

The skin friction was formerly considered of small importance; experiences gained by the lengthening of vessels seemed to favor this assumption. Thus the "Candia" was lengthened 35 feet (inserted as a middle body) and thereby the speed was reduced only one-tenth of a knot. From this the following inference was drawn: "It shows, however, very plainly that the retarding action of friction between the water and the straight part of the sides and bottom of a vessel is comparatively unimportant, the main point being the opening and closing of the water at the bow and stern."†

According to the late Mr. Froude's experiments, skin friction depends upon the area of wetted surface, its length, degree of roughness and the velocity of advance. The resistance of one square foot of an iron vessel's bottom in well-coated condition was found to be 0·25 pounds at a speed of 600 feet a minute, and that this resistance varied with a power of speed, the exponent of which is 1·83. Thus the retarding influence of skin friction is by no means small; on the contrary, by lower rates of speed it constitutes the principal part of the total resistance. As shown, the resistance from skin friction depends upon the area of wetted surface, and this again is decided by the vessel's weight when its form is once settled. A heavy ship must necessarily have a great wetted surface and consequently also a great skin friction.

The second part of the total resistance, the eddy-making at the stern, has been demonstrated by Mr. Froude to stand in a certain proportion to the skin friction, and must consequently also be dependent upon the vessel's weight.

The third part of the resistance, which is due to the vessel's form, is by modern scientists termed the wave-making resistance, but was formerly considered upon an entirely different basis from what it is now. This part of the resistance was very naturally considered dependent upon the degree of rapidity with which the water had to be displaced at the bow, and again replaced at the stern, and therefore in the closest manner dependent upon the form of the longitudinal lines of the vessel. The departure of these lines and their curvature in fore and after body proved to have a great influence upon the resistance, and most especially so at higher rates of speed. After quoting the results of extensive experiments, F. H. Chapman, the eminent Swedish naval architect, says: "The inference which may be drawn from all this is, 1st. That when the motion is slow the velocity of the body is greater, when the sharpest extremity is before, than when the obtuse is. 2d. That when the velocity is increased to a certain degree, the body runs through the same distance in equal times, whichever extremity is before. 3d. That when the velocity becomes still greater, the body runs through the same distance in less time when the obtuse extremity is before."‡ (Fishes capable of a high rate of speed have always the section of greatest area nearer the head and a very slender after body.)

There is ample evidence at hand for the immense importance of fine longitudinal lines for the pursuit of small resistance at high rates of speed. The departure of the longitudinal lines is decided by the form as well as the area of the midship section; and the pursuit of a small ratio between the departure of the mean longitudinal line and its length is plainly traced in all vessels designed for high speed. By modern steamships and outriggers the denominator of this quotient is increased, and in fast yachts the aim is, by variations in form of midship section, to reduce its numerator. If, in this connection, we consider the coefficient of fineness§ of the vessel, it is seen that with increasing claims to high speed

* Manual of Naval Architecture. London, 1882, page 433.

† A Treatise on Marine Engines and Steam Vessels, by Robert Murray, C. E., London, 1878, page 129.

‡ See "History of Naval Architecture," by John Fincham, Esq., introduction page LII., London, 1851.

§ Percentage between the vessel's displacement and a parallelapiped described by the vessel's length, beam and draft

there is always a corresponding reduction in the coefficient of fineness. Some few figures will illustrate this point :

Class of vessel.	Coefficient of fineness.
Cargo-carrying steamers of moderate speed (Devastation class, mastless iron-clads)	65-70 per cent.
Common forms of merchant steamers	55-60 " "
Fast steamships (Holyhead packets for instance)	43-46 " "
Modern racing yachts	22-33 " "

Fine bow and stern lines must necessarily tend to reduce the coefficient of fineness, and most especially so if Mr. Froude's advice is followed, that for high speed a parallel middle body is not admissible, but the whole length should be taken up by entrance and run. The American centerboard yacht is decidedly a success, as far as small resistance goes, and no other form has a smaller coefficient of fineness.

In spite of the great dissimilarity between the old theory and the modern stream line theory, first advanced by Mr. Scott Russell, the preceeding deductions are fully sustained by the latter theory. The following is taken from W. H. White's Manual (formerly quoted): "Very considerable importance attaches, however, to the lengths at the bow and stern over which the retardations of the particles extend; since these lengths exercise considerable influence upon the lengths of the bow and stern waves created by the motion of the ship. And, further, the ratios of these lengths of entrance and run to the extreme breadth of the ship must be important as well as the curvilinear forms of the bow and stern, since the extent to which the particles are retarded in gliding past the ship must be largely influenced by these features, and, as we have seen, the heights of the waves will depend upon the maximum value of the retardations. In other words, with the same lengths of entrance and run, differences in the "fineness" of form at the bow and stern may cause great differences in the heights of the waves created, as well as in the energy required to create and maintain such waves."

Thus we see that both the old and the new theory coincide in supporting the inference, that a small resistance due to form is in the closest manner dependent upon a small coefficient of fineness. But there is only one way in which this coefficient can be reduced, *and that is by reducing the vessel's weight.*

It is thus plainly seen that all those three parts of which the total resistance to a vessel's motion is composed are dependent upon the weight of the vessel. Now, it is a general experience that at lower rates of speed and ordinary forms of hull the total resistance varies with the square of the speed, while at higher velocities it increases as the third, even the fourth power of speed. This rapid increase of resistance is by common consent ascribed to the part of resistance due to form. Therefore it becomes imperative, if a high rate of speed is pursued, to concentrate the attention on this feature; but it is just this part of the resistance which stands in the closest and most direct relation to the vessel's weight; to keep this part of the resistance within bounds at high velocities, a long, slender form of the submerged part of the hull is necessary, and this is obtainable by a light vessel only. The old term "longitudinal lines" becomes insignificant if it is not always remembered that these lines represent a surface which again must envelope a quantity of water equal in weight to the vessel.

I believe that the most striking illustration for the urgent necessity of lightness for high speed is furnished by torpedo boats.

"If torpedo boats are to have the great speed wherein lies their strength, if they have proved that they can fight against a heavy sea, it is because they are so extremely light. In proportion as they are overloaded their quality of speed and their seaworthiness are lost. The captains of these little vessels are so convinced of this that they have been heard to complain very energetically of an addition of even 50 or 100 kilogrammes weight. It cannot be sufficiently insisted upon that if the constructors were able to invent minute torpedo boats, it was because the armament of these boats was very light."*

Thus we see that all evidence strongly points to the conclusion that the fundamental principle to be employed in the pursuit of high speed is a religious saving of weight; and this is in full harmony with experience as to the relation between high speed and burthen gained under all other circumstances. The gain in weight, thus obtained, may either be employed in increasing the power or reducing the resistance according to the designer's individual opinion of what course is the most prudent or effective in his case; but the beginning, the middle and the end of the whole proceeding must be the effort to secure the greatest effects with the smallest weight of materials. Then we have here come down to the same basis as in most other well-developed branches of construction, viz: To combine a maximum of strength with a minimum of weight; and the only agents by which this can be secured are knowledge in designing, care in construction, first-class workmanship and highest grade of materials.

But if lightness is the fundamental necessity for high speed, then this is one of the many strong arguments against the present combination of a passenger, mail and freight steamer all in one boat, which combination should be discontinued provided the transport is so far advanced in quantity that each kind of cargo has become sufficiently important to assert its individual and characteristic requirements. Freight is heavy and requires a heavy ship; it does not require high speed and pays about $3 a ton for transport across the Atlantic ocean. Mails and first-class passengers are light; they claim high speed with the utmost urgency, because time for them is of high value, and pay about $300 a ton for a transatlantic passage. As long as the present combination, which necessarily must be detrimental to all parts concerned, exists, an earnest start towards high speed on the ocean can hardly be said to have begun, because the fundamental condition for high speed—lightness—is ignored. A large steamer designed for passengers and mails exclusively would to an exceptional degree possess the natural conditions for a high speed, which these kind of cargo so urgently demand; but a combined passenger and freight steamer can never be expected to do it.

The Berlin Labor Conference.—The official programme of the subjects to be considered by the International Labor Conference, to be held at Berlin, Germany, has been issued. These subjects are the regulation of mine works with reference to the prohibition of the labor of wome and children undergrounnd; the shortening of the shifts in particularly unhealthy mines; the insuring of a regular output of coal by subjecting the working of the mines to international rules; the regulation of Sunday labor, and also the regulation of the labor of children and females.

Progress of the Basic or Thomas-Gilchrist Process During the Twelve Months Ending December 31st, 1889.—The total make of steel and ingot iron from phosphoric pig during this period amounts to 2,274,552 tons, being an increase over the make for the previous twelve months of about 321,318 tons, and making the total production of basic steel to this date 10,845,000 tons.

It will be noticed that of the above-mentioned make of 2,274,552 tons no fewer than 1,764,639 tons were ingot iron containing under ·17 per cent. of carbon.

The makes of the various countries for the 12 months ending December 31st, 1888, and December 31st, 1889, respectively, are as follows:

	1889.		1888.	
	Total Tons.	With under .17 per cent. carbon. Tons.	Total Tons.	With under .17 per cent. carbon. Tons.
England	493,919	348,828	408,594	276,476
Germany, Luxemburg and Austria	1,481,642	1,185,323	1,276,070	1,026,033
France	222,392	159,271	222,333	158,223
Belgium and other countries	76,599	71,217	46,237	32,300
	2,274,552	1,764,639	1,953,234	1,493,032

With this 2,274,552 tons of basic steel were produced some 700,000 tons of slag (containing about 36 per cent. of phosphate of lime), most of which was used as a fertilizer.

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, FEBRUARY 25, 1890.

421,899. Chill. Nathaniel S. Bouton, Chicago, Ill.
421,900. Mode of Making Sectional Chills. Nathaniel S. Bouton, Chicago, Ill.
421,998. Machine for Railway Construction. John W. Close, Buffalo, N. Y., Assignor of one-half to John C. Graves, same place.
421,920. Car Coupling. Leon E. Ford and Albert J. Whitworth, McComb, Mass.
421,935. Process of Making Alkaline Salts of Antimony. John Holliday, Brooklyn, Assignor to himself and Edward N. Dickerson, New York, N. Y.
421,944. Piston Rod Packing. Albert D. Lewis, Chicago, Ill., Assignor by direct and mesne assignments to the Lewis Metallic Packing Company.
421,950. Rail Joint. Charles B. Lyon, New York, N. Y.
421,976. Dumping Car. Edward C. Sawyer, Waterloo, N. Y., Assignor to Cornelius J. Ryan and John B. McDonald, same place.
421,990. Air Feeding Device for Furnaces. John Tohin, Kansas City, Mo.
421,991. Self Oiling Box or Journal. John Tregoning, Lynn, Mass.
422,011. Car Axle Lubricator. William H. Daniels, St. Louis, Mo.
422,017. Pipe Coupling. William M. Harris and Thomas B. Reese, Mansfield, O.
422,025. Shaft Collar. James MacDonald, Chicago, Ill., assignor the Webster and Comstock Manufacturing Company, same place.
422,031. Car Coupling. James Mooney, Clarion, Pa.
422,055. Mold for Casting. Felton M. Lytle, Boston, Mass., assignor to Addison R. Baldwin, trustee, Charlotte, N. Y.
422,063. Sheet Metal Bending Machine. James C. Bayles and George R. Green, East Orange, N. J.
422,064. Pipe or Tubing. James C. Bayles, New York, N. Y.
422,065. Coupling for Flanged Pipes. James C, Bayles, East Orange, N. J.
422,070. Water front attachment for Boilers. John T. Charest, Red Bluff, assignor of one third to Joseph Marcott, San Jose, Cal.
422,097. Discharge Apparatus for Coal or Ore Bins. Watson W. Rich, Minneapolis, Minn.
422,101. Apparatus for supplying Combustible Liquids to Burners. Roughsedge Wallwork, Manchester, County of Lancaster, England.
422,118. 422,119, 422,120. Procees of Carburizing Malleable Cast iron or Low Carbon Steel. Martin F. Coomes and Arunah W. Hyde, Louisville, Ky.
422,130. Rock Drilling Machine. Jacob Irgens, Pallsade (Dak. Ter.), S. D.
422,139. Conveyor. Daniel M. Maxon, Bay City, Mich., Assignor of one-half to James McKeon, same place.
422,148. Dynamo Electric Machine or Electric Motor, Edward B. Parkhurst, Woburn, Mass., Assignor to the Florence Motor Company, of Maine.
422,150. Self-oiling Axle Bearing. James S. Patten, Baltimore, Md., Assignor to himself and Edwin Higgins, same place.
422,163. Device for transmitting Motion. John N. Severance, Boston, Mass.
422,187, 422,188, 422,189. Furnace. Geffroy P. Denis, Chester, Pa.
422,190. Method of Electrically Heating Bars, etc., for Welding and Working purposes. Mark W. Dewey, Syracuse, N. Y., Assignor to the Dewey Corporation, same place.
422,201. Electrical Apparatus for Driving Artesian Wells. George G. Fryer, Philadelphia, Pa.
422,202. Air Blower. Elliott E. Furney, St. Louis, Mo., Assignor to Andrew Leslie, same place.
422,255. Compressor. Henry C. Sergeant, New York. N. Y.
422,264. Car Coupling. John C. Toberer, New Ulm, Minn.
422,266. Electric Railway Motor Car. Charles J. Van Depoele, Lynn, Mass.
422,278. Snow and Ice Smelter. John B. Archer, Washington, D. C.
422,295. Pyromagnetic Generator and Motor. William B. Cooper, Philadelphia, Pa.
422,330. Car Break. Pierre J. Boris, Boston, Mass., Assignor of two-thirds to Horace M. Oliver and T. Henry Pearse, same place.

DIVIDENDS PAID BY MINING COMPANIES DURING FEBRUARY AND SINCE JANUARY 1ST, 1890.

NAME OF COMPANY.	Paid in Feb.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in Feb.	Paid since Jan. 1st.
Atlantic, Mich	$60,000	$60,000	Little Chief, Colo		$10,000
Badger Ontario		25,000	Mammoth, Utah	$20,000	40,000
Boston & Mont., Mont	100,000	200,000	Matchless, Colo	2,500	2,500
Calliope, Col	10,000	20,000	Metropolitan, Mich	*250,000	250,000
Calumet & Hecla, Mich.		500,000	Montana Ltd., Mont		60,666
Central, Mich	20,000	20,000	Napa, Cal		20,000
Cons. Cal. & Va., Nev	54,000	108,000	Ontario, Utah	75,000	150,000
Cumberland, Mont		15,000	Parrot, Mont		18,000
Daly, Utah	37,500	75,000	Puzzler, Col	2.500	5,000
Don Enrique, Mex		3,000	Quicksilver Pref., Cal	64,370	64,370
Franklin, Mich		80,000	Quincy, Mich		120,000
Granite Mountain, Mont	200,000	200,000	Republic, Mich	100,000	100,000
Homestake, Dak	12,500	25,000	Silver Mg. of L. V. & N. M	25,000	25,000
Iron Mountain, Mont		25,000	Tamarack, Mich		120,000
Kearsarge, Mich		100,000			

*Part of this dividend is to be paid in April.

* "Naval Reform." By M. Gabriel Charmes. Translated by I. E. Gordon-Cumming. London, 1887. Page 38.

PERSONAL.

Herr Krupp, of Essen, was taxed last year on an income of £279,000, while in 1888 his income was estimated at £219,000

Mr. Theodore E. Schwarz, mining engineer, has resigned his position as superintendent of the Guston Company, Lt., of Red Mountain, Colo., to take effect March 15th.

Mr. Charles R. Hanscom, one of the principal draughtsmen in the Bureau of Construction and Repair, Navy Department, Washington, D. C., has tendered his resignation, to take effect on March 10th, to accept a position with the Bath Iron Works.

Mr. W. S. Gresly, mining engineer, has been appointed engineer to the coal mines of William L. Scott, of Erie, Pa. It is to be hoped that Mr. Gresly will find favorable opportunity to introduce the long wall method of mining which he described in the ENGINEERING AND MINING JOURNAL, August 17th, 1889.

The formal dedication of the Carnegie Free Library, of Allegheny, Pa., took place on Thursday evening, February 20th, and the institution was declared open by President Harrison. Addresses were made to a large audience in the music hall of the building by the President, Mr. Carnegie, Governor Beaver, Mayor Pearson, and others.

Prof. Angelo Helprim, J. E. Ives, R. La Boutellier, Whitman Storm and Frank C. Baker, all members of the Philadelphia Academy of Science, have sailed on the steamship "City of Alexandria" for Havana and Yucatan, representing the institution. Their object is to seek precious stones and to make a general survey of the country. They will be gone from three to four months.

OBITUARY.

Hamilton H. Salmon, the senior member of the well-known chemical importing firm of H. H. Salmon & Co., of this city, died at his residence in Brooklyn on Friday morning, Feb. 21.

Frank W. Andrews, a well-known oil operator and speculator, was instantly killed by being thrown from his horse near Mt. Jewett, Pa., last week. He was known throughout the entire oil field.

M. Chanteloup, the largest brass founder in Canada, who died at Montreal last week, left his fortune, estimated at $500,000, with the exception of a few thousand dollars which goes to charity, to his employés. Each of his 500 workmen gets $400, while three foremen are left the business and capital to carry it on.

Mr. Gustave Billing, the well known metallurgist and owner of lead smelting works, died at Berlin, Germany, quite suddenly, on the 14th ulto. Mr. Billing went to Leadville early in the history of that camp. Later on he moved to Socorro, New Mexico, where for some time past he had conducted a large smelting establishment.

John B. Radley died at his residence, Mount Vernon, N. Y., on the 24th ulto. He was born in 1821. He had been connected with the iron trade nearly all of that time, and was one of the incorporators of the Society of Architectural Iron Manufacturers, whose treasurer he was up to the time of his illness. For the past thirty years he had been an active member of the firm of Cook & Radley.

Bart Robins died at Aspen, Colo., on the 16th ulto., aged 49 years. His death was caused by an accident in a mine near that place. Mr. Robins was a native of Devonshire, England, and came to this country in 1864 and engaged in mining. He was county assessor of Gilpin County for one term, clerk and recorder for six years and mayor of Central City for one term. He had quit mining, but about a year ago he was offered the position of foreman of the Durant mine at Aspen and accepted.

Professor Elisha T. Quimby, of Dartmouth College, Mass., died on the 26th ulto. in this city. Prof. Quimby was born in Danville, Vt., July 17th, 1826; graduated at Dartmouth in 1851; was principal of Appleton Academy, New Ipswich, from 1851 to 1864; was made professor of mathematics at Dartmouth College in 1864, and held that position till 1878. He had charge for many years of the United States Coast and Geodetic Survey in New Hampshire. He also directed the survey recently made for the establishment of the boundary line between New Hampshire and Massachusetts.

Charles J. Harrah, the millionaire railroad builder and president of the Midvale Steel Company, died at his residence, in Philadelphia, Pa., on February 18th. He was in his 74th year. Mr. Harrah was born in Philadelphia on January 1st, 1817, and, when a young man, went to Brazil for the benefit of his health. For nearly forty years Mr. Harrah remained in Brazil, and during that time became one of the prominent citizens of the empire. He became a close friend of the Emperor, and did much to advance the prosperity and improve the condition of the people. He also secured concessions and contracts from the government nd became a railroad contractor. When Mr. Harrah returned to Philadelphia he interested himself in local affairs, and in a few years he was at the head of the combined sytem of street railways, known as the People's Line. Mr. Harrah next turned his attention to the Midvale Steel Works, and up to within a few months of his death Mr. Harrah gave personal attention to this work.

INDUSTRIAL NOTES.

Means, Kyle & Co., of Hanging Rock, O., have paid a dividend of 5 per cent.

Late advices from the Rockbridge Furnace at Goshen, Va., give the daily output at 125 tons.

The Globe Iron Works, of Sheffield, Ala., has added the manufacture of automatic engines to its product.

The Coldwater Cart Company, of Coldwater, Mich., mortgaged its plant last week to the amount of $37,500, the step being taken to protect home creditors.

The Calumet and Tamarack Mining companies, of Michigan, are smelting largely wire bars and cakes, the wire bars to supply the demand for electrical purposes.

A corporation has been organized in Utica, N.Y., called the Central Steel Goods Company, with a capital of $1,000,000. It will manufacture horticultural implements.

By act of the Legislature of the State of Virginia, the name of the Virginia Steel Company was changed to the Virginia Development Company. The principal office is at Roanoke, Va.

The furnaces of the Ashland Coal and Iron Railway Company have increased their output from 70 tons to 100 tons per day by the addition of one-third New River coke to the charge of fuel.

The Toledo Pump Company's works and property at Toledo, Ohio, have been seized by the sheriff to satisfy a claim of $15,000 of the Merchants' National Bank. The failure will be a total one. Assets and liabilities unknown.

The Palmer Wire Mill, at Palmer, Mass., after being several months idle, will now run on full time. It is stated that the experiment of burning crude petroleum instead of coal proved unsuccessful, and the company has again changed to coal.

The good demand for pipes is causing the National Tube Works Company, of McKeesport, Pa., to make extensive improvements at its works. A number of new puddling furnaces are being erected and a complete set of new pumps is being built. When the improvements are completed a large number of additional men will be given employment.

The Philadelphia & Reading Coal and Iron Company is about to reline and repair the Emans furnace, near Allentown, Pa., and to erect three 18 × 60 Gordon-Whitwell-Cowper fire-brick hot-blast stoves. All this work will be done by Gordon, Stroebel & Laurean, Limited, blast furnace contractors, of Philadelphia, Pa., to whom the contract has been awarded.

Our correspondent advises us that the Low-Moor Iron Company, of Virginia, has been experimenting in the use of the flue-dust from their furnaces as mineral paint with marked success. The flue dust used contains about 60 per cent. of metallic zinc in the form of oxide. The roofs of the casthouse and dwelling houses have been painted with the flue-dust ground in linseed oil.

The request of the Union Iron Works, of San Francisco, Cal., to be relieved of the penalties accruing by reason of the horse power developed by the cruiser "Charleston" falling below the contract requirements, was favorably acted upon by the Senate Naval Affairs Committee. A bill will be reported relieving the company of the payment of about $33,000 penalty, to which it would otherwise be subjected.

On the 17th ult., Sheffield, Ala., celebrated the first shipment of pig iron from Alabama to Pittsburg, Pa., by barges via the Tennessee and Ohio rivers. The present shipment is 5,000 tons, and is taken by nine barges, which are towed by the steamer "Percy Kelsey." The rate of freight is $2.50 per ton, which is so much less than the rate by rail that it effects the iron trade of the entire country. It is expected that arrangements will at once be made to market the entire product of Sheffield's five furnaces by this route. A contract for the shipment of 12,000 tons additional has been made.

The Lehigh Coal Company, one of the largest coal concerns at Duluth, proposes to build 150 coke ovens to burn the slack and dust that results from the handling of its bituminous coal, and has entered into a contract to furnish steam for a large flouring mill with heat that comes from the coke ovens, and will engage to furnish power equal to 7,000 horse power from the same source. They will use up the slack that is now an encumbrance to make coke, which they will send out to the Western smelting furnaces, and will utilize the heat from the coke ovens to make steam for the mills.

The Hazleton Tripod Boiler Company, of Chicago Ill., proposes the use of their form of steam generators to afford a new mode of employing the waste heat emanating from coke ovens. The company mentioned has contracted with the West Superior Iron and Steel Company, of West Superior, Wis., to put in boilers the fuel for which they guarantee to get from the fifty coke ovens the company now has there. They have contracted to furnish all the steam necessary to run the engines, hammers, and machinery in this mill without using a bushel of coal under the boilers, as they propose to use the heat wasted from the coke ovens, and also to use the 92 per cent. of heat that is wasted in the bloom-heating ovens.

CONTRACTING NOTES.

Contracts for the construction of gunboats Nos. 5 and 6 have been awarded to the Bath Iron Works at their bid of $637,000 for both vessels.

Carnegie, Phipps & Co. have been awarded the contract for three and a half miles of the elevated railroad about to be erected in Chicago, Ill. The work will require about 8,000 tons of iron and steel.

The contract for the interurban railroad between Minneapolis and St. Paul, Minn., has been awarded to the Sprague Electric Railway and Motor Company, of New York. This new road will be the second largest in the country operated by electricity, the West End railway system at Boston being more extensive.

Carnegie, Phipps & Co. have secured the contract to furnish the steel, amounting to 3,000 tons, for the three new coal, ore or grain vessels or steam barges to be built by the American Steel Barge Company to trade on the lakes. Chicago, Cleveland and Detroit capitalists are interested in the venture. These vessels without the machinery are to cost $75,000 each. They will be 260 feet long over all, 36 feet beam, and 22 feet depth of hold. The hull will be shaped like the regular modern ocean craft, but the bow will be cone shaped, with the apex cut off. The deck will be convex. There will be two turrets on the deck, in which will be placed the capstans and steam steering apparatus. The hull will have double bottoms and eight water-tight compartments, each connected by six-inch pipes and two Wellington pumps, which will raise 700 tons of water per hour. The designer says the vessels, which are an innovation in lake craft, will carry 3,000 tons of ore or coal or 100,000 bushels of grain, and when loaded will draw 15 feet of water.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given n 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.

606. Flour mill machinery, short roller system. Kentucky.

607. Tools for boiler shop. Georgia.

608. Steel rails, ten miles 30-lb. steel rails. Texas.

609. Boiler, 4 H. P., horizontal. North Carolina.

610. Engine, 6 H. P., horizontal. North Carolina.

611. Machinery of sufficient capacity to drive a a sharpie 20x30 ft., drawing 20 in. of water when loaded. North Carolina.

612. Tire bender, felloe cut-off and boring machine, and tire setter and cooler. North Carolina.

613. Brayton petroleum engine. Texas.

614. Cotton mill machinery. Three 70-spindle

gin stands; one steam press; one section blower and distributor; cotton seed conveyor. Texas.

615. Corn mill, with a capacity of 25 or 30 bushels per hour. Texas.

616. Gas pipe for conducting natural gas a distance of seven miles; prices and full particulars. Texas.

617. Saw-mill machinery. Georgia.

618. Ice machinery. North Carolina.

619. Material for tram road, 3 feet 6 inches gauge. West Virginia

620. Engine for tram road. West Virginia.

621. Belting: net cash prices. Alabama.

622. Wood-working machinery: net cash prices. Alabama.

623. Thresher. Georgia

624. Screw plate that will cut pipe and bolts. Georgia.

625. Artesian well: bids for sinking same. North Carolina.

626. Engine. Maryland.

627. Dynamos for arc and incandescent lighting: prices on same. Tennessee.

628. Elevator for carriage factory. Georgia.

629. Complete outfit of machinery for manufacturing plow handles. Georgia.

630. Saw mill; general outfit, 30 to 50 horse power. North Carolina.

631. Wood-working machinery for manufacturing crates, baskets, doors, blinds, etc. North Carolina.

632. Railway equipment for ten miles of logging and general traffic railroad. North Carolina.

633. Canning factory machinery; prices and full information. North Carolina.

634. Lead rolling mill that will roll about six tons per day; prices and full information. California.

635. Chillled iron rolls; roll chucks;; pinion rolls; pinion chucks; screws for housings. New Jersey.

636. Twenty-stamp gold mill with copper plates complete. Arizona.

637. Electric motors for running mining machinery. New Jersey.

638. Water wheel. New Jersey.

639. Two mine pumps. New Jersey.

640. Carding, spinning, weaving, finishing and dyeing machinery. Virginla.

650. Flue boiler, engine, shafting, tanks, metal roofing, brick-work, lumber and hose; all for tannery. Virginia.

651. Engine, 75 horse-power; automatic cut-off, boiler pump and heater. Tennessee.

652. Mortising machine, endless bed surfacer, and kiln for drying lumber. Tennessee.

AMERICAN GOODS WANTED ABROAD.

593. Agency for coal mining machinery. Westphalia, Germany.

641. Mining machinery of all kinds. South African Republic.

642. A typewriter or other process for printing music. Queensland.

643. Posters; two and four horses and jockey, printed in colors, life size. Queensland.

644. Refrigerators for household purposes; hard and soft woods. Queensland.

645. Moss; samples and prices of Canadian or other moss. Queensland.

646. Leather; samples wanted for a large railway order for leather for seat covering and other work. Queensland.

647. Agricultural machinery and farm implements. Tasmania.

648. Designs and prices for large lots of sulky ploughs. Tasmania.

649. Nail-making machinery. New Zealand.

GENERAL MINING NEWS.

A report has appeared in the daily papers that the Pennsylvania Lead Company is about to be dissolved and the assets of the company be divided among the stockholders. This statement is misleading. The charter of "The Pennsylvania Lead Company" would expire in about three years, and it was also limited to a capital of $500,000. As it is simpler to sell to another company than to allow a charter to expire and reorganize, a charter has been obtained for the "Pennsylvania Lead Company" (leaving the "The" out) and the old company transfers all its property to the new company and then expires by surrender of its charter. The new charter allows the company to extend its business in new directions if it so desires.

According to press reports, Jay Gould has recently acquired nearly all the coalfields in the Southwest, those operated by the Keith & Perry Company, of Kansas City, being about the only ones not under his control. These mines are all held in the name of the Missouri Pacific Coal Company. Among them are the fields at Lexington and Rich Hill, Mo.; Meriden and Cherokee, Kan., and McAlister, Ind. Ter., the latter having been acquired very recently, and are the only Gould mines that have no Gould railway connection, and now it is announced that a branch of the Missouri Pacific will be built from there to a point on the main line somewhere between Fort Smith, Ark., and Waggoner, Kan. Mr. Edwin Gould, president of the Missouri Pacific Coal Company, opened negotiations recently with the Keith & Perry Company for the purchase of the latter's mines, but was unable to come to terms with them. An authority but little lower than President Roswell Miller himself is responsible for the assertion that the Chicago, Milwaukee & St. Paul will buy the Missouri, Kansas & Texas Railway as soon as reorganization of the latter is effected. The first disposition of the latter property by the receivers will occur at Parsons, Kan., in a few days. If the Chicago, Milwaukee & St. Paul acquires the property it will give a direct line from St. Paul, by way of Chicago and Kansas City, to Denison, Texas

SOUTHERN JELLICO COAL COMPANY.—This company is a consolidation of the Kentucky and Tennessee mines at Jellico, and has an aggregate capital of $2,150,000. Colonel M. E. Thornton, of Louisville, Ky., president of the main Jellico Mountain Coal Company, was elected president, and Russell C. Clapp, secretary. The headquarters of the company will be in Jellico, on the Kentucky side.

ARIZONA.

Commissioner Groff, of the General Land Office, Washington, D. C., has rendered a decision in the celebrated Peralta grant case in Arizona, in which he holds that no grant of the character claimed was ever made. He decided against the claimants on every point, and ordered the case stricken from the Surveyor General's list.

CALIFORNIA.

MONO COUNTY.

STANDARD CONSOLIDATED MINING COMPANY.—At the annual meeting of this company held in San Francisco recently the following gentlemen were chosen as directors: J. C. Grant, president; J. Tate, P. N. Lilienthal, J. Mason, J. W. Pew (secretary), A. P. Brayton and W. H. Oscanyon. E. L. Benedict is acting superintendent, Anglo-California bank treasurer for San Francisco, and Farmers' Loan Trust Company at New York.

TUOLUMNE COUNTY.

BLACK OAK MINING COMPANY.—The scheme for a reorganization of the company has about fallen through and it is said the creditors are prepared to buy in the mine under the bonds. It is also said that San Francisco parties are negotiating for the mine.

COLORADO.

BOULDER COUNTY.

RICHMAN—This mine has again started up with a full force of miners after a stoppage of a week. The mine is now run entirely by contract, and some of the ore is being tested at the new process mill in the old Boyd building, which is now owned by Hon. J. H. Bagley, Jr. The process by which the ore is treated is an invention of Tom Helier, of Boulder.

CHAFFEE COUNTY.

WEAVER STONE COMPANY.—This company has been organized in Denver for the purpose of operating the Buena Vista quarries, formerly owned by Mr. Weaver. These quarries contain granite, and white and black marble of the finest quality. A large saw-mill will be put up to work the marble into all needed shapes. The marble quarry will be an important auxiliary to Denver and Colorado. At present much of the supply is brought all the way from Vermont, which involves a large expenditure for shipping. As a consequence marble has not been used in some cases where it would be if cheaper. The granite obtained from these quarries is said to be most excellent. In case the proposed shortening of the Denver & Rio Grande railroad, which will bring Buena Vesta about 100 miles nearer to Denver, goes through the company claims it will be able to land its granite in Denver cheap enough for ordinary purposes, such as foundations and walls.

CLEAR CREEK COUNTY.

(From our Special Correspondent.)

ATLANTIC PACIFIC TUNNEL.—This famous project is being carried forward with considerable energy at the present time. The tunnel is going ahead with power drills under contract. Some of the veins already encountered in the tunnel are being worked on ore, I believe. For exploring the backbone of the continent, this tunnel ought to be a success, as it will be about 3,000 feet deep where it passes, or is projected to pass, under the divide.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY.—Though apparently beaten in the lawsuit with Truck last December, this company has not been enjoined from working the ground in conflict. The situation is a little difficult for one on the outside to understand. The new management seems to be operating on very much the same lines as the previous one.

LAMARTINE.—It is rumored that the lessees on this mine have secured an extension of their lease at a royalty of 50 per cent. If this is the case it is to be hoped that work will be carried on in a more systematic manner. The working principle has seemed to be heretofore, that there is more money in taking out as much as possible rather than limiting the production to what can be properly saved.

PAY ROCK CONSOLIDATED MINING COMPANY.—The following statement concerning the Pay Rock stock is authorized, says the Georgetown *Courier*: Ever since the original sale of the company's treasury stock on the 17th of December last, a syndicate has been quietly purchasing all of the stock offered, and of course the syndicate brokers bought it as cheaply as possible. This syndicate now holds more than 1,100,000 shares of the stock, which is locked up, and will not be released until the completion of the Ashby tunnel. Of the 900,000 shares remaining, about one-fourth has been purchased at the prevailing low prices for St. Louis and Kansas City parties, and forms part of the 500,000 shares to be placed in Kansas City: and the balance must be obtained from some other source. The exact situation is this: The syndicate has withdrawn from the market 1,100,000 shares; three individuals have withdrawn and locked up 312,000 shares more to remain until the great tunnel shall be completed to its objective point, and there is, therefore, less than 600,000 shares available for trading purposes on the two exchanges in Denver and Kansas City.

SILVER GLANCE.—This lode, a producer of rich ore in the past, has been lying nearly idle for some time. Lately work has been renewed under lease with the expectation of doing considerable development before finding ore. On the contrary, ore was encountered within a few inches of previous workings which mills in quantities from 150 to 250 ounces.

UTE CREEK.—The sale of the Ute Creek property, at Idaho Springs, for $100,000, is reported. Twenty-five thousand dollars was paid down, and the balance will be paid in installments.

DOLORES COUNTY.

MEREDITH MINING AND MILLING COMPANY.—The Waring mill, situated at the mouth of Horse gulch, about two miles north of the town, mill-site, etc., were recently sold to St. Louis and Kansas City parties, who have organized the above company. The direc tors for the first year are: J. Libley White, George A. Bannantine, George E. Blythe and George Parsons of St. Louis; J. P. Nouse of Kansas City and Joseph Meredith of Rico. Capital stock is $50,000. The company will begin overhauling the mill as soon as lumber and other necessary supplies can be obtained, and expect to start up by June 1; it will purchase and treat ores by concentration, amalgamation and the Russell process.

JEFFERSON COUNTY.

DENVER NATURAL GAS AND OIL COMPANY.—This company has been organized with a capital stock of $600,000. One hundred and fifty thousand shares of treasury stock have been placed at present, to which another 100,000 shares will be added when the tanks and pipes are laid, making a listed stock of 250,000 shares. The officers of the new company are: President, J. O. Bosworth; vice-president, G. W. Thompson; secretary and treasurer, D. T. Sanderson; superintendent and manager, John C. Blood. Active operations will shortly be begun near Morrison, on Bear and Turkey Creeks. The company holds leases on over 6,000 acres of land in that vicinity which will run for twenty-five years. Three thousand acres more are also controlled by it, securing possession of the key to to the oil fields in this section of the State. Onone of the farms oil has been taken from near the surface, on another at a depth of 350 feet. President Bosworth and manager are about to go East to purchase the necessary machinery. It will be the best and heaviest of its kind, and constructed for use in sinking deep wells. Pipes are to be run to Denver.

LAKE COUNTY.

ST. KEVIN MINING COMPANY.—The output is 50 tons per day, some 35 tons of which go to the concentrator, the balance being of such a nature that it will pay to send to the smelter direct. As soon as the new shaft, which is already down about 200 feet, shall have encountered the ore chute met with in the lower workings of the old shaft, and which, on the trend of the ore chute, must be met with in the new shaft, the shipments will undoubtedly be much larger, as the old shaft will be used from the 400-foot level down to the junction with the new shaft simply as an ore chute, through which all ores mined at an upper level in the old workings will be shot and hoisted through the newer and more convenient workings. All of these improvements have been planned and will be executed by the new manager, and all are tending toward a full development of the St. Kevin property.

OURAY COUNTY.

IRONCLAD GOLD AND SILVER MINING COMPANY—This company has been organized in Denver

with a capital stock of $300,000. par value $1 each; 100,000 shares of treasury stoch will be sold at 10 cents, the money to be used to develop the property. Its stock will be listed on the mining exchange. The properties owned by this company are the Ironclad and Finance lodes, located on Gold Hill a short distance southeast of the American-Nettie mine and adjoining the Bright Diamond, at Ouray. The following are the officers: President, John M. Berkey, president Real Estate Exchange, Denver; directors, L. L. Higgins, president Union Ice Co.; Hon. Chas. H. Toll, ex-attorney general of Colorado; Geo. E. Ross-Lewin, assistant cashier First National bank; N. E. Wood, director Mining Exchange; Geo. A. Scott, Ouray; W. W. Weston, mining engineer; secretary and treasurer, Geo. Ross-Lewin. Work will be inaugurated at once and several miners employed.

NEW GUSTON COMPANY, LIMITED.—This company is putting on more men, now being able through the use of the new machinery to work the mine on a larger scale. Mr. T. E. Schwarz, the superintendent, has resigned.

OLD LOUT MINING COMPANY, LIMITED.—Reports state that the new strike is looking well. The company is working on dead work mostly now, and will have good stoping ground ready to stope in the spring. Will begin shipping as soon as snow will permit. Working 24 men at present.

YANKEE GIRL MINING COMPANY.—This company has taken up the pumps from the lower levels and will hold the water at the sixth, working the mine, it is stated, from there up.

PARK COUNTY.

ABINGTON MINING COMPANY.—This company has reorganized under the name of the Carbonate Mining Company, and will commence work this month with a larger force than heretofore.

GOOD SAMARITAN MINING COMPANY. — This company (generally known as the Shelby Company) has relinquished the Shelby mine to A. H. Johnson, from whom they had contracted to buy it, first taking the precaution to remove the extensive buildings and machinery they had placed upon the property. This abandonment does not by any means insure that the property is worthless. The *Flume* states that it is the intention to begin work at once, and the surface pockets have yielded and no doubt still contain a great deal of low-grade ore. The company undertook the development of this property under the view that a large body of rich ore could be discovered underlying Loveland Mountain if a shaft were sunk deep enough. The deepest shaft sunk is not much over 200 feet, but so far as it was carried nothing resulted. In the work carried on an immeuse expense was incurred, and Mr. Richard G. Peters, a wealthy Michigan gentleman, who had been putting up the cash, became involved in a suit with his former superintendeuts, and finally concluded to abandon the work. The mine will now revert to first principles.

LAST CHANCE.—It is rumored that the mill and mine will start up this month. The time of redemption expires the 1st inst.

PITKIN COUNTY.

The litigation between the Harrisburg and the Bob Ingersoll has been settled. The former property is owned by the Percy Consolidated Mining Company and the latter by the Bob Ingersoll Mining Company. The Percy claimed the vein in the Ingersoll ground by reason of its apex on the Harrisburg, and a complicated and expensive series of suits have resulted, which suits are pending in the United States Circuit Court. On the 18th ult. the Ingersoll Company executed a lease to the Percy on the Ingersoll claim. This lease runs six years, and is an adjustment of all the points in dispute between the two properties. The suits are all to be dismissed. The settlement is highly important, as it will lead immediately to much new development work in that section. There is 500 or 600 feet of the Ingersoll that has practically had no development work done on it. The Percy has run up to it with two levels, which disclose large bodies of ore, and it is believed that the ground will be found to be rich. The ore that has been found is low grade. The Percy company will now go to work to systematically explore the ground. It will be reached partly from the Percy incline, but a new incline will be started on the Harrisburg. The arrangement that has been perfected gives the Percy company absolute control of about 100 acres of ground.

ARGENTUM-JUNIATA MINING COMPANIES—These companies' incline on Aspen Mountain (the old Cameron property) is now down 400 feet, and preparations are completed to cross cut to the contact. New pumps, pipe line and a third boiler have been completed. The combined capital of these companies is more than one million dollars. Mr. C. E. Palmer, mining engineer, is the manager of these companies.

ASPEN MINING AND SMELTING COMPANY.—This company is now opening a body of ore in the Hidden Treasure, which lies at the northern edge of the company's tract on the side of Aspen Mountain. This ore body is a continuation of the rich chute that was worked in the Enterprise, and the company is working it through the sixth level of the latter property. When the Enterprise company was organized the Aspen Smelting and Mining Company retained right of way through its works, and, under this arrangement, the present operation is being carried on. The mineral is of good grade, running, it is said. from 40 to 90 ounces per ton.

MOLLIE GIBSON CONSOLIDATED MINING COMPANY.—The incline has reached the depth of 100 feet, and drifts are being run north and south on the vein. The north drift, which has been driven about 30 feet, is showing a little ore in the benches, but nothing of importance has yet been developed. The drift has not yet reached the point where the rich chute that was opened above may be expected. The company has been adding to its plant and the work at the bottom has been considerably delayed. A new boiler has been put in and and a new 8-drill compressor will soon be in place. New 5-inch water columns have been placed in the shaft, which with the old 3-inch columns will carry all the water that is likely to be found. A No. 10 pump is being put in to be ready for any increased flow. The mine now makes 175 gallons per minute, but it is handled without difficulty and no interruption of work results from it. While the drifts are being run the sinking of the incline is continued. It is the intention to put the incline down as far as possiible and to run drifts every 100 feet, or at shorter intervals, if there seems to be anything gained by it.

SMUGGLER MINING COMPANY.—This property is producing small quantities of good ore. The ore is found in the old level about 600 feet north of the shaft. The mineral is a heavy spar through which gray copper is found. When it is sorted it runs up to about 500 ounces per ton. A carload is shipped weekly. The chute from which the mineral is taken was discovered several weeks ago, and it has produced some high grade shipments. The chute from which the former rich shipments were made is only a short distance north of the shaft, the last discovery being in an entirely new chute. The shaft is still flooded, as the company is waiting for machinery with which to handle the water. The main level is drained by the tunnel, which comes out at the railroad track, and work can be continued in it while sinking is suspended

SAN JUAN COUNTY.

IOWA.—The drift upon the vein from the end of the crosscut on the Iowa is now in 60 feet. The gold streak still holds about the same, averaging 18 inches wide. Last week a new streak of solid steel galena was uncovered which looks very good. This property is being worked under lease by James H. Robin and B. W. Thayer.

JOHN H. REID MINING AND MILLING COMPANY.—The new mill now being erected will be completed in a few weeks. The company has bought some bumping tables and about 1,000 feet of four-inch wrought iron pipe to supply the mill with water. The water will be taken from Idaho gulch, and for the present the pipes will be laid upon the surface. Next fall they will probably be put under ground.

VICTORIA MINING AND MILLING COMPANY.—From the Little Dora, owned by this company, a nice grade of gray copper is being taken out. A carload has been shipped to Pueblo, and from now on the high grade ore will be shipped regularly.

SUMMIT COUNTY.

GOLD RUN MINING COMPANY.—At the meeting of the Gold Run bondholders at the Mining Exchange in St. Louis on the 25th inst., to take action regarding the sale of that property, nothing was done except to appoint a committee to attend the sale, which takes place March 21st, and look out for the interest of the bondholders. It is expected that arrangements will be made by those interested before the sale takes place to buy the property in, and thus prevent certain Breckenridge parties, who have that object in view from getting possession of the mine.

DAKOTA.

Many aud extensive railroad enterprises are now under way in the Black Hills, the Sioux reservation having been at last opened. Besides the lines of the Milwaukee and the Northwestern roads, which have been surveyed and will be laid as soon as possible across the reservation, there are several important additions to the road in the Black Hills district, which will open up a large number of mines. The Burlington & Missouri River road announces that it will reach the heart of the Harney Peak tin district, via Newcastle, by the middle of July. The Rapid City, Harney Peak & Southwestern will be changed from narrow to standard gauge, and to connect with the Fremont, Elkhorn Valley & Missouri River at Rapid City, will begin work in two weeks on a line to Custer City and Hill City. The Northwestern will extend its lines from Whitewood to Dundance and Wyoming via Spearfish this summer. The Black Hills and Fort Pierre road, owned by the Homestake Mining Company, is is running order to within ten miles of Scorra, a station on the Fremont, Elkhorn Valley and Missouri River Railway, and ties for the completion of the connection have been advertised for. From a small local road this will then become the first road piercing the heart of the hills. The Deadwood Central intends to extend its line to the Ruby basin.

IDAHO.

COMFORT MINING COMPANY.—A large tract of placer ground on Bowlder Creek, Long Valley, in Boise County, has been purchased by the Comfort Company, who own the Ophir mine at Rocky Bar. As soon as spring opens they will construct the necessary ditches and flumes, and send in hydraulic machinery for placer mining on an extensive scale. This company owns, it is said, some 400 acres of ground.

ALTURAS COUNTY.

The Vishnue and the Wild West Mining Companies, at the Rocky Bar, have closed down their works, throwing a great many men out of employment. It is supposed that the mines that have shut down will remain so only for a short time, and that they will commence operations again next spring.

JIM BLAINE.—This group of mines, owned by J. B. Fitzgerald and others, near Rocky Bar, is is reported have been bonded to True W. Rolling, of Boston, Mass., for the sum of $30,000, the bond to run till the first day of June next. These claims almost join the Ophir locations on the west.

BOISE COUNTY.

IDAHO CITY BED ROCK FLUME COMPANY.—This company will commence blasting a cut through New York Bar in March. This cut will be 18 feet deep, 16 wide on the bottom, 25 on the top and 180 long. The object of the flume is to work placers in the beds of Moore and Elk Creeks, long since covered by tailings washed down from the bars and hills.

SILVER MOUNTAIN MINING COMPANY.—An immense snowslide came down the mountain at Graham, on North Boisé River, a week ago. It carried away the boarding house, tramway house and a mile of tramway belonging to the company. The tramway was erected on high trestles. The cable is broken in several places, but as most of it is under snow it is impossible to know what damage it has sustained. It was erected, it is said, in 1888 at an expense of $30,000. The construction of a tunnel that will cut the Julia, Cleveland and other mines belonging to the company at the depth of 2,000 feet will begin next summer. These veins carry good silver ore near the surface. The company's stock is owned in London.

LOGAN COUNTY.

A company has been organized at Salt Lake, with a capital stock of 1,000,000, the object of which is to take the water of Snake river, from a place in the stream near Little Rapids, at Minnedota, Logan country, Idaho, on the Oregan Short Line, out in a northwesterly direction for a distance of 25 miles in a canal, and sell the same to settlers on the land reached by the canal. The canal will be 30 feet wide at the bottom and 6 feet deep, and will carry water to 100,000 or more acres of the very best of agricultural land that is now lying idle on account of lack of water. The estimated cost of the canal is $100,000. The water will be raised by means of centrifugal pumps, each of which will raise 35,000 gallons per minute. At first but six pumps will be used and their power will be derived from water wheels. The general office and place of business is Salt Lake City, and the corporation will last for a period of fifty years unless sooner dissolved or disincorporated according to law. The following are the officers of the company: Matthew White, President; J. E. Langford, Vice-President; J. L. Heywood, Director; John Everill, Director; John H. Reese, Director; F. M. Langford; N. W. Clayton, Secretary and Treasurer.

SHOSHONE COUNTY.

HELENA AND FRISCO MINING COMPANY.—This company has been incorporated, with a capital of $2,500,000, shares $5 each. Incorporators, A. M. Holter, A. J. Seligman, and John T. Murphy. The principal offices will be in Heleua, Mont., and operations in Shoshone County.

KANSAS.

Secretary Mohler of the State Board of Agriculture has issued his first statistical report concerning the salt industry in Kansas, showing the amount and value of the output for the year 1889, and covering the operations of the plants at Hutchinson, Nickerson, Kingman, Anthony, Wellington, Solomon City and Stirling. The product for the year amounted to 547,224 barrels, and in addition there were 19,056 tons that were not put in

barrels. The total value of the product was $448,238. Five companies are reported from Hutchinson, their total product being 381,075 barrels, valued at $270,938. Two companies, the Riverside and the Western, report a product for the year of 125,000 barrels each, these being the two largest plants in the State. Five companies are reported from Kinginan, all of which began their operations during the past year. Only two of the plants report the number of barrels produced, but the value of the total product of the city is placed at $62,000. The Anthony Salt Company reports that it turned out 50,000 barrels, valued at $60,500. The Globe plant, of the same city, which has been in operation less than six months, reports 2,400 barrels. The Sterling Salt Works turned out 41,043 barrels, and have 5,000 tons on hand which is not barreled. The Wellington Salt Mining Company reports 4,221 barrels last year, having been in operation less than a year.

KENTUCKY.

JOHNSON COUNTY.

Oil and gas have been struck at Paintsville, on the Big Sandy River.

MICHIGAN.

COPPER MINES.

OSCEOLA MINING COMPANY.—The large shaft and rock house combined, which has remained idle since work on the Calumet conglomerate stopped, is being taken down, and will be erected at the Opechee shaft, which is still in rich ground. It is expected that the output at this mine will be largely increased during the incoming (fiscal) year, from the fact that the management intend, at least it is so reported, to build ten dwelling houses in the neighborhood of this shaft for the accommodation of the increased force, which will be necessary.

MINNESOTA.

SAINT LOUIS COUNTY.

CRESCENT IRON COMPANY.—This company has been organized by C. E. Shannon, James H. James, John G. Brown, John McKinley and Amos Shephard, all of Duluth, with a capital stock of $200,000. The general nature of the business is to buy, sell, and lease iron lands, to mine and smelt iron ore, and to manufacture iron, steel, etc. For several months past the work of stripping and also sinking a shaft has been carried on under Capt. Thos. James, and the indications are encouraging enough to warrant the expectation of shipments this season, provided the Iron Range road is extended from Ely, a distance of about five miles. The land is only a mile from the celebrated Eaton & Merritt claim.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Mo., Feb. 24.

Saturday evening closed another week of light ore sales. There were great quantities of ore mined, but except at Webb City, where most of it was sold, at other points it has been piled up on the ground, as the ore bins are all full. Many of the large operators in Joplin refuse to sell a pound of zinc ore at the prices offered; while at Galena some of the producers were inclined to give notice that no buyers need apply. The average price obtained at that camp for small lots was $20 for zinc blende, and $20 per thousand for lead. In Joplin the price ranged from $24 to $26 for zinc blende, and $21.50 per thousand for lead. Just how much longer the present prices will prevail is uncertain, and depends largely upon the amount of surplus in the ore bins of the smelters. The following is the output for the week ending Feb. 22:

Joplin mines, 582,310 pounds zinc ore and 88,960 lead. Value, $9,081.65.

Webb City mines, 1,414,650 pounds zinc ore and 57,090 lead. Value, $18,902.43.

Castorville mints, 358,440 pounds zinc ore, 54,700 lead. Value, $5,651.05.

Zincite mines, 56,410 pounds zinc ore. Value, $717.50.

Galena, Kans., mines, 212,360 pounds zinc ore and 163,710 lead. Value, $5,235.33.

All districts, total value, $39,587.96.

An expert says about the Joplin lead and zinc mines:

"Much has been written, and much has been talked about the almost phenomenal lead and zinc deposits of this region, and after one year's study and close examination of developed mines, I am still undecided as to the source from which the present ore bodies have emanated, yet I am fully satisfied of the fact that we can find here two separate and distinct geological ages of zinc ores, namely, primary and secondary. I shall first take up the primary deposits. In every mining district in the world we find the deposits of ore confined to some class of veins which can be identified. While here can be found characteristics of almost all classes of veins and deposits, but nothing clearly defined. As for myself, I favor the theory that the primary ore bodies have emanated from pre-existing fissures, but at the present time no development has reached a sufficient depth to establish the fact that this theory is the true one.

Primary Ores.—In order to be clearly understood, I will give an explanation of how I find the ore bodies in developed mines. In some mines the ore is found in large boulders and masses, intermingled with the various gangues; again, the ore will be found in small particles imbedded in seams of decomposed ground and black mud. Still another form is found disseminated in the country rocks. All of this class of ore has more or less of a resinous lustre, and when broken up leaves a smooth surface on the cleavage. These facts lead me to believe that this class of ore has been moved from its original position by eruptive force; or, in other words, they are only the croppings from larger ore bodies, and may have emanated from pre-existing fissures.

Secondary Ores.—This class of ore is found in almost all of the mines that have been opened up and invariably is in a perfect crystalized form; large masses of crystals are often found closely cemented together, having a black and blue-black lustre. Again, the same ore is found in a perfect crystallized pebble of various sizes that seem to have worn smooth by constant movement, while another form is found where the crystals are cemented unto the gangue rocks and primary ore. Finding the ore in this form leads me to the conclusion that the secondary ores may have been formed by the surface and underground waters percolating through the primary ore bodies, thus impregnating the waters with material that eventually formed a crystal of ore. If this theory be the true one then our crystalized ores are forming at the present time. It has been fully demonstrated in this district that crystals have formed in the past few years, as in cleaning out since abandoned underground workings, miners' tools, such as hammers, picks and drills were found completly covered with perfect crystals of zinc blend ore. This would seem to prove almost conclusively that the crystalized ores of this district are forming at the present time and must belong to the secondary class of ore.

Consolidated Company is now into its ore bodies in good shape and will soon be having a large output.

J. D. Houseman, of St. Louis, has bought the Dorsey mine on the Taylor and Billingsley lease. The mine is already a steady producer, but Mr. Houseman will put up additional machinery.

Tuckahoe mines, northwest of Joplin, are taking out a fine grade of zinc blend, which sold at $26 per ton. These mines in the past have been confined to lead ore, but no depth was gained. large bodies of zinc were opened up, and Mr. Loyd, the president of the company, predicts that this land will be a large producer of zinc in the near future.

Diamond Mines.—This property is rapidly improving as development is advanced. Four shafts have now reached the ore body, and last week produced 40,000 pounds of zinc blend and 10,000 of lead, which sold for $715.

The Joplin Business Men's Club held an open meeting during the week, and decided to send representatives to Kansas City, March 2d, to meet the bankers, mine owners and operators from Colorado who will be in that city on March 3d to assist at the opening of the Mining and Stock Exchange.

This is a grand opportunity to represent our lead and zinc mines on their true merits before men who fully understand the profits to be derived from the mining industry.

The Empire Company are now running on full time, after a general overhauling and repair of machinery, and produced during the week 150,290 pounds zinc and 9,570 lead.

The old Ditman mines on the Interstate Mining Company's land are now in good working order, and now piling up the ore, selling only enough to pay expenses.

MONTANA.

DEER LODGE COUNTY.

BLACK HORSE MINING COMPANY.—This company has been incorporated with a capital of $200,000, shares $1 each. The directors are: R. A. Hawkins, J. H. Loomis, M. B. Scott, M. A. Call and G. S. Williams. The development work on the property has commenced.

JEFFERSON COUNTY.

HIAWATHA MINING COMPANY.—This company has been organized by P. A. Largey, George H. Casey, R. L. Hornbrook, C. E. Gable and Frank Morgan, with a capital stock of $300,000. Shares $1 each, assessable, but the by-laws of the company are such that the maximum amount of an assessment shall be not more than one cent per share, only once a month; provided, however, that it will be necessary at at any time to levy assessments. The officers selected to manage the affairs of the company during the ensuing three months are: P. A. Largey, president; R. L. Hornbrook, vice-president; G. H. Casey, treasurer, and C. E. Gable, secretary. The ground which the company proposes to work is located in Jefferson County, about three and a half miles northwest of Basin, in what is known as the Cataract district. An incline shaft 85 feet deep has been sunk on the vein, showing ore from top to bottom. Besides this shaft, two tunnels have been run on the property, one 60 feet on the vein and the other 40 feet in another place. The latter tunnel cuts the apex of another ore shoot, the average width of which is about 8 inches at a depth of 25 feet from the surface. After the lower tunnel is driven about 75 feet further it will intersect the shaft at a depth of 115 feet, and it is estimated that then there will be ore enough in sight to pay all the expense of development for the following six months. At present there is about $5,000 worth of ore on the dump.

WISCONSIN AND MONTANA MINING AND MILLING COMPANY.—This company has been organized, with head offices at Lacrosse, Wis., and a branch office at Basin. The capital stock is $60,000, of which one-half is cash and the other half is represented by the Saginaw and Whitepine quartz lodes, valued at $3,000 each, the Regalia, Custer and Manchester lodes valued at $3,600 each, and Lacrosse, Midnight Bell, Bald Eagle, Leona, Self Riser, and Silver King lodes, valued at $1,200 each. A. Gile is president of the company, and Frank G. Tiffany secretary, and S. Y. Hyde and Peter Olson are also trustees.

LEWIS AND CLARKE COUNTY.

It is rumored that a company, capitalized at $250,000, has been organized to dig out the rubies and garnets supposed to exist at Eldorado Bar, which is about fourteen miles from Helena. Mr. E. B. Northrup, of St. Paul, is fathering the enterprise.

MISSOULA COUNTY.

IRON MOUNTAIN.—At this mine thirty men are now at work, and there are over 500 tons of ore ready to ship as soon as the roads are in good condition. About the first of June it is the intention of the owners to work at least one hundred hands in the mine. Mr. McDonald for the past years has been superintendent, but poor health compelled him to resign the position, and he is succeeded by Mr. Patrick Sennott. Mr. Jeldness, superintendent of the King and Queen mine, is now in the east securing improved machinery, and as soon as this arrives and is in position about fifty hands will be put to work in these two mines.

IRON MOUNTAIN EXTENSION MINING COMPANY.—Articles of incorporation of this company have been filed. The capital is placed at $2,500,000; shares, $5 each. The corporation is to exist for twenty years. The incorporators are John R. Higgins, S. H. B. Footer, John Barry, Charles Blaisdell, J. M. Hargrave and W. H. Bennett.

SILVER BOW COUNTY.

BUTTE & BOSTON MINING COMPANY.—Advices from the mine to the effect that the No. 2 Silver Bow shaft, now down to the 300 level, is in a fine vein of copper. Cross-cutting to determine whether it is a continuation of the vein in the No. 1 shaft will be commenced when the 400 foot level is reached. The sinking of the No. 2 shaft is progressing now at the rate of about 60 feet per month. The drifts and stopes in the No. 1 shaft are looking well. The hoist and boiler put in place at the Mountain View mine a short time ago for the purpose of working the Right Bower through the Chief shaft has been removed by the company to Silver Bow shaft No. 2, where it will be used.

HARRIS-LLOYD MINING COMPANY.—It is the intention of the company, to which we referred in our issue of the 15th ult., to do all the hoisting through the shaft on which the new machinery is being placed, the other shaft, known as the Harris-Lloyd shaft, to be used for ventilating purposes. The two shafts are to be connected with each other by a level on the south vein, which is tapped by a crosscut from the 300-foot station of the Harris-Lloyd shaft and a crosscut run from the 250-foot station of the Pennsylvania shaft, the latter being 50 feet lower than the former at the mouth. About 40 feet of ground yet remains to be removed before this connection is made; but as it is vein matter, only a week or 10 days will be required to break through. At a greater depth of the Penn shaft a cut toward the Mountain View will be run, as there are several veins between the two great mines.

SILVER MOUNTAIN COMPANY.—At this company's property, near Melrose, sinking on the new two-compartment shaft has been temporarily suspended to permit of the erection of the building to be used as a shaft house, and also to put the new Davis hoist in place. The shaft is 110 feet deep, and it is the intention of the company to sink to a depth of 200 feet, cut a station at that point, and then sink another 100 feet, making 300 feet in all When the 200-foot mark is reached stoping will begin. The ore will be shipped to Butte for reduction. After the 300-foot mark is reached it is the intention of the company to erect reduction works of its own.

SOUTHERN CROSS MINING COMPANY.—The directors of this company recently held a meeting in Butte, and decided to continue work on the property. The last clean up was made on the 15th inst., and showed about $5,000 as the product of the Salton Cameron 10-stamp mill for the month. The Southern Cross mine is developed to a depth of 250 feet, and the ledge at that point is 30 feet wide. The company will shortly put up a mill of its own.

NEVADA.

ESMERALDA COUNTY.

The Mount Cory stamp mill, located at Mount Cory, near Hawthorne, is being dismantled and the machinery and iron work will he shipped to the Fulton foundry on the Divide. The mill cost a very large sum and was probably sold for little above what the iron cost used in the construction of the expensive plant.

STOREY COUNTY—COMSTOCK LODE.

The big storm has prevented regular shipments of ore during the week ended the 22d ult., and considerahly interfered with all mining operations. Everything will go on as usual, however, as soon as the weather clears up.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—The only sidetracks kept clear during the recent continued snowfall were those leading to this ore house. The report of the shipments show that they reached nearly 3,000 tons the week ending the 22d ult., which is above the usual average. The opening of the 1,200 level of the mine is for the purpose of making an air connection to improve the ventilation in the 1,300 level stopes.

NEW MEXICO.

GRANT COUNTY.

Zinc mining is being actively carried on at Hanover, and a number of mines are being developed. It is stated that only the best grades of zinc ore can now be shipped from Hanover to La Salle, Ill., where it is reduced. Freight from the mines to that place is $13.25 per ton, and low grade ores will not bear this charge. An additional stack will be put up at the big smelter in El Paso for the treatment of zinc, and the rates may he reduced so that low grade zinc ores may be mined at Hanover profitably.

OHIO.

SUMMIT COUNTY.

UNITED SALT COMPANY.—This company, capital $1,000,000, has filed articles of incorporation in Cleveland. The company will have workshops at New Portage and at Newburg, a Cleveland suburh. Wells have heen sunk, and veins of rock salt have been found at a depth of 3,000 feet. About three years ago a vein of rock salt was found at a depth of 2,500 feet in a well put down for natural gas in the yard of the Cleveland Rolling Mill Company, at Cleveland, and about the same time rock salt was found in a well sunk at Portage, and this is the basis of the United Salt Company. Buildings have already been erected, and operations will be commenced within a few weeks. The output of the three plants will be about 5,000 barrels of refined salt per day. The incorporators are William Chisholm, H. L. Severance, Herman Frasch, Isaac Reynolds, F. B. Squire and Fred. Hempy, of Cleveland; O. C. Barber, Charles Baird and O. T. Paige, of Akron, and David R. Paige, of New York.

PENNSYLVANIA.

COAL.

A fire broke out in the Cameron colliery slope at Shamokin on the 26th ult. The steam pipes which lined the gangway caused the timbers to become dry, and the supposition is that a spark from a miner's lamp ignited them. The slope is full of smoke and gas, making the work of fighting the fire perilous. General Superintendent Morris Williams and Mine Foreman Brennan were prostrated by gas and taken out of the slope unconscious. Fire was not in the stable, as at first supposed. Twenty-three mules were smothered. It is impossihle to ascertain yet the extent of the damage which will he done by the fire.

The Lehigh Valley Coal Company has suspended work in all its collieries at Pittston. Out of 20 of the Pennsylvania Coal Company's collieries, only three or four have been in operation the past three months, and these only a few days each month.

NATURAL GAS.

PHILADELPHIA COMPANY.—The proposed gas pipe line of this company, from Maple Creek to Pittsburg, will be begun as soon as the weather opens fully. It will be 19½ miles long. Eight miles of it will be constructed of 36-inch pipe, six miles of two 16-inch pipes, and the remainder of one 16-inch pipe. There are 20 wells in the Maple Creek district, nine of which are highly productive, and the company proposes drilling 15 more before the completion of the pipe line.

OIL.

BRUSH CREEK OIL AND GAS COMPANY.—This company has been organized at Rochester, and will commence operations shortly near Unionville.

WEST VIEW OIL COMPANY.—The well on the Ivory farm, near West View, on the Perrysville road, just beyond the city limits of Allegheny, and owned by this company, this week was reported to be doing 35 barrels an hour. The well was started several months ago, and was drilled to the sand. It was reported to be spraying about 25 barrels a day, and was drilled in until the 25th inst. A pipe line was laid to Jack's Run, where the oil from the well is being run into tanks and tank cars. There is a great deal of excitement in the neighborhood, as the well is only about an eighth of a mile from the city limits of Allegheny. The well is only about 1,900 feet deep.

SOUTH CAROLINA.

LEXINGTON COUNTY.

Boston capitalists, it is reported, have bought 3,300 acres of land in this county. The property contains deposits of kaolin, and large pottery works for the manufacture of white table ware will be erected on the tract.

FOREIGN MINING NEWS.

BRITISH INDIA.

BURMAH.

According to the *Rangoon Times* the last Government report on Upper Burmah states that: "The Bawzaing silver and lead mines are situated in the Myelat. These mines were visited and reported on in September, 1888. They are situated about one mile northeast of the village of Bawzaing, on the slope of a small hill, and extended over about 100 yards square. The ore is usually found in small quantities at a depth of ahout 10 feet, but the shafts descend to about 300 feet before the miners hegin to follow up any veins. The mines appear to be rich, and the miners state that there is as much ore as they can work. The ore varies in quality, yielding from 2s. to 10s. weight of silver per hasket of about 365 pounds. The tools used in working the ore are a small hand pick, a mallet, and a cold steel chisel. Two men take it in turns to pick at the rock, while others carry the ore to the surface. The process of extracting the metals from the ore is carried on close to the village of Bawzaing independently of the miners, who sell the rough ore at the pit's mouth. The furnaces used can each reduce about five baskets (1,825 lbs.) of ore daily. There are between 60 and 70 people employed at and living on the proceeds of the mines. The mains profits were in former years derived from the sale of the lead, but the sale in Upper Burmah being now forbidden there is little or no demand for the metal. A considerable quantity of lead has accumulated, and endeavors are being made to obtain a market for it in Rangoon for export to Europe. There are also lead and silver mines of about the same quality at Kyauklat."

MEETINGS.

Atlantic Mining Company, at No. 76 Wall street, New York, March 11th, at 12 o'clock noon.

Colorado Coal and Iron Company, at Colorado Springs, Colo., April 7th, at 12 o'clock noon.

Constitution Milling, Mining and Prospecting Company, at the office of Passmore & Jeffrie, 25 West Granite Street, Granite, Mont., March 3d, at 8 P. M.

Indian Creek Land and Mining Company, at No. 419 California Street, San Francisco, Cal., March 5th at 1 P. M.

John Duncan Land and Mining Company, at Germania Hall, Hancock, Mich., March 3d, at 2 P. M.

St. Louis Copper Company, at Room 40, No. 67 Devonshire street, Boston, Mass., March 11th, at 3 P. M.

St. Mary's Canal Mineral Land Company, at the office of the Albany City National Bank, Boston, Mass., March 5th, at 12 o'clock noon.

Standard Steel Works, at No. 220 South Fourth street, Philadelphia, Pa., March 3d, at 1 P. M.

Taylor Plumas Mill and Mining Company, at No. 32 Broad street, room 78, New York, March 4th, at 2 P M.

Torch Lake Mining Company, at No. 31 Doane street, Boston, Mass., March 18th, at 2 P.M.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Baltimore	6	Jan. 10	Feb. 21	Mar. 12	.20
Best & Belcher, Nev.	.	Jan. 6	Feb. 13	Mar. 6	.25
Col. Quartz, Cal.	2	Jan. 9	Feb. 11	Mar. 8	.01
Col. St. Gothard, Cal	1	Jan. 14	Feb. 17	Mar. 10	.05
Crocker	8	Jan. 20	Mar. 5	Mar. 28	.10
Drytown, Cal.	6	Feb. 8	Mar. 9	Apr. 9	.02
East Best & B., Nev.	1	Feb. 11	Mar. 14	Mar. 31	.25
Elk M'tain, S. Dak.	6	Jan. 25	Feb. 25	Mar. 12	.004
Gate City, Dak.	1	.....	Mar. 15	Apr. 2	.00½
Golden Reward, Dak.	5	Jan. 10	Feb. 12	Mch. 1	.02
Grand Prize	24	Jan. 27	Mar. 5	Mar. 25	.30
Locomotive	6	Jan. 31	Mar. 3	Mar. 21	.05
Mineral Hill	....	Jan. 15	Feb. 19	Mar. 10	.003
Occidental Con.	5	Jan 20	Feb. 25	Mar. 24	.25
Queen Bee, S. Dak.	5	Jan. 10	Feb. 15	Mar. 5	.01
Silver King	4	Jan. 15	Feb. 26	Mar. 27	.30
W. Y. O. D., Cal.	5	Jan. 6	Feb. 8	Mar. 10	.15

DIVIDENDS.

Aspen Mining and Smelting Company, of Colorado, dividend No. 10, of 10 cents per share, aggregating $20,000, payable March 15th, at No. 54 Wall street, New York.

Badger Silver Mining Company, of Gillies, Ontario, dividend of 25 cents per share, payable March 5th at the office of C. A. Read, Milwaukee, Wis.

Charleston (S. C.) Mining and Manufacturing Company, quarterly dividend of $3.50 per share.

Kentucky Iron, Coal and Manufacturing Company recently paid a dividend of $2 per share, aggregating $8,000.

Rochester & Pittsburg Coal and Iron Company, the coupons of the first mortgage bonds, also the principal of the $25,000 worth of bonds Nos. 1,156 to 1,180, inclusive, maturing March 1st, 1890, will he paid on presentation after that date at the Gallatin National Bank, 36 Wall street, New York City.

Westinghouse Electric Company and Westing house Electric and Manufacturing Company have each declared a dividend of 1½ per cent., payable March 1st.

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 265 and 266.

NEW YORK, Friday Evening, Feb. 28.

The mining stock market continues to be very dull; while the general feeling of apathy prevails, there has heen some improvement for special reasons in a few cases. People who bought during the latter part of 1889 in the hope that 1890 would prove a better year find that their stock is still in their hands with little chance of relief at present.

There is and can be no real interest in mining investments here while the Consolidated Stock Petroleum and Mining Exchange is used chiefly to promote gambling in worthless stocks. No good mine can overcome the harm the flock of wildcats can do, and when an interest is developed hy some valuahle property, it simply revives the worthless stocks, which simply disgust investors and discredit "mining."

Comstock shares, with the usual monotony, continue depressed and inactive. Even although local traders are loth to helieve it, the conviction is growing that unless there are some new and important discoveries of ore bodies in the Comstock lode, the mining magnates of the Pacific slope will continue to display that indifference toward the shares which for a year or more has prevented any great activity or important rise in values. The small holders are not able to inaugurate any decided or prolonged upward movement, and under these circumstances the outlook is not at all encouraging.

Consolidated California and Virginia is neglected at $4.95; Crown Point at $1.95; Chollar at $2.70; Gould and Curry at $1.60; Cons. Imperial at 35c; Exchequer sold at from 65c. to 85c. Alta was quite active at from $1.30 @ $1.45. Best & Belcher advanced from $2.85 @ $3.05. Bullion was largely dealt in at from 70c. to 85c. Occidental was firm at $1. Potosi at $1.75; and Utah at from 70c. @ 75c.

There was a small business in the Tuscarora stocks, showing sales of Navajo at 34c.; North Commonwealth, at from 95c. to $1.20; Nevada Queen, at 80c; Del Monte, at from 90c.@1.20.

Barcelona is dull at 36@38c. A meeting of the stockholders has been called for March 20th.

Comstock Tunnel stock sold at from 16@19c., bonds at $31, and scrip at $32.

Astoria shows sales amounting to 26,100 shares, at from 4c. to 8c. The large business is no doubt due to manipulation and attracts but little attention; there is no news of any legitimate improvement in the company's prospects, so far as can he learned, to warrant this activity in the stock. There was also an artificial boom in Sutter Creek, the sales amounting to 13,000 shares. The prices opened at $1.55, declining to $1.25 in the week and advancing again to $1.45, at which price the stock was selling to-day.

Middle Bar and Amador were neglected, and do not show a single sale.

Quicksilver Preferred holds its own at $36, and Common at $6.

The only business done in Bodie stocks was a sale in Bulwer at 23c.

The stockholders of the Taylor Pumas Mill and Mining Company are requested to attend a meeting on March 4th, at 2 P. M. sharp, at the company's office, No 32 Broad Street, Room 78. It is stated that matters of great importance to the stockholders will be laid before them.

El Cristo is weaker, declining from $1.55 to $1.35. Its supporters are exhibiting wonderful patience, but their prophecies and promises seem to be no nearer fulfillment at present than they were six months ago.

The grand old Ontario continues to sell at $40, the highest price yet recorded. Some 300 shares sold at this figure; last year at this time the stock sold at $34 to $35. Daly, its neighbor, is held at $20. Horn Silver is strong at from $2.30 to $2.45.

The Wall Street Mining and Milling Company has been added to the list of Montana stock, but no business has been done. Moulton sold at from 25 to 30, and Alice shows a few transactions at from $1.20 to $1.25.

Caledonia is firmer, and advanced from $1.75 to $2. The cause of this rise is, in all probability, due to an increased production in the month of January. Deadwood Terra sold at $1.50.

The Aspen Mining and Smelting Company has resumed the payments of dividends—one of $20,-

000 having just been declared. The last dividend paid was in July, 1889. The president of the company, who has recently returned from the property, reports that the prospects are good and that the continuance of dividends at this rate is probable. A few sales were made at $8 and $8.50. Small Hopes Consolidated has also been stronger, sales being recorded from $1.15@$1.20; due, no douht, to the reported improved prospects of the company.

Freeland shows the largest transactions on the list, amounting to 34,600 shares. The price declined from 70 to 50c., and has advanced again to 66c. It is reported that the large dealings and the decline in the price is due to manipulation.

Leadville shows one sale at 10c.

Little Chief was active at from 30 to 35c.

Silver Cord at 50@53c.

Lacrosse at 7c.

Phœnix, of Arizona, continues to attract attention, and reports from the company's property continue to he favorable. Large sales of the stock were made at from 78@85c. Silver King sold at 20c., assessment unpaid, and at from 45@50c., assessment paid.

Some of the copper stocks were dealt in this week: Butte and Boston shows sales at $14.13; Boston and Montana at $45.13; Tamarack at $163.13; Calumet and Hecla declined from $255.13 to $253.25.

The sharp decline of the price of Tennessee Coal, Iron and Railroad Company's stock during the past week has attracted great attention. The stock opened at $73 on Saturday, and on Monday declined to $51. Since then it has advanced to $60, again selling to-day at from $54 to $58½. The following is an official statement of the financial results for the fiscal year ending January 31, which shows net earnings of $770,400; all fixed charges, $420,000; surplus, $350,400; dividend on preferred stock, $80,000; balance $270,400, or equal to 3 per cent. on the $9,000,000 of common stock. The officials of the company say that the floating debt has been materially reduced, and that the company has a surplus of quick assets of $250,000 over and above all floating debt of every description; that tue profits from coal and coke will pay all charges, and that there is enough pig iron alone on hand to pay the whole interest coupons, sinking-fund charges and dividend, on the preferred stock for the next half year.

This is a comforting report, but it has not kept up the price of the stock; on the contrary, the stock has declined and it is rumored that Mr. Inman has said:

"We are preparing to hring a cross suit against the Tennessee Coal and Iron Company to compel it to return to us the property it claims we unloaded on it, or else withdraw its suit against us."

Another report has it that Mr. Inman has bought heavily on the decline and aims at again controlling the company. We cannot see that the present value of the property referred to by Mr. Inman has anything to do with the right or wrong of his action when he conveyed it to the company.

If, while an officer of the company he made use of his position to make money out of the company, he is culpahle, whether the company bought good or bad property.

Boston.

Feb. 27.

(From our Special Correspondent.)

Since our last report the market for copper stocks has continued dull, and, with one exception, prices have declined. Butte & Boston has been the active stock, and under good buying orders by parties who are supposed to he well posted in regard to the stock. It has advanced from $11½ to $14½, with a slight reaction to $14. About 4,000 shares have changed hands, and still higher prices are predicted.

Calumet & Hecla has heen heavy this week, and declined from $256 to $250, recovering to-day to $254 for a lot of 30 shares.

Tamarack has also been weak, with sales early at $163, declining to-day to $156.

Boston & Montana has ruled unusually dull, with the prices, however, very well sustained at $45¼@45¾.

Quincy sold at $70, hut very little doing in it.

Osceola declined to $26, a drop of $1 from the highest price for the week.

Kearsarge dull but steady at $9¼.

Atlantic sold at $13 for 200 shares, and a small lot of Franklin at $13⅛.

Allouez sold this week—assessment, 50c., paid—at $2⅛, a gain of 25c. per share.

Centennial sold at $24½@$25.

Huron declined to $2¾ and Ridge to $1.05.

Santa Fe has been fairly active, advancing from $1 to $1.10; but the advance was lost to-day. 1,000 shares selling at $1. The transactions for the week have heen the lightest for a long while, and at present there is no prospect of improvement, unless the general market should advance, in which case copper stocks would come in for their share of the husiness.

Silver stocks have shared in the general dullness, Dunkin selling at 60c., Catalpa at 17c.; Breece declined to 42½c., but sold later at 45c., and is in good demand at this price.

3 P. M.—There was no special change this afternoon. Butte declined $¼ to $13¾; Boston & Montana sold at $45½, the market closing fairly steady.

Denver.

Prices and sales during the week ending Februry 18th:

Company.	Opening.	H.	L.	Closing.	Sales.
Alleghany, Colo	31	32	28	28	15,700
Amity, Colo	19	20	17¾	17¾	83,900
Bangkok-C.-B., Colo	37	39	30	30	8,000
Brownlow, Colo	45	46	39	40	3,700
Calliope, Colo	49	49	47½	47½	3,000
Clay County, Colo	45	50	43	43	3,900
Hard Money, Colo	13	18½	11	11½	10,500
Matchless, Colo	1.28	1.28	1.05	1.12	.....
May-Mazeppa, Colo	1.20	1.20	1.12	1.15	24,800
Mollie Gibson, Colo	50	55	50	50	.....
Oro, Colo	3.25	3.40	3.25	3.40	6,100
Pay Rock, Colo	12½	12½	10	10	192,900
Potosi, Nev	47	47	22	30	62,600
Puzzler, Colo	32	32	28½	28½	21,800
Silver Cord, Colo	61	65	50	50	900
Whale, Colo	43	43	39	39	26,900
PROSPECTS.					
Aspen Mutual, Colo	30	30	24	24	78,500
Big Indian, Colo	38	42	37	37	14,500
Big Six, Colo	31	31	27	27	27,100
Claudia J., Colo	13	15	10	11	1,400
Golden Treasure, Colo	22½	25	22	24	13,200
Legal Tender, Colo	10½	11½	10	10	55,800
Morning Glim, Colo	40	44	39	40	6,900

Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

Iron Stocks.—There have heen no changes in the prices of these during the past week. Very little high-priced stocks are on the market, but the low-priced stocks and those of the new mines still continue to he in good demand.

Gold Stocks.—The prices of these stocks remain unchanged, and there still continues to he a good demand for them.

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	High.
Grayling Gold & Silver Co	$25.00	$1.00	$1.25
Michigan Gold Co	25.00	3.50	4.00
Peninsula Gold & Silver Co	25.00	.....	.75
Ropes Gold & Silver Co	25.00	2.25	2.50

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co	$25.00	.....	$75.00
Aurora Iron Co	25 00	7.50	8.00
Champion Iron Co	25 00	$100.00	110.00
Chandler Iron Co	25.00	45.00	46.00
Chapin Iron Mining Co	25.00	25.00	33.00
Chicago & Minn. Ore Co	100.00	120.00	125.00
Cleveland Iron Co	25.00	20.25	21.50
Germania	25.00	.....	12.00
Jackson Iron Co	25 00	110.00	120.00
Lake Superior Iron Co	25 00	66.00	70.00
Milwaukee Iron Co	25.00	6.00	8.00
Minnesota Iron Co	100.00	84.00	86.00
Montreal Iron Co	25.00	....	12.00
Norrie (Metropolitan)	25.00	83.00	85.00
Odanah Iron Co	25.00	.....	20.00
Pittsburg Lake Angeline Co	25.00	170.00	175.00
Republic Iron Co	25.00	50.00	51.50

PIPE LINE CERTIFICATES.

(Specially Reported by Messrs. WATSON & GIBSON.)

There was a sudden fall in the price of oil this week, breaking from 105 to 98 in two days. The market was very narrow, and some news came in indicating an extension of the productive field in Pennsylvania. This started a small selling movement, which found an entire absence of buyers, thus permitting the sharp break alluded to. There is no speculation in the market whatever, and prices are entirely at the mercy of the few traders who are in the Exchanges.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Feb. 21	104⅞	105⅛	104⅞	105⅜	206,000
24	104¾	104⅞	104⅝	104⅞	89,000
25	105	105	104⅞	100⅞	35,000
26	105	105	100⅛	100⅛	189,000
27	100⅛	100⅛	98	99⅜	269,000
28	99⅛	99⅜	99	99⅛	155,000
Total sales in barrels					943,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Feb. 21	105¼	105⅛	104¾	105⅛	113,000
24	104¾	105¼	104½	105⅛	20,000
25	104⅞	105¼	104⅞	105	22,000
26	104½	104⅝	100½	100⅞	428,000
27	100¾	100¾	97⅞	99¼	367,000
28	98⅞	99⅜	98¾	98¾	112,000
Total sales in barrels					1,062.000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feh. 28.

Statistics.

Mr. John H. Jones, chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of shipments of anthracite coal (approximated) for the week ending February 22d, 1890, compared with the same period last year:

Regions.	Feh. 22, 1890.	Feb. 23, 1889.	Difference.
Wyoming Region. Tons	230,890	286,371	Dec. 55,591
Lehigh Region "	78,222	94,687	Dec. 16,465
Schuylkill Region. "	106,641	119,444	Dec. 12,803
Total	415,843	500,702	Dec. 84,85[illegible]
Total for year to date	3,793,280	4,298,650	Dec. 505,37[illegible]

PRODUCTION OF BITUMINOUS COAL for week ended February 22d and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Tons of 2,240 lbs.	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R. R.	3,579	22,93[illegible]	14 383
Cumberland, Md	66,644	604,853	422,354
Barclay, Pa	2,864	17,994	18,878
Broad Top, Pa	11,120	86,527	67,946
Clearfield, Pa	73,915	641,243	493,593
Allegheny, Pa	19,712	164,414	138,469
Beach Creek, Pa	35,781	272,201	210,914
Pocahontas Flat Top	37,628	281,092	222,237
Kanawha, W. Va	44,672	310,583	252,764
Total	321,706	2,401,845	1,841.538

WESTERN SHIPMENTS.

Pittsburg, Pa	17,436	133,179	97,253
Westmoreland, Pa	31,546	272,800	266,100
Monongahela, Pa	3,146	37,440	24,585
Total	52,128	443,419	387,938
Grand total	373,834	2,845,264	2,229,476

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending February 22d, and year from January 1st, in tons of 2,000 lbs.: Week, 108,832 tons; year, 870,759 tons: to corresponding date in 1889, 589,683.

Anthracite.

The sales agents of the anthracite companies had a meeting on February 27th and talked over the condition of the market, hut did nothing with regard to the important questions of fixing the opening prices or the rules to govern the trade during the coming season. It is well known that the market is greatly overstocked, there being about 1,500,000 tons at the Eastern shipping and stocking points, and that some of the producers keep on sending out whatever they can mine without much regard to curtailment; hut, on the whole, there has been a substantial reduction in output, and it is hoped that by keeping to this through next month a somewhat better condition of affairs will he presented when the next meeting is to take place. This will he on March 13th, and prices will then be settled for opening of trade. At present and up to that time the market is a go-as-you-please one, the companies nominally maintaining prices, but in reality selling almost as the outside operators do, for whatever they can get.

Prices at which good free hurning coals f.o.b. can now be obtained are about as follows: Broken, $3.40; egg, $3.50; stove, $3.60@$3.70; chestnut, $3@$3.25, some of the companies nominally holding for $3.50. Pea coal is rather scarce at $2.80 f.o.b., or $3 alongside.

It is to be regretted that the present demoralizing condition of the trade should he allowed to continue for another fortnight. It makes all the more difficult the fixing of remunerative prices at the opening of the season, or the giving of confidence in what the companies may then propose to do. Hesitation is always demoralizing, and when the companies are afraid even to talk of quotas and are afraid to announce their decision as to the course of the trade during the year, consumers naturally have little confidence in the stability of whatever they may finally arrive at.

At present it looks as though the consumption of anthracite during the current year would be equal to that of 1889, and that with a steadfast adherence to what the companies may decide upon as to prices, and with a curtailment of production to the necessities of the market, there should be no difficulty in maintaining a satisfactory trade during the season. While the prices of several of the companies were greatly demoralized last year, the business, on the whole, was a very profitable one to the producers. Take, for example, the Lehigh & Wilkesbarre Coal Company, which has just issued its annual report showing that it has netted about 63c. a ton on the entire sales of the year, aggregating 2,446,269 tons, sold at an average price of $3.38. This company's cost of mining was $1.18 a ton, or, including new tunnels and openings, about $1.24 per ton. The other expenses of transportation, shipping, salaries, etc., therefore aggregated about $1.50 a ton. It is probahle that this company made a larger profit per ton than any other in the trade; hut, as far as we can make out from the Delaware & Hudson Company's reports, its net profit must have been in the neighborhood of 43 to 45 cents a ton. As the railroad companies have been making large profits on the transportation, and getting extremely high rates of toll, these profits to the mining companies must he considered as very satisfactory. The hituminous coal miners would he delighted to make one-half of these amounts.

The stocks of anthracite at shipping and other stocking points, about 1,500,000 tons, are probably the largest that have ever been piled up at this season of the year. Their effect upon the trade is easily understood, and until a strict curtailment is made and this surplus is worked off there can be no stiffness in prices, whatever they may nominally he.

The New York Retail Coal Trade.

The Retail Coal Exchange of New York held its regular semi-monthly meeting at its Twenty-third street rooms, on Friday evening, Feb. 21. The attendance was light, and, in the absence of the

President, Vice-President McMonagle presided. The following transactions took place:

The minutes were read and approved and C. W. Bird was admitted to active membership.

The dinner committee reported that their receipts and expenditures balanced to a cent. After receiving the thanks of the Exchange the committee was discharged, and there being no further business the Exchange then adjourned.

Bituminous.

The proposed coal trust which was recently projected on a magnificent scale does not appear to materialize, and probably faith in its success has nearly disappeared, for we notice that the Seaboard Association has notified the producers that last year's prices will again rule in the trade for the present year. The Seaboard Association says nothing whatever about the penalties and other iron-clad conditions which were placed upon the trade last year and which were immediately disregarded by those who had promised to observe them. We may now quote $2.60 f. o. b. Newport News, Baltimore and Philadelphia and $3.25 New York harbor as the rates for the present season, provided the companies do better than they did last year. No one seems to have any surplus faith in this; experience is against faith, and the Pocahontas Company claims that it will ship a half million tons more this year than it did last. The Chesapeake & Ohio is also likely to come forward with its Hawk's Nest coal, commencing shipments in about sixty days, and no doubt it will add a quarter of a million tons to this district. What the actual selling price will be it would be difficult to predict now, but last year's experience, when coal was put on vessels at $2, and it is said even below $2, a ton, may serve as an indication. The margin in bituminous coal is very small, and quite insufficient to cover the risk on the investments which the coal companies have made, and it seems strange that prices so low should be maintained where those on anthracite are so large.

The low prices of coal on this side, and the extraordinarily high prices which have been ruling in England and on the European continent, have brought many inquiries for coke to be shipped to foreign ports heretofore supplied by the English mines. We have received inquiries for considerable shipments of coke to Venezuela, and we learn also of enquiries for shipments to Belgium and even to England. We are not able to verify the reports that actual business has been done, but a very active inquiry is going on both as to the prices at which coal and coke can be obtained here f. o. b. for this foreign trade and as to the rates of freight which can be obtained for its delivery. It would not surprise us were contracts closed for shipments to the English foreign markets. We do not expect that we will send coal or coke to England, but we can certainly send it to many of the foreign markets which usually draw their supplies from Great Britain. One of the foreign inquiries for coal of which we hear is for the supply of Holland. No doubt this is owing to the high prices of German and English coal, and it is barely possible that business may be done there; freights from this port to Holland being lower than the rates which we would have to pay to other English markets. A short time ago furnace coke was quoted at 35s. at ovens in England, though this price lasted but a short time and more recent advices put it down again to 28s. Here we can deliver coke at several of the seaboard ports at $4 f.o.b., or 16s. This apparently would leave a margin for freights, which should cover those to many of the English markets. Cuban orders have been particularly abundant during the season and the steamship trade at this port has also been very heavy, the vessels taking coal for the round trip.

There is nothing in the condition of the trade to justify the extremely low prices which have ruled during the last few years, and it would be an easy matter for the companies to secure higher rates were they to act together with a moderate degree of good faith.

Boston. Feb. 27.

(From our Special Correspondent.)

The drop in freights has been the event of the week in coal trade circles. The New York rate is down to 65 cents, and I have heard of 60 cents or its equivalent. The quotation ranges upward to 75 cents. Philadelphia rates are now off to $1.25, and Baltimore has finally broken the $1.60 rate to $1.50, and $1.40 is reported to-day. The break comes a little earlier than was anticipated, and is not wholly to the liking of some who have cargoes afloat at rates ten cents higher.

Anthracite coal is without movement of importance. Tremendously low figures are being made. It is said that a good buyer can get good stove coal at $3.50 f.o.b. at New York from some of the shippers most anxious to work off their surplus. No one here expects the new prices to open at over $3.85 for stove, and some set the price $3.75. Consumption is small and the inquiry is very light.

Bituminous coal is in an unchanged situation. The two agencies here which were currently reported as making contracts last week, are now reported as being well sold up. After Saturday, I expect that all hands will have a number of contracts to announce which were arranged for in remarkably short time. The pool is being treated in the light of a farce. I could quote two leading agency houses here, who say that they don't know whether there is to be a pool in 1890-91 or not. All agree that the pool 1889-90 was a very lame arrangement, and less is expected from any combination this next season. I should quote $2.50 f.o.b. as an outside figure; $2.25 is being talked about and offered by one or two buyers, but I do not learn positively that contracts have been made at so low a price. That contracts are being made delivered is evident from the fact that some parties are making season contracts for barges and vessels this week on an important scale.

Retail trade is light. Most dealers are well-stocked, and some of them are feeling rather blue. One or two large dealers are so fortunate as to be lightly stocked, and are buying in a small way when extra bargains offer themselves.

The receipts for the week are:

	For the week		For the year.	
	1890. Tons.	1889. Tons.	1890. Tons.	1889. Tons.
Anthracite.....	8,380	11,218	108,088	97,648
Bituminous....	14,284	4,070	107,476	113,136
Total...	22,664	15,288	215,564	210,784

Buffalo. Feb. 27.

(From our Special Correspondent.)

Nothing of interest to report relative to the coal market. Prices nominally unchanged for bituminous, and no variation announced for anthracite. Supply of the former about adequate for all requirements, but no accumulations on sidings; of the latter a superabundance. Weather continues mild and unseasonable. Vessels are being moved from dock, and two or three tugs are kept busy—a most unusual condition of affairs. For 30 hours only has ice formed in harbor and outside thus far this winter.

The Buffalo, Rochester & Pittsburg Railroad have contracted with Mr. J. E. McIntire for the building of a dock 600 feet long on the Blackwell canal side of that company's property. If is to be ready by the opening of navigation this year.

What is said to be the largest shipment of coal in one day by one firm is reported. On the 11th instant, the Bell, Lewis & Yates Company sent out from their mines at Reynoldsville and Dubois from 5,500 to 6,000 tons of bituminous.

The Philadelphia & Reading Coal Company has not yet decided where to locate its stocking and transfer coal trestle at this port for supplying their new trestle on the Erie basin. That a large trestle of the most approved pattern will be built this year is, however, an assured fact.

The friction caused by the rules of the Car Service Association not being deemed satisfactory to our coal receivers and shippers is becoming less harsh, and probably on the 1st of March, when the subject of car service rates, etc., will come up for discussion before the board of directors, some satisfactory arrangement or methods will be devised. It would be extraordinary if, when new plans are put in operation affecting any business interest, some causes for dissatisfaction should not arise.

The Silver Creek & Morris Coal Company will build extensive docks at West Superior, Wis., and expect to complete them in time for the fall trade.

The following paragraph appears in one of our newspapers this morning: "The Bell, Lewis & Yates Mining Company, of Buffalo, is negotiating for the eleven coal mines along the Higo branch of the Allegheny Valley Railroad. The property embraces 10,000 acres. It is the intention of the company to make Rimersburg its headquarters. The purchases are exciting great interest." Have not time to verify this before posting.

The Duluth, South Shore & Atlantic Railway's new ore dock at Marquette is to be finished by April 15th. It is to have 200 pockets, a loading length of 1,200 feet, and a total length, with approach, of 1,700 feet. This, with the 300 feet extension of No. 3 dock, will more than double the present loading capacity. Six rails will be placed on the dock, all laid to gauge, thus giving five tracks. In order to save pocket floors, ore will first be dumped from the second or inner track, then as the pockets fill the cars will drop their loads from the outer tracks. The pockets will hold from 135 to 140 tons of ore each. The chutes and hoists will be of the latest design, with counter weights; in fact, the dock will be equipped throughout with the latest and best of loading devices. Some idea of the magnitude of the work may be gathered from the fact that over 4,000,000 feet of lumber will be required, not including piles. The South Shore line is now building at its shops 200 of the latest improved 20-ton ore cars. Last year this railroad had more ore business offered than it was able to handle.—*Buffalo Courier.*

The New York Central Railroad is about to go into business at this port as an ore carrier. It owns all the land on the lake side of River street between Coit Slip and No. 1 Canal Slip, Buffalo, and it has just let the contract to Hinston & Woods to dredge out the north side of Coit Slip, along its whole length, a distance of 1,000 feet, 18 feet deep and 50 feet wide, to connect with the deep water of the lake. The water in the slip is only about 12 feet deep, and nearly all of the remaining six feet is rock, which must be blasted out. The work has already begun. The road has a switch down alongside the slip, and before the season closes it will probably be hauling ore on it.—*Buffalo Express.*

Pittsburg. Feb 27.

(From our Special Correspondent.)

Coal.—We have to report a dull and very unsatisfactory market; the lower ports are all overstocked; both rivers in good navigable order, and have been all season. The week's shipments exceed 5,000,000 bushels. The shipments so far for 1890 are the largest for many years.

The nominal assets are:

Per 100 bushels.		Per 100 bushels.	
1st pool.....	$4.75	3d pool.....	$3.90
2d pool.....	4.50	4th pool	3.25

Railroad coal, $5 20@$5.50.

Connellsville Coke.—The demand has been less active; the advance of forty cents per ton has caused many furnace men to cut down their orders. Report of operations last week shows 13,993 active and 558 idle ovens; estimated production, 145,503 tons, against 143,632 tons for previous week. Shipments aggregate 7,395 cars; to points west of Pittsburg, 4,575; east of Pittsburg, 1,325; to Pittsburg, 1,360.

Current rates: Furnace f.o.b. on cars at works, $2.15; Foundries, $2.45; Crushed, $2.65. Freights show no change. Pittsburg, 70c.; Mahoney and Shenango Valley, $1.35; St. Louis, $3.05; Chicago, $2.75; Cleveland, $1.70; Cincinnati, $2.65; Louisville, $3.20.

FREIGHTS.

From Baltimore to : Boston, Mass., 1.50; Bridgeport, Conn., 1.35; Charleston, .90; Fall River, 1.40; Galveston, 3.00; New Bedford, 1.40; New Haven, 1.35; New London, 1.35; New York, N. Y., 1.20; Norfolk, Va., .60@.65; Portland, 1.50; Portsmouth N. H., 1.50; Providence, 1.40; Richmond, Va., .75; Salem, Mass., 1.50; Savannah, 1.15; Somerset, 1.40; Williamsburgh, N. Y., 1.20.

* And discharging. † Alongside. ‡ And towage.

METAL MARKET.

NEW YORK, Friday Evening, Feb. 28.

Prices of silver per ounce troy.

Feb.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	Feb.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
21	4.85½	43¾	95¼	26	4.84½	42⅞	95⅜
24	4.85	43 13-16	95¼	27	4.84½	44	*
25	4.84½	43 13-16	95⅛	28	4.84	44	†

* 95½ to 95¾, † 95½ to 95¾

Council Bills advanced ⅛d. per rupee on this week's allotment. The silver market has been steadily rising, with good London demand; the only depressing influence being weak exchange. The introduction of the Senate Coinage Committee's bill for increased silver purchases has also had a stimulating influence on buyers.

United States Assay Office at New York reports total receipts of silver for the week to be 84,000 ounces.

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting Thursday made no change in its minimum rate for discount, and it remains at 5 per cent. During the week the bank gained £525,000 bullion, and the proportion of its reserve to its liabilities was reduced from 50·03 to 47·30 per cent. against a decline from 45·40 to 43·58 per cent. in the same week of last year, when its rate for discount was 3 per cent. The bank to-day gained £50,000 bullion on balance. The weekly statement of the Bank of France shows a loss of 1,375,000 francs gold and an increase of 175,000 francs silver.

Domestic and Foreign Coin.

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

	Bid.	Asked
Trade dollars	$ .76	$ 78
Mexican dollars	.75	.76
Peruvian soles and Chilian pesos	Nom'al.	Nom'al.
English silver	4.83	4.88
Five francs	.94	.95
Victoria sovereigns	4.86	4.88
Twenty francs	3.85	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.82	4.88
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00

Copper.—The market continues in a quiet and steady condition. Quotations are well maintained at figures last reported and there appears to be no disposition on the part of producers or holders to make any concessions. For lake wire bars the consumptive demand is very great, and nothing in that form is obtainable below 14⅝@¾, but lake ingots may still be bought at 14¼@½.

In casting copper there is no change to be reported, and the quotations for these sorts remain at 12¾@13, according to brand.

Regarding the state of the European market, it may be described as about the same. The consumptive demand continues quite satisfactory, and the latest quotations for refined and manufactured sorts are as follows: English tough, £53@£54; best selected, £55@£56; strong sheets, £63; yellow

metal, 6d. per pound. The London market for Chili Bars and G. M. B. copper has been fairly steady throughout the week, and the daily fluctuations have not been important, and to-day's closing quotations received by cable are £46 17s. 6d.@£47 spot, and £47 10s.@£47 15s. are only slightly lower than those of a week ago.

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

To Havre	Copper matte.	Lbs.	
By S. S. Marcia	1,577 bars	548,730	$60.360
" "	2,249 pigs	672,608	94,200
" "	90 casks	112,000	13,860
By S. S. La Britagne	348 bars	114,883	12,637
By S. S. Normandie	349 bars	114,883	12,637

Tin.—The market has been fairly steady throughout the week and it has now become apparent that the quantity of spot tin available is very small and is in the hands of a few parties. Under these conditions the market has closed to-day very strong at 21c. for spot and near deliveries, while the quotation for the second half of March is 20½c.

Shipments on the way to this country being light, it is believed that the prices above named can be upheld during the whole of March. The tendency of quotations for later futures has also been a little stronger, and we quote now April, May and June delivery at 20½@20¼.

The London market has been comparatively uninteresting, with business inactive. The quotations last reported have been maintained, and the closing figures to-day are £89 17s. 6d.@£90 spot, and £90 15s.@90 17s. 6d. three months.

The shipments from the East during February amount to a total of about 3,000 tons, but the opinion of well-informed parties is that this does not indicate any increase in production, but simply the movement of accumulated stocks.

Lead.—The market for lead has evinced a much stronger tendency, and offerings from the West have lately been conspicuous by their absence. The metal available for immediate delivery commands higher prices, and the closing is decidedly firm at 3·90.

In contrast with the domestic market the European lead markets are flatter, and in London the quotations have fallen to £12 7s. 6d. for Spanish and £12 12s. 6d. for English lead.

The Chicago Market.—Messrs. Everett & Post telegraph us as follows: "The market is stronger, with improving tendency. Sales during the week aggregate 900 tons, from 3·65 to 3·75c., and closes quiet at 3·70c. bid and 3·75c. asked."

The St. Louis Market.—Messrs. John Wahl & Co. telegraph us as follows:

Lead continues strong, and our market has scored an advance of five cents since our last report. Sales will probably aggregate 700 tons at from 3·60 to 3·65. At the close the metal has buyers at 3·65, and but few sellers.

Spelter continues irregular, and while some Western smelters are understood to have been accepting somewhat lower prices these cuts must not be regarded as ruling the general market values, and the present quotations range between 5·20 and 5·30.

The London market has suffered a relapse during the week, and the latest quotations stand at £22 for ordinaries and £22 5s. for specials.

Antimony.—Values are pretty well sustained, but, owing to considerable quantities having arrived lately, the specially high quotation for Cookson's brand has come down to a more reasonable figure, and we have now to quote Cookson's 24@25c., and Hallett's, 19½@19¾c.

Nickel continues quiet at 75c.@80c., according to quantity. There is a small amount expected to arrive from the other side.

Quicksilver is steady at $50 in New York, and £9 10s. in London.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 28.

The iron trade is not booming; in fact, it has a rather weak tendency, not in this market alone, but generally throughout the country. Prices are receding slightly under the pressure of large production and disinclination on the part of buyers to contract for future requirements. The ore market keeps up, prices being high, and many of the other items of cost also remain high. Coke, whch a year ago was $1 to $1.15, brings now $2.15.

It is not to be expected that any considerable if, indeed, any reduction will take place in the price of pig iron, especially while in Europe prices remain so high that there is some prospect of our competing in some of the foreign markets usually supplied from England.

Nevertheless, there is no denying the fact that the iron market throughout the country is not as strong as it was some time ago, and that lower prices have been accepted in some cases during the past ten days than would have been taken a month ago. We do not anticipate any serious or permanent decline in prices, but we record facts as we find them.

Pig Iron.—This article is quiet; consumers appear to have carried over larger stocks than was expected, the sudden stoppage of orders, which has everywhere been noticeable since the middle of January, having cooled off the enthusiasm of some manufacturers who were willing to anticipate future requirements liberally. Now, all seem to wait on actual necessity before ordering, and it has come to be a question which, the consumer or the producer, can hold out the longest. The stronger furnaces hold firmly to the top prices and appear confident they will get them, while the weaker concerns, feeling the need of realizing, are willing to shade prices.

We continue our quotations for No. 1 Foundry, $19.50@$20.50; No. 2 X, $19@$19.50, and forge, $18@$18.50.

Scotch Pig.—The Glasgow market has declined somewhat during the week, the cable prices today being: Coltness, 75s.; Summerlee, 77s.; Gartsherrie, 71s. 6d.; Glengarnoc at Ardrossan, 73s. 6d.; Eglinton at Ardrossan, 59s. 6d.

With these prices it is impossible to do business here, even with freights from Glasgow down to 2s. or 2s. 6d.

The imports of Scotch pig this year amount to only 600 tons. Our quotations which are nominal are Coltness, $26.50; Dalmellington, $23.25; Eglinton, $21.

Spiegeleisen and Ferro-manganese.—The demand for this material has been quiet and the tendency of prices downward. Twenty per cent. speigel may be quoted $35@$36, and ferro-manganese $85@$90, according to date of delivery, the lower prices being for distant deliveries.

The imports of ferro-manganese during the past year reached unprecedented figures, the use of the higher grade material being on the increase. The Bureau of Statistics has furnished the following statement, showing the amount of spiegel and ferro imported in 1888 and 1889:

Articles.	1888.	1889.
Speigeleisen, tons	71,604	99.481
All other pig iron, tons	123,587	51,469
Totals	195,191	150,950

Steel Rails.—There are still rumors of sales at prices a little off $35, but we have not been able to verify them, though from the persistency with which they are brought up, and some evidence given, it would seem that there is at least a slight foundation for the statement that $35 has been shaded to a considerable extent, possibly to nearly $1. We continue to quote $35 at Eastern mills and $35.50 for small lots. Sales aggregating about 15,000 tons have been made, of which the greater part was for a Southern road. The Bethlehem company has sold a small lot to the Manhattan Elevated road. The larger mills claim that the price will be strictly maintained and that the demand will certainly be much greater than last year. The roads seem disinclined to contract at the present rates, sharing in a measure the general apathy which has come over every department of the iron trade within the past six weeks.

Much discussion is now going on concerning the proposed reduction of duty on steel rails from $17 to $10 a ton. The mills naturally oppose this strenuously, though some of them say that a reduction to $12 or $13 would not affect them much. Not even a reduction to $10 would at present affect them, for the English prices are from £7 10s. to £8 a ton, or say $37 to $39.50 f. o. b. English ports. Competition, therefore, by English rails is out of the question, even without a duty at all; but should the English prices come down to their old figures it is thought that a reduction of the duty here to $10 would possibly let some come in.

It seems improbable that the English prices will decline to the old figures for some time at least, and when they do it will be through improved methods of manufacture which will be equally applicable here. The wages question in Europe generally, and more particularly in England, has reached a point where it affects us less than it ever did before. Wages in many industries over there are at present as high as they are here, and in a few cases are even higher, and there is an absolute scarcity of men. It is very improbable that wages will ever decline there to the old standard, and the probability is that wages both in Eng'and and on the continent, but more particularly in England, will approximate our own rates of wages in the future much more closely than they have ever done in the past. These conditions offer us many advantages in seeking an export trade; and though in steel rails we are not likely to become formidable competitors to the European manufacturers, just at present, yet in many other articles composed for the most part of steel we can compete with European manufacturers in many of the foreign markets. It is therefore well to consider the bearing on our own industries of this radical revolution of wages which has taken place in England within the past year and which is likely to affect permanently the industrial conditions of the country.

It is reported from Washington that the committee preparing a tariff bill after hearing the manufacturers has decided on recommending a rate of $\frac{1}{10}$ cent per pound or $13.44 per gross ton, and this will probably be adopted. This would be a reduction of $3.56 per ton. As no rails could come in, this reduction makes no difference to any one.

Structural Iron and Steel.—There is a fair demand for this season of the year; in fact, the mildness of the winter has rather increased the building demand above the usual standard at this season; nevertheless the capacity of our mills is so great that the consumptive demand still leaves the trade in a dull condition, for the entire product cannot be absorbed. There is every probability that later on in the season the demand will come well up to our productive capacity and we will have a good trade in structural material. At present prices are a little weak and we may quote plates as about 2·30@2·40c., delivered; bridge plate, 2·25@2·40c.; angles, 2·25@2·35c. in iron and about ¼ of a cent more for steel; T's are 2·75@2·85c.; beams and channels, 3·10 for both iron and steel; tank sells at 2·25@2·30c. for iron and 2 50@2·60c. for steel; shell, 2·50@2·60c. for iron and 2·83@3c. for steel; fire box, 3·75 for iron and 3·75@4·25c. for steel.

Merchant Steel.—Merchant steel is somewhat weaker, and prices have been shaded slightly. The best grades, however, are still held at old quotations, while the shading is confined mostly to the lower grades.

Tubes and Pipes.—There has been but a moderate business in these articles and prices are maintained at the schedule rates. The ruling discounts on car lots are 45½ per cent. on small black, 40 on galvanized, 60 on large orders of black and 47 on large lots of galvanized; 45 on 1¾ inch boiler, 50 for 2 to 4 inch and 52½ on larger than 4 inch.

Old Material.—There have been no sales to report in old rails, but we continue to quote T's at $26@$27 as an asking price. This article has also felt slightly the depression which has come over the trade generally.

Louisville. Feb. 25.

(Special report by Messrs. HALL BROS. & Co.)

The market has witnessed considerable improvement in the volume of business during the past week. Buyers are inclined to be conservative and are disposed to buy in rather large quantities, yet with some concessions, mainly in the point of deliveries, some round orders have been perfected. While it is supposed that the recent agreed prices are adhered to, a careful canvass has revealed the opposite with some. The movement is about equally divided between charcoal and coke metals. A more liberal buying movement is looked for in the near future, as it is known that some particular class of consumers will soon require an additional supply of metal to cover their engagements.

Hot Blast Foundry Irons.		
Southern Coke	No. 1	$18.25@$18.75.
" "	No. 2	18.00@ 18.50.
" "	No. 3	17.50@ 17.75.
Mahoning Valley, Lake ore mixture		19.50@ 20.50.
Southern Charcoal	No. 1	18.50@ 19.00.
" "	No. 2	18.00@ 18.50.
Missouri "	No. 1	19.00@ 19.50.
" "	No. 2	18.75@ 19.00.
Forge Irons.		
Neutral Coke		17.00@ 17.50.
Cold Short		16.75@ 17.00.
Mottled		15.50@ 16.00.
Car Wheel and Malleable Irons.		
Southern (standard brands)		23.50@ 24.00.
" (other brands)		19.50@ 20.50.
Lake Superior		23.00@ 23.50.

Philadelphia. Feb. 27, 1890.

Pig Iron.—A policy has been quietly shaping itself for some weeks, but its effects are only now beginning to be apparent. The larger buyers of nearly all kinds of products are withholding their demands as long as possible, and intend to pursue this policy until obliged to come into market, in the hope that in the meantime prices will weaken. Thus far no pronounced break in prices has resulted. and the best makes of iron have shown no weakness; but there is less confidence in the high prices of the early winter than there has been at any time. The quoting of full rates is not now so universal in pig iron as it was a short time ago, especially where buyers can get along with something not quite first-class. At the same time, it would be incorrect to say that prices are not pretty well maintained. When it comes to looking at actual sales, gray forge has sold at $17.50@$18, but prices in a few instances have been shaded 25c. There are bids for large lots of forge at still less, but as yet no makers have been found willing to accept the offers. There is a steady consumption of foundry iron. No. 2 is selling at $18.50@$19, and No. 1 at $19.50@$20.50. The foundry buyers have less stock on hand than have the forge iron buyers, and are, therefore, obliged to purchase oftener; but they are very careful not to buy beyond their immediate necessities. The impression prevails here that outside iron will shortly be sold at concessions. Bessemer pig is quoted at $21, but there is no business worthy of note.

Foreign Material.—Spiegeleisen is quoted at $35@$35.50 for 20 per cent., and ferro-manganese, all the way from $75 to $100, according to per cent. Sales have been made within these limits, and there is a fair degree of inquiry.

Billets and Blooms.—Several makers of billets are trying to close future business at $36, but buyers are standing off. Nail slabs have declined a little further, and are quoted at $35 nominally. Charcoal blooms have been shaded 50c. this week in order to effect sales for cash. Quotations range all the way from $52.50@55. Anthracite sold today at $44; scrap blooms are dull at $35@$36 quoted.

Muck Bars.—Muck bars are quoted at $31@$32; there is a weakening tendency, but buyers are slow to take advantage of it.

Merchant Iron.—Buyers of merchant bars are deferring the placing of orders for summer delivery; most of the business of the past week, both in city and interior mills, has been for immediate wants. A cut or shading has taken place in some interior mills, but very little is known as to the quality of iron on which it was made; it is claimed that the sales reported at 1·80 and 1·85 were for medium and not refined iron. Several lots of refined iron have sold at 1·90. The irregularity of demand is making manufacturers anxious to find buyers.

Nails.—The prospect for a very heavy spring demand is helping sales, which have been made at as low as $2 in car lots, although $2.10 is asked. Store sales are made at $2.20, and small lots 5 to 10c. higher.

Sheet Iron.—The sheet iron makers repeat their favorable reports concerning present and prospective business. Card rates 3·10 to 3·70 for refined, are well maintained; several large orders were placed yesterday for galvanized, and it is stated on good authority that some very heavy orders will be placed next week.

Skelp Iron.—Grooved skelp is quoted at 1·90 to 1·95, and sheared 2·10. There are buyers in the market ready to place large orders as soon as manufacturers will shade these figures sufficiently.

Wrought-Iron Pipe.—A moderate amount of business has been done at full prices. It is stated that there are large buyers willing and anxious to place orders at something less than the quoted rates, but manufacturers are unwilling to cut prices.

Plate and Tank Iron.—A slight shading has been noticed in some sales of tank, but quotations are still given at 2·25@2·30. Shell has sold as low as 2·50, but the asking price is 2·65. Flange, 3·25 for iron. One or two lots of steel flange sold at a shading from that figure.

Structural Iron.—Quotations are given at 3·10 for beams and channels; bridge plate, 2·30; angles, 2·25; tees, 2·80. A large amount of business is looked for, and this is affording much encouragement to manufacturers. Buyers claim that shadings will be made before long, which claim manufacturers positively deny.

Steel Rails.—Quotations to-day are strong at $35. Makers say the market is stronger, but brokers representing buyers deny this. There have been offers made recently at $34@$35.50, but nothing positive can be ascertained as to how these propositions were received. The steel rail makers are strongly opposed to the contemplated reduction of duties to $10; a number of manufacturers have been interviewed this week, and all offer evidence against the desirability of the reduction. A conference was held at Pittsburg which will probably result in the presentation of a strong protest against the measure at Washington. A compromise will be suggested.

Old Rails.—Old rails are quoted at $27.50@$28. Very few lots are selling.

Scrap Iron.—No. 1 wrought scrap will sell at $23.50@$25; some parties are asking as high as $25 delivered at near-by points. Machinery scrap is quoted at $16; wrought turnings, $17.

Pittsburg. Feb. 27.

(From our Special Correspondent.)

Raw Iron.—In our last report we left the iron market with prices very unsettled, and a wide difference in the views of dealers in regard to the value of iron for present and future delivery. In regard to city furnaces, makers show little disposition to shade prices. We hear of various rumors about Bessemer being sold at low figures, but when those who are supposed to have made the transaction are inquired of, they deny all knowledge of the affair. It would seem strange, indeed, if sales were made at low rates, with the facts known that every ton of Bessemer made from raw material of this year's purchases will cost $4 per ton more than that made last year.

Taking these facts into consideration, we do not see how cheap iron is going to be made during the present year, unless there is a decline in coke and labor, which is not very probable; as for ore, the sales required for consumption this year have been made at one dollar advance, which makes the ore alone cost $1.60 more for every ton of raw iron made. The week has not developed much change in the condition of business; the market is certainly a waiting one, neither side showing any inclination to move until circumstances compel them. At the present rate of consumption buyers will not be able to hold out much longer.

A further advance in coke, although rumored, does not seem very probable under the circumstances; the coke men have a good thing and they know it; the talk is principally by outside parties, who, as a general thing, know more about other people's business than those directly interested. The present price of coke is a good one for makers.

The chief item of interest since our last has been the drop of 30 cents per ton in pig iron rates from the south, announced to take place on March 15th. Report comes from Chattanooga that offers are being made for large blocks of crude iron at 50 cents per ton below recent quotations.

The dullness as regards new contracts, therefore, simply means that consumers will not renew contracts at current rates until they are compelled to do so; that makers of standard brands still demand previous rates in accordance with increased cost of materials and labor.

Coke and Coal Smelted Lake Ore.

1,000 Tons Gray Forge	17.00 cash.
1,000 Tons Off Bessemer	19.50 cash.
1,000 Tons Bessemer	22.50 cash.
800 Tons Gray Forge	17.75 cash.
500 Tons Bessemer	22.60 cash.
500 Tons Gray Forge	17.15 cash.
100 Tons No. 2 Foundry	19.00 cash.
100 Tons White and Mottled	17.00 cash.
100 Tons No. 1 Foundry	20.00 cash.
75 Tons Silvery	18.50 cash.

Coke, Native Ore.

100 Tons Gray Forge	17.75 cash.
75 Tons Silvery Extra	21.00 cash.
50 Tons No. 1 Foundry	20.00 cash
50 Tons No. 2 Foundry	19.00 cash.

Charcoal.

375 Tons Cold Blast	26 00 cash.
100 Tons No. 1 and No. 2 Foundry	26.00 cash.
50 Tons No. 1 Foundry	22.00 cash.

Muck Bar.

750 Tons Neutral—March	29.50 cash.
500 Tons Neutral—March	29.00 cash.
250 Tons Neutral	29.25 cash.

Steel Slabs and Billets.

1,900 Tons Steel Billets	36.00 cash.
675 Tons Steel Billets	35.00 cash.
500 Tons Steel Billets	35.50 cash.
300 Tons Nail Slabs	35.50 cash.

Steel Wire Rods.

285 Tons American Fives	50.50 cash.

Bloom Ends.

500 Tons Bloom Ends	25.50 cash.

New Steel Rails.

2,500 Tons New Rails—March	35.00 cash.

Skelp Iron.

575 Tons Wide Grooved	1.90	4 mo
225 Tons Narrow Grooved	1.85	4 mo
100 Tons Sheared Iron	2.20	4 mo

Ferro-Manganese.

200 Tons 80 per cent. Seaboard	84.00 cash.
150 Tons 80 per cent. Seaboard	84.50 cash.
40 Tons 80 per cent. Pittsburg	96.00 cash.

Spiegel.

100 Tons 20 per cent	36.50 cash.
75 Tons 10 and 12 per cent	32.00 cash.

Scrap Material.

500 Tons No. 1 Wrought Scrap, net	24.00 cash.
200 Tons Crucible Steel, net	30 00 cash.
150 Tons Iron Axles, net	30.00 cash.
100 Tons Leaf Steel, net	24.00 cash.

Prices.

Coke or Bituminous Pig—		20% Spiegel at Pittsburg	36.50@
Foundry No. 1	$19.75@20.00	Muck-Bar	29.50@29.75
Foundry No. 2	19.00@	Steel Blooms	35.75@36.50
Gray F. No. 3	17.50@17.75	Steel Slabs	35.50@36.00
" No. 4	17.00@17.25	Steel Cr'p Ends	25.00@25.50
White	17.00@	Steel Bl. Ends	25.00@25.50
Mottled	17.00@	Ferro-Man., 80%, seaboard	84.00@84.50
Silvery	18.25@21.00	Steel Billets	36.00@36.50
Bessemer	22.50@22.75	Old Iron Rails	27.00@27.50
Low Phos	27.00@27.50	Old Steel Rails	23.00@23.25
Charcoal Pig—		No. 1 W. Scrap	23.00@23.50
Foundry No. 1	23.50@24.50	No. 2 W. Scrap	@18.50
Foundry No. 2	22.00@22.75	Steel Rails	35.00@35.50
Cold-Blast	25.00@29.00	" light sec	35.00@38.00
Warm Blast	24.00@25.00	Bar Iron, nom	1.90@ 1.95
10 + 12% Spiegel at seaboard	31.00@32.00	Iron Nails	2.25@
		Steel Nails	2.25@
		Wire Nails	2.85@ 2.90

CHEMICALS AND MINERALS.

New York, Friday Evening, Feb. 28.

Heavy Chemicals.—The alkali trade is extremely active, and consumption appears to be unprecedentedly large. It is indeed difficult to supply the demand. As an illustration of the activity in this branch of trade, we learn that the Solvay Process Co., of Syracuse, N. Y., has contracted for nearly the entire product of its works for the current year. This enterprise is admirably situated for cheap production since it acquired its own brine wells.

These are situated at a considerable elevation above the works, and are below the lake reservoir, from which the water is led to the wells, goes down into the salt deposit, and forces up the saturated brine and sends it on to the works. The whole works without any pumping, and the brine is not only nearly fully saturated, but the supply is so abundant the company will probably be able to sell to the salt works. The company has its own limestone quarries, so that it would be difficult to get more advantageous conditions for manufacture. It is not surprising to hear that these great and admirably-managed works are to be further enlarged.

The market in high test carbonated soda ash continues pretty much as reported in our last issue. It is still scarce on this side, and, according to Liverpool advices a similar state of affairs prevails there. For 58 per cent. $1.50 is asked in a large way, and $1.75@$2 in small lots. The supply in 48 per cent. is rather greater, and in this the ruling quotations are $1.50 @$1.55.

Caustic Soda.—There is a marked upward tendency in this article here, which is also the case in Liverpool. Quotations for the different grades are as follows: Sixty per cent., $2.50; 70 per cent., $2.62½; 74-76 per cent., $2.65@$2.67½. Sales in the last mentioned grade are reported, aggregating same 2,500 drums.

Caustic Soda Ash.—We have very little to record in this article, there being but little demand for it. Prices are nominally $1.45.

Bleaching Powder.—There is nothing new in bleaching powder, and the quotation is $1.40 to $1.50 per 100 lbs. Newcastle brands have been offered at lower figures, but no large sales have come to our notice. There is scarcely any bleach in the market, and purchasers are anxiously waiting the arrival of the much-overdue steamers that bring in our supplies.

Sal Soda.—There is a better demand for the English brand, but it is being held on the other side at prices higher than buyers care to pay. A bid for two hundred tons at 85c. was made, but a cablegram was received stating that anything less than 95c. would not be taken. It is practically unobtainable at lower figures. There is a good demand for the American product at 90c.

Acids.—There is very little to say in regard to the acid market except to record the usual dullness. However, the acid men assert that the production this year will probably exceed that of 1889; at present dealers are for the most part awaiting orders.

There has been a break in the price of nitric acid. The acid combination commonly known as the Knickerbocker Chemical Company, to which we have frequently alluded, and full particulars of whose organization we published in the Engineering and Mining Journal, August 10th, 1889, does not seem to meet with perfectly plain sailing. Many of the stronger firms which were at first announced as having joined it have since withdrawn, having found that, as usual, they were merely giving their trade to the weaker concerns which offered inducements not recognized in the compact. The combination now controls only about one-half of the acid production of this market.

The members of the trade who still remain in the combination are: Messrs. Martin Kalbfiesch's Sons Co.; Jas. L. Morgan & Co.; the Lodi Chemical Company; the Dundee, the Passaic, the Highlands, the Fairfield, and the Gridley Chemical companies.

The original organization contained thirteen firms, and this was thought at the time by the superstitious to be a bad omen. It seems to have been one, for the stronger concerns have generally withdrawn from the "combine." Some of the firms out of the combination are: The Standard, the Bergenport, and the Staten Chemical companies, G. H. Michols & Co., Jos. Binns, Butterworth & Judson, and others.

The capital is mostly out of the combination; it is, therefore, not unnatural to expect the familiar lapses which characterize all combinations, and especially all which are composed of the less robust members of the trade. Trade combinations to be successful should control practically the whole of the product manufactured by the combination, and even then the individual members generally find some means, through drawbacks or outside commissions, to evade the spirit, if not the letter, of the compact.

The Knickerbocker Chemical Company has not been very long in existence, and has not yet been put to very severe tests; but it seems already to show signs of weakness, which must be promptly attended to or the whole structure will crumble to pieces. We learn of members of the combination offering nitric acid, 42 degrees, at 4·95c., which is far below the schedule.

Since outsiders appear to be indifferent as to what the combination does, this cutting of price does not appear to excite either surprise or fear.

Oxalic Acid.—The market in oxalic acid is dull. A fair amount of business at from 6c. to 6·25 has been done in the past few weeks, but at present there is little, if anything, doing.

Fertilizing Chemicals.—The market in fertilizers, although showing an improvement over the business of some weeks ago, is still lacking in briskness, and supplies are not scarce. Orders from Southern districts have been received, showing that consumers have exhausted their stocks and are about to commence buying. The demand from the Northern and Eastern sections is slow; indeed, it is too early to reasonably expect a greater inquiry. There have been a few sales of dried blood at firmer prices; $1.95@$2 for high grade and $1.85 @$1.90 for low grade has been obtained, the demand for this article having improved. Sales of sulphate of ammonia at previous prices are also reported.

Ruling prices are as follows: Azotine, $1.90@$2; dried blood, low grade, $1.85@$1.92½; high grade, $1.92½@$2. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $20@$21 per ton, and low grade, 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.50. Fish scrap, $21.50@$22 per ton, f.o.b. factory. Sulphate of ammonia at $3.12½@3.15 per cwt. Concentrated tankage, $1.90@$2.00. Refuse bone-black, guaranteed 70 per cent. phosphate, $20 per ton. Dissolved bone-black is 95c. per unit for available phosphoric acid, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@23; ground, $25@$26.

Charleston rock, undried, $5.75 per ton; kiln. dried, $6.75@$7 per ton, both f. o. b. vessels at the mines. Freights by sail from Charleston to New York, $3@$3.25 per ton. Charleston rock, ground $11.50@$12, ex-vessel at New York.

Double manure salts 48 to 51 per cent. sulphate of potash, $1.12½ per 100 pounds for shipments after April 1st; high grade manure salts, basis 90 per cent. sulphate of potash, $2 37½ per 100 pounds. For lots on the spot, an advance over the above-named figures of 2½c. per 100 pounds is quoted.

During the week rumors have been afloat and have found their way into print to the effect that a combination is to be formed to control all the phosphate mines anywhere in the United States. Local dealers profess complete ignorance as to any such "combine," and are unanimous in stating that the whole idea is absurd. There is no very large profit in phosphate rock, as statistics show. The Florida product is not likely to materially affect the market for some time to come.

Kainit.—No change in quotations has taken place. The price is nominally $10.50. There continues to be but a small available supply, and there is naturally very little doing in this article. Very little of it will be shipped before the spring season opens on the other side, which will not be before April or May.

Brimstone.—The market in brimstone is unchanged as far as prices are concerned. Seconds to arrive are $18.75; and thirds, $18.25. Seconds on the spot bring $19.

The following figures for exports of brimstone during January, 1890, have been received:

	Seconds.	Thirds.
From Girgenti	6,083	13,080
From Licata	7,778	687
Total, tons	13,861	13,767
		13,861
Total exports for January, 1890, tons		27,628

The total imports of brimstone into the United States in 1889 were 135,901 tons.

Muriate of Potash.—There have been received some fifty or one hundred tons of this article this week. Sales in a jobbing way at previous prices are reported, and nothing new has come to our notice.

Nitrate of Soda.—Seventeen thousand bags of nitrate arrived per "Wachussetts," and were sold at auction in bags of 1,000 pounds at $1.70, one lot, however, selling at $1.68¾. Mr. F. B. Nichols' statistics, under date of the 15th ult., are as follows:

	1890.	1889.	1888.	1887.
Stocks in store and afloat in Atlantic ports Feb. 1, bags	80,705	73,832	59,635	59,447
Arrivals do	25,901	nil.	7,540	11,942
	106,606	73,832	67,175	71,389
Stocks	85,151	63,994	59,635	53,487
Previously reported				72,175
Total arrivals to date				96,076
Same time 1889				50,890
Same time 1888				44,160
Visible supply				581,651
Same time 1889				283,494
Same time 1888				308,563

Stocks with dealers in store and afloat here:

Deliveries fortnight ending Feb. 15	1890. 22,455	1889. 9,838	1888. 7,612	1887. 17,892
Previously reported	43,196	63,058	39,929	37,498
Total deliveries to Feb. 15	64,651	72,896	37,541	55,390
Sales, spot	$1.85 @ $1.90	$2.35 @ $2.37½	$2.10 @ $2.20	$2.05 @ $2.10

"The market has been moderately active with good deliveries. The producers have not agreed upon details of a combination, but it is a fair conclusion from the earnest efforts to reduce the production in the interest of all, that a satisfactory apportionment will soon be reached. We give total charters including May and June shipments but never sure of destination. The arrivals were Troop and Alice Reed, both at this port."

Liverpool. Feb. 14.

(From Geo. G. Blackwell's Report).

MINERALS.—The upward progress of prices has further continued, and there is every prospect of same being maintained. Manganese: Arrivals have been very limited, whilst stocks are practically exhausted; prices, therefore, for prompt and forward delivery have still further considerably advanced. Magnesite: Raw lump quiet, raw ground £6 10s., and calcined ground £10 to £11. Bauxite (Irish Hill brand) continues in strong demand, and brings full prices. Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French chalk: Arrivals have somewhat improved, but the largest proportion has gone into consumption, and prices remain strong, especially for G. G. B. "Angel-White" brand—90s. to 95s. medium. 100s. to 105s. superfine. Barytes (carbonate) steady; selected crystal lump scarce at £6; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6, and selected crystal ground, £8. Sulphate quiet; best lump, 35s. 6d; good medium, 30s.; medium 25s. 6d@27s. 6d; common, 18s. 6d@20s; ground best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d@40s. Pumicestone steady; ground at £10, and specially selected lump, finest quality, at £13. Iron ore continues in good demand at full prices. Bilbao and Santander firmer at 9s.@10s.6d f.o.b.; Irish, 11s@12s 6d; Cumberland, 16s.@20s. Purple ore unchanged. Spanish manganiferous ore commands ready sale at full prices. Emery-stone: Best brands continued to be inquired for, bringing full prices. No. 1 lump is quoted at £5 10s.@£6, and smalls £5 @£5 10s. Fullers' earth steady; 45s.@50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal continue inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: High percentage inquired for at fair prices. Antimony ore and metal have further advanced. Uranium oxide, 24s.@26s. Asbestos: Best rock, £17 to £18; brown grades, £14 to £15. Potter's lead ore: Prices are firm; smalls, £14 to £15; selected lump, £16 to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15 to £16; powdered (manufactured), £11 to £12. Limespar: English manufactured, old G.G.B. brand sought after and brings full prices; 50s. for ground English. Feldspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in fair demand at 22s. to 25s. Plumbago: Notwithstanding large new imports, prices are unchanged; Spanish, £6; best Ceylon lump at last quotations; Italian and Bohemian, £4 to £12 per ton. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese selling at advanced figures. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn). Irish moss, although more is offering, prices are firm at £12 to £14.

Liverpool. Feb. 19.

[Special report by Messrs. J. P. Brunner & Co.]

Chemicals.—For saltcake there has been an active demand of late, and this article has advanced 7s. 6d. per ton during the last week, and the advance paid for some months ahead.

In other articles, although business is not active, the tone has improved, owing to rumors of coal strikes, and also difficulties with chemical laborers, which have caused makers to hold off, except from hand to mouth.

Soda Ash.—Carbonated is still very scarce, orders for this month being returned unfilled. Sales of 58 per cent. are reported for March and April at 1¼d. and also for one special brand April and December at 1 3/8d. Caustic ash is quiet but scarce and 1 5/16d. to 1½d., according to brand, are about nearest values.

Soda crystals firm at £3 and few sellers.

Caustic soda eased off a little, but has taken up again in consequence of the strike reports.

Sixty per cent. is very scarce, and £8 to £8 5s. are about nearest values.

Seventy per cent.—Some resales have been made lately at £8 12s. 6d., up to £8 17s. 6d., and the market closes firm at £8 17s. 6d. to £9, and resellers pretty well cleared out. Makers have little to sell and will only quote from hand to mouth.

Seventy-four per cent. is quoted at £9 17s. 6d. to £10, and very little offering.

Seventy-six per cent.—£10 10s. to £11.

Bleaching powder is rather dull at £5 15s., about nearest value for hardwood, but in the absence of business it is difficult to test the market. At the same time there is very little offering for prompt delivery.

Chlorate of potash rather weaker at 4⅝d. to 5d., but the stock is low.

Bicarb. soda in good request at £5 15s. per ton and upwards, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia rather dull, and £11 16s. 3d. to £11 17s 6d. are about nearest quotations for good gray 24 per cent. f.o.b. Liverpool.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Feb. 28.

Bricks.—There is no material change in this market, as reported in our last issue. Shipments have been few, and there is very little brick in the market. Dealers blame the cold weather which has prevailed for the past week for the scarcity of bricks. Prices remain the same, the best qualities of the Haverstraw product selling from $7.50 @$8 per M. Jerseys continue at from $5.50@$6 per M., and pales are being sold at $3.50@$4 per M.

Lime.—No change in lime has taken place during the week. Prices are the same, and the market is about bare. There is really but a limited supply of Maine lime, and no shipments to speak of have been received for some time past. Dealers state that they could dispose of 20,000 or 30,000 barrels if they had the quantity, the demand being good.

Cement.—There is a good healthy demand in both the domestic and the imported products, but the general features of the cement trade, as usual, remain unchanged. $2.15@$2.45 for American and $2.30@$2.40 foreign are the quotations in Portland cement; $2.45@$3.75 per barrel for special brands being asked.

Stone.—It is rather early in the year to expect any movement of importance in this line, and stone is very quiet. Building has been carried on through the past few months with former supplies, and stone men in answer to inquiries as to the present condition of the trade have but one word to say: "Stagnation."

Representatives of 160 granite concerns of New England, covering the entire area from Eastern Maine to Western Connecticut, have been in secret session at Boston this week, and, it is said, have formed an organization to be known as the Granite Manufacturers' Association of New England, with John Q. A. Field, president; Walter Lyons, secretary; W. S. White, treasurer, and a board of twelve directors. It was voted that after May 1 all labor should be paid for by the hour and the piece. It was the opinion of the gentlemen present that the present condition of the granite business did not warrant the increase in wages asked for by the workmen.

Slate.—There is absolutely nothing new to record in this branch of the building material market.

New slate quarries are being opened in Hartford, Washington County, N. Y. The quality has not yet been determined, and no statements as to the value of the find can be advanced till something definite is learned about it. The Delaware & Hudson Railroad has reduced rates to 23c. per hundred pounds, and the slate men of Washington County are on a par with Pennsylvania producers.

IMPORTS AND EXPORTS OF METALS AT NEW YORK FEBRUARY 15 TO FEBRUARY 22 AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co		25
Meyer, G. A. & E.		9
Muller, Schall & Co.		69
Total		103
Corres. date, 1889		56

Pig Lead.	Lbs.	Lbs.
Schultz & Co., A.		98
Total		98
Corres. date, 1889		

Tin.	Tons.	Tons.
Amer. Metal Co		150
Crooks & Co., R.		25
Naylor & Co.		150
Nissen, Geo.		10
Phelps, Dodge & Co.		370
Thomson, A. A. & Co.		10
Townsend, & Co., J. R.		30
Trotter & Co, N.	15	25
Total	15	770
Corres. date, 1889		935

Tin Plates.	Boxes.	Boxes.
Bruce & Cook	2,111	10,871
Byrne & Son		1,000
Central Stamp. Co.	2,662	20,997
Coddington & Co	1,518	14,935
Cohn & Co		1,314
Con. Fruit Jar Co.		120
Corbiere F. & Co		1,193
Cort & Co.	3,602	24,767
Crooks & Co.	902	4,883
Dickenson, V. D. & Co.	2,877	34,399
Habermann, F.	66	66
Iron Clad Mfg. Co.		277
Lalance & G. M. Co.		1,734
Lehmaier, Schw'z & Co	200	200
Merchant & Co.		5,506
Mersick & Co.	405	1,426
Morewood & Co.	8,927	22,563
Pratt Mfg. Co.	9,263	22,347
Phelps, Dodge & Co	38,092	80,021
Shepard & Co.		789
Taylor, N. & G.		234
Thomson & Co., A. A.	253	7,141
Warren, J. M.	545	545
Wheeler & Co.	427	3,680
Whittemore & Co.		1,490
Wolff & Reesing		625
Total	71,523	257,854
Corres. date, 1889		248,029

Pig Iron.	Tons.	Tons.
Crocker Bros.		200
Stetsson & Co., G. W.	100	100
Williamson, J. & Co.	100	200
Total	200	500
Corres. date, 1889		2,600

Steel Blooms, Billets, and Slabs.	Tons.	Tons.
Dana & Co	248	502
Downing, R. F. & Co.		5
Martin & Co		80
Milne, A., & Co.	11	16
Pope, Jas. E., Jr.		61
Roebling's Sons, J. A.		55
Wolff, & Co., R. H.		60
Total	259	779
Corres. date, 1889		4,865

Bar Iron.	Tons.	Tons.
Abbott & Co., Jere.	35	353
Bacon & Co.		84
Crocker Bros.		77
Downing & Co.	10	145
E. J. Jacobus.		1
Lilienberg, N.	35	235
Milne & Co.	200	234
Page, Newell & Co.	75	452
Wilson, J. G.		2
Total	175	1,403
Corres. date, 1889		1,457

Scrap Iron.	Tons.	Tons.
Samper & Co., S.		186
Total		186
Corres. date, 1889		951

Steel and Iron Rods.	Tons.	Tons.
Abbott & Co.	360	1,828
American S. Co.	115	225
Bacon & Co.	11	22
Carey & Moen.		18
Downing & Co.	19	44
Galpin, S. A.	9	536
Greely & Co. C. S.		30
Hazard Mfg. Co. S.	12	12
Jacobus, E. Y.		2
Lundberg, G.		110
Milne & Co.		180
Muller, Schall & Co.		100
Naylor & Co.	165	779
Page, Newall & Co.	50	202
Roebling's Sons, J. A.	121	612
Schulze, P. R	1	1
Wood & Niebuhr.		25
Wolf & Co., R. H.	60	1,610
Total	1,073	5,600
Corres. date, 1889		6,831

Old Rails.	Tons.	Tons.
Frankfort. M.	345	1,339
Hernsheim, E	350	350
Total	695	1,689
Corres. date, 1889		4,421

Spiegeleisen.	Tons.	Tons.
Blakely & McLellan	64	1,504
Crocker Bros.		2,942
Dana & Co.	145	2,296
Foley, F.		50
Geisenheimer & Co.		125
Hernshime, L.	128	3,184
Naylor & Co.	500	2,384
Perkins, C. L.		400
Whittemore, H. & Co.		23
Total	837	11,208
Corres. date, 1889		10,173

Iron Ore.	Tons.	Tons.
Baiz, Jacob		67
Earnshaw, A.	393	1,135
Ennis, Andrew		438
Total	393	1,640
Corres. date, 1889		749

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co., Jere.	18,000	675,443
Amer. Met. Co., Lt.		648,110
Belmont, Aug. & Co	229,766	229,766
Wil'ms & T'hune.	112,004	112,004
Total	359,770	1,683,323
Corre. date, 1889		

Copper Matte.		
American Metal Co	224,199	973,377
Lewisohn Bros		592,162
Nichols, Geo. H.		267,202
Paulsen, Wm.		1,039,428
Wil'ms & T'hune.	364,402	1,716,310
Total	588,601	4,588,479
Corres date 1889		

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last.			Dividends. Total paid.	Date and amount of last.		
1	Adams S. L.	Colo.	$1,500,000	150,000	$10	*				$555 000	Jan.	1887	.15
2	Alice, S. C	Mont	10,000,000	400,000	25	*				800,000	Dec.	1889	.06¼
3	Alma Cons., G	Idah	300,000	30,000	10	*				60,000	Jan.	1889	.50
4	American & Nettie, C.	Colo.		300,000						150,000	Feb.	1889	.10
5	Amy & Silversmith, S.	Mon.		341,419						247,530	Aug.	1887	12½
6	Atlantic, C	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	620,000	Feb.	1890	1.50
7	Argenta, S	Nev..	10,000,000	100,000	100	335,000	July	1889	.10	40,000	Feb.	1880	.20
8	Aspen Mg. & S., S. L.	Colo.	2,000,000	200,000	10	*				380,000	Mar.	1890	.10
9	Aurora, I	Mich	2,000,000	100,000	20					155,000	Oct.	1887	1.87½
10	Badger, S	Oct.	250,000	50,000	5					25,000	Jan.	1890	.25
11	Bassick, G. S.	Colo.	10,000,000	100,000	100	*				400,000	Mar.	1884	1.00
12	Belle Isle, S	Nev..	10,000,000	100,000	100	155 000	Apl.	1889	.10	300,000	Dec	1879	25
13	Belcher, G. S.	Nev..	10,400,000	104,000	100	2,822,000	Feb	1889	.50	15,397,200	Apl.	1876	1.00
14	Bellevne Idaho, S. L.	Idah.	1,250,000	125,000	10	120,000	Dec.	1889	.25	187,500	Jan.	1887	10
15	Bodie Con., G. S.	Cal .	10,000 000	100 000	100	575,000	Nov	1889	25	1,295,000	Apl.	1885	50
16	Boston & Mont, G.	Mon	2,500,000	250,000	10	*				520,000	Jun.	1886	.10
17	Boston & Mont., C. S.	Mon	2,500,000	100,000	25	*				1,100,000	Feb.	1890	1.00
18	Breece, S.	Colo	5,000,000	200,000	25	*				2,000	Feb.	1880	.01
19	Brooklyn Lead, L. S.	Utah	500,000	50,000	10					127,000	July	1887	.05
20	Bulwer, G	Cal..	10,000,000	100,000	10	130,000	Aug.	1889	.25	175 000	Jan.	1884	.10
21	Bunker Hill & Sull..	Idah.	3,000,000	300,000	10	*				150,000	Oct.	1883	.06⅔
22	Caledonia, G	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	136,000	Oct.	1889	.08
23	Calliope, S	Colo.	1,000,000	¶	1					70,000	Feb.	1890	.01
24	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000				33,850,000	Feb.	1890	5.00
25	Carbonate Hill S. L..	Colo.	1,500,000	200,000	10	*				80,000	Apl.	1884	05
26	Carlisle, G	N. M.	1,000,000	200,000	5					175,000	Dec.	1888	.12½
27	Castle Creek, G	Idah.	100,000	100,000	1					51,000	Oct.	1883	.03
28	Catalpa, S. L.	Colo.	3,000,000	300,000	10	*				270,000	May.	1884	.10
29	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,950,000	Feb.	1890	1.00
30	Chrysolite, S. L.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
31	Colorado Central, S. L	Colo.	2,750,000	275,000	10	*				406,250	July	1889	.05
32	Confidence, S. L.	Nev..		24,960		287,440	Apl.	1887	.50	199,680	Apl.	1889	1.00
33	Cons. Cal. & Va., G S.	Nev.	21 600 000	216,000	100	108,000	Jan.	1885	.20	3,358,800	Jan.	1890	.50
34	Contention, S	Ariz.	12,500,000	250,000	50					‡2,587,000	Dec.	1884	.25
35	**Cop. Queen Cons, C.	Ariz.	1,400 000	140,000	10					210,000	Feb.	1889	.50
36	Crescent, S. L. G.	Utah	15,000,000	600,000	25	*				228,000	Oct.	1888	.03
37	Crown Point, G. S.	Nev..	10 000,000	100,000	100	2,880,000	Sept	1889	.50	11,588 000	Jan.	1875	2.00
38	Daly, S. L.	Utah	3,000,000	150,000	20					1,387,500	Feb.	1890	.25
39	Deer Creek, S. G.	Idah.	1 000,000	200,000	5	*					Jun.	1889	.05
40	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*				20,000	Nov.	1887	.10
41	Derbec B. Grav., G. S.	Cal..	10,000,000	100,000	100	90,000	Dec.	1881	.10	§1,000,000	Oct.	1889	.10
42	Dunkin, S. L.	Colo.	5,000,000	200 000	25	*				210,000	Sept	1889	.05
43	Dunstone, G. S. L.	Mont	1,,000,000	200,000	5	*				390,000	Nov.	1888	.03
44	Eclipse	Colo.	100,000	100,000	1					6,000	Nov.	1887	.10
45	Elkhorn, G. S.	Mont	1,000,000	100,000	10	50,000	July	1883	.50	20,000	July	1887	.05
46	Empire Lt., G.	Mont	500,000	100,000	5					170,000	Oct.	1887	.37½
47	Eureka Con., G. S. L.	Nev..	5,000,000	50,000	100	550,000	Jun.	1889	.50	70,500	July	1888	.25
48	Evening Star, S. L.	Colo.	500,000	50,000	10	*				4,955,000	Dec.	1889	.25
49	Excelsior, G	Cal..	10,000,000	100,000	100	560,000	Sept	1885	1.00	1,450,000	Oct.	1880	.25
50	Father de Smet, G.	Dak..	10,000,000	100 000	100	200,000	Nov	1878	1.00	875,000	Dec.	1885	.20
51	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun.	1871		1,125,000	Jan.	1889	2.00
52	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*				930,000	July	1886	.10
53	Garfield Lt., G. S.	Nov.	500,000	100,000	5					190,000	Apl.	1888	.12½
54	Gould & Curry, G. S.	Nev.	10,800,000	108,000	100	4,434,600	Oct.	1889	.30	85,000	Oct.	1870	10.00
55	Grand Prize, S	Nev.	10,000,000	100,000	100	715,000	Nov.	1889	.30	3,826,800	Jan.	1880	.30
56	Granite, S. L.	Idah.	500,000	500,000	1	*				525,000	Oct.	1889	.02
57	Granite Mountain, S.	Mont	10,000,000	400,000	25					28,400	Feb.	1890	.50
58	Green Mountain, G.	Cal..	1,250,000	125,000	10	*				8 200,000	Nov.	1881	.07½
59	Hale & Norcross, G. S	Nev .	11,200,000	112,000	100	5,086,000	July	1887	.50	212,000	July	1888	.50
60	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50					1,162,000	Dec.	1889	.50
61	Hel'a Mg & Red, G. S. L	Mont	3,315,000	663,000	5	*				1,437,500	July	1886	.06
62	Holmes, S.	Nev.	10,000,000	100,000	100	300,000	Sept	1885	.10	197,970	Apl.	1886	.25
63	Holyoke, G.	Idah	200,000	200,000	1					75,000	Feb.	1883	.10
64	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	27,000	Feb.	1890	.10
65	Honorine, S. L.	Utah	500,000	250,000	2	37,500	Apl.	1889	.05	4,506,250	Sept	1887	.05
66	Hope, S.	Mont	1,000,000	100,000	10	*				125,000	Apl.	1888	.25
67	Horn-Silver, S. L.	Utah	10,000,000	400,000	25	*				233,252	Dec.	1889	.12½
68	Hubert, G.	Colo.	1,000,000	1 mil'n	1	*				4,050,000	Dec.	1889	.00½
69	Idaho, G.	Cal..	310,000	3,100	100					247,000	Dec.	1889	5.00
70	Ideal, S. L.	Colo.	1,500,000	50,000	10					5,235,900	Oct.	1886	.05
71	Illinois, S	N. M.	100,000	100,000	1	*				15,000	Apl.	1889	.20
72	Independence, S.	Nev..	10,000,000	100,000	100	340,000	Oct.	1886	.20	45,000	Sept	1879	.25
73	Iron Hill, S.	Dak.	2,500,000	250,000	10	134,000	July	1889	.03	225,000	Nov	1887	.07½
74	Iron-Silver, S. L	Colo.	10,000,000	500,000	20	*				156,250	Apl.	1889	.20
75	Jackson, G. S.	Nev.	5,000,000	50,000	100	237,500	Nov	1880	.20	2,500,000	Jun.	1889	.10
76	Jay Gould	Mont	2,000,000	40,000	5	*				55,000	Apl.	1889	.04
77	Jocuistita, I	Mex.	2,500,000	250,000	10					395,000	Feb.	1885	.50
78	Jumbo, G.	Colo.	2,000,000	200,000	10					1,200,000	Oct.	1887	.02½
79	Kearsarge, C.	Mich	1,250,000	50,000	25	190,000	Oct.	1887	1.00	35,000	Jan.	1890	2.00
80	Kentuck	Nev.	3,000,000	30,000	100	369,000	Dec.	1889	.30	100,000	Dec.	1886	.10
81	La Plata, S. L.	Colo.	2,000,000	200,000	10	*				1,350,000	Sept	1882	.30
82	Leadville Cons., S. L. I.	Colo.	4,000,000	400,000	10	*				610,000	Apl.	1889	.05
83	Lexington, G. S.	Mont	4,000,000	40,000	100	*				423,000	Jan.	1885	2.00
84	Little Chief, S. L.	Colo.	10,000,000	200,000	50	*				609,000	Jan.	1890	.05
85	Little Pittsburg, S. L	Colo.	20,000,000	200,000	100	*				810,000	Mch.	1889	50
86	Martin White, S.	Nev..	10,000,000	100,000	100	1,175,000	Jan.	1889	.25	1,050,000	Dec.	1886	.25
87	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*				140,000	May	1888	5.00
88	Matchless, S.	Colo.	500,000	500,000	1	*				175,000	Feb.	1890	.00½
89	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1 00	15,000	Mar.	1876	
90	Mono, G.	Cal.	5,000,000	50,000	100	102,850	Nov.	1889	.25	1,820,000	Mar.	1886	.25
91	Montana, Lt., G. S.	Mont	3,300,000	660,000	5	*				12,500	Jan.	1890	.09
92	Morning Star, S. L.	Colo.	1,000,000	100,000	10					2,415,951	Dec.	1889	.20
93	Moulton, S. G.	Mont	2,000,000	400,000	5	*				850,000	Dec.	1887	.07½
94	Mount Pleasant, G.	Cal.	150,000	150,000	1	*				380,000	Feb.	1887	.30
95	Mt. Diablo, S.	Nev.	5,000,000	50,000	100	137,500	Jun.	1880	2.00	150,000	Oct.	1889	.20
96	Napa, Q	Cal..	700,000	100,000	7					160,000	Jan.	1890	.20
97	Navajo, G. S.	Nev..	10,000,000	100,000	100	485,000	Apl.	1888	.30	350,000	Apl.	1889	.10
98	New Guston, S.	Colo.	500,000	100,000	5					365,000	Dec	1889	.87½
99	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*				287,500	Dec.	1885	.06¼
100	Northern Belle, S.	Nev..	5,000,000	50,000	100	425,000	Jan.	1884	8.00	30,000	Apl.	1883	.50
101	North Belle Isle, S.	Nev..	10,000,000	100,000	100	400,000	Sept	1889	.20	2,400,000	May	1888	.50
102	North Star, G	Cal..	1,000,000	100,000	10					230,000	Dec.	1889	.50
103	Ontario, S. L.	Utah	15,000,000	150,000	100					250,000	Feb.	1890	.50
104	Ophir, G. S.	Nev..	10,000,000	100,000	100	4,159,440	May	1889	.50	10,775,000	July	1882	1.00
105	Original, S. C.	Mont	1,500,000	60,000	25	*				1,595,800	July	1888	.05
106	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	123,000	Mar.	1890	1 00
107	Oxford, G.	N. S.	125,000	125,000	1	*				1,272,500	Sept	1888	.02
108	Paradise Valley, G. S.	Nev.	10,000,000	100,000	100	57,000	Apl.	1888	.15	73,500	Apl.	1887	.10
109	Parrot, C.	Mont	1,800,000	180,000	10					150,000	Jan.	1890	.10
110	Peacock, S. G. C.	N. M.	2,000,000	200,000	10	*				516,000	Nov.	1886	
111	Plumas Eureka, G.	Cal..	1,406,250	140,625	10					60,000	Oct.	1889	.37½
112	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*				2,548,046	Feb.	1886	.10
113	Plymouth Con., G.	Cal..	5,000,000	100,000	50	*				20,000	Feb.	1888	40
114	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100					2,280,000	Feb.	1890	1.50
115	" com., Q.	Cal..	5,700,000	57,000	100					1,577,053	July	1882	.40
116	Quincy† C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862		643,867	Jan.	1890	3.00
117	Republic, C.	Mich.	5,000,000	100,000	50	400,000	Dec.	1889	.30	5,370,000	Jun.	1887	1.25
118	Richmond, S. L.	Nev..	1,350,000	54,000	25	*				4,312,587	Feb.	1880	.50
119	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar	1886	.50	99,785	Mar.	1886	.05
120	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*				585,000	Dec.	1882	.50
121	Robert E. Lee, S. L.	Colo	10,000,000	500,000	20					100,000	July	1869	3.00
122	Savage, S.	Nev..	11,200,000	112,000	100	6,542,000	July	1889	.50	4,460,000	Apl.	1883	.01
123	Shoshone, G.	Idah.	150,000	150,000	1					7,500	Apl.	1888	.12½
124	Sierra Buttes, G.	Cal..	2,225 000	122,500	10					1,568,145	Jan.	1871	1.00
125	Sierra Nevada, G. S.	Nev..	10,000,000	100,000	100	6,250,000	Oct.	1889	.50	102,000	Apl.	1889	.10
126	Sierra Nevada, S. L.	Idaho	1,000,000	¶	1	*				270,000	May	1889	.02
127	Silver Cord, G. S. L.	Colo.	4,500,000	450,000	10					40,000	July	1887	.25
128	Silver King, S.	Ariz.	10,000,000	100,000	100	80,000	Jan.	1890	.30	270,000	June	1889	.05
129	Silver Mg. of L. V.	N. M.	500,000	500,000	1					50,000	Feb.	1890	.05
130	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*				75,000	Jan‡	1881	25
131	Small Hopes Cons., S.	Colo.	5,000,000	250,000	20	*				50,000	Jun	1889	.10
132	Spring Valley, G.	Cal..	200,000	200,000	1	50,000	Oct.	1886	.25	3,137,500	Jun.	1888	.05
133	Standard, G. S.	Cal..	10,000,000	100,000	100	25,000	Oct.	1884	.25	3,595,000	Nov.	1881	.06
134	Stormont, S	Utah	500,000	500,000	1	*				155,000	Dec.	1887	.20
135	St. Joseph, L	Mo..	1,500,000	150,000	10	*				844,000	Apl.	1888	.02½
136	Swansea, G.	Colo.	600,000	60,000	10	*				9,000	Nov.	1881	.20
137	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	Apl.	1885	3.00	9100,000	Jan.	1890	3.00
138	Tip Top, S	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	1,220,000	Apl.	1882	.10
139	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*				1,250,000	Feb.	1884	.20
140	United Verde, C.	Ariz.	3,000,000	300,000	10	*				97,500	Apl	1886	2.50½
141	Valencia, M.	N. H.	150,000	1,500	100					37,500	Oct.	1888	.37½
142	Viola Lt., S. L.	Idah.	750,000	150,000	5	*				272,500	July	1887	.10
143	Ward Cons., S. L.	Colo.	2,000,000	200,000	10					1,275,000	Dec.	1889	.05
144	Yankee Girl	Colo.	2,500,000	250,000	10					20,000	Aug.	1871	1.50
145	Yellow Jacket, G. S.	Nev..	12,000,000	120,000	100	5,508,000	Mar	1889	.50	2,184,000	Jun.	1889	.10
147	Webb City, L. Z.	Mo..	55,000	11,000	5					3,300	Oct.	1889	.10
148	Woodside	Utah			.					25,000			
149	Young America	Cal..								175,000	....	1889	.10

NON-DIVIDEND PAYING MINES

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value	Assessments. Total levied.	Date & am't of last.		
1	Agassiz Cons., S. L.	Colo.	$2,500,000	50,000	$50	*			
2	Allegheny, S	Colo.	5,000,000	500,000	10				
3	Allouez, C	Mich	2,000,000	80,000	25	§737,000	Jan.	1890	.50
4	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	688,750	July	1889	87½
5	Alta, S	Nev..	10,080,000	100,800	100	2,248,800	Sept	1888	.50
6	Amador, G	Cal..	400,000	200,000	2	*			
7	American Flag, S.	Colo.	1,250,000	125,000	10	300,000	Jun	1877	.10
8	Amity, S	Colo.	250,000	250,000	1				
9	Anglo-Montana, Lt.	Mon.	600,000	120,000	5				
10	Astoria, G	Cal..	200,000	100,000	2				
11	Barcelona, G	Nev..	5,000,000	200,000	25	*			
12	Bechtel Con., G	Cal..	10,000,000	100,000	100	173,500	Jan.	1883	.10
13	Belmont, S	Nev..	5,000,000	50,000	100	735,000	Apl.	1886	.10
14	Best & Belcher, G. S.	Nev..	10,080,000	100,800	100	2,180,590	Jan.	1890	.25
15	Big Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*			
16	Bi-Metallic, S	Mon.	5,000,000	200,000	25	*			
17	Black Oak, G	Cal.	3,000,000	300,000	10	*			
18	Boston Con., G	Cal..	10,000,000	100,000	100	170,000	Nov	1883	.25
19	Bremen, S	N. M.	5,000,000	500,000	10	*			
20	Brownlow, S	Colo.	250,000	250,000	1				
21	Brunswick, G	Cal..	2,000 000	400,000	5	*			
22	Bullion, G. S.	Nev..	10,000,000	100,000	100	4,007,000	Aug.	1888	.50
23	Calaveras, G	Cal..	500,000	500,000	1	*			
24	Carisa, G	Wy.	500,000	100,000	5	*			
25	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*			
26	Cashier, G. S.	Colo.	500,000	250,000	2	*			
27	Charles Dickens, G. S.	Idah.	1,250,000	250,000	5	*			
28	Cherokee, G	Cal..	1,500,000	150,000	10				
29	Chollar, S	Nev..	11,200,000	112,000	100	1,484,000	July	1889	.50
30	Cleveland, T	Dak.	1,000,000	500,000	2	*			
31	Colchis	N. M.	500,000	50,000	10				
32	Commonwealth, S.	Nev.	10,000,000	100,000	100	170,000	Nov	1888	.50
33	Comstock, G. S.	Nev..	10,000,000	100,000	100	30 000	Mar.	1887	.15
34	Con. Imperial, G. S.	Nev.,	5,000,000	50,000	100	1,802,500	Nov.	1889	.05
35	Con. Pacific, G	Cal..	6,000 000	60,000	100	192,000	Oct.	1889	.10
36	Cons. Silver, S	Mo...	2,500,000	250,000	10				
37	Crescent, S. L	Colo.	3,000,000	300,000	10	*			
38	Crocker, S	Ariz.	10,000,000	100,000	100	135,000	Jan.	1890	.10
39	Crowell, G	N. C.	500,000	500,000	1				
40	Dahlonega, G	Ga...	250,000	250,000	1	*			
41	Dandy, S	Colo.	5,000,000	500,000	10				
42	Decatur, S	Colo.	1,500,000	300,000	5	*			
43	Denver City, S. L	Colo.	5,000,000	500,000	10	*			
44	Denver Gold, G	Colo.	300,000	60,000	5				
45	Durango, G	Colo.	500,000	500,000	1	*			
46	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	1.00
47	El Cristo, G. S.	U.S.C	1,000,000	500,000	2				
48	El Dorado, G	Cal.	1,000,000	250,000	4	*			
49	El Talento, G	U.S.C	1,000,000	500,000	2				
50	Empire, S	Utah	10,000,000	100,000	100				
51	Eureka Tunnel, S. L.	Nev..	10,000,000	100,000	100	*			
52	Exchequer	Nev.	10,000,000	100,000	100	515,000	Apl.	1889	.25
53	Found Treasure, G. S.	Nev..	10,000,000	100,000	100	30,500	Apl.	1889	12½
54	Gogebic L. Syn., I	Wis.	5,600,000	200,000	25				
55	Gold Cup, S	Colo.	500,000	500,000	1	*			
56	Golden Era, S	Mon.	2 000,000	200,000	10	*			
57	Gold Placer, G	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.25
58	Gold Rock, G	Cal.	1,000,000	500,000	2	*			
59	Goodshaw, G	Cal..	10,000,000	100,000	100	*			
60	Grand Belt, C	Tex.	12,000,000	120,000	100				
61	Grand Duke	Colo.	800,000	80,000	10				
62	Great Remance, G	U.S.C	1,000,000	500,000	2	*			
63	Gregory-Bobtail, G	Colo.	550,000	550,000	1	*			
64	Gregory Con., G	Mon.	3,000,000	300,000	10				
65	Harlem M. & M. Co., G.	Cal..	1 000,000	200,000	5				
66	Head Cent. & Tr. S. G	Ariz.	10,000,000	100,000	100				
67	Hector, G	Cal..	1,500,000	300,000	5	45,000	Jan.	1889	.15
68	Highland, C	Mich	500,000	25,000	20				
69	Hollywood	Cal..	200,000	100,000	2				
70	Hortense, S	Colo.	2,000,000	200,000	10				
71	Huron, C	Mich	1,000,000	40,000	25	280,000	May	1887	3.00
72	Iron Gold & Silver, S	N. M.	2,000,000	200,000	10	*			
73	Ironton, I	Wis.	1,000,000	40,000	25				
74	Iroquois, C	Mich	1,250,000	50,000	25				
75	J. D. Reymert	Ariz.	10,000,000	100,000	100	*			
76	Julia Cons., G. S.	Nev..	11,000,000	110,000	100	1,660,000	Jan.	1889	.10
77	Lacrosse, G	Colo.	1,000,000	100,000	10	*			
78	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	*			
79	Mayflower Gravel	Cal..	1,000,000	100,000	10	535,000	Jan	1890	
80	May Mazeppa, S	Colo.	500,000	500,000	1				
81	Medora, G	Dak.	250,000	250,000	1				
82	Mexican, G. S	Nev..	10,000,000	100,000	100	2,800,760	Dec.	1889	.25
83	Middle Bar G	Cal..	400,000	200,000	2	*			
84	Mike & Starr, S. L.	Colo.	1,000,000	200,000	5	*			
85	Mollie Gibson	Colo.	2,000,000	100,000	2				
86	Monitor, G	Colo.	100,000	1,000,000	1	*			
87	Mutual Mg. & Sm.	W'sh	100,000	1,100,000	1	*			
88	Native, C	Mich	1,000,000	40,000	25				
89	Neath, G	Colo.	1,000,000	100,000	10				
90	Nevada Queen, S	Nev	10,000,000	100,000	100	250,000	Oct.	1889	.25
91	New Germany, G	N. S.	100,000	100,000	1	*			
92	New Pittsburg, S L.	Colo.	2,000,000	200,000	10	*			
93	N. Commonw'h, S.	Nev.	10,000,000	100,000	100	60,000	Apl.	1889	.10
94	North Standard, G	Cal..	10,000,000	100,000	100	20,000	Nov		
95	Noonday	Cal..	600,000	60,000	10	208,000	Dec	1881	
96	Oneida Chief, G	Cal.	500,000	125,000	100	*			
97	Oriental & Miller, S.	Nev..	10,000,000	400,000	25				
98	Osceola, G	Nev.,	5,000,000	500,000	10	*			
99	Overman, G. S.	Nev.	11,520,000	115,200	100	3,823,400	Dec.	1889	25
100	Park, S.	Utah	2,000,000	200,000	10				
101	Peer, S.	Ariz.	10,000,000	100,000	100	155,000	Sept	1889	.10
102	Peerless, S.	Ariz.	10,000,000	100,000	100	370,000	Mar.	1889	.25
103	Phoenix	Ariz.	500,000	500,000	1	*			
104	Phoenix, G. S.	Ark.	5,000,000	200,000	25	*			
105	Phoenix Lead, S. L.	Colo.	100,000	100,000	1	*			
106	Pilgrim, G	Cal..	600,000	300,000	2	*			
107	Potosi, S	Nev..	11,200,000	112,000	100	1,461,600	Sept	1889	.50
108	Proustite, S	Idah	250,000	250,000	1	*			
109	Puritan S. G	Colo.	1,500,000	150,000	10	*			
110	Quincy	Colo.	3,000,000	300,000	10				
111	Rappahannock, G. S.	Va..	250,000	250,000	1	*			
112	Red Elephant, S.	Colo.	500,000	500,000	1	*			
113	Ropes, G. S.	Mich	2,000,000	80,000	25	147,200	July	1887	.50
114	Russell, G	N. C.	1,500,000	300,000	5				
115	Sampson, G. S. L.	Utah	10,000,000	100,000	100	288,157	July	1888	1.00
116	San Sebastian, G.	San. S	1,600,000	320,000	5	*			
117	Santa Fe, C	N. M.	5,000,000	500,000	10				
118	Santiago, G	U.S.C	400,000	200,000	2	*			
119	Security, S.	Colo.	10,000,000	1,000,000	10				
120	Sheridan	N. M.	2,000,000	200,000	10				
121	Silver Queen, C	Ariz.	5,000,000	200,000	25	*			
122	South Bulwer, G	Cal..	10,000,000	100,000	100	100,000	May	1881	25
123	South Hite	Cal..	10,000,000	100,000	100	195,000	Jan.	1885	.05
124	South Pacific	Cal..	500,000	100,000	5				
125	Stanislaus, G	Cal..	2,000,000	200,000	10				
126	St. Kevin, G. S.	Colo.	100,000	100,000	1	*			
127	St. Louis & Mex., S.	Mex.	5,000,000	500,000	10	*			
128	St. Louis & St. Elmo	Colo.	2,000,000	200,000	10				
129	St. L. & St. Felipe, G S.	Mex.	1,500,000	150,000	10				
130	St L. & Sonora, G. S.	Mex.	1,500,000	150,000	10				
131	St. Louis-Yavapai	Ariz.	3,000,000	300,000	10	*			
132	Sunday Lake, I	Mich	1,250,000	50,000	25				
133	Sullivan Cons. G.	Dak.	600,000	200,000	3	*			
134	Sutter Creek, G	Cal..	500,000	100,000	5				
135	Sutro Tunnel	Nev..	20,000,000	2,000,000	10	*			
136	Sylvanite, S	Colo.	5,000,000	500,000	10	*			.10
137	Taylor-Plumas, G	Cal..	1,000,000	200,000	5	10,000	Feb.	1888	.25
138	Tioga Cons., G	Cal..	10,000,000	100,000	10	295,000	May	1888	
139	Tornado Cons. G S.	Nev..	100 000	100,000	1	*			
140	Tortilita, G. S.	Ariz.	1,000,000	100,000	110	*			
141	Tuscarora, S	Nev..	10,000,000	500,000	20	160,000	Oct.	1889	
142	Union Con., G S.	Nev..	10,000,000	100,000	100	3,260,000	Oct	1889	
143	Utah, S.	Nev..	10,000,000	100,000	100	170,000	July	1889	
144	Whale, S.	Colo.	500,000	500,000	1				
145	Washington, C.	Mich	1,000,000	40,000	25				
146	West Granite Mt., S.	Mon.	5,000,000	500,000	10	*			
147	Yuma, C. S. G	Ariz.	10,000,000	400,000	25				
148	Zelaya, G. S.	C. A.	600,000	300,000	2	*			

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid $275,000 in eleven dividends, and the Terra $75,000. Previous to the consolidation in Aug., 1884, the California had paid $31,320,000 in dividends, and the Con. Virginia, $240,0 , 00. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid $1,350,00 in dividends. ¶ 1,000,000.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES

NAME AND LOCATION OF COMPANY.	Feb. 21.		Feb. 24.		Feb. 25.		Feb. 26.		Feb. 27.		Feb. 28.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo	.57												500
Alice, Mont					1.25						1.20		200
Argenta, Nev	.13		.14										700
Aspen Mg, Colo							8.50	3.00					400
Belcher													
Belle Isle, Nev													
Bodie Cons., Cal													
Bos. & Mont., Mont	45.13						45.13						45
Breece, Colo	.46												300
Bulwer, Cal	.33												200
Caledonia, Dak			1.75		1.75		2.00						400
Calumet & Hecla	255⅛						253¾						25
Colorado Central													
Cons. Cal. & Va., Nev	4.95				4.95								220
Crown Point, Nev							1.95						400
Deadwood, Dak											1 50		50
Dunkin, Colo													
Eureka Con													
Father de Smet, Dak													
Franklin, Mich													
Freeland, Colo	.70	.54	.50				.55	.50	.68	.55	.66	.60	34,600
Gould & Curry, Nev			1.60		1 60		1.60						300
Hale & Norcross, Nev													
Holyoke, Id													
Homestake, Dak													
Horn-Silver, Ut	2.45	2.40	2.45	2 30					2.40		2.35		815
Iron Hill, Dak													
Kentuck, Nev													
Leadville C., Colo											.10		1,000
Little Chief, Colo							.32	.30	.35	.33	.30		1,200
Little Pittsburg, Colo													
Mono, Cal													
Mt. Diablo, Nev													
Navajo, Nev							.34						200
North Belle Isle, Nev													
North Star, Cal													
Ontario, Ut	40.00				40.00								300
Ophir, Nev													
Osceola, Mich													
Plutus, Colo													
Plymouth, Cal													
Quicksilver, Pref											36.00		50
Com					6.00								100
Robinson Cons. Colo													
Savage, Nev													
Sierra Nevada, Nev													
Silver Cord									.53	.50			1,000
Silver King	‡.20						.50	.45			.59		1,000
Silver Mg. of L. V													
Small Hopes, Colo	1.15		1.15						1 20				300
Standard, Cal													
Tamarack	163¾												30
Yellow Jacket							2.60						100

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb. 21.		Feb. 24.		Feb. 25.		Feb. 26.		Feb 27.		Feb. 28.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez, Mich													
Alta, Nev	1.30		1.35		1.40		1.40	1.35					600
Andes, Nev., Cal	.70												100
Amador, Cal													
American Flag, Colo													
Astoria, Cal			.04		.04		.04		.04		.08	.05	26,100
Barcelona, Nev							.38	.36					200
Bechtel, Cal													
Best & Belcher, Nev	2.55						3.05						200
Brunswick, Cal													
Bullion, Nev	.70		.85	.80	.85		85		.80				1,200
Eutte & Bost, Mont							14 13						100
Castle Creek, Id													
Cholla, Nev					2 70								200
Col. & Beaver, Id													
Commonw'th, Nev													
Comst'ck T., Nev	.18								.19		.16		1,300
" bonds					31 00								500
" scrip	32.00						32.00						400
Con. Imperial, Nev					.35								1,300
Del Monte, Nev			90				1.20						300
El Cristo, Rep. of Col			1 55	1.50	1.55	1.45	1.50		1.40		1.40	1.35	1,700
Excelsior, Cal											.75		100
Exchequer Nev	.65		.85										300
Julia, Nev	.28				.30				.35				800
Kingst'n & Pemb'ke													
Kossuth, Nev													
Lacrosse, Colo	.07		.07								.07		5,000
Lee Basin, Colo													
Mexican, Nev			3.90				3.30						200
Middle Bar, Cal													
Moulton, Mont	.30	.25											200
Mutual Sm. & M. Co	1.65		1.65		1.65		1.60		1.68		1.65		1,500
Nevada Queen, Nev			80										100
N. Com'nw'th, Nev			.95				1.20						300
Occidental, Nev	1.00		1.00										400
Oriental & Mil., Nev													
Overman, Nev													
Phœnix of Ariz	.85		.85	.78	.85	.80	.85	.83	.85	.78	.82	.78	12,000
Potosi, Nev							1.75						100
Rappahann'k, Va	.06	.05	.05										2,500
S. Sebastian, San S													
Scorpion, Nev													
Shoshone Idaho													
Silver Hill, Nev													
Silver Queen													
Stanislaus, Cal													
Sutro Tunnel, Nev													
" Trust Cert													
Sutter Creek, Cal	1.55	1 50	1.50	1.25	1.30	1.25	1 35	1.30	1.40	1.35	1.45	1 40	13,000
Tornado, Nev													
Union Cons., Nev													
Utah, Nev	.70		.75		.75						.75		1,300

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities ‡Assessment unpaid. Dividend shares sold, 45,335. Non-dividend shares sold, 72,550. Total, New York, 117,885.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Feb. 20.		Feb. 21.		Feb. 24.		Feb. 25.		Feb. 26.		Feb. 27.		SALES.
Atlantic, Mich					13.00				13.00		13.25		215
Bodie, Cal													
Bonanza Developm't	.85		.85		.85		.83		.83				600
Bost. & Mont., Mont	45.75	45.25	45 50	45.25	45.75	45 50	45.50	45.15	45 25	45 00	45.75	45 50	1,071
Breece, Colo	.50				.40		.45	.44	.45	.43			900
Calumet & Hecla, Mich	255		256		256	254	255		350		254		149
Catalpa, Colo	.16	.15	.16				.17		.18				1,500
Central, Mich													
Chrysolite, Colo													
Con. Cal. & Va., Nev													
Dunkin, Colo	.65		.65		.65	.60	.63						1,040
Enterprise													
Franklin, Mich	13.50		13.50		13.50		13.50		13.50				370
Hale & Norcross, Nev													
Honorine, Utah													
Little Chief													
Little Pittsburg, Colo													
Martin White, Nev													
Moulton													
Napa, Cal													
Ontario, Utah													
Osceola, Mich	27.13	27.00	27.00	26.00	27.00	26.63	26 50		26 50	25 50	26.25	24.00	645
Pewabic, Mich													
Quincy, Mich	71.00	70.00	70.00				70 00						111
Ridge, Mich							1.95						100
Sierra Nev., Nev													
Silver King, Ariz													
Standard, Cal													
Tamarack, Mich			163	161			160				156		112

NAME OF COMPANY.	Feb. 20.		Feb. 21.		Feb. 24.		Feb. 25.		Feb. 26.		Feb. 27.		SALES.
Allouez, Mich	1.85		2 50	2 38	2.50		2 50		2.50				1,670
Arnold, Mich	.20		.20										400
Aztec, Mich	.08				.07				.08				600
Bowman													
Butte & Bost., Mont	12.00	11.75	12.00	11.75	11.75	11 50	13.00	11.75	14.50	12 88	14.13	13.50	5,124
Centennial, Mich			25.00	24.50			25 00				26 00		132
Coms. Tunnel Scrip							30.00						300
Crescent, Colo			.08		.08								700
Dana													
Don Enrique, N. M.	35				.33		.35		.37				700
El Cristy, S. A													
Hanover, Mich													
Humboldt, Mich			.14		.12								200
Hungarian	.15												100
Huron, Mich			3.50				4.25		3.00		2.75		285
Kearsarge	9.63		9.75	9.63					9.63	9.50	9.75		755
Mesnard, Mich					.35				.40				200
National, Mich													
Orlen & Miller, Nev									.07				300
Phœnix, Ariz	.85												200
Pontiac, Mich							.20		.25				200
Rappahannock, Va													
Rockland													
Santa Fe, N. Mex	1.03	.98	1.04	1.00	1.15	1.03	1.10	1.05	1 20	1.05	1.00		7,726
Security, Colo													
Shoshone, Idaho													
South Side, Mich	.20		.20		.20				.23				500
Star													
Washington, Mich	.20		.18										200

Boston: Dividend shares sold, 6,813. Non-dividend shares sold, 20,272. Total Boston, 27,085.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	Feb. 21.		Feb. 24.		Feb. 25.		Feb. 26.		Feb. 27.		Feb. 28.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal														
Cambria Iron														
Cameron Coal & Iron Co				4¼										100
Ches. & O. RR	100													
Chic. & Ind. Coal RR	100													
Do. pref	100													
Col. & Hocking Coal	100					16		16						300
Col., C. & I	100	47½	45¼	45⅜	43	45⅞	44⅝	45¼	44½	45½	44½	44½	42¼	25,085
Consolidation Coal	100													
Del. & H. C	100			150½	150½			149				148¾		1,709
D., L. & W. RR	50	136⅝	135⅛	135¾	135	136⅜	135⅝	136	135⅝	135⅞	135¼	135½	134⅝	92,776
Hocking Valley	100							20¼	19¼	20¼		20		1,510
Hunt. & Broad Top														
Do. pref		44½	44¼	44⅜	44¼					44¼				686
Illinois Coal & Coke Co		30	29½	29⅞	29½	30	29¾	29¾	29⅝	30	29⅝	30¼	30	3,700
Lehigh C. & N	50	52⅛		52		52⅛	52	52⅛	52	52⅛	52			1,199
Lehigh Valley RR	50	52¾	52⅝	52¾	52⅝	52¾	52⅝	52¾		52¾	52⅝			1,604
Marshall Con. Coal	100													
Mahoning Coal	100													
Do. pref														
Maryland Coal	100													
Morris & Essex	100													
New Central Coal	50													
N. J. C. R. R	100	123	121	121	120¾	121¾	121	120½	120¼	120		120	119¾	5,931
N. Y. & S. Coal	100													
N. Y., Susq. & Western	100			7½	7¼			7		7¼	6⅞	7		1,505
Do. pref	100	29½								28½	27	28	27	420
N. Y. & Perry C. & I	100													
Norfolk & Western R.R.	50	20		20										300
Do. pref	50	62		61⅛				61	60⅝	61⅛		61⅝		780
Penn. Coal	50							300						
Penn. RR	50	54¾	54⅜	54⅝	54⅜	54⅝	54½	54⅝	54⅝	54¾	54½			5,503
*Ph. & R. RR		40⅝	39¾	40½	39	40⅜	40	40⅛	39½	39⅞	38¾	39⅝	39	143,188
Sunday Creek Coal														
Do. pref	100													
Tennessee C. & I. Co		73	65	70	51	61¼	55	60	58¼	60	57½	58½	54	59,750
Do. pref		108	100	102½	101½	102				108	100	101		1,960
Westmoreland Coal														

**Sales in New York, 113,570; in Philadelphia, 29,618. Total sales 143,188.

San Francisco Mining Stock Quotations.

COMPANY	CLOSING QUOTATIONS. Feb. 21.	Feb. 22	Feb. 24.	Feb. 25.	Feb. 26.	Feb. 27.
Alpha						
Alta	1.25		1.30	1.30	1.25	1.25
Belcher						
Belle Isle	.25			.30		
Best & Bel	3.00		3.00	3.10	2.85	2.90
Bodie				.65		
Bulwer				.25		
Chollar	2.45		2.60	2.50	2.45	2.45
C'm'weal'h	3.80		3 90	3.80	4.00	4.10
Con. C. & V	4.75		4.65	4.60	4.55	
Con. Pac.						
Crown Pt	1.70		2.00	1.75	1.80	1.80
Eureka C	4.00					
Gould & C	1.55		1.50	1.45		1.45
Grd. Prize						
Hale & N	2.55		2.80	2.85	2 75	
M. White						
Mexican	3.90		3.75	3.45	3.35	3 35
Mono				.40		
Mt. Diablo						
Navajo			.25		.30	.35
Nev. Queen	.80			.85		
N. Belle I	1.10		1.15		1.05	1.15
Occidental						
Ophir	4.45		4.45	4 45	4.10	4.15
Potosi	1 60		1.80	1.70	1.65	1.65
Savage	1.70		1.70	1.65	1.60	1.65
Sierra Nev	2.60		2.45		2.20	2.30
Union Con.	2.80		2.75	2.40	2.50	2 40
Utah	.70		.65	.70	65	.65
Yellow Jkt.	2.20		2.40	2.40	2.30	

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L. H.	Asked. L. H.
Atlantic Coal	1 00	1.50
Balt. & N. C.	.05	.12@.20
Big Vein Coal		
Conrad Hill	.05	.10
Cons. Coal	23½	.25@.26
Diamond Tunnel	23½	.25@.26
George's Crk. C		1.12
Lake Chrome	.20	.25
Maryland & Charlotte		.05
North State (Balt.)	.05	
Ore Knob	.10@.13	.15@.18
Silver Valley	.60	.80

Prices bid and asked, lowest and highest, during the week ending Feb. 28th.

Birmingham, Ala.

COMPANY.	Bid. L. H.	Asked. L. H.
Ala. R. Mill Co.	$100	$60
*Alice Furnace.	$104½	
Anna Howe G. Mg. Co.	¾	
Bessmer Land.	$26½	$33⅝@$35
Bir. Mg.& M'g.	$80	
Cababa Coal Mg. Co.	$60	$65
Camille Gold Mg. Co.	$⅛	$1⅛
De Bardeleben C. & I. Co.	$65	$80
Decat. L. Imp.	$105⅛@$10¾	$11¼
DecaturMin.L.	$21	$23
Ensley Land	$14	$15
*Eureka	$120	$125
Florence L. & Mg. Co.	$20	$24
Gadsen Land.	$53⅝@$53¾	$54½@$6
Hecla Coal Co.	$30	
Hen. S. & M.Co	$95	$96
Mag-Ellen	$100	
Mary Lee C. & R. Co.	$36	
Sheffield C. & I. Co.	$65@$68½	$71@$72½
Sloss I. & S.		$61½
†Sloss I. & S.	$95¼	
††Sloss I. & S.	$78¾	
Tuscaloose C. I. & L. Co	$21	
Tenn.C. & I. Co.	$59	
" pref.		
Woodstock I.Co.	$57	$58½

Prices, highest and lowest, bid and asked during week ending Feb. 26st, 1890.

* Bonds. † First mortgage. †† Second mortgage.

Kansas City, Mo. Feb. 24.

COMPANY.	Par value.	Bid.	Asked.
Ben Harrison	$25.00		$35.00
Burch, L. & Z., Mo.	1	.20	.30
Express Group		.75	1 00
Hillsboro Gold			
Farmers' Coal Co		50.00	75.00
Ida Hill, S., N. Mex	100		100
Kansas City L. & Z.		.60	
Kan. City M. & M. Co.		2.60	3.00
K. C., Colo.			
Kentuck, Z., Mo.	1		
La Motte, Mo.	100		100.00
Leona			125
Maverick, S., Colo.	10		1.00
Minnequa Zinc		.25	.45
Quartz Mt.		.67	
Ruby Silver		1.12	1.25
Sonora, G. & S., Mex.	10		1.00
Standard, S. S., Colo.			
Silver Monument			3.00
Templar, N. Mex.	1		1.00
The Sylph			2.50
Webb City, L. Z., Mo.	5	5.65	
Wichita, L. Z., Kan.	100		.40

Pittsburg, Pa.

COMPANY.	H.	L.	Closing
Allegheny Gas Co.	$41.00	$40.00	$41.00
Bridgewater Gas Co.	40.00		40.00
Chartiers Val. Gas	*41.00		*41.00
Columbia Oil Co.			
Consolidated Gas Co.	38.00		38.00
East End Gas Co	60.00		60.00
Forest Oil			
Hazlewood Oil Co.	51.00	50.00	51.00
La Noria Mining	*.13	*.13	*.13
Luster Mg. Co.	*21.00	*20.00	20.25
Manuf'turers Gas Co.	25 00	20.00	20.00
Nat. Gas Co. of W. Va	76.00		70.00
N. Y. & Clev. Gas Coal	34 00	31.00	31.00
Ohio Valley Gas			
Pennsylvania Gas	*13.50		15.00
People's N. G. & P. Co.	*15.50		15.50
Philadelphia Co.	*33.50	*32.13	32.25
Pine Run Gas Co.	77.00		
Pittsburg Gas			
Silverton Mg. Co.	1.25		
South Side Gas.			
Tuna Oil Co.	68.00		68.00
Union Gas			
Washington Oil Co.			
W'house Brake Co.	60.00	55.00	60.25
W'house A. B. Co.	110.50	108.50	110.50
W'house E.Light	*45.00		46.00
W'moreland & Camb.	21.00	19.75	20.00
Wheeling Gas	21.00	18.00	18.50
Yankee Girl Mg.	3.00	2.50	3.00

* Actual selling price.

Prices highest, lowest and closing during the week ending Feb. 27th.

Sales during the week ending Feb. 27, 1890:

Chartiers Gas	20 shs.	@$41.00
La Noria Mg. Co.	100 "	@.13
Luster Mg. Co	70 "	$20.00@$21.00
Pennsylvania Gas	10 "	@$13.50
People's N. G. & P.	151 "	@$15.50
Philadelphia Co.	636 "	$32.13@$33.50
W'house Electric.	50 "	@$48.00

Sales at the New York Stock Exchange week ending Feb. 28:

	Sales.	Price H.	Price L.
*American Cotton Oil	27,460	27¼	24
National Lead	31,660	17⅝	16⅛
Sugar	116,229	67¼	61⅛

*Trust receipts.

St. Louis. Feb. 26.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo.	$ .67½	$ .70
American & Nettie	.95	1.05
Anderson		
Aztec, N. Mex.	.23¾	.25
Bi-Metallic	28.50	29.50
Black Oak, Cal.	.01	.01½
Black Spar		
Bremen	.01	.02¼
Buckskin	.05	
Carriboo, Idaho		
Central Silver	.21¼	.23¾
Cleveland, Colo.	.03	.05
Cleveland, Idaho	.30	
Cœur d'Alene		
Dinero, Colo.		
Golden Era, Mont.	.02½	.03
Golden King	.10½	.15
Gold Run	.01	.02
Granite Mountain, Mont.	45.00	45.25
Hope, Mont.	2.15	
Ingram	.40	.65
Iron Clad		
Ivanhoe, Colo.		
I. X. L., Colo.	.06	.07½
Keystone		.04
La Union	.20	.22½
Little Giant		
Major Budd, Mont.	.17½	.18¾
Mexican Imp., Mex.		.15
Michael Breen	.67½	.70
Montrose Placer, Colo.		.45
Mountain Key	.61¼	.65
Mountain Lion	.07½	.08½
Neath, Colo.	.06	.07
Old Colony		
Old Jesuit		
Pat Murphy, Colo.	.05	.06
Pedro	.03	.03½
Phillips, Colo.		
Pine Grove, Idaho	.04½	.05
Queen of the West, Idaho		
Raspberry, Mont.	.04	
San Francisco, Mont.	.02½	.03
Silver Age, Colo.	1.00	
Silver Bell		
Small Hopes, Colo.	1.07½	1.17½
Tourtelotte, Colo.	.07½	.08
West Granite, Mont.		
Wire Patch		
Yuma, Ariz.	.50	.53¾

Trust Stocks. Feb. 28.

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

CERTIFICATES.

American Cotton Oil, old	$35	@$
*American Cotton Oil, new	26	@ 26½
Cattle Trust		@ 15
Distillers' & Cattle Feeders'	38	@ 38½
Linseed Oil	44¼	@
National Lead	17	@ 17⅛
Natural Gas	125	@130
Standard Oil	168	@170
Sugar Refineries	61	@ 61¼

*These are the American Cotton Oil Central Trust Co.'s receipts and are known as new, and represent the old certificates which have been deposited in the Central Trust Co. in furtherance of the reorganization plan—from a trust to a corporation.

Foreign Quotations.

London.

COMPANY.	Highest.	Lowest.
Almada, Mex.	1s 6d.	1s.
Amador, Cal.	£1⅛	£⅞
Appalachian, N. C.	1s 3d.	9s.
Canadian Pbos. Canada.	£⅜	£⅛
Carlisle, N. Mex	3s 6d.	2s. 6d.
Colorado, Colo.	4s.	3s.
Comstock, Utah		
Condova		
Cons. Esmeralda, Nev.	4s.	3s. 6d.
Denver Gold, Colo.	1s.	6d.
Dickens Custer, Idaho.	3s. 3d.	2s. 9d.
East Arevalo, Idaho.	2s.	2s.
Eberhardt, Nev		
El Callao, Venezuela		
Elmore, Idaho	4s.	3s. 6d.
Empire, Mont		6d.
Garfield, Nev.	5s.	4s.
Jay Hawk Mont	4s.	3s. 6d.
Josephine, Cal	4s. 6d.	3s. 6d.
Kobinoor, Colo.	2s. 3d.	1s. 9d.
La Luz, Mex.	1s. 6d.	1s.
La Trinidad, Mex.		
La Valera, Mexico	1½s.	1s.
Montana Lt., Mont	£1⅛	£1 3-16
New California, Colo.	10s.	9s.
New Consolidated	1s.	6d.
New Eberhardt, Nev.	1s.	6d.
New Emma, S., Utah	2s. 9d.	2s. 3d.
New Flagstaff, Utah	2s. 3d.	1s. 9d.
Newfoundland, N. F.	3s.	2s.
N. Gold Hill, N. C.	1s. 3d.	9d.
New Hoover Hill, N. C.	1s. 6d.	1s.
Old Lout, Colo.	£1	£⅞
Palmarejo, Mex	18s.	17s.
Pinos Altos, Mex	15s.	14s.
Pittsburg Orig., Cal		
Pittsburg Cons.. Nev.	2s.	1s.
Plumas Eureka, Cal.		
Quebrada, Venezuela.		
Richmond Con., Nev.	1¾s.	1½s.
Ruby&Dunderberg, Nev	9d.	3d.
Sam Christan, N. C.	2s. 3d.	1s. 9d.
Sierra Buttes. Cal.	5s. 6d.	4s. 6d.
So. Plumas Eur.	1¼s.	1s.
Sonora, Mex.	1s.	6d.
Stanly, N. C	5s.	4s.
United Mexican, Mex.	10s.	7s. 6d.
U. S. Placer, Colo.	4s. 3d.	3s. 9d.
Viola Lt., Idaho	2s. 3d.	1s. 9d.

Highest and lowest prices during the week ending Feb. 15th.

Paris. Feb. 13.

	Francs.	Francs.
Belmez, Spain	550.00	550.00
Callao, Venez.	79 00	79.00
Callao Bis, Venez	4.00	4.00
East Oregon, Ore.	13.00	13.00
Forest Hill Divide, Cal.	200.00	200 00
Golden River, Cal	400.00	400.00
" " parts	65,00	65 00
Lexington, Mont.	140.00	140.00
" parts	4.25	4.25
Ouray, Colo.	10.00	10.00
Rio Tinto, Spain	428.75	428 75
Tharsis, Spain	131 25	131.25

Highest and lowest prices during the week ending Feb. 13th.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18°, ℔ 100 lbs. 1.00@1.50
Muriatic, 20°, ℔ 100 lbs. 1.12½@1.75
Muriatic, 22° ℔ 100 lbs. 1.37½@2.00
Nitric, 36°, ℔ 100 lbs. 4.00@4.25
Nitric, 42°, ℔ 100 lbs. 6.00@6.25
Oxalic, ℔ 100 lbs. .6.50@10.50
Sulphuric, 60°, ℔ 100 lbs. 80@1.25
Sulphuric, 66°, ℔ 100 lbs. 1.00@1.75

Alkali—
Refined, 48 p. c 1.50@1.55
Refined, 58° 1.40@1.45

Alum—Lump, ℔ lb. 1¾
Ground, ℔ lb. 1¾@2
Lump, ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton £4 10

Aqua Ammonia—18°, ℔ lb. 4¾
20°, ℔ lb. 6
22°, ℔ lb. 6@7
26°, ℔ lb. 10@11

Ammonia—Sul., ℔ 100 lbs. 3.15
Carb., per lb. 7½@8½

Arsenic—White, powdered, ℔ lb. 3¼@3½
Red, ℔ lb 5¾@6¾
White, at Plymouth, ℔ ton £12 2 6d.

Asbestos—Am., p. ton $50@$300
Italian, p. ton, c. i. f. L'pool £18@£60

Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb. 4½@5½c
Hard Cuban, ℔ ton $28.00
Trinidad, refined, ℔ ton $30.00

Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, p. ton 19½@21.50
Sulph., off color, p. ton 11.50@14.00
Carb., lump, f.o.b. L'pool, ton £6
No. 1, casks, Runcorn " £4 10 0
No 2, bags, Runcorn " 3 15 0

Bleach—Over 35 p.c., ℔ lb. 1.70@1.75

Borax—Refined, ℔ lb. 9½@9¾c
Concentrated 7¾@8⅜
Refined at Liverpool, ℔ ton £29

Brimstone—*See Sulphur.*

Bromine—℔ lb. 37@38

Chalk—℔ ton. 1.75
Precipitated, ℔ lb. 4¾@5

China Clay—English, ℔ ton 13.50@18.50
Southern, ℔ ton 13.50

Chrome Yellow—℔ lb. 10@25

Cobalt—Oxide, ℔ lb. 2.60@2.90

Copper—Sulph. English Wks, ton £20@£21

Copperas—Common, ℔ 100 lbs. 70
Best, ℔ 100 lbs. 75@1.00
Liverpool, ℔ ton, in casks £1 15s.

Cream of Tartar—Am. 99% 22½
Powdered, 99 p. c. 23

Emery—Grain, ℔ lb. 4½@5
Flour, ℔ lb 2¾@3½

Feldspar—Ground, ℔ ton. 15.00

Fuller's Earth—Lump, ℔ bbl. .90@95
Powdered, ℔ lb. 1⅝@2

Gypsum—Calcined, ℔ bbl. 1.25@1.50

Iodine—Resublimed 2.75

Kainit—℔ ton 10.00

Kaolin—*See China Clay.*

Lead—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb. 6¾@7¼
White, English, ℔ lb 8½@8¾
Acetate, or sugar of, white 15@13

Lime Acetate—Amer. Brown. .95@1.00
" Gray 1.75@1.87½

Litharge—Powdered, ℔ lb. 6½@6¾
English flake, ℔ lb. 5@9½

Magnesite—Greek, ℔ ton 20.00

Manganese—Crude, per unit 23@.28
Oxide, ground, per lb. 2½@6½

Mercuric-Chloride—(*Corrosive Sublimate*), ℔ lb. 70@72

Mineral Wool,—℔ lb. 2

Mica—In sheets according to size, 1st quality, ℔ lb. .25@$6.00

Ochre—Yellow, "B. F.," ℔ ton, f.o.b. mill 30.00
"J. F. L. S.," ℔ lb. ex dock 2½

Phosphate Rock—S. Carolina, per ton f. o. b. Charleston 5.75@7.00
Ground, ex vessel New York. 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton 16.00

Phosphorus—℔ lb. 70@75

Plumbago—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7

Potassium—Cyanide, ℔ lb. 39@40
Bromide, ℔ lb. 33
Chlorate, ℔ lb. 13@10
Carb. ℔ lb. 4.70@5.54
Caustic, ℔ lb. 7½@8
Iodide .2.65@2.70
Muriate, ℔ 100 lbs. 1.80
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb 10½@11
Sulphate, ℔ 100 lbs. 2.30@2 35
Yellow Prussiate, ℔ lb. 17½@18
Red Prussiate, ℔ lb. 42@45

Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered, pure, ℔ lb. 2¼@2½

Pyrites—Non-cupreous, p. units 10d

Quartz—Ground, ℔ ton. 14.00@16.00

Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb. 6@10

Salt—Liverpool, ground ℔ sack. 75@80
Turk's Island, ℔ bush .25@28

Salt Cake—℔ lb. 60@62½

Saltpeter—Crude, ℔ lb. 5¼@5½
Refined, ℔ lb. 6@8

Soda Ash—Carb., 48 % 100 ℔. 1.45
Caustic, 48 % 1.30
Soda Caustic, 60% 2.50
" " 70% 2.27½@2.35
" " 74-6% 2.27½@2 35

Sal, English, ℔ 100 lbs. 1.00
Sal, American, ℔ 100 lbs .90
Nitrate, 100 lbs. 1.90@1.95

Strontium—Nitrate ℔ lb. 9@9¾

Sulphur—Roll, ℔ lb. 1¾
Flour, ℔ lb 2
Crude Brimstone, 2s., ℔ ton. 19.50
Crude Brimstone, 3ds, ℔ ton. 19.00

Talc—Ground French, ℔ lb. 1¼@1½
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5

Vermillion—American, ℔ lb. 61
English, ℔ lb. 82@85

Vitriol—(Blue), Ordinary, ℔ lb. 5½@5¾
Extra, ℔ lb. 7

Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb. 6½@7
* Spot.

THE RARER METALS.

Aluminum—(Metallic), ℔ lb. $2.@$2.50
Sheet, per lb. 2.50

Arsenic—(Metallic), per lb. .40

Barium—(Metallic), per gram $4.00

Bismuth—(Metallic), per lb. 2.75

Cadmium—(Metallic), per lb. 1.00

Calcium—(Metallic), per gram 10.00

Cerium—(Metallic), per gram. 7.50

Chromium—(Metallic), per gram 1.00

Cobalt—(Metallic), per lb. 6.00

Didymium—(Metallic), per gram 9.00

Erbium—(Metallic), per gram. 7.50

Gallium—(Metallic), per gram 140.00

Glucinum—(Metallic) per gram. 12.00

Indium—(Metallic), per gram. 9.00

Iridium—(Metallic), per oz. 7.00

Lanthanum—(Metallic), per gr. 10.00

Lithium—(Metallic), per gram. 10.00

Magnesium—Per lb. 4.50

Manganese—Metallic, per lb. 1.10
Chem. pure, per oz. 10.00

Molybdenum—(Metallic), per gm. .50

Niobium—(Metallic), per gram. 5.00

Osmium—(Metallic), per oz 65.00

Palladium—(Metallic), per oz. 35.00

Platinum—(Metallic), per oz. 9.00

Potassium—Metallic, per lb. 28.00

Rhodium—(Metallic), per gram. 5.00

Ruthenium—(Metallic), per gm. 5.50

Rubidium—(Metallic), per gram 2.00

Selenium—(Metallic), per oz. 1.80

Sodium—(Metallic) per lb. 2.50

Strontium (Metallic), per gm. .60

Tantalium—(Metallic) per gram 9.00

Telurium—(Metallic) per lb. 5.00

Thallium—(Metallic) per gram. .25

Titanium—(Metallic) per gram. 2.25

Thorium—(Metallic) per gram. 17.00

Tungsten—(Metallic) per oz. 2.25

Uranium—(Metallic), per lb. 5.00

Vanadium—(Metallic), per gm. 22.00

Yttrium—(Metallic), per gram. 9.00

Zirconium—(Metallic), per oz. 65.00

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000 3.25@3.50
Jerseys, ℔ 1,000 5.50@6 50
Up Rivers, ℔ 1000 6 00@6.50
Haverstraw seconds, ℔ 1000 6.25@6.50
Haverstraw firsts, ℔ 1.000 6.50@7.00
Fronts, nominal, ℔ 1000.
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore

Building Stone—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu.ft. 45@1.25
Granite, Scotch ℔ cu. ft. 1.00@1.15

Cement—Rosendale, ℔ bbl .85@1.10
Portland, American, ℔ bbl. 2 15@2.45
Portland, foreign, ℔ bbl. 2.30@2.40
Portland, " special brands. 2.45@2.75
Roman, ℔ bbl. 2.65@2.85
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.00@8.25

Slate—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black, roofing, ℔ 100 sq. ft. 4.25@5.50

Lime—Rockland, common ℔ bbl. 1.00
Rockland, finishing, ℔ bbl. 1.20
St. John, com. and finish, ℔ bbl. .90@.95
Glens Falls, com. and fin., ℔ bbl .85@1.10

Labor—Ordinary, ℔ day 1.50@2.00
Masons, ℔ day 4.00
Plasterers, ℔ day 4.00
Carpenters, ℔ day 3.50
Plumbers, ℔ day 3.50
Painters, ℔ day 2.50@3.50
Stonesetters, ℔ day 3.50@4.00
Tilelayers, ℔ day 3.50@4.50
Bricklayers, ℔ day 4.00

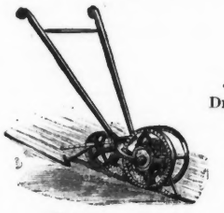
THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.

NEW YORK PRICES CURRENT. MARCH 1, 1890.

Discounts are for Export Only.

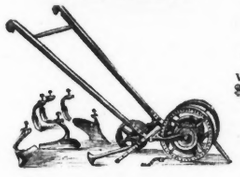
In the interest of the extension of the markets for American manufactures the ENGINEERING AND MINING JOURNAL has secured the services of gentlemen thoroughly acquainted with the export trade and with foreign markets, and it offers its services to foreign buyers who may desire information concerning any 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.

Agricultural Implements.



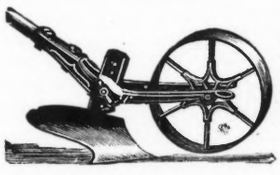
"Planet, Jr." No. 2 Seed Drill, $9.

Dis. 30%.



Combined Drill Cultivator Rake, Plow, etc., $12.

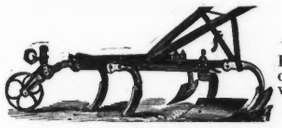
Dis. 30%.



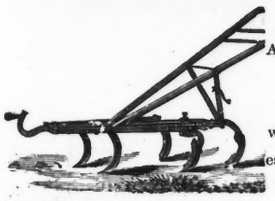
"Fire Fly" single-wheel Hoe, Cultivator and Plow, $5.

"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. less.

HAY FORKS.

Gold Finish, Patent Overcaps.

Three Tine Forks.

No.	Tine.	Handles.	Per doz.
30	10 in.	4½ ft.	Boy's $7.75
32	12 "	4 to 6 ft.	..... 9.00
32 S	12 "	"	Strapped.... 10.50
32 B	12 "	"	Bent..... 9.50
32 B S	12 "	"	Bent & St'pd 11.00
33	12 "	"	..... 9.50
33 S	13 "	"	Strapped.... 11.00
33 B	13 "	"	Bent..... 10 00
33 B S	13 "	"	Bent & St'pd 11.50
34	14 "	"	..... 10.25
34 B	14 "	"	Bent..... 10.75
35	15 "	"	..... 11.25
35 B	15 "	"	Bent..... 11.75
42 B	12 "	"	Bent..... 12.50
42 B S	12 "	"	Bent & St'pd 14.00

Manure Forks, Solid Steel Shanks, Gold Bronze Finish, Patent Overcaps.

No. 44, oval, 4 tine, 12 in. tine, 4 ft. handle, plain ferrules, $12.50 per doz.

No. 44 S, oval, 4 tine, 12 in. tine, 4 ft. handle, strapped ferrules, $14.

No. 44½, oval, 4 tine, 12 in. tine, 4½ ft. handle, plain ferrules, $12.50.

No. 44½ S, oval, 4 tine, 12 ft. tine, 4½ ft. handle, strapped ferrules, $14.

No. 54, oval, 5 tine, 13 in. tine, 4 ft. handle, plain ferrules, $19.50.

No. 54 S, oval, 5 tine, 13 in. tine, 4 ft. handle, strapped ferrules, $21.

No 64, oval, 6 tine, 13 in. tine, 4. ft. handle, plain ferrules, $22.50.

No. 64 S, oval, 6 tine 13 in. tine, 4 ft. handle, strapped ferrules, $24.

HOES.

Ely Standard Socket, all Gold Bronze Neck, full Pol'd, C. S. Blade.

Field, 7 × 5 in., selected handles	$9.00
" 7½ × 4½ " " "	9.00
" 8 × 4¾ " " "	9.00
" 8½ × 4½ " " "	9.00
" 8 × 5 " " "	9.00
Washington County Pattern, spring handles	10.00
Rhode Island, 7 to 9 in., spr'g handles	9.00
" " 9½ in. " "	9.25
" " 10 " "	9.50
Meadow, 9 × 4 in., poplar handles	9.00
Meadow, 9½ × 3½ in., poplar handles	9.25
Meadow, 10 × 3½ in., poplar handles	9.50
Broom Corn, 7½ × 4½ in., poplar handles	9.00

Popular Handles in Meadow Socket Hoes, unless otherwise ordered.

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

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%.

RAKES.

The S. R. Nye Improved.

22 Teeth Rake, $32.00
26 " " 34.00

25% dis.

Chieftain Hay Rake Co.

Chieftain Lock Lever

No. 1	$30.00
No. 2	30.00
No. 5	29.00

Iron wheels, $2 extra. With Pole, Douhle Tree and Neck Yoke, $2 extra. 22 cubic feet packed, 400 lbs. gro., 225 lbs. net.

Golden Farmer Self-Dumping Rake, $37.00; 22 cu. ft., 430 lbs. gro., 250 lbs. net.

Chieftain Hay Tedders, $59.00; 700 lbs. gro., 450 lbs. net.

Potato Diggers, $7.00; 100 lbs. gro., 60 lbs. net; dis., 40% f.o.b. ship New York or Boston.

RAKES (GARDEN).

Braced steel garden rakes. Per doz

8 teeth	$8.00
10 "	9.00
12 "	10.00
14 "	11.00
16 "	12.00

Braced malleable garden rakes.

10 teeth	$5.50
12 "	6.00
14 "	6.50
16 "	7.00

Ten-Teeth Malleable Garden.	Plain.	Braced.	Steel Garden. Plain.	Braced.
10-Teeth	$5.50	$6.00	$9.00	$10.50
12 "	6.00	6.50	10.00	11.50
14 "	6.50	7.00	11.00	12.50
16 "	7.00	7.50	12.00	13.50

Dis. 70 and 5%.

Cast steel garden rakes.

	Per doz.
10 teeth, polished, tapering bar, tempered rake	$9.00
12 " " " " " "	10.00
14 " " " " " "	11.00
16 " " " " " "	12.00

Cast steel lawn rakes.

12 teeth, polished, tapering bar, tempered rake	$10.00
14 teeth polished tapering bar, tempered rake	11.00
16 teeth polished tapering bar, tempered rake	12.00
18 teeth polished tapering bar, tempered rake	13.00

Dis. 70% from Standard Association list.

Prices made where XX handles, etc., are required.

SCYTHES (GRASS).

Waldron's pattern, oiled	$8.50
Silver steel, painted	8.50
Western dutchman, bronzed and painted	9.00
Clipper, polished web	9.00
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
Clover, oiled	11.25
Clipper, bronzed and painted	11.50

Lawn Scythes.

Clipper, bronzed and painted	9.00

Dis., 40 and 10%.

SOWER, BROADCAST SEED.

Goodell & Co.

Per dozen..... $36 f.o.b.

Gross wt., 110 pounds per dozen

Net wt., 75 pounds per dozen.

Anvils.

"Eagle" anvils.

	Weight about				Weight about	
No. 000	½ lb.	$1.00		No. 4	40 lbs.	$4.25
" 00	4 "	1.70		" 5	50 "	5.05
" 0	10 "	2.20		" 6	60 "	5.50
" 1	15 "	2.75		" 7	70 "	6.00
" 2	20 "	3.00		" 8	80 "	7.00
" 3	30 "	3.75		" 9	90 "	8.00

Anvils weighing 100 to 800 lbs., 10 cts. per lb. Discount 20 and 10 %.

Arms and Ammunition.

Wood Powder.
American Wood Powder Company.

	¼ kegs. Kegs, 25 lbs.	6¼ lbs.	1 lb. cans.
Trap for first quality arms only	$19.50	5.00	.85
A, for large bore. C, for general use. D, fine for small bore and rifles. E, very fine for small bore rifles and gallery shooting	17.00	4.35	.75

	Discount. Per cent.	
Bullet Breech Caps.....per lb.	1.60	10
Conical Bullet Caps..... "	1.75	10

	Discount. Per cent.	
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
Lefaucheux Cartridges		60

	Special	
Gatling Cartridges		
Primed Shells and Bullets	25	10
Friction Cannon Primers	20	10
Primers		10
Percussion Caps, F. C .....per M.	33c.	
U. M. C. "	42½c.	
Musket. "	45c.	
Brass Shot Shells, U. M. C., 1st qual	60	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, 33⅓, 10 and 10 per cent.
Gun Wads, 20 and 5 per cent.

RIFLES.

Colts' Lightning Magazine.

	Discount 10 per cent		
40/60 and 45/60 calibre octagon barrel	10	lbs.	$15.38
" " " " round	"	... 9¾ "	14.25
" " " " carbine	"	... 9 "	14.25
32, 38, and 44 calibres, octagon	"	... 7¼ "	13.50
" " " " round	"	... 6¾ "	12.38
" " " " carbine	"	... 6¼ "	12.38
" " " " baby carbine	"	... 5¼ "	12.38
22 calibre, rim fire, octagon barrel			15.38
" " " round			14.25

Remington Light (Baby) carbines, 44 cal., nick., $7.50.

MARLIN RIFLE. MODEL, 1889.

The best in the market, embodying all latest improvements.

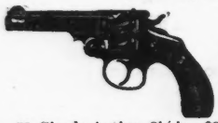
38 and 44 calibres, using the same cartridges as Winchester rifles of the respective sizes.

etagon barrel,	24	inch,	6¼	lbs	$19.50
"	"	26	"	6¾	"	21.50
"	"	28	"	7	"	23.50
Round	"	24	"	6½	"	18.50
Carbine		20	"	5½	"	17.50

Discount, 25, 10 and 10%.

REVOLVERS.

Smith & Weston



32, Single Action, 3, 3½ in., $8.00.

32, Double Action, 3, 3½ in., $9.35.

32, Safety Hammerless, 3, 3½ in., $11.00.

38, Single Action, 3¼ in., $9.40; 38, Single Action, 4 in., $9.65; 38, Single Action, 5 in., $10.00; 38, Double Action, 3¼ in., $10.40; 38, Double Action, 4 in., $10.65; 38, Double Action, 5 in., $11.00; 38, Safety Hammerless, 3¼ in., $12.00; 38, Safety Hammerless, 4 in., $12.25; 38, Safety Hammerless, 5 in., $12.50; 44, Single Action, 4 in., $11.50; 44, Single Action, 5 in., $11.75; 44, Single Action, 6, 6½ in., $12.00; 44, Double Action, 4 in., $12.50; 44, Double Action, 5 in., $12.75; 44, Double Action, 6½ In., $13.00; 44, Double Action Favorite, 5 in., $12.75.

Colts.

Discount, 10 per cent from following prices.

Double Action Army, 44 and 45 calibre, 4¾, 5½, 7½ nch bbl., $13.00.

Double Action, 41 calibre, 2½ to 6 inch bbl., $11.20.

" " 38 " 2½ to 6 " " $10.00.

Single " Army, 45 calibre, 4¾, 5½, and 7½ inch bbl., $12.00.

Single Action Army, 44 calibre. "Frontier," 4¾, 5½, and 7½ ineh bbl., $12.00.

New Line, 41 calibre, blued or nickeled, $4.00.

" " 32 " " " 4.00.

" " 30 " " " 2.00.

" " 22 " half or full plate, 2.10.

Old Model, 22 calibre, by the hundred, half or full plate, $1.50.

Colt Deringer, 41 calibre, per pair half or full plate, $5.50.

American Bull Dog

Double Action 32, 38 and 44 calibre, 2½ inch barrel, $1.60; Double Action 32, 38 and 44 calibre, 4½ ineb barrel, $1.85; Double Action 32, 38 and 44 calibre, 6 inch barrel, $2.10.

F. & W. British Bull Dog revolvers, 32 and 38 calibre 2½ ineb bbl., $1.80.

F. & W. Automatic revolver, 32 and 38 calibre, 3¼ inch bbl . $5.50.

H. & R. Automatic revolver, 32 and 38 calibre, 3¼ inch bbl., $4.75.

Defender revolvers, Single Action, 22, wood handle, 65.

" " " " 22, rubber " 70.

" " " " 32, wood " 85.

" " " " 32, rubber " 90.

Remington Army revolver, Single Action, 44 cal., frontier cartridge, 5¾ inch barrel, $6.50.

Remington Army revolver, Single Action, 44 cal., frontier cartridge, 7½ ineb barrel, $6.00.

Remin gton Double Deringers, 41 cal., rim fire, $4.05.

National Deringers, 41 calibre, per pair, half or ful plate, $4.00.

New House, 41 or 38 calibre, blued or nickeled, $5.00.

" Police, 38 calibre, 6 in., " " 7.00.

" " 38 " 4½ in., " " 7.00.

Assay Furnace.

Hydro-Carbon Blow-Pipe Assay Furnace.

No. 2, Muffle Furnace taking C Battersea Muffle 8x4¾x3 in. $10.00

No. 3, taking F Muffle, 10x6x4 in. 15.00

No. 1, Crucible Furnace, taking Battersea, U or Colorado B Crucible, 4 in. dia. 5½ deep.. 4.00

No. 2, taking Battersea E, round, 5 in. dia., 6½ deep 5.00

Blow-Pipe No. 1, with half gallon tank, made of plain, strong sheet metal 18.00

Blow-Pipe No. 2, with half gallon tank, made entirely of seamless brass 23.00

Blow-Pipe No. 3, with one gallon tank, otherwise same as No. 2 ..... 26.00

Blow-Pipe No. 1, Muffle Furnace No. 2, and Crucible Furnace No. 1 ..... 32.00

Blow-Pipe No. 2, Muffle Furnace No. 2, and Crucible Furnace No. 1 ..... 37.00

Axes, etc.

Hatchets, Broad Single Bevel.

Collins', cut in., 5, $9.50; 5½, $10.00; 6, $10.50; 6½, $11.00; 7½, $11.50; dis. 10%.

Peck's, cut in., 4, $10.50; 4½, $11.50; 5, $13.00; 5½, $14.50; 6, $16.50; 6½, $18.00; 7½, $19.50; 8¼, $22.00; dis. 45%.

Ryder's, cut in., 5, $13.00; 5½, $14.50; 6, $16.50; 6½, $18.00; 7½, $19.50; dis. 50%.

Sbingling Hatchets.

1. 2. 3.

Collins, $4.75, $5.25, $5.75 doz., dis 10%.

Peck's, $8.00, $8.50, $9.00 doz. dis. 45%.

Ryder's, $8, $8.50, $9 doz., dis. 50%.

Claw Hatchets.

1. 2. 3.

Collins', $5.25, $5.75, $6.25 doz., dis. 10%.

Peck's, $9.00, $9.50 $10.00, doz 45%.

Ryder's, $9, $9.50, $10 doz., dis. 10%.

Adzes. House. Sbip

	Half flat head. Dozen.	spur poll. Dozen.	Discount. Per cent.
Collins'	$14.00	$13.00	10
Peck's	24.00	25.00	45
Ryder's	24.00	25.00	50

Broad Axes—Pittsburgh Pattern.

5 to 8 pounds, $32.00 dozen.

7 to 9 pounds, $35.00 dozen.

8 to 10 pounds, $38.00 dozen.

9 to 12 pounds, $45.00 dozen.

Western pattern same price.

Spanish Pattern. Detumba round eye, $10.50 per doz

Spanish Pattern Media labor, $12.25 per dozen.

Axle Grease.

Frazer's (2-lb. tins),	per gross	$18.00
2-lb. wooden boxes,	"	12.00

Discount, 25 and 5 %.

Dixon's Everlasting, boxes 1 lb.,	per doz	$1.20
" " " 2 lbs.,	"	2.00

Lovell, Tracy & Co.

English coach axle grease.

Regular wooden boxes per gross, $8.50.

Axleine.

Decorated tin boxes, per gross $12.

Special prices on quantity, and goods in large packages.

See Oils, page 10.

Bellows.

Miner's Bellows: 24 in., $8.50; 25 in., $9.75; 28 in., $11.00; 30 in., $11.25; 32 in., $13.50. 60 and 5% dis.

Standard, each: 18 to 24 in., $10; 28 in., $12; 32 in., $14; 34 in. $16; 36 in., $18; 38 in., $20; 40 in., $23; 44 in., $32. 60 and 5% dis.

Hand Bellows, per doz.: 6 in., plain, $10; fancy, $20; 7 in., plain, $12; fancy, $24; 8 in., plain, $14; fancy, $28; 9 in., plain, $16; fancy, $32; 10 in., plain, $18; fancy, $36. 50% dis.

Belting. LEATHER BELTS.

Standard Manufacturers List.

Single belts per foot.

Width.		Width.		Width.	
1 inch	.10	6 inch	.76	20 inch	2.84
1¼ "	.13	7 "	.90	21 "	3.02
1½ "	.17	8 "	1.02	22 "	3.20
1¾ "	.20	9 "	1.15	23 "	3.37
2 "	.23	10 "	1.29	24 "	3.54
2¼ "	.26	11 "	1.42	26 "	3.92
2½ "	.30	12 "	1.55	28 "	4.30
2¾ "	.33	13 "	1.68	30 "	4.64
3 "	.36	14 "	1.82	32 "	5.00
3½ "	.43	15 "	1.98	34 "	5.35
4 "	.50	16 "	2.14	36 "	5.70
4½ "	.56	17 "	2.31	40 "	6.40
5 "	.63	18 "	2.49	44 "	7.10
5½ "	.70	19 "	2.66	48 "	7.80

Double belts twice the price of single.

Discounts of Newark Leather Belting Co.

Dis. single and double belts, cemented, 50 and 5%.

Dis. single and double belts, riveted and cemented, 50 and 5%.

Dis. single belts, cemented and lacesewn, water proofed, 50%.

Dis. double belts, cemented and lacesewn, water proofed, 45%.

See Rubber Belting, page 7.
See Link Belting, page 9.

Brick Machinery.

WELLINGTON MACHINE CO.

Heavy Steam Power Machine	$525.00
Horse-Power Machines	300.00
Additional Horizontal Pugmill	225.00
Brick Moulds	$2.50 to $3.00
Brick Trucks	5.00 to 13.50
Brick Barrows	7.25
Brick Barrows with Springs	8.2
Sand Barrows, steel tray	6.7

Burglar Alarm. Tommins & Adams.

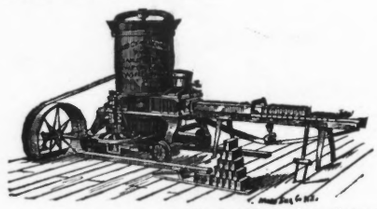
SAFETY AUTOMATIC BURGLAR ALARM AND DOOR FASTENER.

REQUIRES NO WINDING UP.

Per doz., $24. Dis., 40%.

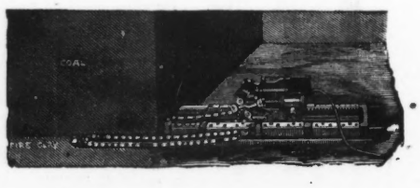
The slightest push on the door explodes two caps in succession and rings alarm bell.

Clay Working Machines.



	No. brick per day.	Compl'te.
No. 10 D brick machine	50,000	$1,500
No. 10 S " "	30,000	1,200
No. 4 " "	40,000	1,100
No. 7 S " "	20,000	650
No. 6 S " "	15,000	575
No. 2 E. H. P. "	6,000	3,360

Coal Mining Machine.



Jeffrey.

6 feet undercut ..... $1500 | 5 feet undercut $1400

Jeffrey Power Coal Drills.

Air feed drill ..... $275 | Screw feed drill $200

Discount, 10%.

Cork Pullers.

The Samson Cork Puller, per dozen, $12 net.

Crucibles. E. H. Sargent & Co.

Battersea Crucibles, Triangular.

No.	Height. Inches.	Width. Inches.	Crucibles. Per doz.	Covers. Per doz.
S	4½	4⅛	$1.00	$0.50
T	4	3¾	0.80	0.50
U	3½	3¼	0.60	0.40
V	3¼	2⅞	0.45	0.40
W	2⅞	2⅝	0.35	0.30
X	2½	2¼	0.30	0.30
Y	2¼	2⅛	0.25	0.30
Z	1¾	1¾	0.20	0.30

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

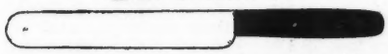
No.	Long. Inches.	Wide. Inches.	High. Inches.	Price. Each.
A	7	3¼	2½	$ .60
B	7½	4⅛	2⅞	.75
C	8	4¾	3	.85
D	8½	5	3¼	1.00
E	9	5½	3⅝	1.15
F	10	6	4	1.25
G	11	4	3½	1.00
H	10½	5¼	3⅞	1.00
J	12	6	4	1.25
K	14	8	5	1.75
L	15	9	6	2.00

Export discount 15 %.

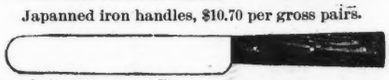
Cutlery.

(Tommins & Adams.)

KNIVES—TABLE.

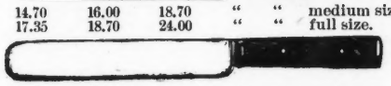


Japanned iron handles, $10.70 per gross pairs.

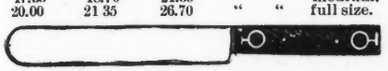


Cocobola handles.	Ebony handles.	Bone handles.	
10.70	12.00	15.35	gross pairs.

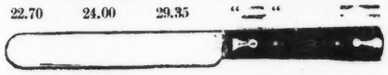
14.70	16.00	18.70	" "	medium size.
17.35	18.70	24.00	" "	full size.



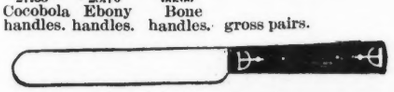
17.35	18.70	21.35	" "	medium.
20.00	21 35	26.70	" "	full size.



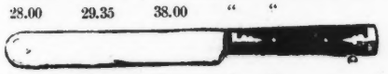
22.70	24.00	29.35	" "



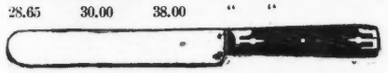
27.35	28.70	36.00
Cocobola handles.	Ebony handles.	Bone handles. gross pairs.



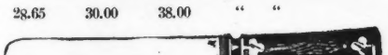
28.00	29.35	38.00	" "



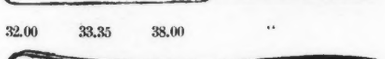
28.65	30.00	38.00	" "



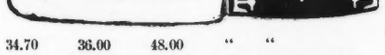
28.65	30.00	38.00	" "



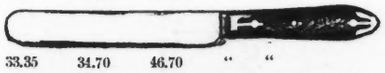
32.00	33.35	38.00	"



34.70	36.00	48.00	" "

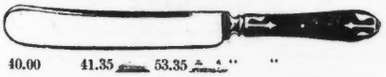


33.35	34.70	46.70	" "



37.35	38.70	50.70	" "

40.00	41.35	53.35	" "



Hard rubber handles, 5.75 per dozen pairs.

Solid bone handles, 4.80 per dozen pairs.

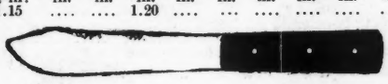
Celluloid handles, 7.35 per dozen pairs.

Forks are made to match all above patterns, with either three or four prongs.

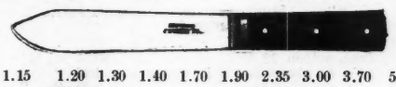
Discount 25 %.

BUTCHERS'—COCOBOLA HANDLES.

4 and 4½ in.	5 in.	5½ in.	6 in.	6½ in.	7 in.	8 in.	9 in.	10 in.	12 in
1.15	....	....	1.20	....	...	....	....	....	....

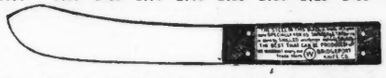


1.40	...	....	1.50	....	..	....	....	....	....

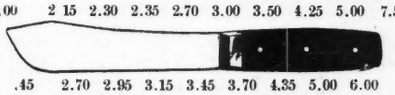


1.15	1.20	1.30	1.40	1.70	1.90	2.35	3.00	3.70	5.35

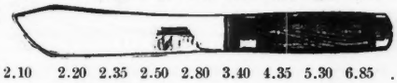
....	1.45	1.60	1.70	2.00	2.35	2.80	3.25	4.00	6.0



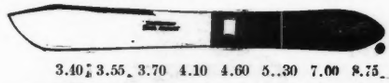
2.00	2 15	2.30	2.35	2.70	3.00	3.50	4.25	5.00	7.50



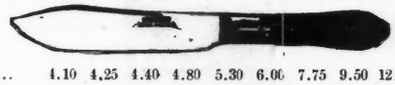
.45	2.70	2.95	3.15	3.45	3.70	4.35	5.00	6.00	



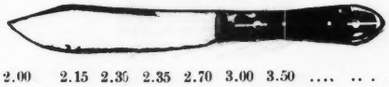
2.10	2.20	2.35	2.50	2.80	3.40	4.35	5.30	6.85	...



3.40	3.55	3.70	4.10	4.60	5..30	7.00	8.75	11.	



....	4.10	4.25	4.40	4.80	5.30	6.00	7.75	9.50	12.5



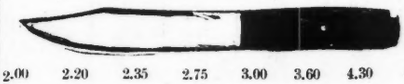
2.00	2.15	2.35	2.35	2.70	3.00	3.50	....	.. .	...

Discount 25 and 10 %.

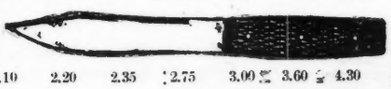
HUNTING—EBONY HANDLES.

5½ in.	6 in.	6½ in.	7 in.	8 in.	9 in.	10 in.

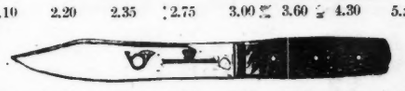
Per Dozen.



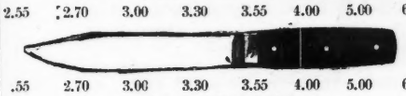
2.00	2.20	2.35	2.75	3.00	3.60	4.30	5.25



2.10	2.20	2.35	2.75	3.00	3.60	4.30	5.25



2.55	2.70	3.00	3.30	3.55	4.00	5.00	6.00



.55	2.70	3.00	3.30	3.55	4.00	5.00	6.00

Discount, 25 and 10 %.

Per Dozen.

Putty knives, cocobola handles..... ..... $1.30@$1.50

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
in ..... 12.00 | 16 in	14.00

Discount, japanned, 60 %; nickle, 45 %.

BENT TRIMMERS.

Per dozen.

6 in	13.00	10 n	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	12.0
5½ in	10.50	7 in	13.00

PAPER AND BANKERS'.

Per dozen.

9 in	18.00	13 in	36.00
10 in	25.00	14 in	42.00
11 in	27.00	16 in	54.00
12 in	32.00	18 in	20.00

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 5½in., 14.00 per dozen.

Discount, japanned, 70 and 10 % nickel, 60 and 10 %

PRUNING.

1 B., 9 in., 24 per dozen; 2 B., 8½ in. 21; 3 B., 7¾ in., 9.80.

No. 110, 10 in., $30 per doz.

PRUNING SHEARS FOR LONG HANDLES.

No. 1, $36 per dozen; No. 2, $30 per dozen.
Discount, 35%.

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 Tipd	Oval.	Perfect and 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 %.

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

Aesthetic medium fork.

Tea spoons.	Table spoons.	Medium forks.
7.50	15.00	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 %

Cutters.

FEED.

No. of cutter.	No. of knives.	Length in inches of knives.	Length in inches of feed cut.	Price.
1	2	6¼	½, ¾ and 1⅛	$18.00
2	2	7¼	½, ¾ and 1⅛	21.00
2½	1	7¼	⅝, ⅞, 1¼ and 1¾	21.00
2½	2	7¼	⅛, ⅛, ⅝ and 1¼	23.00
3	1	8½	⅝, ⅞, 1¼ and 1¾	25.00
3	2	8½	⅛, ⅛, ⅝ and 1¼	27.00
4	1	10	⅝, ¾, 1¼ and 1¾	30.00
4	2	10	⅛, ⅛, ⅝ and 1¼	33.00
5	2	10	⅛, ⅛, ⅝ and 1¼	35.00
6	2	11	⅛, ¾, 1¼ and 2	45.00
6½	2	11	⅛, ¾, 1¼ and 2	45.00
7	2	13	⅛, ¾, 1¼ and 2	60.00
7½	2	13	⅛, ¾, 1¼ and 2	60.00
10	2	16	⅛, ¾, 1¼ and 2	80.00
12	2	20	⅛, ¾, 1¼ and 2	100.00
11	2	11	⅛, ¾, 1¼ and 2	45.00
13	2	13	⅛, ¾, 1¼ and 2	60.00
16	2	16	⅛, ¾, 1¼ and 2	80.00
20	2	20	⅛, ¾, 1¼ 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	32	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., 20%.

Duck and Twine.

22-inch, Hard, Medium and Soft.

	Weight per yd.	Cents, per yd.		Weight per yd.	Cents, per yd.
No. 0...	19 oz.	35	No. 6...	13 oz.	26
1...	18 "	33	7...	12 "	25
2...	17 "	32	8...	11 "	23
3...	16 "	30	9...	10 "	21
4...	15 "	28	10...	9 "	20
5...	14 "	27			

Ravens, 28½-inch.—Eight ounce, 15 cents per yard Ten ounce, 19 cents per yard; twelve ounce, 22 cents per yard; Fifteen ounce, 27 cents per yard. Dis. 25 and 1%.

Cotton Sail Twine.—Tbree-fold and upward, 17 to 20 cents per pound. Dis. 3%.

Electroplate.—Babcock & Co.'s.
Dis. 60 and 2%.

CASTERS.

1,200—Dinner

232—Breakfast.

Dinner Casters.

No. 1,200. 17½ in. high, $8.00, quadruple plate.
No. 80. 17 in., $6.00, quadruple plate.
No. 140. 16 in., $7.50, " "
No. 830. 16 in., $5.00, " " Plain, 50 cents less.
No. 25. 16 in., $4.00, double plate.
No. 33. 16 in., $3.75, " "
No. 53. 15 in., $3.00, " "
No. 15½. 14½ in., $2.00, single plate.
No. 19. 14½ in., $1.85, " "
No. 40. 14 in., $1.75, " "

FLAT WARE.

Calla Lily, Empress, Windsor and Olive Patterns, 18 Per Cent Nickel Silver Base.

	Extra plate, per doz.	Double plate, per doz.	Triple plate, per doz.
Tea spoons	$4.75	$6.00	$7.25
Dessert spoons	8.50	10.50	12.50
Table spoons	9.50	12.50	14.50
French coffee spoons	4.75	6.00	7.25
Berry or nut spoons	24.00	30.00	36.00
Bar spoons, small	4.75	6.00	7.25
Dessert forks	8.50	10.50	12.50
Medium forks	9.50	12.00	14.50
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

PICKLE DISHES

No. 144. 12 In. high, $3.50
No. 66. 10½ in. high, $2; assorted colored glass.
No. 155. 12 in. high, $4; assorted colored glass.
No. 146. 12½ in. high, $9; hand decorated glass.
No. 156. 12½ in. high, $6; hand decorated glass.

No. 146.

No. 255.

TEA SETS.

No. 255. 6 pieces, $35, quadruple plate.
No. 301. 4 pieces, $23, quadruple plate.
No. 1847. 6 pieces, $42, quadruple plate.

Explosives.

Ætna Powder Company.

Dynamite, 75%	Nitro-Glyceine, 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
" " high grades	" 6¼ lbs.	3.00
" " " "	per can 1 lb	60
" " fancy brands	" 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	4.25 " "
" " double tape " "	5.40 " "
" " triple tape " "	6.50 " "

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.

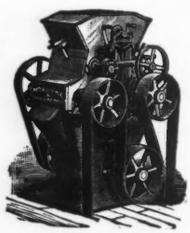
	No.	Capacity.	
Magneto Blasting Machines	1 V.	8 holes	$17.00
" " "	2 V.	20 "	25.00
" " "	3 L.	20 "	25.00
" " "	3 V.	30 "	30.00
" " "	4 V.	60 "	50.00

Discount 15%.

Blasting cables	$5.00 each, discount 40%.
" reels	5.00 " " 20%.

Flouring Mill Machinery.

Nordyke & Marmon Co.



Roller Mills for Wheat Flour.

Prices of Double and Single Roller Mills.

Size.	All smooth.	½ Corrug. ½ smooth.	All corrug.	Single machines. Corrug.	Smooth.
6 × 12	$465	$475	$480	.....	.....
6 × 16	515	525	530	.....	.....
6 × 20	565	575	580	.....	.....
7 × 14	515	525	530	.....	.....
7 × 18	560	570	575	.....	.....
7 × 24	635	645	650	.....	.....
9 × 18	625	640	650	$350	$335
9 × 24	700	720	735	390	375
9 × 30	785	810	830	440	420

20-inch New Era Mill for Wheat, Corn, and Middlings.

Size. Inch.	Power. H. P.	Pulley. Incb.	Capacity Bush.
20	4 to 10	14 × 7	12 to 40

Speed.	Weight. Lbs.	Price.
500 to 800	660	$150

Farm and Plantations Mills.

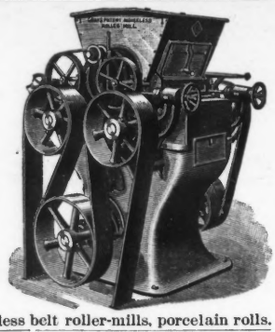
Diameter of burrs.	Power to drive.	Size of pulley.	Capacity per hour.	Revolutions per minute.	Weight.	Price.
	H. P.					
14 in.	2 to 4	9×5½	4 to 14 bushels	600 to 1200	370 lbs.	
18 in.	4 to 10	11×6½	8 to 40 busbels	400 to 700	600 lbs.	

The Dixey Mill—Stiff Spindle Style.

Size.	Power.	Capacity.	Weight. Pulley.	Weight. Geared	Pulley.	Iron gear.	Mortise gear.
18	4 to 6H.P.	8 to 25 bu	560 lbs	650	$130	$165	
22	6 to 8 "	12 to 30 "	800 "	1000	165	200	
26	8 to12 "	16 to 40 "	1100 "	1500	185	220	
30	10 to15 "	25 to 60 "	1300 "	1700	215	255	

Flour Mills.

E. P. Allis & Co.

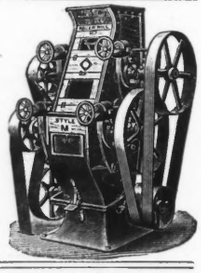


Gray's pat. noiseless belt roller-mills, porcelain rolls.

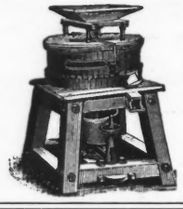
Size of Rolls.	Height.	Length.	Width.	Driving pulley.	Revolutions per minute.	Approximate power required.	Length of driving belt above floor.	Approximate shipping weight.	Price.
With corrugated chilled iron rolls.									
14" × 16" single	5' 7"	3' 2"	5'	20" × 6¼"	200 to 300	1¾ to 2½ H. P.	16' 3"	2,700 lbs.	$600.00
14" × 16" double	5' 10"	5' 6"	10"	20" × 6¼"	200 " 300	3 " 4 "	19 3"	4,000 "	800.00
9" × 14"	5' 1½"	3' 10"	3' 3"	12" × 5¼"	300 " 400	1½ " 2½ "	16' 6"	2,700 "	580.00
9" × 14"	5' 1½"	3' 10"	3' 10"	12" × 5¼"	300 to 400	1½ to 2½ H. P.	16' 6"	2,700 lbs.	$600.00
With Wegmann's patent porcelain rolls.									
9" × 14"	5' 1½"	3' 10"	3' 10"	12" × 5¼"	300 to 400	1½ to 2½ H. P.	16' 6"	2,700 lbs.	$650.00
Divided four roller machines.									
9" × 14"	5' 1½"	3' 10"	3' 10"	12" × 5¼"	300 to 400	1½ to 2½ H. P.	16' 6"	2,700 lbs.	$590.00
1-pr. cor. 1-pr. sm.	5' 1½"	3' 10"	3 10"	12" × 5¼"	300 to 400	1½ to 2½ H. P.	16 6"	2,700 lbs.	615.00
9" × 14"	5' 1½"	3' 10"	3 10"	12" × 5¼"	300 to 400	1½ to 2½ H. P.	16' 6"	2,700 lbs.	625.00
1-pr. sm. 1-pr. por.									
9" × 14"	5' 1½"	3' 10"	3 10"	12" × 5¼"	300 to 400	1½ to 2½ H. P.	16' 6"	2,700 lbs.	
1-pr. cor. 1-pr. por.									

For grinding corn, feed, rye, etc,

Size.	Height.	Width.	Length.
6" × 12"	4' 6"	3' 5"	2' 7"
9" × 14"	5' 8"	3' 10"	3' 5"
9" × 18"	5' 8"	4' 9"	3' 5'
9" × 24"	5' 8'	5' 6"	3'



The Nordyke Bradford Portable Mill.

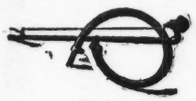


Size of stones. In.	Grinding capacity. Corn, bu. per hour.	Grinding capacity. Wheat bu. per hour.	Horse-power.	Weights. Sing'l gear.	Weights. Double gear.	Pulley mill.	Geared mills. Iron wh'ls.	Geared mills. Mortise wh'ls.
18	8 to 10	.....	4	550	625	$130	$165	$180
20	10 to 12	.....	5	600	700	140	175	190
22	12 to 15	.....	5	700	850	160	190	210
24	15 to 18	.....	6	900	1050	175	210	225
26	18 to 20	8 to 10	8	1200	1400	185	225	250
30	20 to 25	10 to 12	10	1500	1700	225	265	290
36	25 to 30	14 to 17	12	1800	2100	315	355	380
42	35 to 40	19 to 21	15	2000	2300	390	435	460

Driving pulley.	Revolutions per minute.	Length of belt above floor.	Approximate shipping weight	Price.
10″ × 5¼″	400 to 500	14′	.....	$500.00
14″ × 6¼″	350 to 450	18′	2900 lb.	600.00
14″ × 7¼″	350 to 450	18′	3050 lb.	650.00
14″ × 8¼″	350 to 450	18′	3350 lb.	735.00

Flue Cleaner.

Hurley's Automatic Steam Flue Cleaner.



No.	Outside diam. of tubes.	With hose clamps.	Globe Valves.	Best 4-ply steam hose. Per foot.
1	1¼ to 2	$5.00	½, 95 cents	¾, 67 cents.
2	2 to 2½	6.25	½, 95 cents	¾, 67 cents.
3	2½ to 3	7.50	¾, $1.30	¾, 67 cents.
4	3 to 3½	8.75	1, 1.75	1¼, 83 cents.
5	3½ to 4½	10.00	1¼ 2.90	1¼, $1.04

Dis. on flue cleaners, 60 and 70%.
Dis. on steam hose, 50%, good to 90 lbs steam.

Forges (Portable).

Fairbanks.

No.				
No. 2c, weight, 155 lbs.	21 × 27 hearth			$42.00
" 3a, " 80 "	18 in. diam. hearth			27.00
" 3b, " 75 "	18 " " "			24.00
" 3c, " 85 "	18 " " "			30.00
" 6a, " 45 "	14 " " "			18.00
" 6B, " 45 "	14 " " "			16.00

Dis. 60%.

No. 1, 18 in. bellows, $20; No. 2, 20 in. bellows, 25; No. 3, 22 in. bellows, $30.

20% dis.

Stationary.

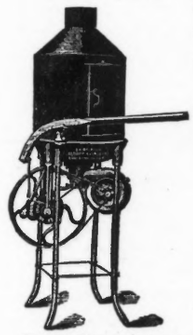
27 in. bellows, $21; 30 in. bellows, $25; 33 in. bellows, $33; 36 in. bellows, $45.

20% dis.

Riveting Forges.

Bellows, 18 in., 20 in.,	22 in., 24 in.,
$8.00. $10.00.	$13.00. $17.00.

20 % dis.



Light work, 12 × 17; height, 15 in., $16.00.
Same, with Hood, 12 × 17; height, 28 in., $20.00.
Bridge, Boiler or Railroad work, Pan, 17 × 19; height, 29 in.; Fan, 8 in., $27.00.
Same, with Hood, $30.00.
Water Tank, $4.00 extra.
Iron Fire Ring Round Tuyere, $1.00 extra.

50 % dis.

Fruit Evaporator.

No. 1. Evaporator..... $30
No. 2. Fruit Drier and Baker, with Bleacher attachment. Weight, 225 lbs. Capacity, 5 to 7 bushels apples per day; 24 in. deep, 26 in. wide, 5½ ft. high; 12 trays, 22 22; 40 square feet drying surface. Complete..... $50
No. 3. Capacity, 15 to 20 bushels per day..... 100
No. 4. Capacity, 20 to 30 bushels per day..... 160

Dis., No. 1, 3 and 4 = 20%. No. 2 = 30%.

Boxing, extra:
No. 1, $3.00; No. 2, $5.00; No. 3, $7.50; No. 4, $12.50.
Freight to New York:
No. 1, $4.00; No. 2, $6.00; No. 3, $12.00; No. 4, $18.00.

Gaskets.

Corrugated Copper.

Price, 2 cents per square inch, less 30 per cent. discount for home trade.

Less 60% discount for export trade.

Glass Tube Cutters.

One Arm Carries Rotary Cutter Price, $2.50 each.

Glassware.

6-in. bowl and cover, per doz				$3.25
7-in. "	"	"	.....	4.50
8-in. "	"	"	.....	6.00
9-in.	"	"	.....	8.00
10-in.	"	"	.....	10.50

Net.

Nappy, 4½-inch., per doz., 50c.; 6-inch., per doz., $2 in ch., per doz., $3; 8-inch., per doz $4.
Cream Pitcher, 1 pint, per doz., $1.25; one quart, per doz., $3.50; 3 pints, per doz., $4.50.

Pint Pitcher, per doz., $1.50; quart pitcher, per doz., $2; ½ gallon pitcher, per doz., $3; 3 quart pitcher per oz., $4.50.

Flange Butter and Cover, per doz., $1.75.
Water Set, per doz., sets of 60 pieces, $7.50.

Cheese Dish and Cover, 8 in., per doz., $4.50.
Quart Water Bottle, per doz., $4.50.

Ind. Salts; per gross, $2.00. A sorted patterns.
4 Bottle Castors, per doz., $7.50; 3 bottle, per doz., $4.50.

Berry Dish, 4½-inch , per doz., 50c.; 10-inch, per doz., $4.
Butter Dish and Cover, per doz., $1.25.
Butter Dish and Cover, per doz., 75c.

Candlesticks, per doz., $2.00. Glass Slipper for Flowers, per doz., 50 cents; slipper and tray, per doz., $1. Jam Jar and Cover, 1 qt., per doz., $2.50; ½ gal., per doz., $3.25; ¾ gal., per doz., $4; 1 gal., per doz., $5; 1½ gals., $9; 2 gals., per doz., $12. Pocket Flask, 1 pint, $1.

Tumblers. 1⅞ oz., per doz 50 cents.
8 " " 75 "

9 oz., per doz., $2.75.

11 oz., assorted patterns, per doz., 30 cts.

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

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

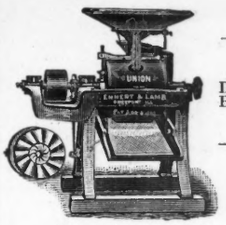
Goblets, banded, per doz 65 cents.
Claret to match, per doz., 55 cents.
Wines, to match, per doz., 50 cents.
Cordials, to match, per 45 cents.

Goblets, per doz.,	50 cts.	Banded, open, hollow stem.	
Claret, "	50 "		
Wine "	35 "	Champagne, per doz., $1.25.	

½ Pt. tumbler, per doz..55 cts.
½ Pt. mug to match, " ..65 "
Goblet, " " ..50 "
Spoon holder, cream pitcher, sugar, butter dish to match.
Sets of 4 pieces, per doz. sets, 48 pieces, $3.75.

Grinding Mills.—Emmert & Lamb.

"Daisy," without Shaking Bolt, 170 pounds, 9 cubic feet, $40.
"Daisy," with Shaking Bolt, 185 pounds, 9 cubic feet, $48.
} Discount 25 per cent.



"The Union Mill."

Diameter of Buhr Stones	Size of Pulleys	
	Diam.	Face.
12 in.	8 in.	6¼ in.
16 "	9 "	7½ "

Horse Power	Capacity in B'sh's	Speed	Without Bolt	With Bolt	Sacking Elevator, Extra	Extra Metal Buhrs
8 to 10	12 to 30	1200 to 1500	$90.00	$105.00	$15.00	$1.20 pair
10 to 15	20 to 50	1000 to 1600	160.00	178.00	17.50	1.50 "

Hammers.

Adz-eye Hammers.—Per Dozen.

No.	Weight.		No.	Weight.	
5.	Round. 1 lb., 4 oz	$9.00	7½.	Round. 13 oz	$8.00
7.	" 1 lb.	8.50	8	" 7 oz	7.50

Adz-eye Hammers.—Per Dozen.
No. 17. Octagon. weight, 1 lb., 4 oz..... $9.00

Adz-eye Hammers.—Patent Nail Holder.—Per Dozen.

No.	Weight.		No.	Weight.	
33.	Bell-face. 1 lb., 4 oz	$9.50	35.	Round h. 1 lb., 4 oz	$9.50
34.	" 1 lb.	9.00	36.	" 1 lb.	9.00

Adz-eye Hammers.—Bell Face.—Per Dozen.

No.	Weight.		No.	Weight.	
37.	1 lb., 4 oz	$9.00	38½.	13 oz	$8.00
38.	1 lb.	8.50	39½.	7 oz	7.50

Farriers' Hammers.—Per Dozen.

No.		Weight.	
55.	Adz-eye. Octagon.	9 oz	$7.75
56.	" "	7 oz	7.50
57.	Plain. "	7 oz	6 25
58.	Plain Brad.	4 oz	5 50
60.	Adz-eye, Round Head.	7 oz	7 50
61.	" Octagon. Boston pattern	10 oz	8.00
62.	" "	7 oz	7.50

Machinists' Ball Pein Hammers.—Octagon.—Per Dozen.

No.	Weight.		No.	Weight.	
90.	3 lbs	$22.00	94.	1 lb., 4 oz	$13.50
90½.	3 lbs., 8 oz	19.00	95.	1 lb	12.50
91.	4 lbs., 4 oz	17.50	96.	12 oz	12.00
92.	2 lbs	16.50	97.	8 oz	12.00
92½.	1 lb., 12 oz	15.50	98.	6 oz	12.00
93.	1 lb., 8 oz	14.50			

Discount, 35 and 5 per cent. Net Cash, 30 days. 10 per cent. Cash, 10 days. Cases at Cost.

Hand Carts No. 0 42 wheel, 1 in. tread, 1 in. axle box 48x28x10 deep' $10.50.

No. 1, 36 wheel, 1 in. tread, ⅞ in. axle, box 40x23x10 deep, $9.00.
No. 2, 30 wheel, ¾ in tread, ¾ in. axle, box 32x20x9 deep, $8.25.

With Wagon-Seat Spring.

No. 6, same sizes as No 0..... $12.00
" 7, same sizes as No. 1..... 10.50
" 8, " " " No. 2..... 9.75

With Third Wheel, Without Springs.

No. 3, same sizes as No. 0..... $12.00
" 4, " " No. 1..... 10.50
" 5, " " " No. 2..... 9.5

Hardware Specialties.

AUGERS.

Patent Adjustable Hollow.

Cuts from ¼ to 1¼, pivoted jaws, graduated scale to 1-16ths, per doz., $60.00.

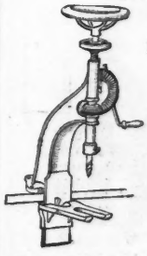
Discount, 15 and 10%.

Patent Hollow Auger.

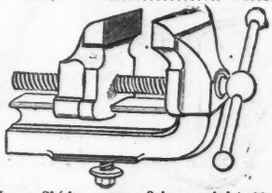
Inch	5-16	⅜	7-16	½
With bits	12.00	12.00	12.00	12.00
Without bits	8.00	8.00	8.00	8.00
9-16	⅝	¾	⅞	1
14.00	14.00	14.00	16.00	16.00
9.00	9.00	9.00	13.00	13.00
1¼	1⅜	1½		
20.00	24.00	24.00		
14.00	16.00	15.00		

Discount, 15 and 10%.

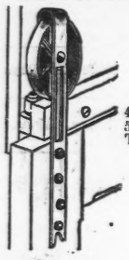
BENCH DRILL.



Adjustable bed plate.
26½ high drills to ½ in. hole, 3½ run of screw.
List price, each..... $10.00
Net, " 3.75

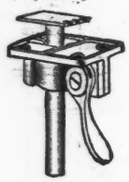


Bench Vise, Steel Jaws, 3½ in., opens 3 in.; weight, 12 lbs.; list price, each, $4.00.; net price, each, $1.60.

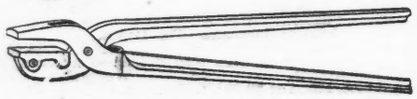


BARN DOOR HANGER.

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

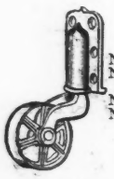


BENCH HOOK.
Patent, adjustable and reversible
List $9 dozen, ½ dozen in box.
Discount, 20 and 10%.



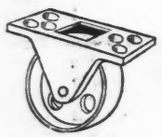
BLACKSMITH'S TONGS.
Swivel Jaw.

No. 1, 16 in., per doz.....$10.00
" 2, 18 " " 10.00
Dis. 20%.



CASTERS.
Swivel Store Truck

No. 20, japanned, 4 in. wheel, each..... .55
No. 25, " 5 " " " " ..... .75
Noiseless turned wheel.
No. 30, japanned, 4 in. wheel, each..... 1.30
No. 35, " 5 " " " 1.60
Discount, 25%.



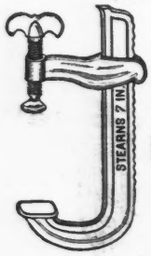
Store Truck, stationary.
No. 50, 5-inch wheel, 1¼ inch wide each, $1.05.
No. 60, 5-inch, extra heavy, 1½ inch wide, each $1.50.
Discount, 25%.

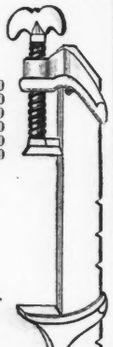
CLOTHES REEL.
Extra heavy, gray iron, japanned.
List per doz.....$15.00
Net 7.00

JACK SCREWS.
New pattern wrought iron screw.

No.	Rise of screw.	High.	Diameter screw.	Price.
20	4½ in.	10 in.	2 in.	$4.50
25	6½ "	12 "	2 "	5.25
30	8½ "	14 "	2 "	5.75
	11½ "	16 "	2 "	6.50

Discount, 40%.



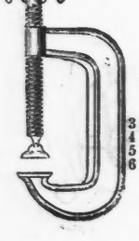


SCREW CLAMPS.
Adjustable.

3 in., per doz.....$4.00
5 " " 6.50
7 " " 9.00
9 " " 10.50
12 " " 15.00
16 " " 20.00

½ 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., ½ 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 ⅞ by 1 in.
Dis., 20 %.

PULLEYS.
Side, No. 45, Japanned.

Inches...	1	1½	2	2½	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: 2½, 3 and 4, 1 dozen in box; 5 inch, ½ dozen in box.
Discount, 50%.

PULLEY HOOK (New Floor.)
Deep cut thread, forged point.

	Per doz.
¼ 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%.

HAY FORK PULLEY.
New pattern.

No. 15, 5 in. iron wheel.....per doz.$4.50
25, 5 in. wood " ..... " 4.50
66, 6 in. " " ..... " 6.00

4 dozen in case, 8 dozen in barrel.

No. 15, per dozen, $2 net.

SHEAVES.
Patent Common
Turned and polished iron wheels, round corners, brass pin, one set in box.

2½ inch.....$1.50
3 " 1.60
4 " 2.00
5 " 2.60
Discount, 50%.

SINKS.
All 6 inch deep.

14 × 20 in....	$1.50	18 × 30 in....	$2.50
15 × 25 in....	1.75	18 × 32 in....	3.00
15 × 27 in....	2.00	18 × 36 in....	3.00
16 × 24 in....	1.80	20 × 30 in....	3.00
16 × 28 in....	2.10	20 × 36 in....	3.70
17 × 30 in....	2.25	20 × 40 in....	4.00
18 × 24 in....	2.10		

Discount, 60%.

SPOKE POINTERS.

	Per doz.
No. 1, points 1⅞ in. diameter,	$9.00
No. 2. points 2⅝ in. diameter,	$15.00

Discount, 15 and 10%.

½ dozen in box.

VISE.
(Bench Vise, Steel Jaws.)
3½ 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., 33⅓%.

No.	per dz.	gr., lbs.	No.	per dz.	gr., lbs.
1	Amateur vise.....	$2.25	70	Clamp. 1½.....	3.00	80
Anvil.				2½.....	5.00	220
				3½.....	14.25	700
2	.....	3.75	200	4½.....	21.00	1,425
3	.....	11.25	615	Combination		
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, 1½, 2 and 2½ are packed in dozens; Nos. 3 and 3½ in half dozens; Nos. 4, 4½ 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' Knife Handle Wrenches.

BLACK.

Size.	₱ doz.	Size.	₱ doz.
6 inch.....	$9.00	15 inch.....	$24.00
8 "	10.00	18 "	30.00
10 "	12.00	21 "	36.00
12 "	14.00		

BRIGHT.

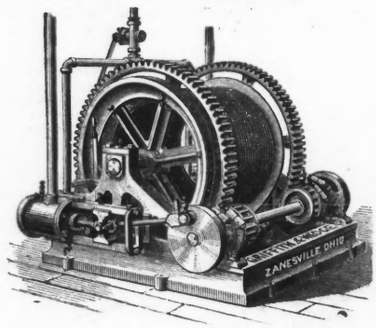
4 inch.....	$10.00	12 inch.....	$16.00
6 "	10.00	15 "	26.00
8 "	11.00	18 "	32.00
10 "	14.00	21 "	38.00

Discount, 55, 10, 7½ and 3 %.

Coes Mechanics' Screw Wrenches, same list, less 55 10, 10, 7½ and 3 %.

A. G. Coes & Co. Pat. Screw Wrenches, same list as above. Discount, 55, 10, 7½ and 3%.

Hoisting Engines.—Griffith & Wedge.

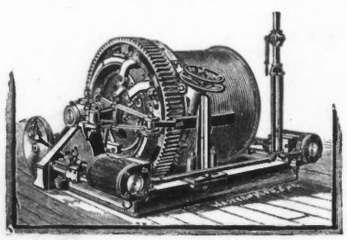


	Weight.	$
Hoisting Engines, Miner's Prospecting.....	4,500	750
Hoisting Engines, No. 1 Double Cylinder...	4,500	800

Discount, 20%.

" "	No. 2 Double Cylinder...	6,000	1,000
" "	No. 3 " " ...	11,000	1,550
" "	No. 4 " " ...	15,500	1,800
" "	No. 5 " " ...	17,000	2,100
" "	No. 6 " " ...	13,600	1,750
" "	No. 7 " " ...	17,000	2,100
" "	No. 8 " " ...	19,000	2,400
" "	No. 9 " " ...	48.000	4,500

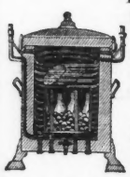
Discount, 25%



Webster Camp & Lane Machine Co.

Single drum. No.	Average Load. Pounds.	Double drum. Approx. weight, complete. Pounds.
$825.00 = 5	1,950	6,000 = ...
918.50 = 6	1,650	6,500 = ...
1,177.00 = 7	2,200	8,000 = $1,661.00
1,331.00 = 8	3,000	8,500 = 1,815.00
1,694.00 = 9	3,500	14,000 = 2,722 50
1,914.00 = 16½	3,700	16,000 = 3,124 00
2,343.00 = 17½	5,500	19,000 = 3,333.00
2,475.00 = 18	5,500	22,000 = 3,872.00

Ice Machines (Family).



L. DERMINGNY & CO.

No. 1, Ice machine, ice and ice cream molds, 1 lb. ice, $15.00.

No. 2, Ice machine, ice and ice cream molds, 1½ lbs. ice, $20.00.

No. 3, Ice machine, ice and ice cream molds, 1 carafe 1 bottle holder, 2 lbs. ice, $26.50.

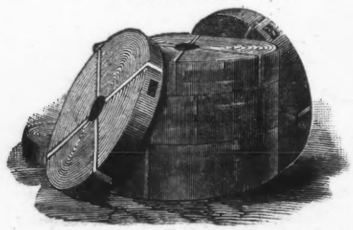
No. 4, Ice machine, ice and ice cream molds, 2 carafe 1 bottle holder, 4 lbs. ice, $33.00.

No. 5, Ice machine, ice and ice cream molds, 3 carafe 1 bottle holder, 6 lbs. ice, $40.66.

No. 6, Ice machine, ice and ice cream molds, 4 carafe 1 bottle holder, 9 lbs. ice, $46.50.

India Rubber Goods.

MECHANICAL.



RUBBER BELTING.

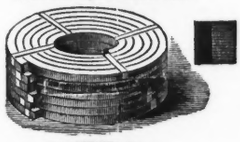
Inches.	2 ply per foot.	3 ply per foot.	4 ply per foot.	5 ply per foot.	6 ply per foot.
1	$0.07	.....	.....	.....	.....
1¼	0.09	.....	.....	.....	.....
1½	0.11	.....	.....	.....	.....
2	0.15	$0.17	$0.21	.....	.....
2½	0.18	0.22	0.26	.....	.....
3	0.22	0.26	0.31	.....	.....
3½	0.26	0.30	0.37	.....	.....
4	0.30	0.34	0.42	.....	.....
4½	0.33	0.39	0.47	.....	.....
5	0.36	0.43	0.52	.....	.....
6	0.43	0.52	0.62	.....	.....
7	0.51	0.60	0.73	.....	.....
8	0.59	0.70	0.84	$1.05	$1.25
9	0.67	0.80	0.95	1.18	1.42
10	0.75	0.90	1.07	1.33	1.60
11	0.83	1.00	1.18	1.47	1.77
12	0.91	1.08	1.30	1.62	1.95
13	1.00	1.18	1.42	1.77	2.13
14	1.08	1.28	1.54	1.92	2.31
15	1.16	1.38	1.66	2.07	2.49
16	1.25	1.50	1.78	2.22	2.67
18	1.41	1.70	2.02	2.52	3.03
20	1.58	1.90	2.26	2.82	3.39
22	1.76	2.12	2.52	3.15	3.74
24	1.96	2.36	2.80	3.50	4.20
26	2.18	2.60	3.08	3.85	4.62
28	2.42	2.84	3.36	4.20	5.04
30	.....	.....	3.64	4.55	5.46
32	.....	.....	3.92	4.90	5.88
34	.....	.....	4.20	5.25	6.30
36	.....	.....	4.48	5.60	6.72
38	.....	.....	4.76	5.95	7.14
40	.....	.....	5.04	6.30	7.56
42	.....	.....	5.32	6.65	7.98
44	.....	.....	5.60	7.00	8.40
46	.....	.....	5.88	7.35	8.82
48	.....	.....	6.16	7.70	9.24
50	.....	.....	6.44	8.05	9.66
52	.....	.....	6.72	8.40	10.08

Dis. Reliance, 60 and 5. Dis. Royal, 60, 10 and 10. Dis Manhattan, 70 and 5. See Leather Belting, page 3; Link Belting, page 9.

PACKING.

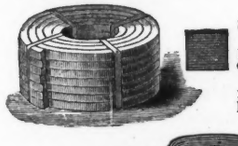
Piston Packing.

Round Piston Packing Per lb. 85c.
Discount, 60, 10 and 5 per cent.



Square Piston Packing.

Price same as above. Round and square pis ton packing is made in lengths of twelve or twenty-four feet.



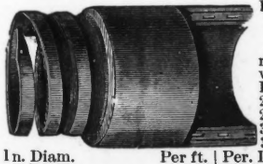
Square Piston Packing. Rubber back, per pound $1. Discount 60 der cent. Best only.
Square piston packing rubber back is made in lengths of twenty feet.

Steam Packing.
Cloth Insertion, Rubber Outside.
Cloth Insertion, Cloth on one or both sides.

Thickness.	1-Ply.	2-Ply.	3-Ply.	4-Ply.
1-64 inch	70 cts.	.....	.....	.....
1-32 "	65 cts.	.....	.....	.....
1-16 "	60 cts.	63 cts.	66 cts.	.....
3-32 "	55 cts.	58 cts.	61 cts.	.....
1-8 "	55 cts.	55 cts.	58 cts.	61 cts.
3-16 "	55 cts.	55 cts.	55 cts.	58 cts.
1-4 "	55 cts.	55 cts.	55 cts.	55 cts.

One-ply of cloth to every 1-16 inch thickness.
Three cents per pound additional will be charged for each extra ply of cloth. Each cloth, whether insertion or on outside, to count as one ply.
All cloth insertion or plain packing is one yard wide, and any length desired.
Wire insertion packing, all thicknesses, per lb, 50 cents.
Discounts: Reliance, 70 & 10; Royal, 60, 10 & 10: Manhattan, 60 per cent.
See Packing, page 10.

HOSE.



Improved "Smooth Bore" Rubber Suction Hose.
On spiral flat or round tinned steel wire.

Int. Diam.	Per ft.	Per. Diam.	Per ft.
2 inch	$2.60	7 inch	$13.50
2½ "	3.50	7½ "	15.00
3 "	4.00	8 "	16.50
3½ "	5.50	9 "	19.50
1n. Diam.		10 "	22.50
inch	6.50	12 "	27.50
4½ "	7.50		
5 "	8.50		
5½ "	9.50		
6 "	10.50		
6½ "	12.00		

Suction bose discount: Reliance, 50 and 10%; Royal, 60, 10 and 5%; Manhattan, 70 and 5%.

SUCTION HOSE.
On spiralbrass or iron wire

Int. Diam.	Per. ft.
¾-inch	$ .77
1 "	1.00
1¼ "	1.25
1½ "	1.65
1¾ "	2.10
2 "	2.50

RUBBER HOSE.
Conducting Hose—Two-ply.

Int. diam.	Per ft.	Int. diam.	Per ft.	Int. diam.	Per ft.
⅛ in.	$0.20	2 in.	$0.66	5 in.	$1.65
¾ in.	25	2¼ in.	75	6 in.	1.98
1 in.	33	2½ in.	83	7 in.	2.31
1¼ in.	42	2¾ in.	92	8 in.	2.64
1½ in.	50	3 in.	99	9 in.	2.97
1¾ in.	58	4 in.	1.32	10 in.	3.33

HYDRANT HOSE—THREE-PLY.

⅛ in.	$0.25	1½ in.	$0.60	2½ in.	$1.00
¾ in.	30	1¾ in.	70	2¾ in.	1.10
1 in.	40	2 in.	80	3 in.	1.20
1¼ in.	60	2¼ in.	90	3½ in.	1.40
				4 in.	1.60

Discount—Reliance, 60; Royal, 70; Manhattan, 70 and 10 per cent.

Indurated Fibre Ware.

CORDLEY & HAYES.

SPITTOONS.

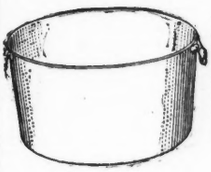
	Doz.
16 in. dia., 8 in. bigh	$24.00
12½ in. dia., 5½ in. bigb	10.80
9 in. dia., 5 in. high	7.80

Dis. on all 25 and 20%.

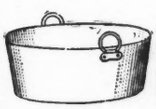
Pails.

	No. doz. in crate.	Cubic feet.	Price per doz.
Ladies' or Weaver's pails, 6 qt	1	2¾	$5.35
Half or buggy pails, 6 qt	1	3	4.80
Star pails (standard plain), 12 qt., stencilled "for fire only" without extra charge	1	3½	6.00
Deck or Mason's pails (same size as Star, but heavier, with heavy wire bail)	1	4	6.60
Railroad or fire pails, 14 qt. (also stencilled "fire" without extra charge)	½	3½	7.80
Fire pails, round bottoms	1	4	7.80
Milk pails, 14 qt	1	4	7.80
Stable pails, flush bottom, heavy wire bail, 14 qt	1	4	7.80
Stable pails, 16 qt., same as above	½	3½	8.40
" 18 " "	½	3¾	10.70
" 20 " "	½	4	12.00
Covers for fire or star pails		1	3.35

WASH TUBS.



No. 0, 23 in.	½	12	27.00
Nos. 0, 1, 2 and 3, nested	1 n.	3½	22.50
No. 1, 21 in.	½	10½	24.00
No. 2, 19½ in.	½	9	21.00
No. 3, 18½ in.	½	9	18.00
Nos. 1, 2, and 3, nested	½	9¾	21.00



KEELERS.

		Doz.
A—20 in.	7 in. deep	16.20
B—19 "	" "	15.00
C—18½ "	" "	14.00
1—17½ "	" "	13.20
2—15½ "	6 in. "	12.00
3—13½ "	5 in. "	10.20
4—12 "	4 in. "	9.00

MILK OR VEGETABLE PANS.

13½ in. dia 3¼ in. deep, 6 quarts,

$3.60 per doz.

WASH BASINS.

	Doz.
12½ in.	$4.80
12½ in.	4.20
11½ in.	3.60

CHAMBER PAILS.

12 in. dia., 9 in. deep, 3 gal. 16.00

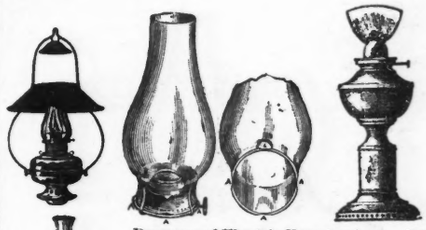
WATER COOLERS.

	Doz.
3 gal.	$32.00
4 "	40.00
5 "	44.00
6 "	48.00
8 "	64.00
10 "	80.00
12 "	96.00
15 "	120.00

WATER COOLERS AND FILTERS.

	Doz.
4 gal.	$96.00
5 "	108.00
6 "	120.00
8 "	144.00
10 "	192.00
15 "	288.00

Lamps.



Drummond Electric Hanging Lamp, 300 candle power, complete, each $3.50.
The electric lamp, 60 candle-power.
With decorated shades, nickel, per doz. $22.00
With opal plain shades, nickel, per doz, 18.00.
With decorated shades, brass, per doz. 21.00.
With opal plain shades, brass, per doz. 17.00.
Lamp chimney patent for Sun burners.

Per doz. No. 0, 50 cents. No. 1, 60c. No. 2, 75c.

Hitchcock nickel table lamp (No. 654), each	$3.25			
" " hanging	"	656	"	7.25
" " bracket	"	651	"	3.50
" " with reflector	653	"		3.75

" Frenob bronze bracket, with reflector, No 653, each $3.75.

Harp, complete, with square tin shade, per doz., $9.50.
Complete, with Burner and chimney, per doz., $1.50.
Hurricane lanterns 25 cents extra with guards.
875, ¾ wick, without guards, per doz., $5.00.
876, square safety lifting globe, per doz., $5.50.
877, ⅝ wick, safety lifting globe, per doz., $6.75.
Nickel plated diamond reflector reading lamp, 30 candle-power, $13.50 per doz.
Net.
Illuminated night clock, per doz., $27.

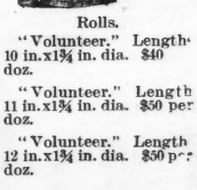
PAPER LAMPS.
Lined with oil proof composition.

	No. 0.	No. 1.	No. 2
Height, 2½ in.	3 in.	3¾ in.	
Diameter, 3½ in.	2½ in.	2½ in.	
Weight, ⅓ doz., 3¾ lbs.	1¾ lbs.	2 lbs.	
Price, $2.75 per doz.	$2.25	$2.75	
	No. 0.	No. 3.	No. 4.
Height, 2½ in.	5 in.	6½ in.	
Diameter, 3½ in.	3½ in.	4 in.	
Weight, ⅓ doz., 3¾ lbs.	3½ lbs.	7 lbs.	
Price, $2.75 per doz.	$3.25	$4.50	

Dis., 20%.

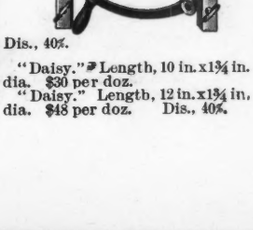
Miners'.

Brass, Collar and Breast in one piece, Spout and Body in one piece.
Price, $9 per gross net.



Laundry Appliances.

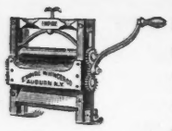
Empire Wringer Co.



Rolls.
"Volunteer." Length 10 in. x 1¾ in. dia. $40 doz.
"Volunteer." Length 11 in. x 1¾ in. dia. $50 per doz.
"Volunteer." Length 12 in. x 1¾ in. dia. $50 per doz.

Dis., 40%.

"Daisy." Length, 10 in. x 1¾ in. dia. $30 per doz.
"Daisy." Length, 12 in. x 1¾ in. dia. $48 per doz. Dis., 40%.



"Empire." Length, 10 in. x 1¾ in. dia. $63 per doz.
"Empire." Length, 11 in. x 1¾ in dia. $74 per doz.
"Empire." Length, 12 in. x 1⅞ in. dia. $84 per doz.
"Empire." Length, 12 in. x 1⅞ in. dia. $87 per doz.
"Empire." Length, 14 in. x 2¼ in. dia. $156 per doz.
"Empire." Length, 14 in. x 2¼ with pulleys. $220 per doz.
"Empire." Length, 16 in. x 2½ with pulleys. $360 per doz.
Dis., 40%.

EMPIRE CLOTHES DRYING BARS. $10 per doz. Dis., 40%.

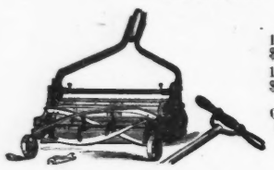
Closed. Open for use.

Lawn Mowers.

Forward Cut Mowers.

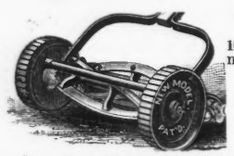
In.	Lbs.		In.	Lbs.	
10	Weight, 30¾	$13.00	16	Weight, 38	$19.00
12	" 31½	15.00	18	" 41	21.00
14	" 36	17.00	21		34.00

Dis. 60 and 5%.

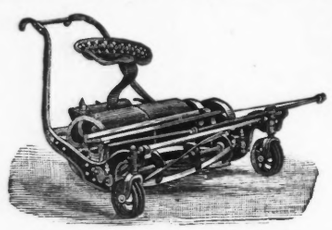


10 in.	12 in.	14 in.
$13.00	$15.00	$17.00
16 in.	18 in.	20 in.
$19.00	$21.00	$23.00

24 in., $30.00.
Geared at both ends.
Dis. 60 and 5 and 5%.



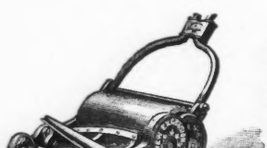
Chadborn & Caldwell Mfg. Co.
10 in. Croquet, 18 pound, mower..... $11.00
10 in..... 13.00
12 in..... 15.00
14 in..... 17.00
16 in..... 19.00
18 in..... 21.00
20 in..... 23.00
Dis., 60 and 5% and 5% cash 30 days, f.o.b. New York.



New Excelsior Horse Lawn Mower.

25 in. cut, without shafts or seat	$65.00
30 " with shaft and seat	110.00
35 " " " " "	135.00
40 " " " " "	170.00
Horse 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.

Link-Belt Machinery Co.'s. Price per running foot net.

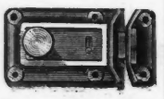
No.	Price.	No.	Price
25	$0.13	78	$0.40
32	.13	83	.45
33	.12	85	.50
34	.13	88	.50
35	.14	95	.60
42	.16	103	.75
45	.16	105	.70
51	.20	106	.90
52	.25	107	.80
55	.22	108	.80
57	.24	109	.90
62	.30	114	1.10
66	.30	122	1.50
67	.30	124	1.30
75	.35	146	1.40
77	.35		

Sprocket wheels..... 25%

Locks.

YALE PATENT. RIM STORE LATCH.

	Per doz.
3 × 5 in., 4 keys	$48.00
2½ × 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.

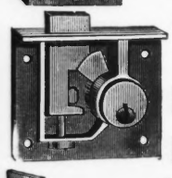
4⅝ × 3½	45.00
2⅝ × 3½	24.00

CUPBOARD LOCKS.

Plated Nose	13.20
Brass Nose	12.00

CUPBOARD

Dead Lock	10.80
Spring Lock	13.80



CHEST LOCKS.

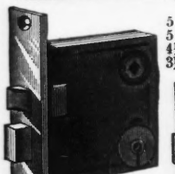
Plated nose	19.20
Brass "	18.00

DRAWER LOCK.

Plated nose	10.20
Brass "	9.00

KNOB LOCKS.

5 × 3⅜	22.50
5 × 3⅜	20.00
4¼ × 3⅜	13.25
3½ × 3⅜	10.50

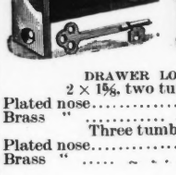


STANDARD LATCHES.
Dead locks.

3¾ × 2¾	24.00
2½ × 3¾	14.00
1¾ × 2¾	12.00

NIGHT LATCHES.

3¼ × 3⅜	20.00
2½ × 3¾	18.00



DRAWER LOCKS.
2 × 1⅝, 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.	3 tumblers.
Plated nose	7.50	9.00
Brass "	6.00	7.50

BRONZE SPRING PADLOCK.
2 flat steel keys.

In.	
1	11.00
1¼	12.00
1½	13.50
1¾	14.50
2	16.00
2¼	17.50

Subject to special net prices; no discount.

YALE KEYS.

Machinery—Foot Power.

S., M. & Co.'s Screw-Cutting 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.

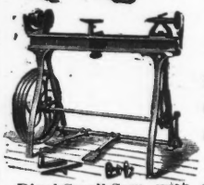
Price, boxed	$40
Scroll saw attachment	7
Boring attachment	10
Moulding attachment	10

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.
With mortise ¼ to 1 in. wide, 3 in. deep.
" cut tenons ⅛ to ¾ thick, 3 in. wide.
Price, with 3 chisels..... $25.00
Dis., 20%.

The "Star" Lathe.
Swings 9 × 25 in., back geared screw cutting.
Feeds in or out, right or left. Adjustable Tail Stock for Tapers.
Price..... $75.00
Dis., 15%.



The Crown Lathe.
Swings 10 × 36 in.

Price, boxed	$45.00
Compound slide rest	15.00
Countershaft	10.00

Dis., 20%.

Rival Scroll Saw, with six extra saw blades, twist drill and wrench.
Price..... $10.00
Lathe attachment..... $3.00
Dis., 25%.

The Challenge Scroll Saw, for shell, bone wood, or metal.
Nickel Plated, with six extra saws, twist drill and wrench.
Boxed..... $20.00
With lathe attachment..... $5.00
Dis., 25%.

Hand Circular Rip Saw.
Cuts 3¾ thick, 19 in. wide.
Price $50.00.
Dis..

W. F. & J. Barnes Co.
Scroll and Circular saw Combined.
Combined Machines.

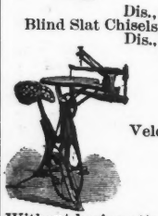
Combined circular scroll saw and boring attachment—2 circular saws, 12 assorted scroll saws, boring attachment, and self-centering drill chuck..... $50.00
Combined circular and scroll saw—2 circular and 12 scroll saws..... 40.00
Circular saw—1 extra rip and 1 cross-cut saw..... 35.00
Scroll saw—12 assorted scroll saws..... 32.00
Counter shaft for steam power..... 10.00
Dis., 35%.

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 " " " 23.00
1 doz. saw blades, 1 3-16 bit, } Included. Dis., 35%.

Lathe.

3 centres, 1 spur, 2 tool rests and sockets, 1 turned face-plate, $35.

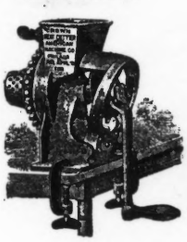
Dis., 30%.

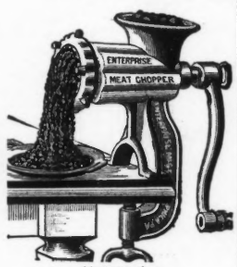
Lathe.

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.





American.				Enterprise.				
1	2	3	4	10	12	22	32	42
each, $5.00	7.00	10.00	25.00	each, $3.00	2.50	4.00	6.00	15.00
Dis. — —.				Dis., 30%.				

Motors (Water).

Size No. 8, for Sewing Machines, etc , $18 each.

No. 9, ⅛ horse-power (30 lbs. pressure), ¼ h. p. (50 lbs.), ½ h. p. 100 lbs.), ¾ h. p. (150 lbs.), 1 h. p. (200 lbs.), $30.

No. 10, ¼ horse-power (30 lbs. pressure), ½ h. p. (50 lbs.), 1 h. p. (100 lbs.), 1½ h. p. (150 lbs.), 2 h. p. (200 lbs.), $50.

No. 10½, ½ horse-power (30 lbs. pressure), 1 h. p. (50 lbs), 2 h. p. (100 lbs.), 3 h. p. (150 lbs.), 4 h. p. (200 lbs.), $75.

No. 11, 1 horse-power (30 lbs. pressure), 1½ h. p. (50 lbs.), 3 h. p. (100 lbs.), 4½ 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 h. p. (150 lbs.), 12 h. p. (200 lbs.), $175.

No. 13, 3 horse-power (30 lbs. pressure), 5 h. p. (50 lbs.), 10 h. p. (100 lbs.), 15 h. p. (150 lbs.), 20 h. p. (200 lbs.), $285.

Dis., 40%.

Governors for 11 and 12, $25 extra; for No. 13, $35 extra.

Mining Machinery.

N. B.—Special attention is invited to the goods advertised and illustrated in the advertising pages of the ENGINEERING AND MINING JOURNAL, quotations and discounts upon which would only mislead buyers.

Price-lists and other information may be obtained by addressing the advertisers direct, or by writing to the ENGINEERING AND MINING JOURNAL.

Concentrating Machinery.
Fort Scott Foundry & Machine Works Co.

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 7,500; $625.00.

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, $800. Discount, 10 per cent.

Automatic working Jig Machines, all complete, woodword included, with slidemotion: 2 sieves, $340; 3 sieves, $360; 4 sieves, $450.

With Eccentric Motion, all complete, woodwork included: 1 sieves, $200; 2 sieves, $270; 3 sieves, $320; 4 sieves, $330.

Automatic working Double Jig Machines, 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, $230. Discount, 25 per cent.

Nails and Tacks.

Swedes. Tacks.

Per doz.	½	¾	1	1½	2	2½	3	
½ wt..	35	40	46	50	55	60	65	75
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	½	¾	1	1½	2	2½	3	4
weight	60	70	80	90	1.00	1.10	1.20	1.40
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	½	¾	1	1½	2	2½	3	4
or paper	1.60	1.25	1.00	80	66	58	52	46
6	8	10	12	14	16	18	20	24
36	32	31	30	29	28	28	28	28

Discount, 67½,10 and 2%.

O. H. Swedes.
Price, same as Swedes.
Swedes steel tacks same list price as iron.

Upholsterers.
Price, same as Swedes.

Discounts, 72½, 10 and 2%.

Cut Tacks. Price per dozen ounces.

	1	1½	2	2½	3	4	6	8	10
¼ wt.....	..	..	..	..	35	40	45	50	55
	12	14	16	18	20				
	60	70	80	90	1.00				
½ wt.	1	1½	2	2½	3	4	6	8	10
	45	50	50	55	60	65	70	80	95
	12	14	16	18	20				
	1.10	1.25	1.40	1.55	1.70				
Full wt ..	1	1½	2	2½	3	4	6	8	
	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			

Discount, 70, 10 and 2%.

Carpet Tacks, flat and oval heads.

Blued, doz.	oz.	4	6	8	10	12	14	16	18	20
¼ wt.		35	40	45	50	55	65	75	85	95
		22	24							
		1.05	1.15							
" ⅛ wt.		4	6	8	10	12	14	16		
		65	70	80	95	1.10	1.25	1.40		
		18	20	22	24					
		1.55	1.70	1.85	2.00					
Tinned, doz. ¼ wt.		4	6	8	10	12	14	16		
		50	55	60	75	85	1.00	1.10		
		18	20	22	24					
		1.20	1.35	1.45	1.60					
Tinned, doz. ⅛ wt.		4	6	8	10	12	14			
		95	1.05	1.15	1.40	1.60	1.85			
		16	18	20	22	24				
		2.10	2.35	2.60	2.85	3.10				

Discount, 72½, 10 and 2%.

Finishing Nails.

Inch....	⅝	3½-8	4-8	4½-8	⅝	5½-8	6-8	7-8	1
Per lb...	48	40	32	28	26	24	22	20	18

1⅛ and larger.
16
Discount, 60, 10 and 2%.

Chair Nails.

Doz. ½ wt. ; doz. full wt.; pound B. or P.							
Inch..	⅝	3½-8	4-8	4½-8	⅝	5½-8	6-8	7-8
Per lb.	51	43	35	31	29	27	25	23
	1	1⅛						
	21	19						

Discount, 60, 10 and 2%.

Common and patent brads.

inch.	Price per doz. ½ wt.	Price per doz. full wt.	Price per lb. in papers or bulk.
2-8.....	.50	1.00	1.25
3-8.....	.60	1.20	.80
4-8.....	.65	1.30	.58
5-8.....	.72	1.44	.48
6-8.....	.80	1.60	.36
7-8.....	.90	1.80	.30
1.....	1.00	2.00	.26
1⅛.....	1.12	2.24	.25
1¼.....	1.26	2.52	.24
1½.....	1.82	3.64	.22
1¾.....	2.25	4.50	.20
2.....	2.43	4.86	.18

Dis. 60, 10 and 2%.

Oils. LUBRICATING.—Fiske Bros.

Lubroleine A cylinder oil 50 in. barrels.
Lubroleine D cylinder oil 40 in. barrels.
Lubroleine A machine oil 45 in. barrels.
Lubroleine B machine oil 35 in. barrels.
Lubroleine A engine oil 50 in. barrels.
Lubroleine B engine oil 40 in. barrels.
In cases 5c gal. extra.

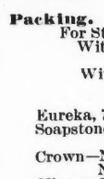
Crescent Axle Grease.—Barrels, 3c per lb; 100-lb. kegs 3½c lb.; 2-lb. decorated tins, $12, gross less 5 per cent.

Texas Star Axle Grease.—Barrels, 2½c per lb.; 100-lb. kegs, 3c per lb.

See Axle Grease, page 2.

Oil Stoves.

Burns 8 hours; holds 1 quart oil.



Nickel plated crown plate, per doz., $12.

Packing. 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%.
Hine & Robertson.
Eureka, 75c. per lb. Dis., 40%.
Soapstone—Standard, 8c. per lb.
XX. 11c. per lb.
Crown—No. 1, 23c. per lb.
No. 2, 26c. per lb.
Climax, 9c. per lb. Net.

See Rubber Packing, page 7.

Paints.

For Assorted Cans of 1, 2, 3 and 5 pounds. 100-lb. cases.

No.	lb. c.	No.	lb. c.
533. Scotch yellow.....	18	583. Black	18
534. Lead color	18	584. Dark blue.....	25
536. Brown	18	585. Chrome yellow.....	30
537. Light drab.....	18	586. Vermilion.....	30
539. Buff.....	18	587. Indian red.....	25
542. Warm drab.....	18	588. Bronze green.....	25
544. Dark green.....	25	589. Quaker green	25
581. Light green.....	25	546. Inside white.....	18
582. Norway red.....	18	547. Outside white.....	18

Discount 50 per cent.

Ordinary shades. Per gal.

Per gal.		Per gal.
One to 5 gallon caus.. $1.90	Half gallon cans.....	$2.00

Tuscan Red, Green and Yellow.

Per gal.		Per gal.
One to 5 gallon cans.. $3.10	Half gallon cans.....	$3.30

Vermilion.

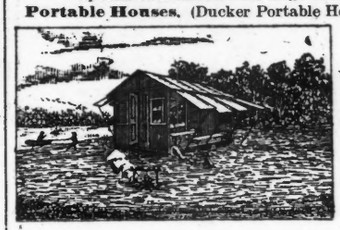
Per gal.		Per gal.
One to 5 gallon cans.. $5.00	Half gallon cans	$5.20

Discount 40 per cent.

The list in barrels, half-barrels and kegs (of 5 [gallon or larger) will be 10c. a gallon less than in gallon cans. Kegs of less than 5 gallons will be charged at gallon price. One-quarter gallon cans not put up. Special shades made to order.

Special cash discount for large orders.

Portable Houses. (Ducker Portable House.



Weight, 450 lbs.

Price, $150.

Closes securely.

Dis., 10%.

Weight, 85 lbs. per section.

Price, $220.

Dis., 10%.

No. 10.—26 × 33 ft.. including veranda and rear extension. Main part, 19 × 26 ft.....$500.00

Post Hole Diggers.

Chieftain Hay Rake Co.

Little Giant.....	$36.00 doz 11 cu ft.
Hercules.....	30.00 " " " "
New Champion....	20.00 " " " "
Scheidler.....	36.00 " " " "

Dis. 40% f.o.b. New York or Boston.

Press.

Combined press for cutting, forming, horning 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 et ceteras.....	$130	$200	$260	$420	$660
Weight, about.....lbs	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	16½	20
Hole through bed—circle intersecting.....ins	4½	6	8½	12	17
Hole through back—width.....ins	8	9½	12	15½	20½
Width between die clamps—clear.....ins	8	11	15	20	27
Distance back from center of slide bar.....ins	4½	5½	7	9	12
Height to slide-bar, when up..ins	5¼	6½	7½	8½	9
Stroke of slide-bar.....ins	1	1¼	1½	1¾	2
Adjustment of slide-bar.....ins	1	1¼	1½	1¾	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.....	30	40	50	60	70

Printers' Sundries.

Vanderburgh, Wells & Co.
And Liberty Machine Works.

Wood rules, 12 cents per yard.
Wood rules, on end wood, 15 cents per foot.

EUREKA STAND.
12 full cases.

Price without cases.....$12.00
Boxing and cartage..... 1.25

SHOOTING STICKS.

Each.
No. 1, 75c.
No. 2, $1.
No. 4, 45c., black.
No. 4, 60c., bright.
No. 5, 60c., black.
No. 5, 75c., bright.

GAUGE PINS—ALL SIZES.

Brass, 40c. doz.	Steel, 60c. doz.
Wire, 25c. doz.	Golden, 40c. doz.

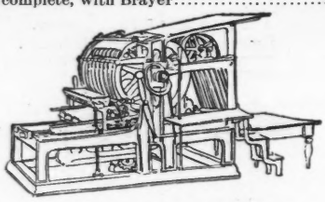
MITRE BOXES.
Regular size, 2 in., 50c. each.
Extra size, 3½ in., 75c. each.

LEAD CUTTER.

Curtis' Lead Cutter $2.00

PROOF PRESS, "OUR OWN."

9 × 32, complete, with Brayer.....$28.00



THE "LIBERTY" CYLINDER PRESS.
For Newspaper and Job Printing.

	Bed.	Form.	
No. 5	29 × 42	24 × 40	$1,200
6	33 × 47	28½ × 45	1,300
7	37 × 51	33 × 49	1,600

Dis., 20 and 5%.

THE "LIBERTY" JOB PRINTING PRESS.

	Size of chase.	
No. 2 — 7	× 11	$200
2a— 9	× 13	250
3 —10	× 15	300
3a—11	× 17	350
4 —13	× 19	400
5 —14½	× 22	500

Dis., 12½ and 5%.

Two sizes built extra strong for boxmakers, embossing, etc.

No. 3a—11 × 17.....$375
4 —13 × 19..... 425

Dis., 12 and 5%.

Fountains, either size, $25 extra, if ordered with press. Steam fixtures, either size, $15 extra.

THE AMERICAN CARD AND BILL HEAD PRESS.

No. 5—4 × 6..... $1
7—6 × 9..... 3
8—8 × 12..... 6
Dis., 20% and 5%.

THE "LIBERTY" PAPER CUTTER.

Cuts 30 inches.....$140.00
Extra knife..... 18.80
Dis., 12% and 5%.

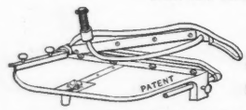
THE "LIBERTY" IMPOSING TABLES

Marble top.

No. 1—24 × 36.....$24
2—32 × 48..... 38
3—26 × 74..... 44
4—36 × 48..... 48
Dis., 12% and 5%.

Slate Top.

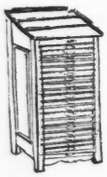
No. 1—24 × 36.....$18
2—32 × 48..... 25
3—26 × 74..... 32
Dis., 12 % and 5%.



Kelsey & Co.

The Eagle Card and Paper Cutter, 24½ inch, $12 each, $100 per doz.

THE "LIBERTY" TYPE CABINETS.



Number of cases.	Stained. Flat.	Stained. Galley.*	Grained. Flat.	Grained. Galley.*
	$	$	$	$
12⅞	12.00	14.50	14.00	17 00
16⅞	15.00	17.50	17.00	20.00
18⅞	16.50	19.00	18.50	21.50
20⅞	18.00	20.50	20.00	23.00
12¾	15.00	17.50	17.00	20.00
16¾	18.00	20.50	20.00	23.00
18¾	19.50	22.00	21.50	24.50
20¾	22.00	24.50	23.00	26.00
12 full	18.00	20.50	20.00	23.00
16 "	22.00	24.50	24.00	27.00
18 "	24.00	26.50	26.00	29.00
20 "	26.00	28.50	28.00	31.00

Number of cases.	Pine. Flat.	Pine. Galley.*	Cherry. Flat.	Cherry. Galley.*	Napanoch. Flat.	Napanoch. Galley.*	Walnut. Flat.	Walnut. Galley.*
	$	$	$	$	$	$	$	$
12⅞	18.00	21.00	20.00	23.00	22.00	25.00	23.00	26.00
16⅞	22.00	25.00	24.00	27.00	26.00	29.00	27.00	30.00
18⅞	24.00	27.00	.....	.....	.....	.....	.....	.....
20⅞	26.00	29.00	28.00	31.00	30.00	33.00	31.00	34.00
12¾	21.00	24.00	23.00	26.00	25.00	28.00	26.00	29.00
16¾	25.00	28.00	27.00	30.00	29.00	32.00	30.00	33.00
18¾	27.00	30.00	.....	.....	.....	.....	.....	.....
20¾	29.00	32.00	31.00	34.00	33.00	36.00	34.00	37.00
12 full	24.00	27.00	26.00	29.00	28.00	31.00	29.00	32.00
16 "	28.00	31.00	30.00	33.00	32.00	35.00	33.00	36.00
18 "	30.00	33.00	.....	.....	.....	.....	.....	.....
20 "	32.00	35.00	34.00	37.00	36.00	39.00	37.00	40.00

—*Furnished with galley top and extra drawer for copy.
Dis., 20 and 5%.

THE "LIBERTY" CASE STANDS AND RACKS.

Stands.

Single, without racks ..$3.75
" with racks for 8 full cases..... 4.00
Single, with racks for 10 full cases... ..... 4.25
Single, with racks for 12 full cases..... 4.50
Single, with racks for 14 full cases..... 4.75
Double, without racks... 4.25
" with racks for 8 full cases..... 4.50
Double, with racks for 16 full cases, and gal. rest 6.25
Double, with racks for 20 full cases and gal. rest.... 6.50
" " " " 24 " " " " 6.75
" " " " 24 ⅔ cases..... 5.25
" " " " 8 full and 8 ⅔ cases 5.00
" " " " 8 " " 8 ¾ " 5.25
" " " " 10 " " 12 ⅔ " 5.55
" " " " 12 " " 16 ⅔ " 5.70
" " " " 12 " " 16 ¾ " 6.05
Stands with closed ends, extra..... 2.00
Extra slides for stands, each..... .00

Case Racks.

Cases.	Inches High.	Price.	Inclosed Back and Sides.	Cases.	Inches High.	Price.	Inclosed Back and Sides.
12	41	$6.00	$8.50	30	84	$10.00	$13.50
16	50	7.00	9.50	32	51	12.50	16.00
20	60	8.00	11.00	40	60	14.00	17.50
24	70	9.00	12.00	60	84	18.00	23.00

Dis., 20 and 5 %.

THE "LIBERTY" TYPE CASES.

Name.	Outside Measurements.
Full size.....	32¼x16½x1 9-16
Rooker size.....	28⅛x14¼x1 9-16
¾ size.....	26x16½x1⅝
⅔ size.....	22⅝x16½x1⅝
Enlarged size.....	32¼x23x2 3-16
Wood type "	32¼x23x1 9-16
Mammoth "	44x23x1 9-16

Cabinet case sides extend 1½ to 3 inches. In ordering cabinet cases, state whether high or low fonts are wanted.

Name.	Without Pat. Clasps.	With Pat. Clasps.
News, full, per pair.....	$1 60	$1.75
" Rocker, "	1.60	1.75
" ¾ "	1.50	1.60
" ⅔ "	1.40	1.50
German, full, "	1 60	1.75
Music " "	2 00	2.20
Job " "	.90	1.00
Job, full size, California.....	.90	1.00
" Rooker.....	.90	1.00
" full, Yankee.....	.90	1.00
" ¾ Regular.....	.80	.90
" ⅔ Yankee.....	.75	.85
" " Boston.....	.75	.85
" " California.....	.75	.85
" " improved.....	.90	1.00
" full size, Middletown.....	1.20	....
" " Paterson.....	.90	....
" " New York.....	.90	1.00
Quadruple, full size.....	1.20	....
Double lower, "	1.20	....

Name.	Without pat. clasps.	With pat. clasps.
Galley lower, full size.....	$1.10	
Enlarged Yankee job.....	2.20	
Enlarged German.....	2.20	
Founder's sort case.....	2.20	
Half-cap.....	.50	
L. S. lead, full-size.....	1.00	
" rule "	1.15	$1.25
" " ¾ size.....	.95	1.05
" " ⅔ "	.80	.90
Improved, ⅔ "	.90	1.00
Space and quad, full-size.....	1.00	
Slug "	1.00	
Figure "	.90	
Triple "	.90	1.00
Improved triple "	.90	1.00
Triple, ¾ size.....	.80	.90
Blank, full-size	.65	
" ¾ size.....	.55	
" ⅔ size.....	.50	
Script, full-size.....	.90	
" ¾ size.....	.80	
" ⅔ size.....	.75	
Wood type, 23x32¼.....	1.10	
Mammoth, 23x44.....	1.30	
Metal furniture, full-size	1.25	
Border "	1.25	
" ⅔ size.....	1.00	
Leader, ⅔ size, per pair.....	1.40	
Butler jobs, full-size, per pair.....	3.00	
For pulls on cabinet cases add per case.....		.10
For rollers " "		.30

Dis., 25 and 5%.

THE "LIBERTY" GALLEYS.

All brass "indestructible."

Single,	3¾ x 23¾ inside	$2.50
"	3¾ x 17¾ "	2.00
"	3¾ x 11¾ "	1.75
Medium, 5 x 23¾ inside		2.75
Double, 6¼ x 23¾ inside		3.00

Dis., 33⅓%.

SMOOTH LINED NEWS GALLEYS.

	Half-lined.	Full-lined.		Half-lined.	Full-lined.
Single col.	$1.75	$2.00	Double col.	$2.00.	$2.50

Dis., 20% and 5%.

SCREW GALLEYS.

	Unlined.	Half-lined.	Full-lined.
Single column.....	$1.25	$1.50	$1.75
Double column.....	1.50	1.75	2.00

Dis., 20% and 5%.

SMOOTH LINED JOB GALLEYS.

Size.	Unlined.	Full-lined.	Size.	Unlined.	Full-lined.
6 × 10	$1.25	$2.00	12 × 18	$2.50	$3.50
8¼ × 13	1.50	2.50	14 × 20	3.00	4.00
9 × 14	1.75	2.75	15 × 22	3.50	5.00
10 × 16	2.00	3.00	18 × 25	4.00	5.50

Dis., 20% and 5%.

RULED GALLEYS.

These have a rule laid out on one of the rims, divided into quarter inches, by which to set advertisements. Cost of ruling extra, 25 cents.

Dis., 20% and 5%.

MAILING GALLEYS.

Zinc bottom, 50 cents; brass bottom, 90 cents. Brass closed both ends, $3.

Dis., 20% and 5%.

GALLEY RACKS.

From $3 up.

LEAD CUTTERS.

From $2 up.

D · and 5%.

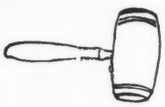
THE "LIBERTY" STEEL SHOOTING STICKS.

Bright, $1 each.
Nickelplated, $1.25 each.
Dis., 40%.

STANDARD METAL FURNITURE

25c. a pound.
In fonts of 25, 50, 75 and 100 lbs.
Dis., 15%.

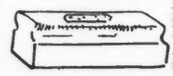
THE "LIBERTY" MALLETS.



Hickory, small.....	$ .20
" medium.....	.25
" large.....	.30
" iron bound.....	1.00
Lignum Vitæ, No. 4.....	.30
" " No. 3.....	.40
" " No. 2.....	.50
" " No. 1.....	.70

Dis. 20 and 5%.

THE "LIBERTY" PLANERS AND PROOF PLANERS.



Midget planer.....	10c.
Small Maple.....	20c.
Large "	25c.
" b'ked with leather.....	30c.
Midget " " "	12c.

Proof planer, faced with cloth, 50c.
Dis., 40%.

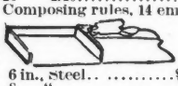
COMPOSING STICKS.

GROVER'S PATENT AND UNION.

	Screw or News.
6 in., 1.10	$ .90
8 " 1.20	1.10
10 " 1.40	1.20
12 " 1.60	1.40
14 " 1.80	1.60
16 " 2.00	1.80
18 " 2.20	2.00
20 " 2.40	2.20

Composing rules, 14 ems pica and under, 25 cents.

THE "LIBERTY" COMPOSING STICKS.



Grover.

6 in., Steel..	$ .90	16 in., Steel.	$1.80
8 "	1.00	18 "	2.00
10 "	1.20	20 "	2.20
12 "	1.40	Extra Clasp.	.10
14 "	1.60	Extra Knee.	.40

Screw.

6 in., Steel.	$ .75	16 in., Steel.	$1.45
8 "	.80	18 "	1.60
10 "	1.00	20 "	1.75
12 "	1.15	Extra Knee.	.30
14 "	1.30	" Screw and Nut.	.10

Dis., 40%.

Yankee.

6-in., Steel.	$ .75	12 in., Steel	$1.15
8 "	.80	Extra Knee	.30
10 "	1.00	" Clamp and Screw	.15

Other Sizes to Order.
Dis., 40%.

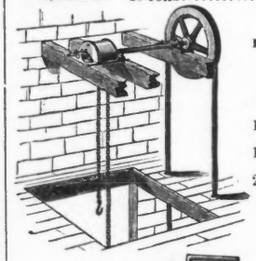
Albion.

6-in., Steel.	$1.00	6-in, German Silver.	$1.50
8 "	1.10	8 " " "	1.75
Extra Knee.	.40	Extra Screw and Nut.	.10

Pulley Blocks.

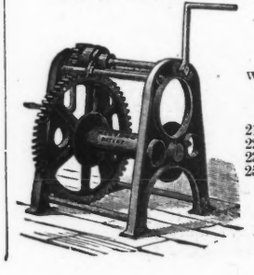
WESTON DIRECT.

	Each.
⅛ ton	$10
¼ ton	13
½ ton	15
1 ton	20
1½ tons	25
2 tons	30
3 tons	40
Geared.	
1 ton	35
2 tons	45
3 tons	60
4 tons	80
5 tons	110
6 tons	150
8 tons	210
10 tons	275



DOUBLE LIFT HOISTS FOR HATCHWAYS, ETC.

500 lbs.	$25.00
1000 "	50.00
1500 "	65.00
2000 "	80.00
500 "	30.00



WESTON CRAB SAFETY BRAKE, HANDLES CANNOT FLY BACK.

	Each.
21	$35.00
22	45.00
23	65.00
25	100.00

Pumps.

Prices on all pumps include cylinders.

No.	Dia. Cyl.	Suction.	Cap. stroke.	Price Iron.	Price Brass cyl.
0	2 in.	1 in.	1-15 gal.	$3.50	.....
1	2¼ "	1 "	1-12 "	4.00	$6.00
2	2⅜ "	1¼ "	1-11 "	4.50	7.00
3	2½ "	1¼ "	1-10 "	5.00	8.00
4	3 "	1¼ "	1-6 "	5.50	10.00
5	3¼ "	2 "	1-5 "	6.50	14.00
6	3½ "	2 "	1-4 "	8.00	18.00
7	4 "	2½ "	1-3 "	12.00	20.00

Dis., 65%.

1	2½ in.	1¼ in.	1-10 gal.	4.25	.....
2	3 "	1¼ "	1-7 "	4.75	.....
3	3½ "	1¼ "	1-5 "	5.25	.....
4	4 "	1½ "	1-4 "	5.75	.....
5	4½ "	1½ "	1-3 "	6.25	.....

Dis., 70%.

Standard and Cylinder for 1½ in. Iron Pipe, $16.00. Dis., 55%

No. 6½, standard and cylinder, 1¼ in pipe, $13.00.
No. 7½, standard and cylinder, 1¼ in. pipe, $15.00.
No. 8½, standard and cylinder, 1½ in. pipe, $18.00.
With hose and discharge pipe, add $3.00 to list price.
Dis. 55%.

No. 1, diam. cyl., 2½ in.; cap. stroke. 1-8 gal.; size pipe, 1¼ in. Price, iron, $12.50; brass cyl., $17.50.
No. 2, diam. cyl., 3 in.; cap. stroke, 1-6 gal.; size pipe, 1¼ or 1½ in. Price, iron, $14.50; brass cyl., $18.50.
No. 3, diam. cyl., 4 in.; cap. stroke, 2-5 gal.; size pipe, 1½ or 2 in. Price, iron, $23.50; brass cyl., $34.50. Dis., 55%.

No. 1, diam. cyl., 3 in.; suction, 1¼ in. cap. stroke, 3-10 gal. Price, iron, $28.00; brass cyl., $58.00.
No. 2, diam. cyl., 4 in.; suction, 1½ in.; cap. stroke, 1-2 gal. Price, iron, $32.00; brass cyl., $60.00.
No. 3, diam. cyl., 5 in.; suction, 2 in.; cap. stroke, 6-7 gal. Price, iron, $35.00; brass cyl., $90.00.
No. 4, diam. cyl., 6 in.; suction, 2½ in.; cap. stroke, 1 1-5 gal. Price, iron, $45.00; brass cyl. $120.00. Dis., 45%.

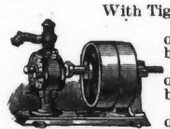
No.	Diam. cyl.	Cap. stroke.	Stroke.	Pipe.	Price.
0	2 in.	1-11 gal.	7 in.	1 in.	$21.50
00	2½ "	1-7 "	7 "	1¼ "	23.00
1	3 "	1-5 "	7 "	1½ "	25.25
2	3½ "	1-3 "	7 "	1½ "	27.25
3	4 "	4-10 "	7 "	2 "	30.50
3½	4½ "	1-2 "	7 "	2 "	37.50
4	5 "	8-10 "	10 "	2½ "	44.00
4½	5½ "	1 "	10 "	2½ "	47.00
5	6 "	1 1-5 "	10 "	3 "	50.00

Dis., 40%.

No.	Diam. cyl.	Cap. stroke.	Diam. pipe.	Price. Iron.	Price. Br's cyl.
1	2 in.	1-5 gal.	1 in.	$39	$51
2	2½ "	1-3 "	1¼ "	41	56
3	3 "	1-2 "	1½ "	45	62
4	3½ "	6-7 "	2 "	51	81
5	4 "	7-8 "	2 "	63	114
6	4½ "	1 "	2 "	80	155

Dis., 40%.

With Tight and Loose Pulleys.



No. 1, cap. per rev., 1-6 gal.; size of pipe, 1¼ in.; price, iron, $26; bronze, $45.
No. 2, cap. per rev., 1-5 gal.; size of pipe, 1½ in.; price, iron, $31; bronze, $55.
No. 4, cap. per rev., 1-3 gal.; size of pipe, 2 in.; price, iron, $48; bronze, $75.
Pulleys on Nos. 1 and 2 are 8 in. diam., 2½ in. face; on No. 4, 12 in. diam., 3½ in face.
Balance wheels for above pumps. $1, $2, and $3, according to size. Dis., 45%.

No. 2, ½ to 2 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, ¾ in.; discharge, ⅜ in.; price, $9.
No. 3, 1 to 4 gal per min.; length of drive pipe, 25 to 40 ft.; callbre of pipes, drive, 1 in.; discharge, ¾ in.; price, $11.
No. 4, 2 to 8 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive 1½ in; discharge 1¼ in; price $14
No. 5, 3 to 14 gal, per min.; length of drive pipe, 25 to 40 ft.; calabre 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, 2½ in.; diseharge, 1¼ 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.; discnarge, 2½ in.; price, $125. Dis., 45%.

Railroad Dumping Cars and Carts.

A. C. McEWEN.

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.	36"		170				
"	4' 8½"		185				
Hand.....	36"		45				
"	4' 8½"		50				
Push.....	36"		40				
"	4' 8½"		45				
R.R. Construction	36"		60				
"	4' 8½"		65				
Carts.							
Plantation and Railroad..... Wagons.			45 to 75				
McEwen Patent Dumpling....		1 "	175	1½ "	200		

*These cars built of any gauge from 18" to 56½" and of any capacity from ½ to 6 cu. yd.

Refrigerators.

Indurated Fibre and Stoneware-Lined.

Cordley & Hayes.

No.	High.	Wide.	Deep.	Price.
35	46¼	28¾	20¼	$20.00
75	44¼	33¼	23½	28.00
85	47¾	38	23½	34.00

Nos. 75, 85.

No.	High	Wide.	Deep.	Price.
2	41	46	26	$36.00
6	84	46	26	60.00

No. 2. No. 6.

Mirror 16 by 18 in. Dis., 30 and 5%.

Slate.

F. o. b. New York. Stowage allowed.

Purple and Green, per 100 feet sq..... .....$4.50
Dark blue, per 100 feet sq..... 4.10
Sizes, 24 × 12 = 115 to sq., 650 lbs. weight.
Sizes, 20 × 10 = 170 to sq., 650 lbs. weight.

Sash Chains.

Phosphor Bronze Smelting Co.

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 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 enameled, 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 hooks, 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	10%
" " Steel " "	40	10	10	10%
" " Fastenings.....	40	10	10%	

Scales.—Discount on all scales 50 per cent.

Postal scales.

No 1, capacity ½ to 9 oz. $3.00.
No. 2, capacity ½ to 12 oz., $4.00.
No. 3, capacity ½ to 34 oz. $6.00
No. 4, capacity ½ oz. to 4 lbs., $8.00

Even balance trip scales, seamless scoop, with weights.

No. 1, capacity ½ oz. to 2 lbs., tin scoop, $5.50 brass scoop, $6.50.
No. 2, capacity ½ oz. to 4 lbs., tin scoop, $6.50; brass scoop, $7.50.
No. 2½, capacity ½ oz. to 18 lbs , tin scoop, $11; brass scoop, $12.50.

Butter Trip Scales, slab, weights and scoop.

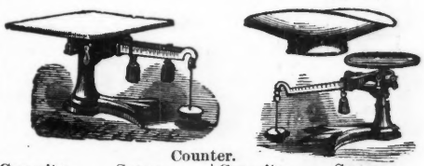
No. 7, ½ oz. to 10 lbs.,	10 in. slab,	without	side beam	$10.50
" " " " "	" "	"	with "	11.50
" 8 " "	20 lbs., 12 in.	"	without "	12.50
" " " " "	" "	"	" "	13.50

Tea Scales—All Seamless Scoops.

Capacity.	Scoop.	Capacity.	Scoop.
¼ oz. to 10 lbs.	Tin ..$8.00	¼ oz. to 10 lbs.	Brass .. 9.00

Druggists.

Capacity.	Scoop.	Capacity.	Scoop.
1-16 oz. to 8 lbs.	Tin ..$10.00	1-16 oz. to 8 lbs.	Brass..$11.00



Counter.

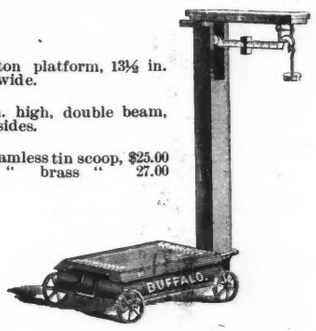
Capacity.	Scoop.	Capacity.	Scoop.
½ oz. to 36 lbs.	Tin ..$10.00	½ oz. to 36 lbs.	Brass..$12.00

Grocer.

Capacity.	Scoop.	Capacity.	Scoop.
½ oz. to 62 lbs.	Tin ... $12.00	½ oz. to 62 lbs.	Brass..$14.00

Meat or Butter Scales, with Slab.

½ oz. to 62 lbs.,	with Single Beam	$14.00
" " " "	Double "	15.00



Patent Boston platform, 13½ 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.
1	400 lbs.	21½ by 15 inches.	$23.00
2	600 lbs.	25 by 16 "	30.00
3	800 lbs.	25 by 17 "	34.00
4	1,000 lbs.	26 by 17 "	39.00
5	1,200 lbs.	28 by 20 "	45.00
6	1,600 lbs.	29 by 21 "	55.00
7	2,000 lbs.	32 by 23 "	70.00

With Wheels.

No.	Capacity.	Platform.	Price.
1	400 lbs.	21½ 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.

With Wheels and Drop Lever.

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.	33¼ by 24¾ "	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 ⅛, $12.

No. 2 cuts round metal up to ½ in., steel to 3-16, $20.

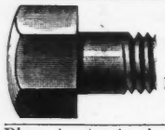
Discount, 25%.

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. 33 1-3%.
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	½	9-16	⅝	¾	13-16	⅞	1	1⅛	1¼	1⅜
Length head.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
Diam. screw.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞		1⅛
¾..	3.00	3.25	3.75	4.40	5.50	7.00					
1 ..	3.25	3.50	4.00	4.70	5.70	7.00	9.50				
1¼..	3.50	3.75	4.25	5.00	6.00	7.50	9.50	12.20			
1½..	3.75	4.00	4.50	5.30	6.30	8.00	10.00	12.20	16.00		
1¾..	4.00	4.25	4.75	5.60	6.60	8.50	10.60	12.80	16.60	21.20	
2 ..	4.25	4.60	5.05	5.95	7.00	9.10	11.20	13.40	17.20	22.30	29.00
2¼..		5.00	5.40	6.35	7.50	9.70	11.90	14.10	17.90	23.60	30.50
2½..			5.80	6.80	8.00	10.40	12.70	14.90	18.80	25.10	32.30
2¾..				7.30	8.60	11.20	13.60	15.90	29.00	26.90	34.40
3 ..					9.30	12.10	14.70	17.00	21.80	29.00	37.00
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%; dis., heads black, 60 and 5%; dis., heads extra finish, 50%; dis., heads case-hardened, 5%; dis., heads polished after hardening, 45%.

SQUARE CAP SCREWS.

Diam. head.	⅝	7-16	½	9-16	⅝	11/16	¾	⅞	1⅛	1¼	1⅜
Length head.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
Diam screw.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
¾	2.40	2.75	3.20	3.80	4.40	5.75					
1	2.60	2.95	3.40	4.00	4.70	5.75	7.70				
1¼	2.75	3.10	3.65	4.20	4.95	6.05	7.70	10.50			
1½	2.90	3.30	3.85	4.45	5.25	6.35	8.25	10.50	14.00		
1¾	3.05	3.50	4.10	4.70	5.55	6.65	8.80	11.10	14.80	18.00	
2	3.25	3.70	4.35	4.95	5.90	7.05	9.40	11.80	15.70	19.00	22.50
2¼		4.00	4.65	5.25	6.30	7.55	10.10	12.60	16.70	20.20	24.00
2½			5.00	5.60	6.75	8.15	10.90	13.50	17.80	21.50	25.80
2¾				6.00	7.25	8.85	11.80	14.60	19.10	23.10	27.90
3					7.80	9.65	12.80	15.90	20.60	25.00	30.50
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%; dis., heads black, 65 and 5%; dis., heads extra finish, 55%; dis., heads case hardened, 60%; dis., heads polished-hardened, 50%.

MILLED HEADS, COLLAR SCREWS

Diameter of Collar.	¼	11/32	7/16	½	⅝	11/16	13/16	15/16	1	1¼
Diameter of Screw.	⅛	3/16	¼	5/16	⅜	7/16	½	9/16	⅝	¾
¾	2.50	2.80	3.10	3.75	4.40	5.00	6.25			
1	2.80	3.10	3.40	4.05	4.70	5.30	6.60	8.25		
1¼	3.10	3 40	3.70	4.35	5.00	5.60	7.00	8.60	11.25	
1½	3.45	3.70	4 00	4.70	5.30	5.95	7.40	9.00	11.90	15.00
1¾		4 05	4.35	5.05	5.65	6.35	7.80	9.45	12.60	15.60
2			4.70	5.45	6.25	6.85	8.40	10.00	13.35	16.25
2¼				5.95	6.85	7.40	9.00	10.60	14.15	17.10
2½					7.50	8.10	9.60	11.25	15.00	18.00
2¾						8.75	10.30	11.90	15.90	19.00
3							11.00	12.60	16.85	20.00
Threads to inch	40	30	20	18	16	14	12 or 13	12	11	10
Add for each ¼ inch	30	40	50	60	80	1.00	1.30	1.60	2.00	2.40

Length under Head to Point.

Dis., 25%.
MILLED FROM SOLID BAR.

Fillister. Bevel Head. Button Head

Diam. Head	3-16	¼	⅜	7-16	9-16	⅝	¾	13-16	⅞	1
Length Head	⅛	3-16	¼	5-16	⅜	7-16	½	9-16	⅝	¾
Diam. Screw	⅛	3-16	¼	5-16	⅜	7-16	½	9-16	⅝	¾
¾	2.00	2.25	2.50	3.00	3.50	4.00	5.00			
1	2 25	2.50	2.75	3.00	3.75	4.25	5.30	6.60		
1¼	2.50	2.75	3.00	3.50	4.00	4.50	5.60	6.90	9.00	
1½	2.75	3.00	3.25	3.75	4.25	4.75	5.90	7.20	9.50	12.00
1¾		3.25	3.50	4.00	4.50	5.00	6.20	7.50	10.00	12.50
2			3.75	4.35	5.00	5.50	6.75	8.00	10.75	13.00
2¼				4.75	5.50	6.00	7.25	8.50	11.50	13.75
2½					6.00	6.50	7.75	9.00	12.00	14.50
2¾						7.00	8.25	9.50	12.75	15 25
3							8.75	10.00	13.50	16.00
Threads to inch.	40	30	20	18	16	14	12	12	11	10

Length under Head.

Head on Bevel and Button Head Screws, 1-16 larger in diameter than above specifications.
Price, according to size of head.
Discount, 50%; case hardened, 45%; case hardened and polished, 35%.

Soups (French). Franco-American Brand

	Per dozen. In Cans—Quarts.	Pints.	In Glass. 1½ pt.
Green turtle	$3.00	$4.32	$9.00
Terrapin			
Chicken	3.75	2.25	
Mulligatawny			
Mock turtle			4.50
Ox tail			
Consommé			
Tomato			
Julienne			
Printanier	3.50	2.10	
French bouillon			
Mutton broth			None in glass.
Vegetable			
Beef			
Pea			

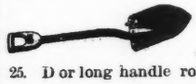
Packed in cases of..... 2 doz. 4 doz. 1 doz.
Regular Assorted Cases. In Cans—Quarts.
2 Chicken, 1 Mulligatawny, 3 Mock Turtle, 3 Ox Tail, 2 Consommé, 2 Tomato, 3 Julienne, 1 Printanier, 1 Mutton Broth, 1 Vegetable, 1 Beef, 2 French Bouillon, 2 Pea. Per doz., $3.55.
In Glass.
11 Chicken, 1 Mulligatawny, 2 Mock Turtle, 1 Ox Tail, 2 Consommé, 2 Tomato, 1 Julienne, Printanier, 1 Mutton Broth.
Terms cash Discounts: 5% for lots of 10 cases, 10% for lots of 5 cases. 15% for lots of 50 cases.

Spades and Shovels.

The D. F. Jones Mfg. Co., of Gananoque (Ld.).
JONES'
Patent plain black solid cast-steel shovels and spades.

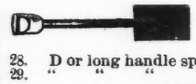
Patent solid steel shovel.

No.		Per Doz. No. Black.	Per Doz. Pol's'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.	" " " " chareoal.8	20.50	22.00



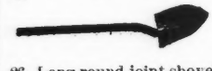
Pt. plain back solid cast steel shovel.

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	16.00	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.

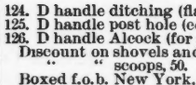
50.	D. or long handle sq.-point shovels.2	$12.00	$13.00
51.	" " " " " 3	12.75	14.00
52.	" " " round point " 3	12.75	14.00
55.	D. handle spades.....2	12.25	13.25
56.	" " " 3	13.00	14.25

Patent solid corrugated cast steel scoop.

SCOOPS.

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
	Jones' riveted scoops.		
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.	" " " Locomotive 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
	" " " 32 in. D..2		13.50
	" " " 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.

Stamp Head Shoes and Dies.

Shoe & Die (Adamantine), showing even wear from end to end.
Chrome Steel Works.
8 cents per lb f.o.b. New York.

Stencil Inks.

Black.

No.	Per can.	Per cake.	No.	Per can.	Per cake.
1.....	7 cents	3 cents	3.....30 cents.		12 cents
2.....10	"	5 "	4.....50 "		20 "

Blue.

1.....10 cents.		6 cents	3.....30 cents.		22 cents
2.....15	"	9 "	4.....50 "		40 "

Red and Green.

1.....12 cents		8 cents	3.....50 cents.		42 cents
2.....20	"	15 "	4.....90 "		80 "

Per doz. cans or cakes, net, per gross, 10% less.

Indelible Ink.

Small bottles per	100	$2.75
" "	500	12.00
" "	1,000	20.00

STENCIL COMBINATIONS.
Contains Alphabet, Figures, Brush, and Ink.

½ inch, per doz		$5.00
¾ " "		5.40
1 " "		5.75
1¼ " "		7.50
1½ " "		8.40
2 " "		10.00
2½ " "		15.00

Dis., 10%.

Tools.

ARTISANS.

Chisel (Mason).
Stone, 5 and 8c. lb., net.

Mill Picks.
Cast steel. 2 to 3 lbs., $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 Frocs.

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, 2% 10 days.

Vise.

No 1. Solid Box Vises.

		Each.
No. 25, 3⅜ in.	Jaw	$12.00
" 30, 3½	"	11.00
" 55, 3⅞	"	10.00
" 40, 4	"	10.50
" 45, 4¼	"	11.00
" 50, 4¼	"	11.50
" 55, 4½	"	12.00
" 60, 4½	"	13.00
" 65, 4¾	"	14.00
" 70, 5	"	15.00
" 75, 5	"	16.00
" 80, 5¼	"	17.50
" 85, 5¼	"	18.50
" 90, 5½	"	20.00
" 95, 5¾	"	21.00
" 100, 6	"	22.00
" 105, 6	"	23.00
" 110, 6¼	"	24.00
" 115, 6¼	"	25.00
" 120, 6½	"	26.00
" 125, 6½	"	27.50
" 130, 6¾	"	29.00

	Each.		Each.
No. 135, 6¾ in. Jaw	$31.50	No. 170, 7¼ in. Jaw	$44.50
" 140, 7 "	33.00	" 180, 8 "	47.00
" 145, 7 "	35.00	" 190, 8 "	53.00
" 150, 7 "	36.00	" 200, 8 "	56.00
" 160, 7¼ "	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 5%.

Coal Picks.

No.		Per doz.
16, Weight, 2	lbs.	$8.50
16, " 2½	"	9.00
16, " 3	"	9.50
16, " 3½	"	10.00
16, " 4	"	10.50
16, " 4½	"	11.00
16, " 5	"	11.50
16, " 5½	"	12.00
16, " 6	"	12.50
16, " 6½	"	13.00
16, " 7	"	14.00

Packages charged at cost. Dis., 60%.

Adze Eye Miners Picks—Surface, Drifting and Poll.

No.			Per doz.
19, Surface,	No. 1, 4	lbs.	$14.00
19, "	No. 2, 4½	"	15.00
19, "	No. 3, 5	"	16.00
19, "	No. 4, 5½	"	17.00
19, "	No. 5, 6	"	18.00
19, "	No. 6, 6½	"	19.00
19, "	No. 7, 7	"	20.00
20, Drifting,	No. 1, 3	"	12.50
20, "	No. 2, 4	"	14.00
20, "	No. 3, 4½	"	15.00
20, "	No. 4, 5	"	16.00
20, "	No. 5, 6	"	17.50
21, Poll,	No. 1, 3½	"	15.00
21, "	No. 2, 4	"	16.00
21, "	No. 3, 4½	"	17.00
21, "	No. 4, 5	"	18.50
21, "	No. 5, 6	"	20.00
21, "	No. 6, 6¾	"	21.50

Dis., 60, 10 and 5%.

Ore Picks.

No.			
54, Adze Eye,	5 to 6	lbs. ₱ 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 and 10

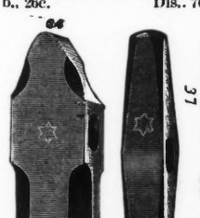
Tamping Picks.

Adze eye, 6 to 7 lbs., per doz., $17.
Adze eye, 7 to 8 lbs., per doz., $18.
Adze eye, 8 o 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.
Dis., 60 and 10%.

Steel Face Hammers.

No. 43, band drilling hammers, 2 to 5 lbs.; No. 45, napping bammers, 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 b., 26c. Dis., 70 and 10%.

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.
No. 37. Coal sledge, 5 lbs. and over, 30c.; 3 to 5 lbs. 36c.; under 3 lbs., 45c. per lb.

No. 43, hand drilling hammer, 5 lbs. and over, 36c.; 3 to 5 lbs., 40c.; under 3 lbs., 45c. per lb.
Dis., 70 and 10%.

Cast Steel.

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., 36c.; under 3 lbs., 45c. per lb.
No. 45, napping bammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 35c., under 3 lbs., 45c. per lb.
Dis., 70 and 10%.

RAILROADS.

Railway Track Punch

Round Point.
15c. lb., net.

Track Wrench.

7¾c. lb., net.

Rail Fork.

9c. lb., net.

Crow Bars.
Wedge Points,
3½c. lb., net.
Pinch Point,
3⅛c. lb., net.

65 Tamping Bar,
6c. lb., net.

66 Claw Bar,
7c. lb., net.

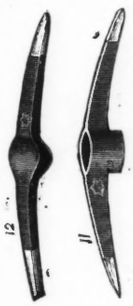
Railroad Spike Mauls
6 to 16 lbs., Steel Face
18c. lb.

Dis., 50, 10, and 5%.

Steel Track Chisel,

15c. per lb., net.

Railroad or Clay Picks.



No.			Per doz.
11, Adze eye,	4 to 5	lbs.	$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 and 10%.

Mattocks—Price per doz.

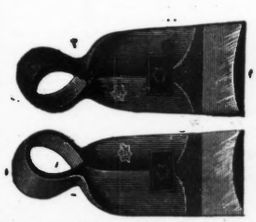
2, Adze Eye, Long Cutter, 6 lbs., $16.00.
3, Adze Eye, Short Cutter, 5½ lbs., $15.50.
2, Adze Eye, Long Cutter, Light, $15.00.
3, Adze Eye, Short Cutter, Light, $15.00.
4, Hunt Eye, Long Cutter, 6 lbs., $16.00.
5, Hunt Eye, Short Cutter, 5½ lbs., $15.50.

Adze Eye Pick Mattocks.....$16.

Hunt Eye Pick Mattocks.....$16

Dis., 60 and 10%.

Grub Hoes.



Western Pattern, No. 0, 3 lbs., ₱ doz., $10.50.
Western Pattern, No. 1, 3½ lbs., ₱ doz., $11.
Western Pattern, No. 2, 4 lbs., ₱ doz., $11.50.
Western Pattern, No. 3, 4½ lbs., ₱ doz., $12.
Baltimore Pattern, No. 1, 3½ lbs., ₱ doz., $11.
Baltimore Pattern, No. 2, 4½ lbs., ₱ doz., $11.75
Baltimore Pattern, No. 3, 5 lbs., ₱ doz., $12.75.
Baltimore Pattern, No. 4, 5¾ lbs., ₱ doz., $13.75.
Dis., 60 and 10%.

BAILEY'S PATENT WOOD PLANES.

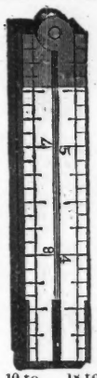
Smooth.	Handle smooth.	
9 × 3¾ in.	8 × 2 in.	9 × 2 in.
$2	$2	$2.50 each

Jack.	Fore.	Jointer.
15 × 2⅛ in.	20 × 2¾ in.	26 × 2⅝ in.
$2.50	$2.75.	$3.25 each

Dis., 40, 10 and 10%.

Stanley Rule & Level Co.

CARPENTERS'.



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, 1⅜ inches wide.

Plate.	Middle.	Edge.	Bound.
Square joint	$7	$9	$18
Arch "	9	11	20

Two feet, two-fold, 1½ inches wide.

Square joint.	Arch.	Arch Bound.
$5	$7	$16
12	14	24

Gunter's Slide.

Dis. 80, 10 and 10%.

LEVELS.

	10 to 16 in.	18 to 24 in.
Arch top plate, 2 side views	$9.00	$12.00

PLUMBS AND LEVELS.

Arch top plate, 2 side views.

	12 to 18 in.	18 to 24 in.	24 to 30 in.
Polished	$14.00	$16.00	$18.00
Mahogany	....	16.50	22.50
Mahogany tp'd and lp'd	27.00	.....	.....
Polished and lipped	.....	.....	24.00
Polished and tipped	.....	.....	28.00
Polished, lip'd and tip'd	.....	.....	35.00

	in.	
Mason's level, 2 plumbs, polished,	36,	$30.00
Mason's level, 2 plumbs, p'd and t'd,	36,	36.00
Mason's level, 2 plumbs, polished,	42,	36.00

PATENT ADJUSTABLE PLUMBS AND LEVEL.

Arch Top plate, 2 side views	26 to 30 in.
Polished and lipped	$27.00
Polished and tipped	30.00
Polished, lipped and tipped	39.00
Mabogany	27.00
Manogany, lipped	33.00
Mabogany, lipped and tipped	48.00
Polished, triple stock, lipped and tipped	48.00
Mabogany " " " " "	60.00
Rosewood, lipped and tipped	90.00

Dis., 70, 10, 10%.

POCKET LEVELS.

Iron top, Japanned	2 50
Brass top	3.00

Dis., 70, 10, 10%.

SCREWDRIVERS.

Varnished handles, pat. metallic fastening. Size 1½, $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 %.

PLANES, BAILEY'S PATENT IRON.

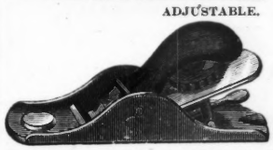
With pat. lateral adjustment.

Smooth, 8 in. × 1¾ in., $3; 9 in. × 2 in., $3.25; 10 in. × 2⅜ in., $3.75 each.
Jack, 14 in. × 2 in., $3.75.
Fore, 18 in. × 2¾ in., $4.75
Jointer, 24 in. × 2⅝ in., $6.50 each.
Dis., 40, 10 and 10 %.

STANLEY IRON BLOCK PLANES.

3½ × 1 in. 20c.
5½ × 1¼ in. 40c.
7½ × 1¾ in. 60c. each.

ADJUSTABLE.



5½ × 1¼ in. 60c.
7½ × 1¾ in. 85c. 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) Deptb 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%.

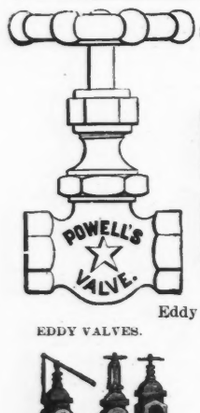
Ludlow Valve Co.
Double Gate Brass Valves.
Gland in packing box.

Size.	Screw socket.	Flange.	Diameter of Standard Flange.	Face to face of Screw socket	Face to face of Flanges.	Extra for slide stem and lever subject to discount.
In.	$	$	In.	In.	In.	
⅛	1.25	.....	.....	2¼	.....	$1.00
¾	1.65	.....	.....	2½	.....	1.00
1	2.15	.....	.....	2⅝	.....	1.00
1¼	3.15	.....	.....	3⅜	.....	1.00
1½	4.25	.....	.....	3¾	.....	1.00
2	6.25	11.50	6	4½	4½	1.00
2½	11.50	18.00	6½	4 13-16	5⅜	1.25
3	16.00	22.00	7	5	6¼	1.25
3½	21.00	31.00	7½	.....	.....	1.25
4	35.00	43.00	9	.....	7 1-16	1.25
5	52.00	64.00	10	.....	.....	1.25
6	78.00	90.00	11	.....	9	1.25
8	.....	.....	.....	.....	.....	.....
10	.....	.....	.....	.....	.....	.....
12	.....	.....	.....	.....	.....	.....

Rubber-Faced Slide Gate Fire Hydrant.

Diameter of pipe connection.	Diameter of stand pipe.	Diameter of seat ring.	One 2½ nozzle.	Two 2½ nozzles.	Three 2½ nozzles.	Four 2½ nozzles.	Six 2½ nozzles.	One steamer nozzle.	One steamer and one 2½ nozzle.	One steamer and two 2½ nozzles.	Frost case, standard length.
Inches.	Inches.	Inches.									
3 or 4	4⅝	3	$28	.....	.....	.....	.....	.....	.....	.....	$4.50
3–4–6	5¾	4	31	$33.00	$35.00	.....	.....	$33.00	$35.00	$37.00	5.00
4 or 6	7	5	.....	38.50	40.50	.....	.....	38.50	40 50	42.50	6.50
6 or 8	8	6	.....	49.00	51.00	$53.00	.....	49.00	51.00	53.00	7.50
8 or 10	10	8	.....	.....	.....	.....	.....	.....	.....	.....	.....

For each 6 inches or less than standard length of stand pipe, add or deduct from list.	For each 6 inches more or less than standard length of frost case, add or deduct from list.	Extra charge for hub.	Independ't nozzle gates each.
$0.60	$0.44	.....	.....
.75	.50	6 in. $0.50	$3.50
.85	.70	No ch'ge	3.75
1.00	.90	8 in. $1.25	3.75
.....	.....	.....	4.50



Star Radiator Valves, with Brass T Handles or Wood Wheels.

Size; inches.	½	¾	1
Plain brass	$1.60	$2.00	$2.50
Plated trim'gs.	1.80	2.25	2.80
Rough & Plat'd	2.00	2.45	3.05
Finish'd & P't.	2.50	3.00	3.65

Size, inches.	1¼	1½	2
Plain brass	$3.60	$4.80	$7.50
Plated trim'gs.	3.95	5.20	8.00
Rough & Plat'd	4.20	5.50	8.50
Finish'd & P't.	4.95	6.50	9.75

Dis., 40, 10 and 5%.

Eddy Valve Co.

EDDY VALVES.

S. S. & L. O. S. & Y. Class 2.

Class 3 and 4. Cl'ss 4.

Size.	Class 2. Iron, brass mounted. Screw, or Gauge ends.	Class 2. Add for S S&L	Class 3. All ir'n for gas. Hub ends.	Class 4. Water works valves. Hub ends.	Class 5. Quick opening valves with rack and pinion stem. Iron, brass mounted. Hub ends.	Class 5. Screwed.	Class 5. Flanged.
2	$7.00	$1.00	$8.00	$10.00	$10.00	$9.00	$9.00
2½	10.50	1.30	.....	.....	15.00	14.00	14.00
3	13.00	1.40	10.00	15.00	20.00	17.00	17.00
3½	16.50	1.50	.....	.....	25.00	21.00	21.00
4	18.00	1.70	15.00	18.00	30.00	25.00	25.00
4½	22.00	1.80	.....	.....	.....	.....	.....
5	25.00	2.00	20.00	25.00	35.00	31.00	31.00
	31.00	2.30	25.00	31.00	40.00	37.00	37.00
	37.00	2.70	30.00	37.00	.....	.....	.....
	45.00	3.00	35.00	45.00	55.00	55.00	55.00
	60.00	3.50	48 00	60.00	.....	.....	.....
	80.00	4.00	65 00	80.00	.....	.....	.....

All Iron Valves, Classes 2 and 5, 10 per cent. less than Brass Mounted.

Varnish.

E.S. 1827 &Co.

Edward Smith & Co.

For Finishing Coats.	gal.		
Wearing body varnish	$5.50		
Medium drying body	5.50		
One coat coach varnish	4.50		
Wearing carriage	4.50		
Heavy gear varnish	4.00		
Coach body "	4.00		
No. 1 coach "	2.25		
For Under Coats.			
Hard drying body	$4.50	Black rubbing varnish	$4.00
Rubbing body varnish.	4.00	Priming (1st coat)	2.50
Quick rubbing "	3.50	Filling (2d coat)	2.50
		Rough stuff	2.50
For Inside Work.			
Best flowing varnish	$4.50	Hard oil finish light	$2.75
Best polishing "	4.50	" dark	2.25
Cabinet "	3.00	White copal	4.00
Dryers.			
Japan gold size	$3.50	Brown japan	$1.25
Coach japan	1.75	Liquid dryer	1.25

Discount, 40 per cent, f.o.b. N. Y.

Preservative Coatings.

Spar coatings	$4.00	Exterior car coating	$4.00
I. X. L. No. 1	2.50	Interior car coating	3.25
I. X. L. No. 2	4.00	Locomotive coating	4.00
Floor finish	2.50		

Discount, 35 per cent, f.o.b. N. Y.

Wagons, Carts, Etc.

D. F. Sargent & Son.

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.	86
No. 2. Cart, one man, top and fenders	90
No. 3. Cart, two man, open	60
No. 3-H. Cart, two man, open	54
No. 4. Cart, two man, top.	86
No. 5. Cart, two man, top and fenders	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 33⅓ per cent. off.

Wheelbarrows.

Climax Bolted Barrow, with Wood Wheel	per doz.	$22.50.	
1½ tire of iron,			
Common Nailed Barrow	per doz.	$18.50.	
" Bolted "	"	18.75.	
Lansing's Patent Iron-Bolted Barrow,	per doz.,	$25.50	
Capital Patent Bolted Dirt	" " "	30.00	
Red oak or Government	" " "	40.50	
Wharf	" " "	72.50	
Mortar	" " "	30.00	
Bent Handle Stone	" " "	48.00	
Coal or Ore	" " "	31.50	
Pig Metal or Casting	" " "	40.50	
Brick Yard 20 inch Iron Wheel	" each	10.50	
Globe Patent Bolted Garden Barrow Box 30 by 24 by 12 deep, wood wheel	per doz.,	42.50.	

Capita Patent Barrows

With Iron Tray, A,	per doz.,	$39.00
" " " B,	" "	42.00

The Leader Iron and Steel Barrows.
Gas-pipe Legs and Handles in one price.

No. 1 Tray of 16 iron, capacity ½ cu. ft. of earth,	each	$12.
No. 2 " " 14 " " ⅝ " " " "		
or 250 lbs. of coal	"	15
3 Galvanized 18 iron, capacity same as No. 2	"	15

Whiffletree.

JAFFERY MFG. CO.

Willson spring Jeffery Manufacturing Company).

	Single.	Double.
No. 1, 34 or 36 inches long	$1.25	$2.50
No. 2, " " "	1.40	2.75
No. 3, " " "	1.50	3.00
No. 4, " " "	1.65	3.25

Including either steel hooks or rings.
Discount, 45 and 5%.

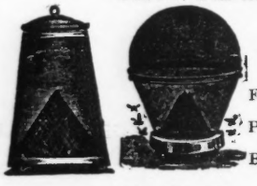
Whims—Horse.

THE WHIM CO.

Common-sense Steel.

F. O. B. $125

Dis., 25%., in car lots.



Wire Goods.

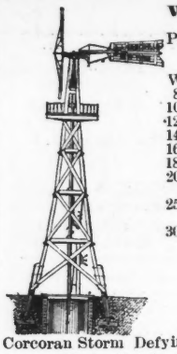
Fly Traps. Per gross.

Paragon $18.00

Balloon 15.00

Dis., 10%.

Windmills.



Patent Storm Defying Pumping Mills.

Wheel.	Weight, hoxed.	Cubic feet.	Price.
8½ ft.	650 lbs.	55	95.00
10 "	700 "	75	120.00
12 "	900 "	95	150.00
14 "	1,350 "	135	250.00
16 "	1,850 "	195	375.00
18 "	2,150 "	250	450.00
20 "	3,500 "	335	600.00
	Dis., 25%.		
25 "	5,400 lbs.	450	775.00
	Dis., 20%.		
30 "	9,500 lbs.	795	975.00

Boxing for export extra.

Corcoran Storm Defying Geared Wind mills for Driving Machinery.

Price includes upper set of Bessemer steel gears, one length of shaft.

Dia.	H. P.	Weight.	Cu. ft.	Price.
16 ft.	2½	1,900 lbs.	200	$400.00
20 "	5	3,600 "	340	650.00
25 "	6½	5,400 "	355	850.00
30 "	8	9,600 "	816	1,150.00
36 "	10	12,000 "	856	1,500.00
40 "	12	14,500 "	896	2,000.00
50 "	30	16,500 "	956	3,500.00
60 "	40	20,000 "	1,015	4,500.00

Dis., 25%.

10 ft. pumping	$75	
12 ft. "	95	Plus cost of packing.
14 ft. "	140	
16 ft. "	225	

Dis., 50 per cent.

EMMERT & LAMB.

"Stover" Pumping Windmills (no tower).

Size wheel.	Wt. packed.	Cubic ft.	Price.
10 ft.	650	50	$80.00
12 ft.	750	58	100.00
"Zenith" Pumping Windmills (no tower).			
10 ft.	650	48	85.00
12 ft.	750	57	110.00
Dis., 50 per cent.			
14 ft.	1,400	108	160.00
16 ft.	1,600	111	250.00
Dis., 45 per cent.			
20 ft.	2,950	220	400.00
25 ft.	4,225	280	600.00
Dis., 40 per cent.			

"Zenith" Geared Windmill (no tower).

Prices include upper set of Gears and about 5 feet vertical extra heavy shaft in windmill head.

14 ft.	1,550	178	260.00
16 ft.	1,780	198	300.00
20 ft.	3,170	216	500.00
Dis., 40 per cent.			

Wire Cloth.

Brass and Copper Wire Cloth.

No. Mesh.	Price per foot.	No. Mesh.	Price per foot.
2 from No. 10 wire	$2 50	20 from No. 26 wire	$.80
3 " 11 "	2.50	22 " 27 "	.80
4 " 12 "	2.50	24 " 28 "	.80
5 " 13 "	2.50	30 " 30 "	.65
6 " 14 "	2.50	40 " 32 "	.70
8 " 16 "	2.50	50 " 34 "	.75
10 " 18 "	2.00	60 " 35 "	.78
12 " 19 "	2.00	70 " 37 "	.70
14 " 22 "	1.10	80 " 38 "	.90
16 " 24 "	.80	90 " 39 "	1.10
18 " 25 "	.80	Dis., 60%.	

Wire Rope.

JOHN W. MASON & CO.

Circumference in inches.	Diameter in inches.	Price in cents per foot best crucible cast steel rope. 19 wires to strand.	Price in cents per foot best crucible cast steel rope. 7 wires to strand.	Price in cents per foot best bright iron rope. 19 wires to strand.	Price in cents per foot best bright iron rope. 7 wires to strand.	Price in cents per pound galvanized iron rope. 12 wires to strand.	Price in cents per pound galvanized iron rope. 7 wires to strand.
5½	1¾	100	.....	60	.....	11	10½
5¼	..	90	.....	64	.....	"	"
5	1⅝	80	.....	58	.....	11½	"
4¾	1½	71	.....	53	.....	"	"
4½	..	65	.....	48	.....	"	"
4¼	1⅜	60	60	43	39	"	"
4	1¼	50	50	36	34	"	"
3¾	..	46	.....	33	.....	"	"
3½	1⅛	41	40	29	27	12	10¾
3¼	..	.....	.....	.....	.....	"	11
3⅛	1″	34	32	26	23	.....	.....
3	..	33	.....	24	.....	"	11
2¾	⅞	27	25	20	19	.....	"
2½	..	23	.....	18	.....	.....	11½
2¼	¾	21	19	16	14	.....	12
2	⅝	18	14	14	10½	.....	13
1¾	9-16	17	11	12	8	.....	14
1½	½	15	8	10	7	.....	16
1¼	⅜	.....	7	8	5	.....	17
1	5-16	.....	5	.....	4	.....	18

Discounts for export in bond, requiring from four to six weeks time, 55%.